
QPCARD 101 v4


QpCARD 101 v4

9

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

ANNUAL REPORT OF COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

STATE OF NEVADA

1948

by

Cecil W. Creel

Director of Agricultural Extension

ANNUAL REPORT
OF
COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION DIVISION
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING
FISCAL YEAR 1947-1948

I NAME OF PROJECT - 1-A Administration

State Office Staff, Organization and Duties

The State Extension staff, during the fiscal year ending June 30, 1948, consisted of a Director, devoting 70% time to Extension, an Administrative Assistant, assigned 66 2/3 time to Extension, three full-time Supervisors carrying titles as Assistant Directors, three full-time subject matter specialists (one not a cooperative employee), two part-time subject matter specialists, and a part-time Extension Editor. The clerical and accounting work for the above mentioned staff, together with the county extension accounting operations, necessitated by State Law to be carried at the University of Nevada, required the services of five full-time and two part-time clerks in the State Extension office, and one full-time and three part-time clerks in the University Comptroller's Office.

The Director of Agricultural Extension is in administrative charge of all cooperative extension work for the University of Nevada and the United States Department of Agriculture in the State of Nevada. He devotes 30% of his time to his duties as Dean of Agriculture.

The Administrative Assistant is assigned all administrative functions and responsibilities, which the Director finds it necessary to delegate. His duties are similar to those usually assigned to persons carrying the title of "Associate Director" in other states. By action of the Board of Regents on January 24, 1948, the Administrative Assistant was designated to be Acting Director of Agricultural Extension, at all times that the Director found it necessary to be in the field or on leave. The Administrative Assistant devotes one third time to work in the office of the Dean of Agriculture.

The Chief Clerk acts as Secretary to the Director and has supervision of the State office clerical staff. She is in general charge of all correspondence files, records and reports. She also assists the Director in the preparation of payrolls, checking of accounts, and the keeping of the financial records of the Agricultural Extension Division, including all funds expended for extension work in the counties.

The Extension Editor edits all bulletins, prepares news releases, and is in charge of the weekly news service supplied Nevada newspapers and agricultural publications of California and Utah, which serve Nevada farmers and livestock men. The Extension Editor devotes but 20% time to extension work, since he also serves as Professor and Head of the Department of Journalism at the University.

The Assistant Director for County Agent Work has supervision of all adult agricultural projects conducted by the Extension Agents in the several counties.

The Assistant Director for Home Demonstration Work has supervision of all ne economics extension projects conducted by the Extension Agents. She cooperates th, and works under, the direction of the Assistant Director for Junior Extension rk, with respect to supervision of girls 4-H Club work.

The Assistant Director for Junior Extension Work has general supervision of l 4-H Club and rural youth projects conducted by the Extension Agents in the counties.

The Extension Dairy Specialist assists the men District and County Extension ents in developing and carrying out both production and marketing projects in dairy- g.

The Extension Soil Conservationist assists Extension Agents in developing Ex- nsion programs in soil conservation and soil improvement. He serves as an advisor to e State Soil Conservation Committee, of which the Director of Agricultural Extension Chairman. He cooperates with the Soils Department of the Agricultural Experiment ation in arranging for the conducting of soil improvement and soil fertility tests and monstrations by the Extension Agents throughout the state. He also assists Extension gents and Soil Conservation Service representatives in setting up new soil conservation stricts where farmers and ranchers indicate an interest and desire for the same.

The Extension Forester devotes 50% time to assisting Extension Agents with arm forestry projects. He devotes the other half of his time to the duties of Assistant tate Forester Fire Warden, in which field of work there is also active cooperation with ne Extension Agents. The Extension Forester has his headquarters in the State Capitol, arson City.

The Extension Agricultural Economist devotes 20% time to extension work. The ther 80% of his time is given to his work as Professor and Head of the Department of gricultural Economics in the College of Agriculture. His extension duties include the iving of agricultural outlook information to the Extension Agents and assisting them ith their farm management projects. He also gives assistance in dairy marketing surveys nd the development of county marketing projects.

The Extension Marketing Specialist is not a cooperative extension employee, eing paid entirely from state non-offset funds. He supplies market information to both tate and county workers, farmers and stockmen. He assists Extension Agents in develop- ng cooperative marketing organizations for crop, livestock and livestock products. He dvises and counsels these organizations after they are in operation. He advises Exten- ion Agents, farmers and livestock men on problems of agricultural credit and financing.

All Extension Specialists, with the exception of the Forester, have their head- uarters either in the College of Agriculture or Extension Building on the University of Nevada campus at Reno.

Field Staff, Organization and Duties

The county and district field staff of the Agricultural Extension Division, for the fiscal year ending June 30, 1948, consisted of ten full-time County and District Agricultural Agents, one part-time District Agricultural Agent, four full-time and one part-time Assistant Agricultural Agents, and six County and District Home Demonstration Agents. The men agents are in charge of all agricultural projects, including boys 4-H

Club work. In the absence of Home Demonstration Agents, in certain counties, the Agricultural Agents also organize and supervise the girls 4-H Club activities. The Agricultural Agents act as secretaries of the County Agricultural Conservation Committees, and are responsible for the educational work of the A.C.A. program in their respective counties and districts.

The Home Demonstration Agents are in charge of both the adult and junior home economic extension work in their respective counties or districts.

Extension Agents are officed in the 12 County Seats best located from the standpoint of proximity to the farming and rural communities they are assigned to serve. Seven Extension offices are located in Federal Post Office buildings, two in Municipal buildings, and three in County Court Houses.

Changes in Extension Organization and Relationships

A. Relationships with other Agricultural Divisions of the University of Nevada

The resident teaching, experiment station and extension activities in agriculture and home economics are coordinated under a Dean of Agriculture. All three units now work together in complete harmony. There have been no changes in relationship during the past year.

B. Relationships with State Regulatory Agencies

No change during the past year. The Extension Service continues to give and to receive excellent cooperation from the State Department of Agriculture and other State Regulatory agencies.

C. Relationships with County Farm Bureaus

The 1947 Nevada Legislature passed a new County Extension law separating the county extension operations from the County Farm Bureaus, effective December 31, 1947. As of January 1, 1948, County Farm Bureaus in Nevada lost their quasi-public status, and since that date have had no legal connection with extension work. Financial cooperation for extension work on the county level, is now arranged for directly with Boards of County Commissioners. The senior agricultural agent serving a county conducts negotiations with the County Board, as the representative of the Director. The new law provides that the senior agricultural agent must also approve and sign all claims against county extension funds before submitting the same to the Director for his approval. Prior to January 1, 1948, such claims had to be approved by the President of the County Farm Bureau. County Farm Bureau Directors as such, no longer serve as Extension County Project Leaders. As individuals many such persons are continuing to serve, however, as leaders and active sponsors of the extension program.

Separation of the Farm Bureau and Extension Service in Nevada was accomplished on an entirely friendly basis, both the Farm Organization and the University Administration, supporting the new state law.

D. Relationships with Farm Organizations

The Extension Service is now receiving the active support of the Grange, Farm Bureau, and State Cattle and Sheep Associations. A fine cooperative attitude towards the extension program is evidenced by all of these organizations on both the state and local levels.

E. Relationship with the Nevada State Fair, State Livestock Show and County Fairs

The Agricultural Extension Service has continued to assist in the collection and preparation of crop, livestock, home economic, and 4-H Club exhibits for all State and County Fairs. Extension staff members have also acted as judges, without pay, at these Fairs.

F. Relationships with Banker Groups

Active support for the Extension Program has been received from both the Nevada Banker's Association and the American Banker's Association. Cooperation has been through the Banker-Farmer and 4-H Club programs.

G. Relationships with Bureaus and Offices of the United States Department of Agriculture

Relationships with all Agencies and Bureaus of the Department have continued on a satisfactory basis. Close contacts with the other Department Agencies has been maintained through the operation of the State and County U.S.D.A. Councils.

H. Changes in Relationships of Extension Specialist and Extension Agents.

No changes in these relationships have occurred during the past year.

xtension Staff as of June 30, 1948

Administration

ecil W. Creel, Director of Agricultural Extension
larence E. Byrd, Administrative Assistant
arie Watkins, Chief Clerk
Grossholz

Publications

lfred L. Higginbotham, Extension Editor

Supervision

homas E. Buckman, Assistant Director for County Agent Work
argaret M. Griffin, Assistant Director for Home Demonstration Work
aul L. Maloney, Assistant Director for Junior Extension Work

Specialists

L. E. Cline, Extension Marketing Specialist
Don M. Drummond, Extension Forester
Albert J. Reed, Extension Dairy Specialist
Otto R. Schulz, Extension Soil Conservationist
Eldon E. Wittwer, Extension Agricultural Economist

District Extension Agents - Agricultural

Leonard A. Anker	Douglas and Ormsby Counties
J. Kirk Day	Humboldt and North Lander Counties
Michael Galli	Esmeralda and Nye Counties
Wm. N. Helphinstine	Eureka and White Pine Counties

Assistant District Extension Agents - Agricultural

James G. Jensen	Churchill and Southern Lander Counties

County Extension Agents -Agricultural

Archie R. Albright	Washoe County
Ferren Bunker	Lincoln County
Fred C. Batchelder	Pershing County
Louie A. Gardella	Lyon County
Mark W. Menke	Elko County
John H. Wittwer	Clark County
Charles R. York	Churchill County

Assistant County Extension Agents - Agricultural

Donald D. Drown	Elko County
Lyle McCartney	Washoe County
Warren Welsh	Lyon County
Robert J. Whelan	Eureka and White Pine Counties

District Extension Agents - Home Demonstration

)live C. McCracken	Douglas, Ormsby & Storey Counties
I. Hazel Zimmerman	Clark and Lincoln Counties

County Extension Agents - Home Demonstration

Lena H. Berry	Churchill County
Madge Elder	Lyon County
M. Gertrude Hayes	Washoe County
Rose M. Spezia	Elko County

ource of Extension Revenue

Revenue for the support of the Agricultural Extension Division of the niversity of Nevada, including the Cooperative Extension Work carried on in everal counties in the State was derived from the following sources during the iscal year ending June 30, 1948:

Federal Appropriations -	
(1) Unexpended Balance (Bankhead Flannagan)	- $ 1,459.51
(2) Federal Smith-Lever & Bankhead-Jones Fund	- 40,493.58
(3) Federal Capper-Ketcham Fund	- 20,583.19
(4) Federal Norris-Doxey Fund	- 1,200.00
(5) Federal Additional Cooperative Fund	- 11,955.08
(6) Federal Bankhead-Flannagan	- 35,089.15
Total Federal Funds	$ 110,780.51
State Appropriations -	
(1) College and State (Non-offset)	- $ 14,196.34
(2) College and State (Offset to Federal Funds)	- 25,779.36
Total State Funds	$ 39,975.70
County Appropriations -	
(1) Appropriations by Boards of County Commissioners (Non-offset)	- $ 38,076.18
(2) Appropriations by Boards of County Commissioners (Off-set to Federal Funds)	- 16,147.96
Total County Funds	$ 54,224.14
rand total of all public funds available for support of Extension work during the fiscal year	- $ 204,980.35

Important Additions to Offices and Equipment

The following important items of furniture and equipment were purchased from Federal Extension funds during the fiscal year ending June 30, 1948:

1 - 1947 Chevrolet Stylemaster Sport Sedan, Motor No. EAA222118, Serial GEJF1066
1 - 25 A. B. Dick Mimeograph with Electric Motor and Stand
1 - large letter press
1 - Golde Slide Projector
1 - Royal Typewriter, KMM14-3381872
12 1/4-T-650067 Flat Atomizing Nozzles with Strainer
12 1/2 BB Check Valves for above
1-3/8 - T.W. Liquid Strainer 200 mesh cast iron with monel screen
1 - Scott Handi Air Tanks
Weed gun & nozzles with screens
26" forks - tires - wheels with hubs - speedometer
1 - 3/4" pump and bearing mounted on "B" base and pulley
1 - double Nozzle Weed Guns
1 - dispenser, grease, portable, small
2 - tank, full, for generator
30 gal., capacity - 4 1/2" safety cap
Pipe - ells - caps - unions - nipples - elbows - bushings, etc.
1 - dowmetal Handboom
1 - Jack Ratchet - 1 jack
1 - Torpedo Compressor
1 - Carryall trailer WAA - #345637
Weed Gun
Tarp
64 - Fire Extinguishers with pump and gauge (W.A.A.)
1 - 12" Trimming Board
2 - leather cases
1 - pr. 600 x 16 chains
1 - Studebaker Climatizer and Defroster
1 - Chains 15 x 550
2 - Torpedo Compressors
1 - Torpedo Compressor
80 - Fire Extinguishers
14 - Fire Extinguishers - freight on same
1 - Used English Graflex Camera
1 - Gray Steel Adding Machine Stand
25 - Metal Shelves in bulletin cabinet
1 - Engine - gasoline, air cooled, single cylinder
1 - Generator set
1 - Electric Freezer
1 - pr. 16 x 600 chains
2 - 221 M/C AH209083 and AH210135 - 7 (312) Tables
1 - Westinghouse Portable Econo-Cooker

PUBLICATIONS

Two bulletins were issued during 1948. One at the Nevada State Printing Office, and the other through a generous arrangement with Cornell University, by that institution's press.

Bulletin No. 80 "The Summer Outfit"

(This is a 4-H Clothing handbook, and is a revision of a Nevada bulletin first published in 1936.)

Bulletin No. 99 "Guiding the 4-H Club"

(This is a manual of instruction for 4-H Club Leaders and Parents. Printed by Cornell.)

Attention is invited to the report of the Extension Editor, Pages 24 to 27, inclusive, regarding the need for additional bulletins in subject-matter fields and current difficulties to be met in arranging for both their preparation and production.

REPORT OF WORK ACCOMPLISHED ON PROJECTS

The reports of work accomplished on projects are contained in the reports of the Assistant Directors, Extension Editor and Agricultural Economics, Dairy, Forestry, Soil Conservation and Marketing Specialists, attached hereto and constituting a part of this report.

GENERAL CONDITIONS AND OUTLOOK FOR 1949

It is essential that increased appropriations be secured from the 1949 Nevada Legislature for the support of Cooperative Extension Work, on both the State and County levels. It is particularly urgent that money be obtained for salary increases to offset the rapid rise in living costs during the past two years. State staff members, other than clerks, have received no salary raises since July 1, 1946. County Agents, Assistant Agents, and Home Demonstration Agents received small salary increases, varying from $60.00 to $120.00 per annum, on July 1, 1948, from the additional allotment that Nevada received from Federal Bankhead-Flannagan Funds.

The Board of Regents of the University will request the Legislature for sufficient funds to provide substantial salary increases for all Extension workers, effective July 1, 1949. Approximately $10,000. additional for this purpose will be needed annually for State workers, and $14,500 for County workers. Other than this money for salary increases, only sufficient additional money to take care of the increased operating costs and a state offset of $2,500. for Extension Federal Research and Marketing Funds, will be asked for campus operations.

The Legislature will be requested to provide an appropriation of $30,750. and a State tax levy of 2½ cents, to provide for support of Extension work in the counties during the two fiscal years, 1949-1950 and 1950-1951. This will represent an increase in State biennial appropriations, or from $87,000 to $150,000., of which it is proposed to use $29,000 to provide salary increases for Extension Agents and office clerks. The increased State appropriation, if granted, will permit retention of the 5 Assistant Agricultural Agents on a full-time basis, and the employment of at least one additional Home Demonstration Agent.

With the addition of one more Assistant Agent in 4-H Club Work, and two Home Demonstration Agents to work on a district basis, it would appear that our field staff will be adequate to meet present requests for assistance from Nevada farmers, farm and rural housewives, and the rural youth. After these urgent field demands are met, attention must be given to increasing the State staff of subject-matter specialists, which staff in turn can assist the Agents in developing better programs, thereby enabling them to more adequately meet the demands in the field.

NEVADA AGRICULTURAL EXTENSION SERVICE

II - A COUNTY AGENT SUPERVISION

ANNUAL REPORT

FOR

CALENDAR YEAR

1948

Thomas E. Buckman
Project Leader

1. 1948 COUNTY PROJECT PLANS REVIEWED

Project plans of county agents for 1948, were reviewed for 1948 and approved for all counties. Progress in program was generally satisfactory despite the fact that the farmers and farm bureau were not yet fully accustomed to the change in the extension law which separated the farm bureau and extension organizations.

The county extension advisory committees appointed by the Director of Extension as a substitute for the County Farm Bureau Board do not as yet function as smoothly as did the Farm Bureau Boards as an extension planning committee. This is a problem that extension must meet during the near future, if Nevada extension programs are to have the high approval that they have always received from our farming and ranch interests.

2. INDUCTION OF NEW AGENTS

No new agents with permanent appointments were inducted in 1948. Several summer time assistants, who worked mostly on 4-H Club work, were employed in several counties. These men were included in the one state-wide training and county agent planning meeting which was held at the Knoll Creek Range Experiment Station in Elko County during the summer.

Continued reference was made of the agricultural project files in the State Office containing all project plans written since 1928 by Nevada County Agents and approved by the State Extension Office. This file contains 637 project plans and progress reports and is the best source of information available for acquainting newly appointed agents with projects that have been started and carried on successfully or unsuccessfully, in any particular county.

3. IN SERVICE TRAINING OF COUNTY AGENTS

In February most of the county agents attended one or more of a series of Weed Control equipment and method demonstration meetings held in Western Nevada. Agents who were not in attendance were given an opportunity to attend the Western States Weed Control Conference meeting held at Sacramento and Davis, California. At these training meetings it was possible for the agents to hear the best speakers and see the most modern weed control equipment available to farmers.

Another training meeting (also a planning meeting) was held at the new Knoll Creek Range Experiment Station of the University of Nevada Agricultural Experiment Station in Elko County. Agents from every county gathered here to meet with the Director of the Experiment Station, his project leaders on range improvement, the county agent supervisor and extension soil conservationist to:

1. Inspect the new station.
2. Offer advice on -
   a. Range Improvement.
   b. Weed Control on the Range.
   c. Grass Variety Tests.
3. See the results of ten years of range reseeding with crested wheat grass.
4. Make plans for 1949 State-wide Weed and Livestock Pest Control programs.

Herewith follows a radio discussion of what took place at the Knoll Creek Conference. This broadcast was given over the Farm Program of Radio Station KOH, Reno, Nevada:

8/25 12-45 hes

HERB: Our guest is Thomas E. Buckman, in charge of the County Extension agents, and assistant Director of Extension Service at the University of Nevada. Good afternoon:

BUCKMAN: Good afternoon, Herb:

HERB: Haven't you just returned after spending a few days near Elko?

BUCKMAN: Yes. I was attending a meeting of the county extension agents. We met at one of our newer experiment stations -- Knoll Creek. It's located on highway 93, near Contact. This new unit has facilities to house about thirty men. This gives us a grand opportunity to spend a few days inspecting the various meadows and test plots, feeding pens, and other experimental work. Incidentally, the station is also available to geology students.

HERB: Was there anyone else at the meeting, besides the county agents?

BUCKMAN: We had quite a few men there. Mark Shipley, manager of Knoll Creek, who explained some of the work there. Director Fleming, of the Experiment Station, Joe Robertson of the College of Agriculture, Don Drummond, Extension Forester; Otto Schulz, Soil Conservationist; Fred Wilson, and Chester Brennen and a few others.

HERB: That is certainly a good representation of the various agricultural specialists. What was the main purpose of the meeting?

BUCKMAN: We were there to see the results of tests in range livestock management. Knoll Creek is high in the mountains in the very northeast corner of the state, typical of much of the state's range country. We wanted the county agents to know just what the experiment station men had found out so that they could pass the information on to the ranchers in their counties. And they're doing that right now.

HERB: Then you would say the extension agents are better prepared to help meet the range farmers problems in their respective counties?

BUCKMAN: Yes, we have some well organized statewide programs in effect, now, in other fields. By that I mean livestock pest control, soil improvement and weed control and alfalfa production. And we're trying to add more services of benefit to the rancher. We expect the statewide range program to become just as popular and as effective.

HERB: What in particular was shown at Knoll Creek?

BUCKMAN: One of the most significant things we saw was the steer feeding project to learn the proper time for cutting meadow hay to get the greatest gains. The steers were sleek and fat and the early cut hay for winter feeding was of excellent quality. We saw the newly fenced pasture, some two square miles in size, where future grazing experiments will be conducted.

We inspected the mountain meadow, where hay characteristic of the entire Humboldt River Basin, was being cut for winter feeding.

We saw Mark Shipley demonstrate the use of the Wheat Land Plow, to clear brush for planting crested wheat and other grasses. We inspected poisonous plant areas on the adjacent range and looked over experiments with 2-4D sprayed on Larkspur and Halogeton.

Within a year or two when present and future projects progress sufficiently, the Station will hold a Field Day at Knoll Creek so that the stockmen can see for themselves what is being done there. In the mean time, HERB, I suggest that any stockmen having a meadow hay feeding problem, consult his county agent about how to get bigger gains from the meadow hay he is feeding. All of the facts are not yet determined at Knoll Creek, but they can secure advance information, pending announcement of final conclusions concerning the best time to get the most protein in to their hay.

HERB: Was there any demonstration in the way of eradicating poisonous plants?

BUCKMAN: Yes, Mark Shipley showed us how they were controlling larkspur in Gohllier pasture with salt and how they were trying to get away from this laborous method by using 2-4D. At Knoll Creek the Experiment Station men use a jeep to climb to the highest elevations, to spray this dangerous plant.

HERB: How long before some of this information will be available to the farmer?

BUCKMAN: More experimental work will be necessary before there is anything to give out on this subject.

HERB: And how will he get it?

BUCKMAN: The Experiment Station will publish a bulletin giving the results of the study and release pertinent facts at once to ranchers through their county agents.

HERB: Then you'd say you have your work cut-out for a few years to come?

BUCKMAN: Yes, but by working together the ranchers, experiment station workers and county agents, can and will work out many of these problems in a surprisingly short space of time.

HERB: Thank you, Thomas E. Buckman, of the University Extension Service.

4. STATISTICAL SUMMARY OF WORK DONE BY SUPERVISOR

Summary of days worked in 1948:

63	days conferences with agents in the field by counties
52	days miscellaneous time spent in field in counties
43	days time spent on Project II-A outside the state
140	days spent in office, at headquarters, at the University
12	days miscellaneous conferences, with other extension workers, with other agencies, and attendance at meetings of interest to Nevada agriculture.
0	days Annual Leave
0	days Sick Leave
300	Total working days accounted for

Probably one half of this was spent in conference with Experiment Station workers, specialists and other agriculturists on the campus and those headquartered in Reno. Part of this was spent answering requests of county agents or individual ranchers or giving information that co-workers in the Experiment Station needed.

5. THE MAIN ACHIEVEMENTS OF COUNTY AGENT WORK THE PAST YEAR WERE:

1. Treatment of cattle for cattle grubs, lice and fly control, established as an approved farm and ranch practice throughout the state.

2. Spraying of dairy barns to control flies established as an approved farm practice.

3. Weed control work, using latest methods and equipment, started as an extension project, by county agents, in all counties.

4. Cooperation with Agricultural Experiment Station - investigative programs as follows:

    1. Experimental and observational fertilizer test plots in the following counties: Churchill, Clark, Douglas Elko, Lyon, Pershing and White Pine.

    2. Alfalfa variety test plots in Clark County.

    3. Meadow hay improvement demonstration and range improvement-Knoll Creek Field Station, Elko County.

    4. Alfalfa Seed production - Churchill, Lyon, Humboldt and Washoe Counties.

    5. Tomato plant production - Clark and Nye Counties.

    6. Management of irrigated pastures.

5. Acreage of Ranger and other alfalfa wilt resistant alfalfas greatly increased throughout the state.

6. Rural Fire Protection stressed in all counties. Two new rural fire districts were formed as the result of county agent and the extension foresters activities.

7. Continued progress towards the solution of irrigation, storage and flood control problems was made in Clark County.

8. Considerable demonstration equipment was secured from Army and Navy surplus that will make county agent demonstrations more effective and numerous during the next five years.

6. STATEWIDE COUNTY AGENT PROJECTS, SUPERVISOR AND COUNTY AGENTS WORKED ON IN 1948, WERE:

1. Livestock External Pest Control

2. Weed Control

   a. On cultivated lands

   b. Range lands and mountain meadows

   c. Irrigation ditches and small streams

   d. Poisonous plants

3. Soil Fertility in cooperation with Soils Department of Nevada Agricultural Experiment Station

4. Crop Improvement

   a. Alfalfa production using improved varieties

   b. Grain variety

   c. Small seed production - alfalfa, clover, crested wheat. New program planned for 1949, planning conference to be held at Minden January 13 and 14 to start it off - 4 best crop specialists in the Western States to meet with Nevada Agents to help start it.

5. Range Improvement

   a. Reseeding

   b. Maintenance

6. To improve sheep for better lamb and wool production under range conditions in cooperation with Nevada Agricultural Experiment Station and Western Sheep Breeding Laboratory. County Agent conference scheduled for late spring at Ely with agents from range sheep counties present to complete plans for the work.

7. SURVEY SHOWED FROZEN LOCKERS IN STATE, 1948

Thirteen commercial frozen food locker plants are now operating in Nevada, according to the annual survey made by the Agricultural Extension Service.

The number operated was an increase of two over 1947.

Las Vegas lead the state in number of lockers with 4, while Reno had 3, Fallon 2, and Winnemucca, Ely, Elko, and Sparks 1 each.

8. SPECIAL SUBJECT MATTER MEETINGS ATTENDED BY THE SUPERVISOR

These meetings consisted of the Western Weed Control Conference held at Sacramento and Davis, California, the Annual Farm Machinery meeting held at Davis, California. The Spring Agronomy Day held at the University of California, Davis, Calif., and the Fall Agronomy Day held by the University of California in September. The annual meeting of the Advisory Committee representing the Experiment Stations collaborating with the Western Sheep Breeding Laboratory, DuBois, Idaho.

9. SPECIAL TRIPS MADE TO SECURE SUBJECT MATTER FOR USE IN THE COUNTIES

In July the writer made several visits to the San Francisco Bay area to visit manufacturers supplying spray chemicals used in Nevada livestock pest control and weed control. It really consisted of a preview of what the chemical companies and equipment manufacturers were going to present to the farmers in the coming year. Which provided a very useful stock of information that has proved valuable for starting the 1948-49 livestock spraying program as well as the Extension weed control program for 1949.

The writer plans to use this method in future years as the experience of the last two years has shown that information secured on such conferences give the Extension Program a big impetus that can't be secured otherwise. Most of the manufacturers in the San Francisco Bay area work very closely with the farm machinery and insecticides divisions of the University of Calif. at Davis and Berkeley. Their programs are based on the best research secured from this institution. By contacting not only the manufacturers but the College as reported above, it is possible to secure ideas and information that is not only the very latest but is also backed up by the most up to date research.

NEWS RELEASES DURING THE YEAR

1948

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-11-29-159-290-A &AB-EXCLUSIVE IN YOUR CITY

AGRICULTURAL CAR WILL TOUR THREE NEVADA COUNTIES

TO BRING NEVADA RANCHERS AND FARMERS LATEST INFORMATION ABOUT NEW AGRICULTURAL DEVELOPMENTS, THE UNION PACIFIC RAILROAD'S AGRICULTURAL IMPROVEMENT CAR WILL TOUR THREE NEVADA COUNTIES IN WHICH THE ROAD HAS LINES.

THE CAR WILL COME TO THE STATE UNDER THE AUSPICES OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE. STATE OFFICE REPRESENTATIVES, LOCAL COUNTY AGENTS, AND UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION STAFF MEN WILL WORK WITH THE U. P. IN PRESENTING THE EXHIBITS.

A MEETING OF FARMERS IN THE VICINITY WILL BE HELD IN THE CAR DURING THE DAY IT IS AT EACH STOP, ACCORDING TO THOMAS BUCKMAN, ASSISTANT EXTENSION DIRECTOR FOR COUNTY AGENT WORK, WHO IS HANDLING ARRANGEMENTS FOR THE VISITS OF THE CAR. A LOCAL COUNTY AGENT WILL BE IN CHARGE OF THE GATHERING.

FIRST NEVADA STOP OF THE CAR WILL BE TO WELLS, ELKO COUNTY, ON DECEMBER ~~20~~ 21, AND FILMS AND DISCUSSIONS WILL FORM THE PROGRAM. LIVESTOCK WILL BE THE SUBJECT, WITH TALKS BEING GIVEN BY BUCKMAN, DIRECTOR CHARLES FLEMING OF THE EXPERIMENT STATION, ELKO COUNTY AGENTS, AND THE U. P. CAR STAFF.

A SIMILAR PROGRAM WILL BE GIVEN SOMETIME DURING FEBRUARY AT PANACA AND AT CALIENTE IN LINCOLN COUNTY.

LATER IN FEBRUARY, THE CAR WILL BE AT LAS VEGAS, WITH IRRIGATION AS THE SUBJECT OF BOTH FILMS AND DISCUSSIONS.

WESLEY D. SOULIER, AGRICULTURAL AGENT FOR THE U. P. FOR UTAH AND EASTERN NEVADA, IS IN CHARGE OF THE CAR IN HIS TERRITORY.

WASHINGTON, OREGON, IDAHO, UTAH, WYOMING, COLORADO,

(MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR

KANSAS, AND NEBRASKA COUNTIES HAVE BEEN COVERED BY THE CAR THIS YEAR, WHILE, IN 1949, BESIDES NEVADA, IT WILL TOUR MONTANA AND ADDITIONAL COUNTIES IN THE OTHER STATES.

THE CAR IS PART OF THE UNION PACIFIC PROGRAM TO STIMULATE IMPROVED AGRICULTURE IN THE TERRITORY TRAVERSED BY ITS LINES.

-30-

A G R I C U L T U R A L N E W S S E R V I C E
RELEASE UPON RECEIPT-1948-9-7-126-330-A&AB-EXCLUSIVE IN YOUR CITY

NEVADA SHEEPMEN GET READY TO SPRAY FOR TICKS

WITH THE APPROACH OF THE FALL SEASON, NEVADA SHEEPMEN ARE PREPARING TO SPRAY THEIR FLOCKS FOR THE CONTROL OF TICKS.

LATE SEPTEMBER AND OCTOBER IN MOST PARTS OF THE STATE ARE IDEAL FOR TICK CONTROL MEASURES, ACCORDING TO THOMAS BUCKMAN OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE.

INCREASED SPRAYING OF ALL KINDS OF NEVADA LIVESTOCK FOR THE CONTROL OF EXTERNAL PARASITES HAS BEEN REPORTED FROM ALL PARTS OF THE STATE DURING THE LAST YEAR.

ONE OF THE LARGEST NUMBERS OF SHEEP, A TOTAL OF MORE THAN 11,000, WERE SPRAYED IN ELKO COUNTY LAST SPRING FOR THE CONTROL OF SHEEP TICKS.

COMPRISING FIVE BANDS OF THE GRISWOLD LIVESTOCK COMPANY, THE SHEEP WERE GIVEN THE TICK CONTROL SPRAY BEFORE TAKEN TO THE SUMMER RANGE. THE SPRAYING WAS DONE IN COOPERATION WITH DONALD DROWN, ASSISTANT ELKO COUNTY AGRICULTURAL EXTENSION SERVICE AGENT. A DEMONSTRATION SPRAY MACHINE OWNED BY THE EXTENSION SERVICE WAS USED.

THE SHEEP TICK, WHICH IS REALLY A DEGENERATE, LOUSE-LIKE FLY THAT HAS COMPLETELY LOST ITS WINGS, IS OFTEN CALLED A LOUSE-FLY OR KED.

IT SUCKS THE BLOOD OF SHEEP CAUSING THEM TO RUB, BITE, AND SCRATCH AT THE WOOL, THUS SPOILING THE FLEECE.

WHEN THE TICK IS ABUNDANT, ANIMALS ARE UNTHRIFTY AND UNPROFITABLE. TICKS CAUSE A LOSS OF FROM 25 CENTS A HEAD UPWARD A YEAR ON THE AVERAGE IN THE PRODUCTION OF WOOL. THEY ARE ESPECIALLY SEVERE ON LAMBS. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

A G R I C U L T U R A L N E W S S E R V I C E
RELEASE UPON RECEIPT-1948-8-30-123-410-A&AB-EXCLUSIVE IN YOUR CITY

RANGE LIVESTOCK WORK AT BRANCH STATION REVIEWED FOR AGENTS

UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION AND AGRICULTURAL EXTENSION SERVICE WORKERS RECENTLY GOT TOGETHER TO PLAN RANGE RESEARCH TO HELP NEVADA STOCKMEN.

THE MEETING WAS HELD AT THE KNOLL CREEK BRANCH OF THE STATION IN NORTHERN ELKO COUNTY, WHERE TESTS NOW UNDER WAY WERE GONE OVER AND SUGGESTIONS MADE AS TO FUTURE DEVELOPMENT OF THE PROGRAM THERE.

IN ATTENDANCE WERE OFFICERS OF THE EXPERIMENT STATION AND EXTENSION WORKERS, INCLUDING AGRICULTURAL AGENTS FROM MOST OF THE COUNTIES OF THE STATE WHO CONTRIBUTED IDEAS FROM THEIR EXPERIENCE WITH LIVESTOCK RAISING IN THEIR TERRITORIES.

FROM SUGGESTIONS MADE AT THE EVENT, THE FUTURE PROGRAM AT THE STATION IN ELKO COUNTY WILL BE PLOTTED, ACCORDING TO DIRECTOR CHARLES FLEMING OF THE EXPERIMENT STATION.

INSPECTIONS WERE MADE OF ALL THE EXPERIMENTAL RANGE WORK AT KNOLL CREEK, THOMAS BUCKMAN REPORTED THIS WEEK. BUCKMAN, WHO IS ASSISTANT DIRECTOR OF THE EXTENSION SERVICE FOR COUNTY AGENT WORK, ARRANGED THE AFFAIR.

THE AGENTS AND OTHERS, HE SAID, LOOKED OVER, AMONG OTHER WORK, WHAT HAS BEEN DONE TO DETERMINE THE COMPARATIVE VALUE OF FEEDING CATTLE EARLY-CUT AND LATE-CUT MEADOW HAY.

MARK SHIPLEY, SUPERINTENDENT OF THE KNOLL CREEK BRANCH STATION, TOLD THE VISITORS THAT, WHILE FINAL RESULTS HAVE NOT YET BEEN ACHIEVED, IT LOOKS AS THOUGH THERE IS MORE PROTEIN FEED VALUE IN THE EARLY CUT HAY. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE 1914.
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

EXPERIMENTS IN VARIOUS METHODS OF KILLING NOXIOUS WEEDS ON THE RANGE WERE EXAMINED.

HALOGETON SPRAYED WITH 2,4-D, THE NEW HERBICIDE, APPEARED TO BE KILLED, BUT BUCKMAN SAID IT IS EVIDENT MUCH WORK WILL NEED TO BE DONE TO LEARN SUCCESSFUL METHODS OF CONTROLLING RABBIT BRUSH AND SAGEBRUSH IN CRESTED WHEAT SEEDINGS. SALT WILL KILL LARKSPUR BUT APPLYING IT IS LABORIOUS. SPRAYING EXPERIMENTS WILL BE STARTED IN THE SPRING OF 1949 FOR THE CONTROL OF TALL LARKSPUR ON CATTLE RANGES.

A RANGE AREA WHICH HAS BEEN UNDER FENCE AND CONTROLLED GRAZING FOR 33 YEARS, BUCKMAN STATED, SHOWED ABUNDANT FORAGE IN COMPARISON WITH SIMILAR RANGE WHICH HAS BEEN GRAZED WITHOUT CONTROL.

NOT AT THE STATION, BUT ALSO IN ELKO COUNTY THE VISITORS INSPECTED A LARGE AREA IN RUBY VALLEY WHICH HAS BEEN SUCCESSFULLY PLANTED TO CRESTED WHEAT GRASS BY THE U. S. FOREST SERVICE.

EACH AGENT, BUCKMAN SAID, WILL REPORT TO THE RANCHERS IN HIS COUNTY THE RESULTS OF THE EXPERIMENTS WHICH MAY BE APPLIED LOCALLY, SINCE THE KNOLL CREEK AREA IS TYPICAL OF MUCH OF THE STATE'S RANGE.

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-7-19-101-260-B&AB-EXCLUSIVE IN YOUR CITY

PEAK ACCIDENT TIME IS HERE ON NEVADA FARMS

WITH THE HAYING SEASON UNDERWAY ON NEVADA RANCHES, ACCIDENT HAZARDS ARE REACHING THEIR PEAK PERIOD OF THE NEVADA FARM YEAR, THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY AGENT WORK IN THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, SAID THIS WEEK.

THE PEAK OF SUCH ACCIDENTS, ACCORDING TO SUCH RECORDS, IS JULY AND AUGUST.

PRECAUTIONS ON THE FARM, THEREFORE, ARE ESPECIALLY IMPORTANT TO INSURE SAFETY FROM ACCIDENTS AT THIS TIME OF YEAR, THE EXTENSION MAN SAID.

HAYING MACHINERY IS EXPECIALLY DANGEROUS BECAUSE IT IS USUALLY OPERATED WITH HIGH SPEED GEARS AND CUTTING MECHANISMS.

A FEW PRECAUTIONS AT THIS TIME OF YEAR, BUCKMAN POINTED OUT, WILL GO A LONG WAY TOWARD PROTECTING FARM WORKERS FROM ACCIDENTS, EVEN AT THIS PEAK HAZARD PERIOD, AND WILL OFTEN REDUCE DISASTROUS LOSS.

HERE, HE SAID, IS A LIST OF SIX STEPS WHICH CAN BE TAKEN WITH WISDOM ON MANY NEVADA FARMS DURING HAYING SEASON:

1. CAREFULLY CHECK ALL EQUIPMENT FOR DEFECTIVE HITCHES, ROPES, PULLEYS, LIFTS, HAY RACKS, OR LADDERS. LOFT FLOORS SHOULD BE PUT IN GOOD REPAIR AND HAY CHUTES GUARDED.

2. MAKE STARTS AND STOPS GRADUALLY IN ALL HAYING OPERATIONS AND WATCH OUT FOR FALLS FROM HAY RACKS, HAY STACKS, AND HAY MOWS.

3. MACHINERY SHOULD BE STOPPED AND THROWN OUT OF GEAR BEFORE OILING, ADJUSTING, OR UNCLOGGING, AND SAFETY GUARDS SHOULD BE KEPT IN PLACE AT ALL TIMES. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR

4. PITCHFORKS ARE DANGEROUS. ALWAYS PLACE THEM WHERE THEY ARE IN PLAIN SIGHT OF ALL WORKERS. NEVER THROW A PITCHFORK.

5. DO NOT WEAR LOOSE OR RAGGED CLOTHING WHICH MAY CATCH EASILY IN MOVING MACHINERY.

6. DAMP HAY IS ONE OF THE PRINCIPAL CAUSES OF BARN FIRES. THEREFORE, BE SURE THAT THE HAY IS WELL CURED. CHECK REGULARLY FOR SEVERAL WEEKS FOR ANY SIGNS OF HEATING.

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-5--11-72-220-B&AB-EXCLUSIVE IN YOUR CITY

WESTERN NEVADA FARMERS TO VIEW PASTURES

FARMERS OF WESTERN NEVADA WHO USE IRRIGATED PASTURES WILL GATHER AT THE NEWLANDS FIELD STATION NEAR FALLON ON MAY 18 FOR A FIELD DAY.

PURPOSE OF THE EVENT, ACCORDING TO THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY AGENT WORK OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, IS TO SHOW HOW THE USEFULNESS OF PASTURES CAN BE INCREASED BY PROPER MANAGEMENT.

THE VISITING FARMERS WILL BE SHOWN THE VARIOUS PASTURES OF THE FIELD STATION AND WILL BE TOLD HOW THEY ARE TAKEN CARE OF TO PRODUCE THE MOST FEED FOR DAIRY COWS, BEEF CATTLE AND HOGS.

THE FIELD DAY IS BEING ORGANIZED BY THE EXTENSION SERVICE, IN CO-OPERATION WITH THE U. S. DEPARTMENT OF AGRICULTURE, WHICH OPERATES THE FIELD STATION, AND THE UNIVERSITY OF NEVADA'S AGRICULTURAL EXPERIMENT STATION.

GATHERING AT 10 A.M., THE FARMERS, AND OTHERS INTERESTED, WILL TOUR THE PASTURES, AND WILL HEAR FROM FORREST WILLHITE, AGRONOMIST AND SUPERINTENDENT OF THE STATION, HOW THE PASTURES ARE MANAGED.

OTHERS WHO WILL TALK TO THE FARMERS ON THE TOURS WILL BE EXTENSION AGENTS CHARLES YORK AND JAMES JENSEN OF CHURCHILL COUNTY, BUCKMAN AND F. B. HEADLEY OF THE EXPERIMENT STATION.

YORK AND JENSEN WILL ALSO DEMONSTRATE THE USE OF 2,4-D TO CONTROL WEEDS IN GRAIN TEST PLOTS AT THE STATION.

-30-

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-8-9-110-450-A&AB-EXCLUSIVE IN YOUR CITY

CONTROL OF FLIES ON FARMS SAID PROFITABLE

"CONTROL OF FLIES ON CATTLE AND IN BARNS IS AN INEXPENSIVE WAY TO INCREASE MEAT AND MILK PRODUCTION," THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY EXTENSION WORK OF THE AGRICULTURAL EXTENSION SERVICE OF THE UNIVERSITY OF NEVADA, SAID THIS WEEK.

DDT, HE POINTED OUT, IS A SUITABLE INSECTICIDE FOR SPRAYING ON BUILDINGS HOUSING THE CATTLE.

IT MAY BE USED EITHER IN WATER SUSPENSIONS OR IN AN OIL EMULSION, BUT THE OIL EMULSION SHOULD NEVER BE APPLIED TO THE ANIMALS THEMSELVES.

BUCKMAN SUGGESTS A SPRAY OF 50 PERCENT WETTABLE DDT POWDER TO THE RATE OF 4 POUNDS TO 10 GALLONS OF WATER FOR SPRAYING BARNS. TEN GALLONS OF THE SOLUTION WILL COVER ABOUT A THOUSAND SQUARE FEET OF SURFACE.

"THE EASIEST WAY TO PREPARE THE SPRAY", THE EXTENSION MAN SAID, "IS BY MAKING THE DDT POWDER INTO A THIN PASTE, WHICH IS POURED INTO THE SPRAYER AND TO WHICH IS ADDED THE CORRECT AMOUNT OF WATER." AGITATION OF THE SOLUTION PREVENTS THE DDT FROM SETTLING.

WHILE THE SOLUTION MAY BE PUT ON WITH A POWER SPRAYER, BUCKMAN SAID THAT HIGH PRESSURE IS NOT REQUIRED.

A PRESSURE OF 40 TO 50 POUNDS IN THE POWER SPRAYER IS ENOUGH FOR THIS KIND OF WORK. IT IS MOST EFFECTIVE WHEN APPLIED AS A COURSE SPRAY IN AMOUNTS GREAT ENOUGH TO WET THE SURFACE BUT NOT TO DRIP.

WHERE SMALL AREAS ARE TO BE COVERED AND A HAND SPRAYER IS TO BE USED, THE EXTENSION MAN SUGGESTS THAT THE SPRAY BE MADE FROM THE 5 PERCENT DDT EMULSION SOLD AT MANY STORES. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION WORK, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

DDT OIL EMULSIONS ARE SOLD WITH DIRECTIONS FOR DILUTING THEM TO A 5 PERCENT SPRAY.

OIL EMULSIONS ARE NOT AS LIKELY TO CLOG THE NOZZLES OF INSECTICIDE SPRAYERS, EXPERTS POINT OUT, BUT THEY ARE MORE EXPENSIVE AND MAY NOT BE AS EFFECTIVE ON SURFACES WHICH ABSORB THE OIL.

FOR SPRAYING CATTLE, BUCKMAN RECOMMENDS USING 8 POUNDS OF WETTABLE 50 PERCENT DDT POWDER TO 12 GALLONS OF WATER.

SMALLER AMOUNTS OF DDT WILL CONTROL HORN FLIES ON CATTLE BUT THE APPLICATION IS MORE EFFECTIVE IF 8 POUNDS ARE USED.

APPLICATIONS ON BUILDINGS OR CATTLE SHOULD BE RENEWED AS NEEDED. IN BUILDINGS THE EFFECTIVENESS OF DDT USUALLY DECREASES PERCEPTIBLY AFTER 8 WEEKS, WHILE ON CATTLE IT LASTS ONLY ABOUT 4 WEEKS.

BENEFITS FROM DDT SPRAYED ON BARN WALLS WILL BE REDUCED BY COATS OF DUST. WHITEWASH OR OTHER ALKALIES WILL WEAKEN THE INSECTICIDE. WHILE A DDT SOLUTION SHOULD NOT BE SPRAYED DIRECTLY ON FEED OR INTO THE WATER SUPPLY, SMALL AMOUNTS OF SPRAY DRIFTING TO FEED SUPPLIES OR WATER ARE REPORTED NOT TO HARM LIVESTOCK.

DDT IN ANY SPRAY MUST BE IN CONTACT WITH THE FLIES TO KILL THESE INSECTS.

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-5-3-#67-480-B&AB-EXCLUSIVE IN YOUR CITY

TOMATO PLANT WORK PROGRESSING IN CLARK COUNTY

NEVADA'S TOMATO PLANT INDUSTRY IN CLARK COUNTY IS PROGRESSING SATISFACTORILY, ACCORDING TO THOMAS E. BUCKMAN ASSISTANT DIRECTOR FOR COUNTY AGENT WORK, UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE.

BUCKMAN, WITH A GROUP DIRECTLY INTERESTED IN THE GROWING AND DISTRIBUTION OF THE PLANTS, RECENTLY VISITED THE COMMERCIAL AND EXPERIMENTAL FIELDS IN MOAPA VALLEY. HE REPORTS THAT THE ENTIRE PARTY WAS MUCH PLEASED WITH THE PROGRESS WHICH HAS BEEN MADE THUS FAR.

THE OCCASION OF THE VISIT WAS A FIELD DAY AND INSPECTION TOUR CALLED BY THE UTAH CANNER'S ASSOCIATION, WHICH YEARLY DEPENDS UPON THE PRODUCTION OF TOMATO SEEDLINGS IN THE MOAPA VALLEY FOR THE PLANTS USED IN THE TOMATO FIELDS OF UTAH.

THE CANNER'S ASSOCIATION WAS REPRESENTED BY REED JENSEN, ITS PRESIDENT, WHO WAS ACCOMPANIED BY A NUMBER OF COMMERCIAL TOMATO GROWERS OF UTAH.

ALSO IN THE GROUP, REPORTED BUCKMAN, WAS A DELEGATION OF SCIENTISTS FROM UTAH STATE AGRICULTURAL COLLEGE.

INCLUDED WERE DR. G. F. KNOWLTON, ENTOMOLOGIST; DR. F. L. WALDEE, PLANT PATHOLOGIST; DR. E. MILTON ANDERSEN, PLANT PATHOLOGIST, AND DR. HOWARD F. DORST, ENTOMOLOGIST OF THE U. S. DEPARTMENT OF AGRICULTURE, NOW STATIONED AT LOGAN, WHERE HE IS MAKING A STUDY ON THE CONTROL AND THE MIGRATION HABITS OF THE LEAF HOPPER.

THE UNIVERSITY OF NEVADA WAS REPRESENTED BY BUCKMAN, M. R. MILLER, CHEMIST OF THE AGRICULTURAL EXPERIMENT STATION; RAY K. PETERSEN, WHO IS IN CHARGE OF THE EXPERIMENTAL WORK OF THE AGRICULTURAL EXPERIMENT STATION ON TOMATO PLANT PRODUCTION, AND JOHN (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION WORK, ACTS OF MAY AND JUNE, 1914.
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

WITTWER, CLARK COUNTY EXTENSION AGENT. SEVERAL REPRESENTATIVES OF THE U. S. BUREAU OF RECLAMATION WERE ALSO ON HAND AS OBSERVERS.

THE EXPERIMENTAL WORK, BUCKMAN EXPLAINED, IS BEING CONDUCTED BY THE NEVADA EXPERIMENT STATION AND IN COOPERATION WITH THE AGENCIES WHICH WERE REPRESENTED AT THE MEETING. PURPOSE OF THE EXPERIMENTAL WORK, WHICH IS BEING CARRIED ON, ON A SPECIALLY PROVIDED PLOT OF LAND AT LOGANDALE, IS TO AID IN THE BUILDING OF A PERMANENT, LARGE SCALE TOMATO PLANT INDUSTRY IN SOUTHERN NEVADA.

THE EXPERIMENTAL WORK ON THE FIVE-ACRE TEST PLOTS INCLUDES INVESTIGATION OF SUCH MATTERS AS FERTILIZERS, INSECT PESTS, DISEASES, IRRIGATION WATER AND SOIL CONDITIONS, PLANT VARIETIES, AND MARKETING.

THE GROUP, ACCORDING TO BUCKMAN, PRONOUNCED THE WORK BEING DONE BY THE EXPERIMENT STATION, THE GROWERS AND THE COOPERATING AGENCIES TO BE VERY PROMISING. ALL AGREED THAT THE COMMERCIAL GROWERS, ARE TRYING TO PRODUCE CONTINUALLY HIGHER QUALITY TOMATO PLANTS AND THAT THEY ARE SUCCEEDING.

LAST WEEK, BUCKMAN SAID, F. C. GAYLORD, ASSISTANT CHIEF OF HORTICULTURE OF THE AGRICULTURAL EXPERIMENT STATION OF PURDUE UNIVERSITY IN INDIANA, VISITED THE TEST PLOTS.

GAYLORD ARRANGED FOR THE SHIPMENT OF 5,000 TOMATO PLANTS TO THE MIDWESTERN STATE FROM THE SOUTHERN NEVADA EXPERIMENTAL PLOTS FOR TESTING UNDER INDIANA COMMERCIAL GROWING CONDITIONS. TOMATO PRODUCTION IS A BIG INDUSTRY IN THE HOOSIER STATE.

UNDER A SPECIAL PROJECT OF PETERSEN'S, BUCKMAN SAID, PLANTS FROM THE MOAPA VALLEY TEST PLOT WILL ALSO BE TRIED OUT IN UTAH THIS SUMMER. THE PLANTS WILL BE UNDER PETERSEN'S OBSERVATION FROM THE TIME THEY HAVE BECOME ROOTED UNTIL THEY PRODUCE TOMATOES UNDER FIELD CONDITIONS.

THE PRODUCTION OF CELERY PLANTS, ALSO A COMPARATIVELY NEW DEVELOPMENT IN THE SOUTHERN NEVADA VEGETABLE PLANT INDUSTRY, WAS ESPECIALLY INTERESTING TO THE MEN FROM UTAH. MUCH CELERY IS RAISED COMMERCIALLY IN UTAH. SHIPMENTS OF THIS YEAR'S CROP OF PLANTS WILL SOON BE MADE.

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-7-5-96-330-B&AB-EXCLUSIVE IN YOUR CITY

FARMERS ARE ASKED TO ELIMINATE ACCIDENT HAZARDS

NEVADA FARMERS WERE ASKED THIS WEEK TO ELIMINATE ONE ACCIDENT HAZARD ON EACH RANCH DURING FARM SAFETY WEEK JULY 25 -- 31.

THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY AGENT WORK FOR THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE IS CHAIRMAN OF THE STATE COMMITTEE FOR THE PROMOTION OF THE WEEK.

"FARM ACCIDENTS," HE SAID, "CAN BE REDUCED AND POSSIBLY ELIMINATED BY PROPER CARE."

IN THE UNITED STATES AS A WHOLE, HE POINTED OUT, 4,300 FARM WORKERS WERE KILLED AND ABOUT 300,000 WERE INJURED DURING 1947.

BUT, BUCKMAN SAID, THIS IS FEWER DEATHS AND INJURIES THAN THE YEAR BEFORE AND PROVES THAT ADEQUATE PRECAUTIONS PAY OFF IN LIVES SAVED AND INJURIES AVOIDED.

WHILE NEVADA FARM ACCIDENT FIGURES ARE NOT YET AVAILABLE FOR LAST YEAR, BUCKMAN SAID THAT PROBABLY THEY ARE PROPORTIONALLY VERY LITTLE DIFFERENT FROM THE UNITED STATES AS A WHOLE.

IF THEN, RECORDS OF THE PAST HOLD FOR THIS YEAR AND UNLESS PRECAUTIONS ARE TAKEN, IN THE NATION:

ONE OUT OF EVERY 18 FARM RESIDENTS WILL SUFFER A DISABLING INJURY.

ONE OUT OF EVERY 4 FARMS WILL BE THE SCENE OF AN ACCIDENT RESULTING IN A DISABLING INJURY TO A FARM RESIDENT.

ACCIDENTAL DEATH WILL OCCUR IN ONE OUT OF EVERY 320 FARM FAMILIES.

A DISABLING INJURY WILL STRIKE SOME FARM RESIDENT EVERY 19 SECONDS. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

ACCIDENTS, ON THE AVERAGE, WILL KILL 51 FARM RESIDENTS EVERY DAY.

TOTAL COSTS OF ACCIDENTS INVOLVING FARM PEOPLE, INCLUDING FIRE, MOTOR VEHICLE AND PROPERTY DAMAGE WILL BE $1,050,000,000, OR $35 PER FARM RESIDENT.

FOUR FARM BUILDINGS WILL BE DESTROYED BY FIRE EVERY HOUR OF THE DAY .... EVERY DAY OF THE YEAR .... ACCORDING TO THE NATIONAL FIRE PROTECTION ASSOCIATION.

"THE GOAL THIS YEAR," BUCKMAN SAID, "IS LOW ENOUGH SO THAT ANY NEVADA FARMER CAN DO HIS PART."

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1949-2-7-#16-240-B&AB-EXCLUSIVE IN YOUR CITY

MORE CATTLE ON FEED IN NEVADA THAN A YEAR AGO

MORE CATTLE AND CALVES WERE BEING FED IN NEVADA ON JANUARY 1, THAN ON THAT DATE IN ANY YEAR SINCE 1942.

THE TOTAL OF SUCH ANIMALS IN THE FEED LOTS OF THE STATE WAS REPORTED THE FIRST DAY OF THIS YEAR AS 26,000. THAT'S AN 8 PERCENT INCREASE OVER A YEAR AGO.

AND A SIMILAR INCREASE OF CATTLE AND CALVES ON FEED IS CHARACTERISTIC OF OTHER FAR WESTERN STATES. TAKING THE SITUATION AS A WHOLE, THE NUMBER OF ANIMALS ON FEED THE FIRST OF THE YEAR IN THAT AREA WAS UP 12 PERCENT FROM THE SAME DAY LAST YEAR.

THE REASON, ACCORDING TO L. E. CLINE OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, IS A MORE PLENTIFUL FEED SUPPLY AND LOWERING PRICES.

THE RESULT IS A GREATER PRODUCTION OF BEEF AND VEAL FOR THE CONSUMER MARKET, HE POINTED OUT THIS WEEK, AND CONSEQUENT LOWER PRICES FOR CONSUMERS.

THE SITUATION IS REPORTED TO BE JUST THE REVERSE OF THAT OF A FEW MONTHS AGO WHEN BEEF WAS SCARCE AND HIGH PRICED AND THE MOVEMENT OF FAT CATTLE TO MARKET WAS SLOW.

CATTLE FEEDING FOR MARKET HAS NOT BEEN A COMMON PRACTICE IN NEVADA, BECAUSE FEED GRAINS FOR THAT PURPOSE ARE NOT GENERALLY GROWN IN THE STATE AND THE FEED-PRICE RATION FOR CATTLE IS NOT USUALLY CONDUCIVE TO FINISHING ANIMALS FOR THE CONSUMERS MARKET.

THE INCREASED TREND TOWARD FINISH FEEDING OF CATTLE AND CALVES IS NOT LIMITED TO THE WEST BUT IS NATIONWIDE, THE ECONOMIST REPORTED.

IN THE U. S. THE CATTLE AND CALVES ON FEED JANUARY 1 TOTALED 19 PERCENT MORE THAN A YEAR AGO AND 23 PERCENT ABOVE THE ALL-TIME HIGH OF 1943.

-30-

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-6-21-88-340-B&AB-EXCLUSIVE IN YOUR CITY

NEW WEED KILLER WORKS BEST WHEN USED PROPERLY

NEVADA FARMERS AND HOME OWNERS USING 2, 4-D TO CONTROL WEEDS NEED TO PAY CONSIDERABLE ATTENTION TO WEATHER, SOIL, AND OTHER CONDITIONS TO GET THE BEST RESULTS.

THIS NEW CHEMICAL WEED KILLER WIDELY USED ON FARMS AND AROUND HOMES IS MUCH MORE EFFECTIVE IF PROPERLY USED, ACCORDING TO THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY AGENT WORK OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE.

THE TYPE OF FOLIAGE TO BE COVERED, KIND OF SPRAY NOZZLES, AMOUNT AND DIRECTION OF WIND, CONDITION OF THE SOIL, HUMIDITY IN THE AIR, LIKELIHOOD OF RAIN, TIME OF DAY, TIME OF YEAR, AND OTHER FACTORS, BUCKMAN SAID MUST BE TAKEN INTO CONSIDERATION.

A FUNDAMENTAL PRINCIPLE IN WEED SPRAYING, HE SAID THIS WEEK, IS TO MAKE CERTAIN THAT ALL FOLIAGE IS WET WITH A UNIFORM COVERAGE OF WATER CHEMICAL.

NEITHER TOO FINE, NOR TOO COARSE A SPRAY IS DESIRABLE, THE EXTENSION MAN SAID. IN SLIGHT WINDS, THE FINE SPRAY IS BLOWN ABOUT TOO MUCH, WHEREAS A HEAVY SPRAY IS LIKELY TO BE WASTEFUL.

THERE IS ALWAYS NEED FOR CAUTION IN APPLYING 2,4-D WHEN A MODERATE OR STRONG WIND IS BLOWING. DRIFTING SPRAY SOMETIMES DAMAGES NEARBY CROPS AND ORNAMENTAL PLANTS. THEREFORE, BUCKMAN SAYS, MOST PEOPLE NOW APPLY 2,4-D ON A DAY WHEN THERE IS LITTLE OR NO WIND.

ALSO IMPORTANT IS THE AMOUNT OF MOISTURE IN THE SOIL BEFORE AND AFTER 2,4-D TREATMENTS. IF THE SOIL IS TOO DRY TO PROMOTE NEW GROWTH OF WEEDS, THE TREATMENT DOES NOT WORK SO WELL. WEED SPECIALISTS BLAME DRY SOIL FOR POOR RESULTS OR MANY FARMERS IN REGIONS OF LOW RAINFALL, SUCH AS NEVADA. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

EVEN IF THE AIR IS TOO DRY, 2,4-D MAY NOT STICK SO WELL ON THE VEGETATION OR BE ABSORBED BY THE WEEDS AS IT SHOULD BE. HIGH HUMIDITY IS BETTER.

JUST BEFORE A RAIN IS NOT CONSIDERED A GOOD TIME TO TREAT WITH 2,4-D. RAIN WITHIN AN HOUR OR SO AFTER TREATMENT SEEMS TO WASH SOME FORMS OF 2,4-D OFF THE WEEDS BEFORE IT CAN GET A CHANCE TO DO ITS WORK.

BUCKMAN SAYS THAT IT IS INADVISABLE TO USE DILUTE SPRAY SOLUTIONS OF 2,4-D WHEN THE VEGETATION IS WET WITH RAIN OR DEW. ON THE OTHER HAND, FOR APPLYING 2,4-D DUSTS OR HIGH-CONCENTRATION SPRAYS VEGETATION WET WITH DEW OR RAIN IS THE IDEAL CONDITION.

BUCKMAN SAYS THAT FARMERS AND HOME OWNERS FREQUENTLY WILL FIND IT ADVISABLE TO TALK OVER 2,4-D WITH THEIR AGRICULTURAL EXTENSION AGENTS BEFORE APPLYING. THE AGENTS KNOW LOCAL CONDITIONS AND ARE INFORMED AS TO THE EXPERIENCE OF OTHERS.

-30-

AGRICULTURAL NEWS SERVICE
RELEASE UPON RECEIPT-1948-6-14-86-270-A&AB-EXCLUSIVE IN YOUR CITY

SEASON ON HORNFLIES IS NOW OPEN ON NEVADA FARMS

IT IS OPEN SEASON ON HORNFLIES ON NEVADA FARMS AND RANCHES THESE DAYS, ACCORDING TO THOMAS BUCKMAN, ASSISTANT DIRECTOR FOR COUNTY AGENT WORK OF THE UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE.

THE MORE OF THESE TROUBLESOME AND WASTEFUL LIVESTOCK PESTS KILLED NOW, THE FEWER THAT WILL HAVE TO BE KILLED LATER ON IN THE SEASON, HE POINTED OUT.

ONE OF THE COSTLIEST OF LIVESTOCK PESTS, THE HORNFLY SPECIALIZES IN CATTLE.

WHILE NO FIGURES ARE AVAILABLE FOR NEVADA, BUCKMAN SAID THAT IN SOME PARTS OF THE COUNTRY WHERE THE HORNFLIES ARE ESPECIALLY NUMEROUS, THEY ARE REPORTED TO HAVE CAUSED A DROP FROM ONE-FOURTH TO ONE-HALF IN THE PRODUCTION OF DAIRY CATTLE.

LOSS OF WEIGHT IS CAUSED BY THE HORNFLY TO BEEF AND DAIRY CATTLE AS WELL.

SO, ACCORDING TO BUCKMAN, GOOD CONTROL OF HORNFLIES IS AN EFFECTIVE WAY TO CONSERVE FEED, MUCH NEEDED FOOD, AND TO MAKE MORE MONEY IN THE LIVESTOCK BUSINESS.

THE EXTENSION MAN SAID THAT IT IS IMPORTANT THAT THE FARMER OR LIVESTOCK GROWER IN THE STATE USE THE RIGHT INSECTICIDE AND THE CORRECT FORMULA, OBSERVE THE PROPER METHOD OF APPLICATION, AND APPLY THE INSECTICIDE WHEN THE INSECTS ARE MOST VULNERABLE.

HE REPORTED THIS WEEK THAT DDT WETTABLE POWDER IS EFFECTIVE AND ECONOMICAL UNDER WIDELY VARYING CONDITIONS FOR USE AGAINST HORNFLIES. (MORE)

FROM-UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE, RENO, NEV.
COOPERATIVE AGRICULTURAL EXTENSION SERVICE, ACTS OF MAY AND JUNE, 1914
CECIL W. CREEL, DIRECTOR . . . . . A. L. HIGGINBOTHAM, EDITOR.

STRENGTH OF THE DDT SPRAY AND THE AMOUNT TO BE USED, DEPENDS TO SOME EXTENT, ON THE EQUIPMENT AVAILABLE, TYPE OF CATTLE, AND LOCAL CONDITIONS.

HOWEVER, BUCKMAN POINTED OUT A SPRAY CONTAINING 0.5 PERCENT DDT (8 POUNDS OF 50 PERCENT DDT WETTABLE POWDER TO 100 GALLONS OF WATER) AND APPLIED AT THE RATE OF TWO QUARTS FOR EACH MATURE ANIMAL, IS GENERALLY EFFECTIVE AND PRACTICAL IN NEVADA.

AS A RULE, CATTLE SPRAYED WITH DDT WILL BE PROTECTED AGAINST HORNFLIES FOR ABOUT THREE WEEKS TO A MONTH.

SINCE SPRAYING PRACTICES VARY WITH DIFFERENT CONDITIONS IN NEVADA, BUCKMAN SUGGESTED THAT FARMERS TALK THINGS OVER WITH THEIR AGRICULTURAL EXTENSION AGENTS BEFORE TREATING HORNFLIES.

-30-

Livestock Pest Control Summary

Weed Control Summary

Crop Planning Conference

1947-1948

LIVESTOCK INSECT CONTROL IN NEVADA

Compiled and Edited

by

THOMAS E. BUCKMAN

Assistant Director for County Agent Work

University of Nevada
Agricultural Extension Service
Reno

TABLE OF CONTENTS

PAGE NO.

NEW INSECTICIDES FOR CONTROLLING EXTERNAL PARASITES

PAGE NO.

Progress Report

NEVADA LIVESTOCK EXTERNAL PEST CONTROL PROGRAM
and Calender. 1947 - 1948

Date	Place	Work Done	Results
Dec. 4 and 5 1946	Elko	Plans for a statewide livestock pest control program was launched by the extension service at Elko, in a special two-day training school for county agents, ranchmen and others, the 4th and 5th of December. The school was conducted by E. G. Kelly of Kansas. Dr. Kelly had considerable experience with livestock insects and was invited to Nevada on that account by Mr. Buckman, Assistant Director for County Agent Work. The first day was taken up with discussion of cattle grubs from every angle. The life of the grub in the animal, its exit and the changes it goes under to become a heel fly. Considerable time was given to the types of damage caused by the cattle grubs. The attack of the heel fly, which is adult stage of the grub, that causes cattle to run with their tails over their backs. The running into bogs, mires and through brush in an effort to get away from the fly causes much damage to the cows that are heavy with calf, often causing a premature birth and the loss of the calf. The injury that is caused by the tiny grub in its route from the heel of the animal to the oesophagus, from the oesoph agus to the back and the making of the holes in the skin on the back. Every ranchman knows about the big bumps on the backs of the cattle at certain seasons of the year, mostly in early summer. The injury to the flesh in the loins and the damage to the hide which is later made into leather. It is required all day to get the lesson and then came the discussion of methods of control. The second day was given to the careful study of lice and the control methods, horn flies, stable flies and mosquitoes. Then the common house flies were brought into the picture for they are transmitters of many diseases of the human as well as some to cattle.	

Date	Place	Work Done	Results
		There was considerable time given to the study of the common old horse flies. These flies have vicious biting mouths; they can cause great pain to cattle, horses and other livestock. The county agents and ranchers asked numerous questions which were well answered in most cases. The county agents made plans for a program of livestock control before they left Elko for their homes. In these plans were the location of spraying equipment, rotenone bearing powders and DDT.	
January 1947	Reno	Plans completed for holding three ranch "How to do it" meetings for ranchers and County Agents, Vo. Ag. instructors, FFA and 4-H club members in Western Nevada, using high pressure power sprayers capable of delivering 400 to 600 pounds pressure. Dr. E. W. Laake of the USDA was secured to personally assist county agents of Churchill, Lyon and Douglas counties to conduct these demonstrations. All county agents from other parts of the state were asked to attend the demonstration closest to their headquarters.	
Feb. 3,1947	Reno	Demonstration control of cattle Grubs and lice with high pressure equipment.	65 people present
Feb. 4,1947	Fallon	Same	125 " "
Feb. 6,1947	Yerington	Same	100 " "
Feb. 7,1947	Smith	Same	80 " "
Feb. 8,1947	Gardnerville	Same	65 " "
			435 people informed and 17 county agents trained as to use of latest equipment and insecticides to control external livestock pests. They in turn passed the word on to farmers ranchers, farm machinery dealers, livestock feeders, handlers of spray materials, and others.
Feb. 10,28, 1947	Throughout State		Machinery dealers throughout the state were informed by the extension service of the kind of equipment needed to get the best results.

Date	Place	Work Done	Results
March 1947	Throughout State		The Extension Service spent $2,000 for demonstration equipment. It also obtained a $2,500 sprayer and several trucks from war surplus without cost to provide a mobile unit to tour the state for demonstrations.
Feb. to July 1947	Elko, Lyon, Douglas, Washoe Counties		Use of dipping vats was pointed out to ranchers who already had such equipment as an excellent means of utilizing DDT and Rotenone for controlling external cattle pests, but most Nevada ranchers are using High-Pressure power sprayers to treat cattle, since they are portable, have other uses than for spraying cattle, and are not as expensive as dipping vats.
May 1947	Ely		U.S. Grazing District No.4 which covers White Pine and parts of Eureka, Lincoln, and Nye counties, bought a $1,500 sprayer for its county agents' use in that area in demonstrations.
June 1947	Yerington, Fallon, Hiko		Three sprayerswere purchased by the vocational agriculture division of the Nevada State Education Department for use in training classes of high school students of agriculture along the lines of methods recommended by the extension service and proved by practice.
Feb. to July 1947	Throughout State		Extension agents held demonstrations in every corner of the state to help stockmen learn approved ways of spraying livestock.

Date	Place	Work done	Results
October 1947	All Counties	Extension service made a survey to determine progress made in the livestock external pest control campaign. Results were as follows:	59 power sprayers capable of delivering 400 to 600 pounds pressure were found to be in the state and at work on pest control. 26,085 cattle were treated for grubs 41,175 were treated for flies 31,030 were treated for lice 3,250 sheep were treated for wood ticks and keds 2,755 hogs treated for mites 13,750 poultry treated for lice, mites, etc.
January to December 1948	Throughout State	Same general program followed, but directed by county agents and county agent leader. No assistance was received from outside specialists with the exception of that received by letter from E.G. Kelley, Extension entomologist from Kansas and E.W. Laake of the USDA, Kerrville, Texas. And M. P. Jones, Extension entomologist, Washington, D.C.	

The farmers and ranchers of Nevada saved nearly one-half million dollars during 1948 through the treatment of cattle for the control of external parasites. About one-fifth of the cattle population of the state, it is estimated, was treated during this time.

Biggest saving was in the control of lice on cattle which, amounted to more than $340,000.

Curbing of grubs, flies, and mosquitoes made a profit to the livestock owners of more than $ 109,000. The savings were the result of the concentrated campaign carried on under the direction of the extension service working with farmers, ranchers, and others during the two-year period.

Spraying of livestock, expecially cattle, fits well into the year-round Nevada ranch operations, and has been widely adopted by ranchers.

DATE	Place	Work done	Results
Jan.toDec. 1948 contd.		Pest-free cattle, Mr. Buckman said, are healthy cattle, and they produce more meat more quickly and at a lower cost. Nevada stockmen are using successfully every known method to control livestock pests. 1949 should see over 200,000 head of cattle treated, as it pays big gains in pounds of meat marketed.	
October 1948		The Extension Service State Survey of work done on pest control in 1948, the second year of the external pest control campaign shows the following:	83 power sprayers were on hand in December 1948 25,000 head of cattle were treated for grubs 60,050 were treated for flies 45,350 were treated for lice 101,736 different cattle were treated for one or more times.

TABLE I

1948 Livestock Pest Control Survey for Nevada made by the University of Nevada Agricultural Extension Service

1 — 83 Total no. power sprayers used for livestock pest control in state

2 — 36 Est. No. power sprayers that might be purchased if available.

3 — 4490 Est. amt. in lbs. of rotenone used on control program(terms 5% rot. root.)

4 — 16761 Est. amt. in lbs. of DDT used (terms technical product)

5 — 865 Est. Amt. in lbs. of BHC (terms technical material with 10 to 12 % gamma).

6 — 471 Est. amt in lbs. of chlordane

7 — 512 estm.amt. lbs. chlorinated camphene

8 — 0 est. amt. lbs. of other chlorinated insecticides.

9 — 1221 No. farm premises sprayed for housefly control and stable fly control

10 — 101,736 total No. cattle treated one or more times(regardless of pest and not total No. of treatments).

11 — 15,950 total No. of sheep treated for ticks, etc. Est. savings not available.

12 — 2580 Total no. of hogs treated for mites, etc. Est. savings $2,905.

13 — 51,050 total No. poultry treated for lice, etc. $25:525.00 est. savings.

COUNTY	1	2	3	4	5	6	7	8	9	10	11	12	13
Churchill	12	Plenty Available	500	3120	400	50	0	0	600	27000	3200	1200	40000
Clark	0	2	--	100	0	50	0	0	52	1000	0	0	0
Douglas & Ormsby	13	0	1250	2500	300	225	12	0	55	14000	0	200	1750
Elko	12	20	500	3000	100	0	0	0	25	8000	12000	100	1000
Esmeralda & Nye	--	--	--	116	--	--	--	--	2	1200	--	--	--
Eureka and White Pine	10	3	0	700	0	0	0	0	15	9000	0	250	300
Lander & Humboldt	6	3	50	625	0	20	0	0	8	14536	0	40	0
Lincoln	4	3	40	500	0	16	0	0	8	6000	0	50	500
Lyon	10	0	2000	5000	50	100	500	0	310	15000	750	550	0
Pershing	1	0	40	200	5	0	0	0	1	1500	0	30	1000
Lander & Nye	3	Plenty	10	500	0	0	0	0	15	1000	0	0	500
Washoe	12	5	100	400	10	10	0	0	130	3500	0	160	6000
	83	36	4490	16761	865	471	512	0	1221	101736	15950	2580	51050

TABLE II

1948 Livestock Pest Control Survey for Nevada made by
University of Nevada Agricultural Extension Service

Effectiveness of DDT for fly control (The general picture for 1948. If different from 1947, insert the figures designating each year in the space to which it applies instead of a check mark.)
On livestock - Excellent - Good - Fair - Poor - Unsatisfactory

COUNTY	On Livestock *(4)				In Barns *(4)						
	Excel.	Good	Fair	Poor	Excel.	Good	Fair	Poor	Grubs	Flies	Lice
Churchill		x		x					2000	21000	11000
Clark											
Douglas & Ormsby		x			x				9000	7000	7000
Elko	x				x				3000	5000	8000
Esmeralda & Nye										1200	1200
Eureka & White Pine											
Lander & Humboldt	x				x						
Lincoln		x			x					6000	6000
Lyon	x	x			x				6000	12000	6000
Pershing	x		x							50	1450
Washoe	x			x					2000	800	700
Lander & Nye		x			x				0	1000	1000
White Pine		x			x				3000	6000	3000
STATE TOTALS									25000	60050	45350

ESTIMATED SAVINGS:

Grubs ---	$ 18,740
Flies ---	90,075
Lice ---	340,125
Total	$ 448,930

* Question (4) Estimated amount on pounds of DDT used.

WHITE PINE COUNTY ANNUAL REPORTS ---

William Helphinstine
Robert Whelan

LIVESTOCK PEST CONTROL

A very successful livestock pest control program was carried forward in the County during the year. The campaign was started with newspaper articles and spraying demonstrations last fall.

The agent met with all the ranchers who graze cattle in the Jakes Valley grazing unit in an effort to set up a louse and grub control program. All of them agreed to cooperate in a program. They assisted each other in gathering and handling. Some 2,000 head of cattle were treated in this cooperative project.

In visiting different ranches last spring it was noted that grubs were emerging from the backs of animals from the middle of January until the middle of May. Specimens of both northern and southern species of grubs were found. It is believed though that the southern species is more prevalent in the area than the northern species. It was further found that grubs are present throughout the County but vary in degree of infestation.

The cattle throughout the County all seem to be infested with lice. The ranchers in the County are realizing the economic losses they are suffering from the louse infestation. Many of them are planning control measures this fall.

Several spraying demonstrations were held in launching the fly control program. All the dairymen in the Lund area participating in the program this year. The residual effort of the D.D.T. did not seem to last so long this year as last. The cause of this as yet has not been determined. It is not believed that the flies could have built up resistance to D.D.T. so soon.

When the livestock pest control project was initiated in the spring of 1947, there was not one power sprayer in the County. At the present time six rigs are being used by the ranchers throughout the County.

A goal of 15,000 head to be treated for livestock pest control was set for the County during 1948.

The Agent actively assisted in the treatment of approximately 9,500 head. It is estimated that about 7,000 additional head were treated. Thus, about 16,000 head were treated.

Some experimental work has been done with B.H.C. this fall for louse control. So far results look very pormising. No ill effects have been noted as yet.

Livestock pest control work in the County can be improved by:

1. Encouraging cooperators in cooperative purchase and operation of spray machinery.

2. Stressing the necessity of fall treatment for optimum results in louse control work.

3. Use of B.H.C. for louse control.

4. Give more publicity to the campaign through news stories and demonstrations.

Demonstrations were given on several ranches as to horn fly control on cattle using 50% D.D.T. wettable powder. Eight pounds of this powder was mixed with 100 gallons of water and applied to the animal under a pressure of 450 pounds. The results obtained were good in some areas and fair in others. In some cases it seems that these flies are building up a resistance to the D.D.T. In the coming year a 30% emulsible D.D.T. spray will probably be used and the results observed.

In many cases buildings were sprayed with the 50% wettable powder for stable fly control. Again the results were from poor to good. The D.D.T. seems to be losing its effectiveness more on the stable flies than on the horn flies.

Demonstrations were also given to 4-H members on horn fly and stable fly control in connection with their projects.

In November the Agents gave demonstrations in spraying cattle for lice with benzine hexachloride. This type of spray is also a wettable powder mixed 4 pounds to 100 gallons of water.

Results were very satisfactory.

LANDER COUNTY ANNUAL REPORTS: --

J. Kirk Day
James Jensen

The livestock pest control program is gaining in popularity among the different ranchers with the Agent assisting in the spraying of approximately 2500 head of cattle. New spray equipment is being purchased by various ranchers. (Kirk Day)

Ranchers in southern Lander County have not as yet entirely accepted the spraying of livestock for pest control. In order to carry out a good control program it would necessitate the handling of their cattle at least three times a year. This would be a rather difficult job as cattle are on the range at the time they should be treated and the gathering of them would make the job rather expensive. Ranchers are being encouraged to spray cattle whenever they do have them in. By doing this ticks can be kept down without much additional handling and expense.

During the spring the assistant agent and Mr. F. F. Weaver, custom sprayer, held a demonstration on the Vesbeck Ranch in Reese River Valley. At this time 70 head of range bulls were treated with DDT for control of lice. Most of these animals were badly infested and were in very poor condition. A check on them, three weeks later, showed that the spraying had been effective. The foreman at the ranch stated that they began to gain weight within a few days and at the time of the check they looked like an entirely different herd of stock. (James Jensen)

Spraying demonstrations were held on 3 ranches in Smokey Valley, Nye County. Here 650 head of mixed cattle were treated. Later checks with the owners indicated that they were satisfied with the results. One group of 125 head were kept on the ranch during the summer. Mr. McLeod, the owner, said that for two months after the spraying these cattle were still not bothered with flies. He plans to make this an established practice in the future on the s tock kept on pasture at the ranch. (James Jensen)

ELKO COUNTY ANNUAL REPORT:

Mark W. Menke

" A general questionnaire on the results of the 1947 demonstration sprayings was sent to ranchers and it indicated that they were well satisfied with the results and intended to continue spraying where needed for grubs, lice and flies. However, extensive plans for expanding this program had to be dropped when an extension of the cattle scab area was proclaimed by the State Stock Commission and Bureau of Animal Industry. Several conferences were held and a county-wide meeting was called in which it was decided to request all stockmen to dip their bulls even though they were not in the quarantined area. " (Not for publication)

The Agent was flooded with calls for information on securing heating equipment for the vats and lime-sulphur for the dip.

One carload of lime-sulphur was ordered at a saving to ranchers of 40% in the cost. This consisted of 85 drums and an additional 48 drums were ordered later. This material was used in filling 12 dipping vats. Many ranchers involved in these dipping operations were in no humor to discuss additional dipping or spraying and a large additional program was not pushed.

However, the following spray demonstrations were arranged and completed by the Agent and Assistant Agent:

Stock Ranch	Lemoille	130	Cattle	Grub Control	Very Good results
Kennedy "	"	50	"	Lice & Grub Control	" "
Lampson "	"	150	"	Grub Control	Very " "
Winchell "	Deeth	500	"	Lice	Fair results
Weeks "	Wells	500	"	Lice	Good results
Neff "	Ruby	900	"	Grubs	" "
Sharp "	Ruby	300	"	Grubs	" "
Brennen "	Lamoille	500	"	Horn Flies	" "
Kane "	Lee	150	"	" "	" "
Stock "	Lamoille	150	"	" "	" "
Kennedy "	"	140	"	" "	" "
Smith "	"	350	"	" "	" "
Lampson "	"	100	"	" "	" "
Marciel "	Ruby	350	"	" "	" "
Conley "	Lee	175	"	" "	" "

In addition to the spraying demonstration program, the following cattle were dipped for lice control in dipping wats; Ellison Ranching Company - 5,000, Ceseare Salicchi - 800, Willis Packer - 1,500, and several thousand others were sprayed by individuals with their own equipment.

Considerable correspondence was necessary to finally secure recommendations on the use of B.H.C. (Benzine Hexachloride) for control of lice and scabies on cattle.

The recommendations for scab control were from 13 to 32 pounds of 6% gamma isomer and for lice 6 1/2 pounds of 6%.

The Agent spent 27 days on work in connection with control of external livestock parasites, made 27 farm visits, received and attended to 159 office calls and made 110 telephone calls.

Nine thousand head of sheep were sprayed for wood tick and sheep ked control by Donald Drown for the Griswold Livestock Company. They claimed that the results were very good, showing better growth of lambs and increased production of wool. However, since no check band of sheep could be secured, exact gains are not known.

"

November 10, 1948

TO: ELKO COUNTY CATTLEMEN
SUBJECT: CATTLE LOUSE CONTROL

Dear Sir:

As a result of work done the past two years with livestock parasites it has become apparent that the louse problem is more wide spread among Elko County cattle than has been commonly thought.

Lice do their greatest damage during the fall and winter months, building up to a peak population by spring at which time their damage decreases through the summer. Therefore, the proper time to control lice is in the fall after practically all cattle have been rounded up and they can all be treated.

Effective louse control requires complete coverage of the infested animals. Dipping is far more effective than spraying. Since there are now a large number of dipping vats in the county in good shape it would be advisable for cattle owners whose stock are infested with lice to consider filling these vats and running cattle through them for louse control. It is not necessary to hear the water. The animals can be put through as fast as they will go and one treatment should be sufficient for good louse control.

Use 8 lbs. of 50% DDT to the hundred gallons of water or 4 to 8 lbs. of 6% Benzene Hexachloride. The DDT will not kill louse eggs but the residual effect should be sufficient to kill all eggs on the animals as they hatch.

The Benzene Hexachloride kills all stages of the lice including the eggs and also has some residual effect. The BHC is also rapidly coming to the front not only as a preventative but as probably the most effective chemical for control of Scabies. However, it does taint the meat and should not be used on animals which are going to be slaughtered before 60 to 90 days. DDT does not taint the meat.

There is little danger of injury to the livestock from putting them through the dipping vat even though the temperatures are quite cool as range cattle will dry off rapidly if there is any wind or sun. However, it is probably not advisable to dip short haired dairy cattle if the weather is very severe.

The cost of the DDT solution should not exceed 3¢ per gallon for the final mix if the DDT is bought in hundred pound lots. The cost of the BHC will be between 1 1/2 ¢ and 3 ¢ per gallon for the final mix.

If lice are a problem on your cattle it might be well for you to consider doing the above as soon as possible. It is not advisable to wait until spring to control cattle lice as they hqve done their worst damage by that time.

If you need further information it can be secured at the Extension Office. There is a supply of DDT on hand in Elko but BHC would have to be ordered which would mean a few days delay.

Very truly yours,

Sgd: Mark W. Menke
Mark W. Menke
County Extension Agent "

" Spraying demonstrations were conducted with the use of DDT and Technical Chlordane, for the control of lice and horn fly. Results were highly satisfactory and most ranchers have signified their intentions to spray. A total of 12,000 were sprayed in this county this year."

WASHOE COUNTY ANNUAL REPORT:

Archie Albright

Cattle Grubs:

Object:

To demonstrate the value of controlling cattle grubs, and how to control them effectively.

Goals:	Accomplishments:
1. Demonstrate Control	1. Two demonstrations conducted.
2. Carry on Campaign	2. Campaign conducted in all districts.

Results:

Further study of the grub infestation was made and the 1947 figures were found to be a true indication of the grub problem in Washoe County. It appears that the greatest number of our cattle drop the grubs on the spring range and therefore have lesser chance of reinfesting the cattle.

The one packing plant, two slaughter houses and one hide dealer stated that only calves in fair flesh raised locally were grubby. The grubby cattle come from other areas. No penalty for grubs is assessed against the producer by the slaughterer. Upon inspection of the dairy herds very few grubs were found. Occasional grubby dairy cows were found and most were treated by dusting.

Results (contd)

In every herd of cattle where an infestation was found treatment was applied with good results. Very thinly scattered infestations were found from December through July. Several farmers were assisted in spraying and dusting.

Most of the cattle were sprayed by farmer owned sprayers, however, there were two custom sprayers in the County. There are now 12 sprayers in use in the County.

Lice:

More livestock were sprayed for lice than all other pests. Dairymen, beefmen and hog men applied DDT and BHC in early spring and fall for lice control. The B.H.C. showed better results. 8000 head of cattle were sprayed this year. 150 head of hogs were sprayed.

The Mount Rose Ranch south of Reno spray every animal brought on the ranch. Approximately 6000 head were sprayed with a spray-dip machine. DDT and Rotenone are applied in fall and winter. Approximately one gallon of the spray is required per animal. Mr. Nichols who feeds cattle for the Stockmens Packing Company spray-dips his feeders as they go into the feed yard.

When B.H.C. was used it showed very good results.

Mr. William Bassett found lice in his purebred Duroc hogs. He dusted with DDT and so far as can be determined the suckling pigs picked up enough of the material to paralyze 3 and sicken the others.

B.H.C. was recommended for use on dry sows and on buildings. The last report shows very fine results.

Flies:

Nearly every farm used DDT for fly control. Commercial preparations for livestock and buildings have been used very successfully. Dairy barns visited this year showed practically no flies. Use of DDT in the homes has cleared them of flies and moths to a great extent. A continuous campaign is carried on to help the farmer and homemakers control flies.

DOUGLAS COUNTY ANNUAL REPORT:

Leonard Anker

Cattle grubs and lice have infested Carson Valley cattle for many years. A concerted drive, using newer type chemicals, was deemed advisable in order to produce more beef and milk from the same amount of cattle and feed.

To expedite the campaign, a cattle spraying demonstration was held at the Sheep Camp Ranch. Various types of spraying apparatuses were shown.

Information was extended to all cattlemen, explaining fully the use of DDT.

Demonstrations were conducted on the A. & L. Settlemeyer and Fred Settlemeyer ranches, using wettable benzene hexachloride. Results were very good. Out of a group of 250 cows sprayed, three which were known to have heavy infestations were examined three weeks later. Not a single live louse could be found.

Included in the campaign was a section devoted to control of the heel fly. A combination plan of management and spraying with derris and cube powders was recommended.

A majority of the heel flies are of the southern variety and do not drop out until late spring. Most cattle can be moved to range or farm pastures before the flies complete pupation and reach adulthood.

At least 8,000 head of cattle were sprayed to control lice at least once during the past year in Douglas and Ormsby Counties. DDT and benzene hexachloride were used.

An estimated 4,750 head were sprayed to control heel flies.

Nearly all dairy barns were sprayed at least once with DDT for fly control.

A majority of dairy cows were sprayed for horn fly control.

EUREKA COUNTY ANNUAL REPORT:

William Helphinstine

The livestock pest control program is making progress in the county. Several ranchers are already doing control work and others have signified their intention.

The Agent has met with several of the ranchers and plans are being formulated for the cooperative operation of pest control machines.

A large percentage of the cattle in the county are louse infected. The Agent is sure that control work will prove financially helpful to all cooperators. Fly control work would be financially sound in certain areas of the County where the cattle are grazed on the meadow lands.

LYON COUNTY ANNUAL REPORT:

Louie A. Gardella

INSECT CONTROL:

Livestock:

While not as many cattle were treated for grub and lice control in 1948 as were in 1947, the practice seems to have become fairly well established. Several new power sprayers were purchased by livestock owners and commercial operators were active during the entire season.

The Agent estimates that at least twelve thousand head of cattle were treated for lice and grub control during the 1948 season. Many of these were only treated once while others were treated two and three times.

In November and December, the Agent checked several herds which had been treated in 1947 and found very encouraging results. One herd in 1947 was found to have one hundred or more grubs in each back of the yearlings in 1948 contained about twenty five grubs per back and the calves were in much better condition. Another herd which in 1947 had about twenty five grubs per back was found to have in 1948 less than five. Not all herds of course showed as good results but a noticeable reduction was noted. Less lice were also noted in herds that had been treated for grub or fly control during the summer.

The Agent did not have time to follow the program as closely in 1948 as in 1947 but interest in the program was maintained by circular letters, news articles, and personal contact. The Agent feels confident that with the favorable results obtained in 1947 and 1948 that more cattle will be treated in 1949.

Lice Control:

The lice population on cattle were materially reduced through the control program for grubs in the winter and spring of 1947 and through the fly control program during the 1948 summer. Several small herds were treated with owner owned sprayers and with commercial spraying outfits but the lice control program has not yet taken good hold mainly because of the extra handling of cattle involved to treat the cattle.

Fly Control:

The control program for hornflies, stable flies, houseflies and mosquitoes was very popular with both beef men and dairymen. Well over fifty percent of the cattle which were kept in the valleys were treated at least once during the summer with a DDT solution containing from eight pounds to sixteen pounds of fifty percent DDT per one hundred gallons of water. Nearly one half of the barns, outbuildings and farmsteads in the area were sprayed. Results were excellent and farmers and ranchers were pleased with the results.

Cattle Ear Ticks:

The Agent has examined many herds of both beef and dairy cattle and in at least eighty percent of the cases has found the cattle to be heavily infected with ear ticks. The Agent has called attention of this condition to livestock men by use of circular letters, news articles and personal contacts. Many are treating infected cattle.

CHURCHILL COUNTY ANNUAL REPORT:

Charles R. York

Cattle Spraying:

Livestock pest control program has progressed in a very satisfactory manner with at least 95% of the cattle being sprayed in the county again in 1947 - 1948.

The Moffat Company and their manager, S. M. Taylor, cooperated in a spraying demonstration whereby 200 head of fat steers were weighed and then fed for a six weeks period, then weighed, sprayed with 50% wettable DDT, eight pounds per one hundred gallons of water, then fed for another six weeks period. The gains on the second six weeks feeding period exceeded the first period enough to warrant S.M. Taylor's statement, "We have made from $5. to $15. per head on every animal we have sprayed for lice control and I believe the average per head is $7.50 at least." He also stated that their spraying program would net them approximately $50,000 on 4,000 head of animals sprayed.

Very little progress was made in warble control work in 1947-1948. About 2,000 head were treated or the same number as we treated the year before. It is hoped that a demonstration can be held in 1949 whereby actual actual weights may be kept on sprayed or treated animals. All of the cattle in the community pasture were sprayed twice in the summer of 1948 with exceptionally good results.

Most of the grade A dairy barns in the county did a complete pest control job on their premises and had very good control until late in the summer at which time the DDT had apparently lost its effect for some reason or another. Some people surmised it might be the breeding of a resistant strain of flies; others felt that it was an old product of DDT but no definite fact has been learned as to the re ason for its lack of control.

A new product was tried by the name of Marlate with 50% methoxychlor compound with very good results in one dairy barn and one slaughterhouse with exceptionally quick kills lasting until frost eliminated the need for fly control.

Early spraying for lice has been urged by the agent for the past three years. This year a great deal of early spraying was in evidence. The Moffat Co. has placed a spray dip machine at the mouth of the loading chute at the railroad yards and spray all the animals as they are unloaded from the cars before they are placed in the feed lots. Moffat still believes in use of 50% wettable DDT for lice control. A few thousand head of cattle have been sprayed by other operators with benzine hexachloride with very good results.

C
O
P
Y

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

Kerrville, Texas

May 9, 1947

Mr. Mark W. Menke
County Extension Agent
Elko, Nevada

Dear Mr. Menke:

Thank you for your letter of April 25 and also for sending me the 3rd instar Hypoderma larvae which you removed approximately two weeks after the infested animals were dipped in the rotenone suspension.

The larvae in question were at least 25, or possibly 30, days old and were definitely present when the animals were dipped. It is obvious, therefore, that the larvae were not all killed by the dip; but this has been found to be quite common when animals are dipped in rotenone suspension for the control of cattle grubs. We have never been able to get 100% kill of all the cattle grub larvae in the backs of animals by any method of treatment, including dipping of animals. For some reason or other, some larvae will always escape thorough treatment, even the most thorough treatment applies by experienced operators. We often get close to 100% kill, but I doubt that this is ever accomplished under the average ranch methods of treating cattle.

With reference to the suitability of rotenone in dipping vats, I should like to state that although the rotenone-sulphir suspension often becomes contaminated with decaying organix matter and develops a very offensive odor, it does not deteriorate or become ineffective in a period of one month or longer. I personally conducted a test to discover the longevity of rotenone suspension in dips and our results show that the material was just as effective in the fourth dipping as in the first. In this case we merely supplied the amount of expended material during the previous dip by the same formula just before dipping the next time. The dip finally became almost balck and had a definitely hydrogen sulphid odor, but as mentioned above, it apparently did not reduce the effectiveness so far as the rotenone was concerned.

I am not in a position to give you information on the effectiveness of the so-called spray-dip machines because we have never tested them for the control of cattle grubs. The principle upon which they are built is good, however, and I believe that if the animals are retained in the chute for a sufficient length of time, even though the pressure of the spray is rather low, relatively good results should be obtained with these machines.

What is of advantage for treating animals with this machine for cattle grubs is that they can also obtain a control of all species of lice at the same time that the animals are treated for grubs. If the second treatment is made approximately 15 or 16 days after the first treatment, a reduction of all species of cattle lice should be accomplished.

You and all the county agents, and especially Mr. Buckman, deserve to be commended on the fine work you are doing on the control of the external parasites of animals. You have made a wonderful start and I know that you will be able to continue to enlarge your program as soon as the stockmen become familiar with it and learn of the good results they will obtain.

Very truly yours,

Sgd/ E. W. Laake
Entomologist

cc: Mr. Thomas E. Buckman
Asst. Director of County Agents
University of Nevada
Reno, Nevada

July 15,1948

PERMITTED LIME-SULPHUR DIPS FOR CATTLE AND SHEEP

Name of Dip	Gallons of dip	Gallons of water Cattle	Sheep
The Adams Lime and Sulphur Dip	1	15	20-1/4
The Anchor Brand Lime and Sulphur Dip	1	13	17-1/2
Bremco Dip	1	15	20-1/4
Curtis-Folse Lime and Sulphur Soltuion	1	15	20-1/4
Cooper's Lime-and-Sulphur Dip	1	15	20-1/4
Devoe Lime and Sulphur Solution	1	14-3/4	20
Dow Lime Sulphur Solution	1	14-3/4	20
"DuPont" Lime Sulfur Solution	1	13-1/2	18-1/2
Eckman's Lime Sulphur Solution	1	15	20-1/4
"Flag Brand" Lime Sulphur Solution	1	13	17-1/2
Jen-Sal Lime and Sulphur Solution	1	15	20-1/4
Lariat Cattle Dip	1	15	20-1/4
Latimer Lime-Sulphur Solution	1	15	20-1/4
Lilly's Lime and Sulphur Solution	1	13-3/4	18-1/2
Maas Lime-Sulphur Solution	1	15	20-1/4
Miller's Lime and Sulphur Dip	1	14	19
Norden Lime and Sulfur Solution	1	15	20-1/4
Orchard Brand Lime and Sulphur Solution	1	15	20-1/4
Ortho Sprays Lime-Sulfur Solution	1	14-1/2	20
Peak Brand Lime-Sulfur Solution	1	14-1/2	19-3/4
Perfection Lime and Sulphur Dip	1	15	20-1/4
Rex Lime and Sulphur Solution	1	15	20-1/4
Richards' Lime and Sulphur Dip	1	9-3/4	13-1/4
Sherwin-Williams Lime-Sulphur Solution	1	13	17-1/2
Sherwin-Williams No. 15 Cattle Dip	1	15	20-1/4
Shur-Shot Cattle Dip	1	15	20-1/4
S.J. Brand Lime-Sulphur Solution	1	15	20-1/4
Springdale Brand Lime-Sulphur Solution	1	15	20-1/4
Union Lime and Sulphur Solution	1	14-1/4	19-1/4
Yakima Lime-Sulphur Dip	1	14	19

(DRY LIME-SULPHUR)

Acme Dry Lime Sulphur)
Amvet Dip)
Devoe Dry Lime and Sulphur)
Devoe & Reynolds Dry Lime Sulphur) For cattle 32 lbs. to 100 gallons water
Dow Dry Lime Sulphur) For sheep 24 lbs. to 100 gallons water
Green Cross Scab Dip)
Killmange)
"Kilscab")
Scabex)
Scabi Dip)
Sherwin-Williams Dry Lime Sulfur)

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEVADA

UNIVERSITY OF NEVADA
AGRICULTURAL EXTENSION DIVISION
AND
U. S. DEPARTMENT OF AGRICULTURE
COOPERATING

EXTENSION SERVICE
COUNTY AGENT WORK

September 28, 1948

To - Agricultural Extension Agents
From - Thomas E. Buckman, Assistant Director for County Agent Work
Subject - Control of cattle louse by dipping

Supervisory Circular Letter No. 14

Dear Extension Agents:

Most of you will not be interested in dipping cattle to control the cattle louse, but I am certain that you will find the contents most interesting and instructive regarding the materials that can be used successfully and with safety in controlling this pest. Dr. Laake's comment regarding research needed on some materials will also be of interest.

Those of you who were not at the livestock spraying demonstration meetings held two years ago in Western Nevada and did not have the opportunity of meeting Dr. Laake, should feel free to contact him by letter as he will be glad to assist you with subject matter.

"P.O. Box - 232 - Kerrville, Texas
September 21, 1948

"Mr. Mark W. Menke
County Extension Agent
Elko, Nevada

Dear Mr. Menke:

I have your letter of September 13, requesting information on the control of the cattle louse by dipping. I note that you are interested in organizing a program to dip many thousand head of cattle during the months of October and November if effective control can be obtained from one dipping.

Excellent control or even eradication of all species of cattle lice with one dipping has become a reality when some of the new chlorinated hydrocarbon insecticides are properly used. In our experimental work here at the

station and in other parts of Texas, we have obtained eradication of all of the common species of lice with one dipping of DDT, BHC, chlorinated camphene and chlordane, and probably also in the methoxy analog of DDT and DDD. Inasmuch as our Bureau and the Department of Agriculture has not yet recommended all of these materials for civilian use, I would hesitate to recommend them for your use, but you know, of course, that we do recommend DDT for civilian use and also recommend the use of BHC and chlorinated camphene for experimental purposes.

Rather extensive experiments and work with BHC have indicated that this material kills both eggs and motile stages of lice with one dipping, when used at a concentration of 0.25%. The various kinds of BHC now on the market differ somewhat in their gamma isomer content. The material which I am referring to should be a wettable powder containing 50% BHC and 6-7% gamma isomer. Some of the material now on the market or coming on the market shortly is composed almost entirely of the gamma isomer, which is the active isomer in benzene hexachloride. In the event you should use a powder composed only of the gamma isomer, you should be very careful because it is highly toxic to livestock when used in high concentrations. When the gamma isomer is used alone instead of the mixed isomers, the concentration for treating domestic animals should never exceed 0.025%. This is approximately the concentration of the gamma isomer when the wettable BHC is used in a concentration of 0.25%.

Both DDT and chlorinated camphene have also given very excellent results, on all species of lice when used at a concentration of 0.50% wettable powder or emulsion. Neither of these materials is an ovicide, but the residue left on the animal continues to kill the young which hatch from the eggs subsequent to treatment, until all the eggs have hatched that were on the animal at the time of the initial treatment.

At least we feel sure that we can obtain eradication with one treatment with either of these materials, so long as we do a thorough job of treatment under natural envrionments as they occur in our state. I do not believe that environments in Nevada are so different that you would not obtain the same results there that we obtain here with these materials. In view of this I believe you would be entirely safe in recommending either DDT or chlorinated camphene either in emulsion or wettable powders as a control for all species of cattle lice. However, in the event you use chlorinated camphene, please be careful to point out to all livestock owners who plan to use this new material that they should not use it at a concentration greater than 0.50%, and under no conditions should they dip or

treat young calves, that is, animals under three months of age. Recent work has shown that although chlorinated camphene is quite safe when used in concentrations as recommended above for grown animals, it may be injurious to small calves, especially very young calves.

Please remember that our Bureau and Department is recommending DDT for civilian use, not only for louse control, but for many other purposes, but that we still consider BHC and chlorinated camphene in the experimental stage. We admit, however, that both of these materials are at least equal or superior to DDT for the control of lice, but we need more research in order to recommend the best possible formulation and concentrations for application to livestock.

I am sending a copy of this letter to Mr. Buckman for his information.

Yours very truly,

/sgd/ E. W. LAAKE, Entomologist"

Very truly yours,

Thomas E. Buckman

THOMAS E. BUCKMAN,
Assistant Director for
County Agent Work

TEB/mg
Copies to Director C. E. Fleming
M. R. Miller, Chemist
Agricultural Experiment Station

UNITED STATES DEPARTMENT OF AGRICULTURE
Extension Service
Washington 25, D. C.

REPORT OF REGIONAL CONFERENCE ON LIVESTOCK AND CROP PEST CONTROL

Chicago, Illinois
June 24-26, 1948

The conference held at Chicago was called by the Cooperative Extension Service in cooperation with the Bureaus of Entomology and Plant Quarantine, Animal Industry, Dairy Industry, Plant Industry, Soils, and Agricultural Engineering, and the Office of Food and Feed Conservation. Three representatives from each of the 12 States in the area attended the meeting. Those present represented various groups interested in livestock and crop pest problems, including entomologists, animal husbandmen, dairy husbandmen, veterinarians, and agronomists from various States and from the United States Department of Agriculture. Workers in extension, research, and regulatory activities were also present.

Mr. Karl Knaus was chairman of the conference. Committees were appointed to prepare a report of the major topics discussed. The discussions, which were informal, covered developments and problems in the animal and crop pest fields, including those in research, control, and extension.

In general, insufficient time was available to discuss all important aspects of the many problems and to prepare detailed reports of the conference. However, rather thorough discussions were held on the control of cattle grubs, lice, flies, several important internal parasites, crop pests, and equipment for the application of insecticides and weed-killing agents.

The report that follows is a brief resume of the conference. The recommendations prepared by the committees were discussed and approved by the group in attendance.

SOME GENERAL STATEMENTS CONCERNING THE NEW INSECTICIDES AND NEW METHODS OF APPLICATION

The days are gone when farmers and cattlemen had to be talked into trying new materials and methods as a result of research. Now they are eager and ready to use anything, whether it has fundamental research behind it or not.

Research has been hard pressed to keep ahead of manufacturers, processors, and salesmen. This has been especially true for the insecticides - DDT, TDE (DDD), BHC, methoxy analog of DDT, chlordane, chlorinated camphene, and pyrethrum-synergist combinations that may be useful in combating external parasites of livestock.

The development of machinery for the application of insecticides to livestock and plants has been phenomenal and revolutionary. However, there is still much research to be done. Work is needed on all kinds of dusting and spraying equipment, including airplanes, ground power, and hand-operated units. Special attention should be given to the development of suitable spray guns, booms, and nozzles. Such problems should be given special attention by manufacturers and research stations.

There are literally hundreds of custom spray operators available to undertake any kind of pest control needed on the farm.

In consideration of the control of flies - horn flies, stable flies, house flies, lice, internal parasites, and other pests on livestock, in barns, and in the home, further research on all the newly developed chemicals is needed.

State entomologists and parasitologists should be responsible for recommendations within their States. Representatives of cooperating industry are urged to comply with such recommendations.

We further urge that processors, distributors, and those who do custom spraying of livestock, buildings, or crops conform to the approved recommendations for each State.

REPORT ON CATTLE GRUB CONTROL

A. Present Research

The Bureau of Entomology and Plant Quarantine reports no new and unpublished developments in control. Rotenone is still the only insecticide effective against grubs.

Benzene hexachloride, chlordane, chlorinated camphene, DDT, parathion, and other new insecticides were tested, with poor results. Various formulations of rotenone (emulsifiable extracts, impregnated dusts) were not as good as ground root. Tests are under way to see if over-all spray with the new insecticides will kill eggs or larvae or discourage oviposition by adults. Research is also under way on internal administration of drugs to kill larvae.

Dr. Gunderson, of Iowa, reported results as follows: 300 pounds - pressure without wetting agent - 95 percent control; 75 pounds - 50 percent control; dusts - 87-90 percent control.

Dr. Severin reported that South Dakota had run weight-gain tests on limited numbers of cattle for 2 years. Five different types of treatment ranked as follows (maximum gain on sprayed cattle - 2.47 pounds per day.):

Grub-free	- 4, 3
Sprayed	- 1, 1
Dusted	- 5, 4
Currier	- 3, 5
No treatment	- 2, 2

Automatic currying machines gave very poor control in Iowa, South Dakota, Kansas, and Nebraska. Widespread use of DDT on cattle for fly control has caused no perceptible decrease in cattle grub infestations.

B. Distribution

Hypoderma lineatum - apparently over practically the entire United States.

Hypoderma bovis - spreading over the United States. It is common in Northern States and has been reported from Oregon, Idaho, Nevada, Utah, California, Tennessee, Missouri, Virginia, and North Carolina. In South Dakota it is more abundant than Hypoderma lineatum.

C. Control Practices

Where only Hypoderma lineatum occurs, two or three treatments have been recommended. South Dakota set up an area test involving 6,500 head of cattle sprayed four times (began February 10-15). County agents report very little fly activity where isolated herds were treated four times, but much fly activity when three treatments were made. The activity was possibly due largely to Hypoderma bovis. Where both Hypoderma lineatum and Hypoderma bovis are present, five treatments will probably be needed.

High-pressure sprays ranging from 250 to 600 pounds are most widely used. Dust and washes are employed to a lesser extent.

D. Cattle Grub Legislation

Dr. H. R. Smith, of the National Livestock Loss Prevention Board, reported that Congress had passed a bill authorizing appropriations for for area clean-up demonstrations and for research. Although funds have not yet been appropriated, they are expected to be available by January 1, 1949. It was the opinion of the group that clean-up could start with 90 percent cooperation of the livestock growers, but that more complete cooperation should be the goal.

Several States already have a start on area clean-up. Nebraska, Kansas, and Iowa have one or more counties treating 85 to 97 percent of the cattle now. These percentages represent the number receiving one or more treatments. Dr. Foster, of the Bureau of Animal Industry, reported that in a 100-square-mile area in Colorado where intensive control was carried out there was a reduction of 70 percent in infestations after one year, and 85 percent in two years.

Dr. Kelly, of Kansas, remarked that reinfestation occurs through shipped-in grubby cattle. This points up the need for wide cooperation between States. The group stressed the need to use money for concentrated work in small areas.

E. Needed Research

1. Effect of wetting agents on sprays applied at various pressures.

mentioned. Chlorinated camphene, in general, has proved most effective, giving apparent complete control in some tests at 0.05 percent concentration.

3. Cattle lice

a. Representatives of several States reported that adequate louse control was not obtained by the ordinary DDT applications made for horn fly control.

b. The Bureau of Entomology and Plant Quarantine reports that one treatment with 0.5 percent concentration of the different chlorinated hydrocarbons, either emulsions or wettable powders, gave good control where the animals were wet thoroughly. BHC, in general, seems most effective, Pyrethrum at 0.005 percent concentration and piperonyl butoxide at .1 percent killed motile forms but did not give complete control with one treatment.

B. Recommendations for Controlling Cattle Lice. (See report on other external parasites for lice on other livestock.)

1. A thorough treatment with 0.5 percent DDT wettable powder in water (8 pounds of 50 percent wettable powder for 100 gallons of water) is recommended as a dip or spray for control of cattle lice. The wettable is recommended in preference to emulsions.

2. A thorough application at the time of the last treatment for horn flies is suggested. Particular attention should be given to wetting such areas as the brisket, ears, tail, and underline.

3. A 10 percent DDT dust, 6 to 8 ounces of dust per animal, may be used. A second treatment about 3 weeks later is required.

4. Rotenone is also recommended for control of cattle lice, when employed as a dip or spray, as follows:

As a dip use the old standard of 10 pounds of 5 percent cube or derris powder and 100 pounds of 325-mesh wettable sulfur to each 1,000 gallons of water. Two applications at 14 to 18-day intervals are necessary.

As a spray, use the same concentration employing 1 pound of 5-percent cube or derris powder to 100 gallons of water for power sprayers. Make 2 applications 14 to 18 days apart.

5. BHC is effective but is still in an experimental stage. If it is employed, restrict its use to beef animals (not including small calves) and at concentrations not to exceed 0.05 percent gamma isomer or about 0.5 percent of technical BHC, employing wettable powders only. If young calves less than 3 months old are treated do not exceed .025 percent gamma isomer spray or dip.

REPORT ON FLY CONTROL

A. Current Research

1. Horn flies

Dr. Knipling reviewed briefly the results of recent studies to determine the relative effectiveness of various new materials for fly control. Studies on horn flies were conducted during 1947 in Kansas and Missouri in cooperation with the experiment stations and extension services in those two States and with the National Livestock Loss Prevention Board. Tests were also conducted on herds in the vicinity of Kerrville, Texas.

Good control of horn flies employing wettable powders at 0.5 percent concentration was obtained with DDT, TDE, chlorinated camphene, chlordane, and the methoxy analog of DDT; however, some were indicated to be slightly more effective than others. DDT and chlorinated camphene in general were most effective and gave about the same results. Chlordane, which was tested less extensively, was slightly inferior to DDT when used at 0.25 percent concentrations. TDE and methoxy analog of DDT in general were about equal and somewhat less effective than DDT. Although the effectiveness of treatments varied in different localities, about 1 month's protection resulted with DDT and chlorinated camphene. TDE and methoxy analog of DDT were effective on the average for about 25 days. No significant difference has been shown in the effectiveness between wettable powders and emulsions employing DDT or the other insecticides.

Dr. Kelly discussed the Kiowa County county-wide horn fly test under way in Kansas. This large-scale horn fly control demonstration project is being carried out jointly by the Kansas Experiment Station and Extension Service, the National Livestock Loss Prevention Board, and the Bureau of Entomology and Plant Quarantine. Practically all cattle and barns in Kiowa County were treated with DDT for fly control. The test has not progressed sufficiently to determine results, but a united effort in the treatment of cattle seems to be definitely advantageous in prolonging the effectiveness of a single DDT treatment for controlling horn flies.

2. Other flies

No outstanding new developments in controlling tabanids was reported. The variation in results reported by different workers when BHC and other insecticides are applied to livestock for tabanid control was discussed. In some cases treatment with these materials seems to offer fairly satisfactory results, but in others they have been of little value. In the Southeast, BHC and methoxy analog of DDT or combinations of the two have shown considerable promise. The pyrethrum-piperonyl butoxide combination has also shown promise for temporary protection. DDT is still the outstanding residual insecticide for flies in barns. The methoxy analog of DDT is probably the next best material for this purpose according to studies reported by the Bureau of Entomology and Plant Quarantine.

All members present recognized the need for more research with the various new materials and other methods of control for flies, especially the tabanids.

B. Recommendations

1. In view of the questions that have arisen regarding toxicity hazards of DDT in milk, the committee urges that minimum amounts of DDT be applied to dairy cows consistent with satisfactory fly control. Concentration and amounts of DDT to apply should be in accordance with State recommendations. Available information on the toxicology of the methoxy analog of DDT suggests that this material is of a low order of toxicity to warm-blooded animals. Studies conducted thus far also indicate that little or none of the insecticide when applied to dairy animals is secreted in milk. Therefore, if toxicologists conclude that DDT in milk is hazardous to the health of man or animals the committee suggests the methoxy analog of DDT as a possible substitute for the control of horn flies on dairy animals.

2. The continued use of DDT, thoroughly applied to buildings and other places where flies rest, is recommended for house fly and stable fly control. Sanitation to reduce breeding areas should be practiced and stressed as a necessary adjunct to chemical control.

3. DDT and some of the other new insecticides have not been found to be effective in the control of horse flies and deer flies for more than a few days. Under certain conditions this seems to reduce the severity of these insects; however, no general recommendations can be made at this time.

4. In treating cattle for fly control it is urged that one thorough treatment be made in the fall to control lice following recommendations outlined under louse control.

REPORT ON MEDICATION FOR INTERNAL PARASITE CONTROL

Inasmuch as most materials used in controlling and elimination of internal parasites in livestock are a poison, the amounts required to expel the parasites and yet not harm the animal should be known. Proper methods of dosage and recommended amounts must be adhered to for optimum results.

A. Phenothiazine for the Removal of Worms in Cattle, Horses, and Sheep.

Phenothiazine is the most used of all worming agents in the livestock field.

1. Cattle

The drug of choice for the removal of stomach and intestinal roundworms is phenothiazine. The dose is 20 grams per hundredweight, the total dose not to exceed 60 grams, administered in capsules or boluses, as a drench or in feed. Probably the best control comes from treating calves, yearlings, and 2-year olds immediately before each grazing season. Caution: The drug should not be given to dairy cows on account of an excretion of a dye in the milk. Mature cattle rarely suffer from parasitism.

2. Horses

Phenothiazine is the most effective drug known for controlling strongyles. Horses, however, are somewhat susceptible to intoxication. Constipation must be guarded against. Animals should be on an adequate protein and adequate calcium diet.

Dosage: Dosage of 30 grams for animals of average size is safe and may be given by the method of preference. The safest method consists of giving 5 grams daily in the feed for 6 days.

For most effective control of strongylosis, animals may be treated once each season before being put on clean pastures.

Young stock may be given a first treatment at 6 to 8 months of age.

3. Sheep

The most useful drug for controlling gastrointestinal roundworms in sheep is phenothiazine.

Dosage: Doses of 25 grams (about 1 ounce) are used for adult animals and 15 grams (about $\frac{1}{2}$ ounce) for lambs under 60 pounds. Treatment may be given in capsules, boluses, as a drench, or in feed.

The free choice of a mixture of 1 part phenothiazine (by weight) in 9 to 14 parts of salt (by weight) is an effective control measure. Weekly salting with 1 part of phenothiazine and 7 parts of salt may be useful where weekly salting is practiced.

Caution: Ewes should not be treated during the last month of pregnancy.

From the research standpoint, the most important practical problem concerning the use of phenothiazine in horses and cattle is the possible application of the method of free choice administration in salt or mineral mixture. The best free choice mixtures appear to be those that contain about 4 percent phenothiazine (instead of 10 percent) in loose salt or mineral mixtures. Such mixtures may be kept before grazing animals (horses and calves) almost indefinitely without intoxication. The method effectively controls parasitism in 75 to 90 percent of the animals; it should be employed only when the user assumes the responsibility of seeing to it that the system is effective in individual cases.

B. Removal of Roundworms in Swine

To date sodium fluoride is the most effective worming agent for removing roundworms from swine. Oil of chenopodium is about 75 percent effective, phenothiazine about 50 percent effective, and sodium fluoride 95 percent effective.

Sodium fluoride has all the advantages of ease of administration that phenothiazine has, plus nearly twice the efficiency.

Dosage: The chemical is administered in dryground feed at a concentration of 1 percent for 1 day. Extensive experience to date indicates that this is a safe, effective, simple, and economical method of medication. One pound of sodium fluoride should be mixed with 99 pounds of dry ground feed. This treated feed should be fed as a dry feed for a period of 1 day. To control roundworms, growing pigs should be treated once after weaning and asecond time about 2 months later.

Caution: Do not starve pigs the day before feeding treated feed. Be sure the feed is well mixed and fed in a dry feed. Do not treat pigs that are scouring or sows that are pregnant.

Milk fed to the extent of producing a diarrhea will expel worms in swine. Milk can be fed for 3 successive days or fed once a day for 3 weeks.

LEAD ARSENATE FOR THE REMOVAL OF TAPEWORMS IN SHEEP

Tests on about 4,000 animals shows that doses of 1/2 to 1 gram of lead arsenate were well tolerated by lambs, that such doses removed tapeworms, and the result was beneficial to the health of the treated animals.

The treatment must be regarded as in the experimental stage. Further information is needed on the occurrence of lead and arsenic in the tissues of treated animals (these are dangerous elements in human foodstuffs) and on the need of lead and arsenic in the molecule.

REPORT ON OTHER EXTERNAL PARASITES

A. Screwworms

Smear 62, as developed by the Bureau of Entomology and Plant Quarantine, is available and should continue to be used against screwworms. Smear 82 is equally effective. These treatments should be applied to wounds of uninfested animals to prevent infestations. Wounds should be treated twice a week until healed.

In addition to chemical control of infested stock on farms, emphasis should be placed on inspection and treatment of infested animals shipped from infested areas.

B. Fleeceworms

The fleeceworm treatment still recommended by the Bureau of Entomology and Plant Quarantine consists of:

10 percent diphenyl.
1 percent triton x 70.
5 percent N-butyalcohol.
84 percent benzol.

Research indicates that several of the new chlorinated insecticides at a concentration of 2 percent are superior to 10 percent diphenyl in protecting animals from reinfestation. Among these are BHC, DDT, chlordane, and chlorinated camphene.

C. Lone Star Tick

The Bureau of Entomology and Plant Quarantine reported that DDT sprays at concentrations of 2.5 percent or lower are not completely effective against engorged forms of the lone star tick, but concentrations as low as 0.75 percent thoroughly applied will kill flat stages and will provide 2 and 3 weeks' protection against reinfestation. However, benzene hexachloride at a concentration of 0.025 percent gamma isomer kills all stages of ticks. Research results indicate a kill of all stages and 2 to 3 weeks' protection when animals are treated with 0.75 percent DDT in combination with 0.025 percent gamma isomer BHC. At present, BHC or combinations of this insecticide with other materials are still considered in the experimental stage. Any use of BHC at present should be restricted to animals (avoid treating young calves) not producing milk for human consumption. Chlorinated camphene and chlordane are more effective than DDT in killing the lone star tick but their use is not recommended at this time because of possible toxicological effects.

Ticks in grassy areas - The control of ticks on grass, shrubs, trees, and in camping areas may be obtained by using 2 to 3 pounds of technical DDT, chlordane, or chlorinated camphene per acre applied as a spray or dust to margins along paths and grassy areas where infestations exist.

D. The Winter Tick

The winter tick shows about the same degree of resistance to the insecticides mentioned as does the lone star tick. However, the same materials provide much longer protection against reinfestation. DDT sprays containing from 0.5 to 0.75 percent DDT will protect animals from reinfestation for about one month. Although their use is not recommended at this time, chlordane and chlorinated camphene at similar concentrations will protect for about 2 months.

E. Brown Dog Ticks

Good control of dog ticks can be obtained with DDT treatment of infested premises and on animals. Building treatment requires thorough coverage of walls, baseboards, and casings with 5 percent DDT in an odorless kerosene and a 10 percent DDT powder blown into cracks. On dogs a 10 percent powder is effective if repeated treatments are made, though engorged ticks possess more resistance to the material than flat ticks. Benzene hexachloride rapidly kills all stages but does not have prolonged residual effect. One percent rotenone in the dust or wash is also effective against ticks on dogs.

F. Sheep Tick (Keds) and Sheep and Goat Lice

Research has revealed several materials effective against sheep ticks and sheep and goat lice: (1) Rotenone dip at the rate of 1/2 pound of 5 percent rotenone-bearing powder (ground root) per 100 gallons of water is highly effective and the most economical treatment; (2) DDT dip prepared as emulsion or suspension at a concentration of 0.2 percent DDT is also highly effective; (3) BHC dip at the rate of 0.025 percent gamma isomer. A single treatment with any of these results in complete kills and suggests the possibility of complete eradication.

When dipping is not considered practical, spraying or dusting may be used. A 0.5 percent DDT spray, properly applied with a power sprayer, has produced good results. Rotenone dust containing 0.5 percent rotenone applied with a power duster has also given satisfactory results.

G. Sheep Scab

Nicotine and lime sulfur are the only official recommendations for sheep scab, and quarantine regulation remains an essential for control. Experimental work with benzene hexachloride indicates that it is very promising for scab control.

H. Hog Lice and Mange

1. Spray with 0.5 percent DDT when lice appear, using 8 pounds of wettable powder to 100 gallons of water. One thorough treatment is sufficient.

2. Benzene hexachloride can also be used effectively for the control of hog lice at a suggested concentration of 0.25 to 0.5 percent technical or 0.025 to 0.05 percent gamma.

BHC is also effective against mange but should not be used in excess of 0.25 percent gamma isomer. It should not be applied later than 60 days prior to marketing or less than 30 days prior to farrowing.

3. Crankcase oil will also control lice and mange. Chlorinated camphene and chlordane have been used successfully but are still experimental.

I. Sheep Head Bot

Control of sheep head bot is obtained by injection of a 3 percent aqueous lysol solution into the nasal passages under pressure (see references for procedure and equipment).

J. Poultry Lice

1. Sodium fluoride, 1 ounce to 1 gallon of water should be used as a dip (pinch method used in cold weather).

2. DDT as a 5 to 10 percent dust is also effective.

Poultry ticks and mites: Treat house, roost, nests, and posts with residual application of DDT (5 percent in kerosene or as an emulsion or 2½ percent wettable powder) for control of ticks, bedbugs, mites, fleas, and flies.

K. Mosquitoes

The use of recommended applications of DDT for buildings and livestock will aid in the control of mosquitoes.

EQUIPMENT

Power spray equipment for farm use is of two general types, namely the low-pressure type commonly used in weed control, and the piston-type sprayers commonly used in orchard spraying.

The gear-type equipment is designed for low-pressure and low-volume spraying, and many of the units now being manufactured are attached to the power take-off of tractors. Thousands of such units are now being used on farms throughout the Middle West.

It was generally agreed that the conventional piston-type sprayers had ample pressure and were suitable for all types of weed and insect control work. Such machines have the disadvantages of being expensive, cumbersome, and difficult to transport from place to place. Another factor to be considered is the difficulty of removing 2-4,D residues, especially from wooden tanks, if the machine is to be used for spraying crops susceptible to 2-4,D injury. For these reasons, it was thought that no one type of sprayer was entirely satisfactory and practical for both weed and all types of insect control.

Some workers reported satisfactory fly control on dairy cattle and in buildings with gear-type equipment, but it was agreed that at least 400 pounds pressure was necessary for most satisfactory cattle grub and sheep tick control. Pressures higher than those normally obtained from the gear pumps is also desirable for spraying range cattle, mainly because of the time element involved. It was pointed out that the abrasive materials in wettable DDT powder seriously affected the gears of some low-pressure units, and the emulsifying agents in oil emulsions might adversely affect those units that had rubber-type gears.

In insect-control work, the gear-type sprayer will operate with less difficulty if coarse straining screens are used. There is considerable research under way involving the use of concentrates for insect control. If such materials prove effective, they will increase the use of low-pressure equipment, especially against field crop insects.

In view of these factors, it would be best for the farmer to recognize the need for both types of equipment until all-purpose units are developed. Purchasers of equipment should carefully study the uses to which the machine will be put and acquire equipment that will most nearly fulfill these needs. In the absence of farmer-owned equipment, custom spraying may well serve a useful purpose in solving specific problems.

The group strongly recommends a well-planned and intensive research program to develop suitable equipment for various types of farm spraying. Such research should include a study of pumps, motors, nozzles, and screens and should be carried on in cooperation with persons having a good knowledge of the engineering principles involved.

GENERAL STATEMENTS ON THE TOXICITY OF INSECTICIDES

The toxicity of the new chlorinated compounds to animals and especially to human beings who consumes the meat or milk from such animals must be considered in connection with their use. Thus far, relatively few cases of harmful effects to livestock have been observed where the chemicals were used according to directions and in the minimum amounts adequate for insect control. In addition, no authenticated cases of toxicity to human beings are known, after the use of any of the chlorinated compounds to control insects. Chlorinated camphene in the hands of stockmen has killed young calves when used for livestock pest control. Experimentally, toxic symptoms have been produced in young calves receiving a single thorough treatment with a 1.5-percent spray, whereas older animals have shown no toxic effects when treated a number of times with even higher concentrations. Chlordane has killed cattle that were thoroughly treated with 2-percent spray at 2-week intervals, which is considerably in excess of that needed for controlling various pests. However, insufficient information is available to determine possible adverse effects at lower concentrations.

Even though in most cases the chlorinated compounds have had no evident detrimental effect upon livestock, nevertheless it is known that the insecticides or some related products are deposited in varying amounts in the fatty tissues or butterfat of treated animals. The amounts deposited in animal tissues when the insecticides are employed in quantities needed for pest control have not been determined. Studies have been conducted to determine the amounts of insecticides secreted in the milk of dairy animals treated for horn fly control. It is known that DDT and TDE are secreted in milk in small quantities. In the case of DDT the amounts are about the same whether wettable powders or emulsions are applied. The possible critical health hazards of these deposits and secretions to human beings are not yet known. Apparently, concentrations of some of the chlorinated compounds in meat and milk persist for a considerable period and are dissipated gradually after the animal is treated or is taken off insecticide-treated feed.

Of the materials that have been tested, methoxychlor has produced the least accumulations of organic chlorine in milk. The amounts of chlorinated camphene, chlordane, and benzene hexachloride secreted in milk have not been definitely established.

There have been reports of off-flavor in meats caused by the use of benzene hexachloride on animals. Few, if any, of the cases can be authenticated when the insecticide has been used in amounts necessary for controlling livestock pests. However, more taste tests of meats from various classes of animals treated under diverse conditions must be made before definite statements can be made in this respect.

In general, it may be said that much additional research is needed on the toxicology of the various new insecticides. More information is needed in particular to determine the relative susceptibility to insecticides of different age groups of various kinds of livestock, chronic effects of repeated treatments of low concentration, toxicity of different types of formulations, amounts of insecticides stored in animal tissues and secreted in the milk, and possible tainting of animal products from treated animals. In view of these many complicating factors it seems desirable to move slowly in recommending new materials for general use in the livestock pest field, even though some of them are known to be highly effective for controlling livestock pests.

INSECTS ATTACKING FIELD CROPS

A. European Corn Borer

A review of the general recommendations of the Peoria conference, subject to local area modifications, was generally accepted by the group. Since these recommendations are now in the hands of all entomologists concerned and are also available to others on request to W. G. Bradley, Toledo, Ohio, or to the Bureau of Entomology and Plant Quarantine, Washington 25, D. C., they are not included in this report.

The office for Food and Feed Conservation's program on the European corn borer was developed to supplement State facilities and endeavors on educational and demonstrational procedures in the four States most seriously involved--Illinois, Iowa, Minnesota, and Wisconsin. The consensus of those present was that this and other phases of the OFFC program were of material aid in meeting problems of each State as encountered.

The committee recognizes that the full damage potential of the European corn borer may not be realized this season. Even so, results obtained to date indicate the value of an enlarged educational program in acquainting farm operators with adequate means of determining individual corn borer problems and the associated need for control procedures. This provides effective conservation and adequate distribution of insecticides throughout the area and also gives farmers confidence in similar entomological procedures for the future.

Brief discussions among the group covered a progress report on studies in varietal resistance to the European corn borer, cultural practices, and local experiences in insecticidal control.

B. Alfalfa Insects

The Alfalfa weevil appears to be moving eastward out of the Black Hills area of South Dakota, where it has been established for some time. Severin reports effective control with either toxaphene or chlordane as used for grasshoppers.

With regard to other alfalfa insects, a question regarding the use of low-volume, low-pressure sprayers remained unanswered. Kelly reported good control of webworm by the use of 2 pounds each of DDT and BHC in 50 gallons of water per acre. Nebraska results against webworm and lygus bug were satisfactory with 20 to 25 pounds of 10-percent DDT dust. Kelly reported briefly on a Kansas station study, which indicated that alfalfa plots sprayed with DDT showed much more uniform blossoming, with the bloom completed in 16 days, as compared with almost continuous bloom on unsprayed plots.

Michigan recommends 1½ pounds of actual DDT per acre on alfalfa, but Jones cautioned that seed yield increase will vary greatly, depending on varying insect infestations.

Gunderson reported excellent yield increases of alfalfa seed from spraying, but poor or inconsistent increases on red clover in Iowa. Sooter observed that adequate pollinating insects were a most important item and that careful use of insecticides appeared to be relatively noninjurious to pollinators.

Parks reported extensive damage from clover root borer in Ohio, but that fall applications of DDT provided effective control for the following season.

Caution in washing 2,4-D from sprayers was advised by Strahler. The use of distillate, soapy water, and thorough rinsing are indicated. 2,4-D probably cannot be cleaned from wooden tanks in a satisfactory manner to permit the use of the machine on susceptible crops such as beets or tomatoes.

C. Chinch Bugs

Infestations of chinch bugs are generally not important this season. Bugs were very abundant in Kansas early in the season, and there was heavy egg deposition on barley. However, timely rains practically eliminated them just after hatching. Preparations for barrier construction were made, but were not generally needed. Quisenberry reported promising results in the development of varieties of barley and sorghum resistant to chinch bug.

D. Hessian Fly

The Mida variety of hard spring wheat shows excellent resistance in North Dakota, but not in Wisconsin. Likewise, Pawnee winter wheat is reported widely grown and very resistant in Kansas, except in the southeastern counties. Pawnee is not too resistant in Iowa. These differences appear to be due to different strains of the insect.

Volunteer grain in legume seedings serves as host reservoir and complicates control. Winter barley, requiring early seeding, is also a favorable host and complicates delayed seeding recommendations. Resistance studies are continuing, with several varieties of winter barley showing marked resistance. Sources of resistance for all strains of the fly now

appear available. Incorporating these various resistance factors into acceptable varieties is a major endeavor now under way.

E. Grasshoppers

Gunderson reported hoppers abundant, especially in the south half of Iowa. He is planning no baiting program, but recommends farmer purchase of effective insecticides for crop protection. This can be accomplished with reasonable cost if applications are made early to concentration areas.

The consensus is that chlordane and toxaphene give excellent hopper control if used as recommended. (See Bureau of Entomology and Plant quarantine Circular E C 1, 1948.)

A question regarding the use of 2, 4-D and chlordane together on roadsides for weed and grasshopper control was unanswered. The committee recommends general trial of this combination in appropriate localities.

F. Stored-Grain Insects

There is normal heavy farm storage in Ohio, and Parks recommends timely treatment of empty bins with DDT emulsion before harvest. He thinks this will greatly reduce the necessity of later fumigation. Both inside and outside of bins should be treated, using 5-percent strength.

Recommendations given in the O FFC fact sheets on this problem have general approval. Emphasis should be placed on storage of dry, dockage-free grain to reduce insect problems. Also fumigation procedures must be accomplished under high temperature conditions.

G. Miscellaneous Items

Briggs reported a localized wireworm problem in Wisconsin, especially in oats.

Gunderson reported 150,000 acres of corn destroyed in Iowa by cutworms (black cutworm is the major species). Damage is most severe in low areas that were flooded out last year and overgrown with grass and other vegetation. Younger worms are well controlled with 2 pounds of DDT per acre, but older worms are not controlled with DDT, chlordane, BHC, or poisoned bait.

White grubs (controlled with 5 pounds actual DDT per acre) were briefly discussed. Webworms (not controlled satisfactorily with newer insecticides) and spittle bugs on legumes were discussed also.

The report was prepared after the adjournment of the meeting, and no opportunity was available for presentation to the group for approval. Omissions and errors are due to inadequate notes available to the committee.

WEED CONTROL

A. Discussion by L. M. Stahler, Agronomist, Bureau of Plant Industry.

1. Pre-Emergence Treatments with 2,4-D and other herbicides.

In general experimental pre-emergence treatments with 2,4-D at the various stations this season offer very little encouragement for any recommendations that can be made for next year. Rates of application from 1 to 3 pounds of 2,4-D acid per acre have in general given little or no weed control and also in general have shown no injurious effects on the corn. Elder, of Oklahoma, had definite injury to the stand and vigor of corn on his pre-emergent treated plots with little or no weed control in evidence. Buchholtz, of Wisconsin, has an extensive investigation under way and the only evidence of weed control on his plots was indicated for those treated with the esters of 2, 4-D. You will recall that in the past we felt that there was no advantage in any one of the 2,4-D formulations as a pre-emergent treatment but there is slight evidence this year at several locations that the esters of 2,4-D may give slightly better results in weed control under the conditions that existed this year. This does not mean, however, that we are in any position to recommend the esters over the sodium salts and amines when used as pre-emergent treatments on corn, as the evidence this year is only fragmentary and cannot be interpreted in any way as dependable over a period of years. In fact the reactions observed in both weed control and damage to corn this season will illustrate the uncertainties that we will have to expect in any use of 2,4-D as a pre-emergence treatment for the control of weeds in corn. Over most of the area observed, the early spring season has been very dry and has limited the growth and germination of weeds as well as of corn. In a few areas where normal precipitation was recorded this season we are getting a few reports of fair to good weed control in corn where pre-emergence treatments with 2, 4-D at rates of application of 2 to 3 pounds were used, with damage to the corn reported as zero to heavy.

Investigations of the use of 2,4-D as a pre-emergence treatment to control weeds in flax, oats, barley, wheat and soybeans likewise indicate that we will be in no position to make any recommendations for field use of this method for 1949. In fact, results so far this season will make us more cautious than we were in 1948. As an example of the uncertainties of 2,4-D as a pre-emergence treatment, we observed plots of onions at Madison, Wisc. which were growing on upland and on muck soil, respectively, but which had had comparable applications with 2,4- D as a pre-emergence treatment. On the upland soil the stand of onions was greatly reduced by all rates of application of 2,4-D, while on the muck soil only excessively high rates of application resulted in any reduction in stand. Set onions on upland soil were heavily injured by all rates of application tested, whereas on muck soil little damage was in evidence from any rate of treatment tested. Plots on the upland and muck soil were closely adjacent, and several inches of rain fell on these plots within a few days after seeding and retreatment. I mention this example to illustrate the effect of soil type on the outcome of pre-emergence treatments. I want to emphasize that rainfall following the application of 2, 4-D as a pre-emergent treatment--an uncontrollable factor--generally is a more important consideration than the amount of 2,4-D

used per acre in determining the results of the treatment. It is apparent that even the most optimistic investigators are going to be reluctant to make any recommendations for the use of 2,4-D as a pre-emergence treatment in weed control when the results of the many investigations being conducted this year are summarized at our annual weed conference this fall.

Other herbicides such as the dinitros, pentachlorophenols, various petroleum fractions, TCA, and cyanamids are being widely investigated as pre-emergent treatments this season, and to date there is little evidence that any one of these compounds will offer much that we can use in recommendations in 1949. The dinitros offer some possibilities in use.

2. New Herbicides

You are undoubtedly interested in getting information on some of the newer herbicides that have received some publicity in the past year. Of these 2,4, 5-T (2,4,5-trichlorophenoxyacetate) is being widely tested for control of brushy species and for herbaceous perennials such as leafy spurge. To date there is little evidence that this material is greatly superior to the ester of 2,4-D in the control of leafy spurge, but there is some evidence that it has possibilities for the control of some of the woody species that have been quite tolerant to 2,4-D. The various species of the bramble or Rubus--blackberry, raspberry, and the like appear to be less tolerant to 2,4,5-T than to 2,4-D, and considerable research is being done this season to establish the possibilities of the use of this material for controlling these heretofore resistant species. There is some indication that 2,4,5-T is slightly less toxic to winter wheat than the esters of 2,4,-D, and it may have some possibilities in use in the control of annual and perennial weeds in this crop. The herbicide 2,4,5-T is generally formulated as an ester. It is not widely available commercially but is being used extensively in some areas this season by commercial operators in the control of brushy, woody plants under power and communication lines along highways.

TCA (trichloroacetate), formulated as a sodium or amine salt, is not available commercially but is being supplied to investigators by several commercial companies. Investigations to date indicate that this material may be valuable in the control of quackgrass, Johnson-grass, Bermuda-grass, and some of the less noxious annual and biennial grasses. Throughout the area investigators report good control of Johnson-grass and Bermuda-grass with 100 to 150 pounds of TCA per acre. Seldom is complete elimation obtained and spot re-treatments are the general rule. Bermuda-grass treated with 100 pounds per acre has been completely eliminated in investigations being conducted at Manhattan, Kans., Stillwater, Okla., and other stations in the area. TCA has proved very efficient in the elimination of Opuntia cactus and Yucca--both species having been resistant to previously tested herbicides. Preliminary investigations, particularly in Nebraska, indicate that TCA at rates of 8 to 20 pounds per acre applied in the fall may be used to control weedy grasses in brome seed fields. Extensive investigations are under way to determine the possibilities of use of TCA for the control of grassy weeds in sugar beets--the latter being somewhat tolerant of moderate rates of application of 2,4-D.

The cost of TCA to the ultimate consumer has not yet been established, but we cannot hope that this material will be as cheap in use as 2,4-D. The residual effect of TCA in soil is relatively short-lived--from 3 weeks to 3 months, depending on moisture and soil temperatures.

IPC (iso-prop yl-n-phenylcarbamate), which has been widely tested in comparison with TCA, has in general shown little to recommend it for the uses previously discussed. There are some reports of successful use of IPC in the control of grassy weeds in sugar beets.

Fortified oils--various fractions of the distillation of petroleum with a high aromatic content--are being widely tested for the control of weeds in specialized horticultural crops and for the control of undesirable grassy weed seedlings. These oils are used either straight or fortified with pentachlorophenols or dinitro compounds. The aromatic oils and oils fortified with dinitro compounds have attained wide use in the Western States, but in this area their use is still in the experimental stage. When fortified with dinitros or pentachlorophenols, some of the oil fractions are especially "hot," giving a quick kill of all green foliage, and may be adapted to control weedy grasses such as brome, goatgrass, and wild barley along roadsides, fence lines, and elsewhere.

The dinitro compounds are of two types, the selective materials used for the control of broad-leaved annual weeds in flax, peas, and small grain--such as Sinox-W and Dow Selective. These materials have lost considerable ground to 2,4-D in the control of broad-leaved annuals in small grains and flax but are yet highly popular for the control of these weeds in peas or in small grains and flax where legumes are seeded as a companion crop--the legumes being tolerant of recommended rates of application. The more concentrated dinitros, Sinox General and Dow General applied in oil are widely used on the west coast for quick, unselective elimination of all types of undesirable herbage but to date have very limited use in this area. Investigations under way at several stations, particularly at Nebraska, show promise in the use of the dinitro compounds for the control of weedy grasses and winter annual broad-leaved species in fields seeded with grass and alfalfa.

3. 2,4-D

A tremendous acreage is being treated this year with 2,4-D for the control of annual and perennial weeds in growing crops. The many thousands of new low-volume sprayers being used, all of which have certain undesirable factors, have led to a lot of difficulty in field application. Many of the materials, particularly the amines, are causing trouble by the clogging of screens and nozzles when applied in hard water.

Field results of farm application have been spotted because of the generally dry soil. Weeds have not been growing vigorously and therefore have been tolerant of or resistant to 2,4-D at the lower levels of application being used especially in flax. The crops growing under these dry conditions have in general been also especially tolerant of 2,4-D. In many cases where excessive rates of application or poor methods of application have been used, damage to the crops has been averted by the resistant

condition of the crop plants this season. Many operators are doing a poor job of application, not knowing the amount that they are applying and being generally confused by the diverse recommendations and suggestions of commercial manufacturers and particularly the salesmen of the manufacturers. There have been some scattered reports of injury to flax as the result of 2,4-D treatments, but in general we have not observed much real damage.

Airplane application of 2,4-D for the control of weeds in growing crops promises big business. Although much of the work observed has been good, many fliers new to it are doing a sloppy, haphazard job of application. Many of the States in this area and their Civil Aeronautics Administration organizations are getting together to limit and control the application of herbicides by planes in coming years. Planes are applying from 1 quart to 5 gallons of either oil or water solution and in general favor the ester formulations.

B. Dr. Karl Quisenberry, Bureau of Plant Industry.

Dr. Quisenberry reported that the Civil Aeronautics Administration had recently announced a regulation prohibiting the application of 2,4-D dust by planes. The Bureau of Plant Industry has recently completed extensive tests on methods of application of 2,4-D as a spray solution by airplanes using various types of equipment of flying at different heights, flying various width swaths and under varied weather conditions. He indicated that particular attention was paid to determination of the distance to which 2,4-D would drift when applied by plane under the various conditions being studied. As an example he indicated that in a flight at 20 feet across a 5 - to 7-mile wind, a drift of 1,350 feet had occurred, and that tomato and cucumber seedlings were affected at this distance from the center of application. He indicated that it was evident from their tests that few fliers actually knew how wide a strip they were applying. Results of the investigations recently conducted will be made available when completely assembled and should do much to clear up the diverse opinions on the subject of airplane application of 2,4-D.

Dr. Quisenberry urged that all people concerned with the weed-control program, both in research and in extension, emphasize the cautions that should be observed in the use of this material. He mentioned the Thomas Resolution entered in the recent Congress, which concerned the publication of cautions in the use of 2,4-D by the United States Department of Agriculture.

Dr. Quisenberry, in indicating the wide and growing interest in weed research and weed control, stated that a southern weed-control conference had recently been organized and that all four of the recognized regions in the United States were now organized into weed-control conferences. He asked that those in charge of organizing the programs of the various regional meetings take into consideration State or regional meetings that might conflict and prevent the attendance of extension research or regulatory workers.

C. Oliver C. Lee, Extension Agronomist, Purdue University.

Lee made the following observations as a result of his work in Indiana:

1. Last year, pre-emergence treatments were, in general, good. This year, the treatments gave good control of weeds where applied very early with sufficient moisture; but, in general, results were very poor in the Indiana and Illinois area because the soil was dry and little precipitation occurred after planting of the corn and application of 2, 4-D.

2. Post-emergence treatments on corn of as low as $\frac{1}{4}$ pound 2,4-D per acre may cause injury to the corn due to breaking of the brittle stalks in high wind.

3. Heavy applications of 2,4-D on the growing corn causes considerable lodging of the corn plants and a reduction in yield of corn.

4. Damage to both weeds and crop plants is greatest when plants are growing rapidly and is lessened by adverse growing conditions such as drought and cool weather--factors that prevailed over much of the area this past spring.

5. Both injury and stimulation of crop plants may result in the same plant population. Stahler emphasized that this undoubtedly is of common occurrence and that injury and stimulation probably result in a leveling off of yields of treated crops.

6. Varietal differences have shown up in corn but no outstanding differences have been observed in the effects on sweet corn, popcorn, and field corn.

7. Rarely have complete kills been obtained on thistle, bindweed, and other deep-rooted perennials with one application of 2,4-D, some re-treatment usually being necessary in the following and succeeding years. If good kills are obtained with the first treatment it may not pay to treat the following year and may be advisable to wait a year or two before re-treatment. Weak growth of these perennials in the year following application makes surviving plants especially tolerant to 2,4-D.

8. The ester formulations are in general more effective than the amine and sodium salts but also are most hazardous to crops and have the additional hazard of being volatile and subject to wind drift.

9. The amines are water soluble, next to the esters in effectiveness, and nonvolatile.

10. Rates of application that give fast kills of perennial herbaceous weeds usually do less harm to the underground roots, and the end results are poorer than where moderate rates of application are used.

11. Control of garlic with 2,4-D has not been very successful. Treatment must be early to be most effective.

12. Three-fourths of a pound of 2,4-D acid per acre is about optimum for bindweed control. This statement was generally agreed with by other members of the conference.

D. General Statements Contributed by Other Members.

1. Spraying oats with 2,4-D in the late boot stage will generally result in blasting of the lower florets.

2. Bond cross oats varieties have shown more injury from 2,4-D than other standard varieties.

3. In Wisconsin, where oats under-seeded with clover and alfalfa were treated in the early boot stage, clover is only slightly injured but alfalfa is generally injured. When 2,4-D is used on oats where legumes are seeded as a companion crop, a heavy growth of oats protects the legume seedlings. This practice is being widely adopted by farmers in Wisconsin.

4. Although 2,4-D is nonpoisonous to livestock, some carriers or diluents used in formulating 2,4-D may be poisonous. It was indicated that cattle prefer 2,4-D treated foliage, but no explanation of this preference was evolved.

5. Thirty to thirty-five pounds nozzle pressure per square inch was agreed to be most satisfactory in the application of 2,4-D.

6. Ammate (ammonium sulfamate), the most dependable general herbicide for woody plants, stumps, and stump sprouts, is unselective in action and will kill osage-orange and other woody species that are resistant to 2,4-D. The newer form of ammate carries a buffer that eliminates much of the corrosiveness associated with the older product.

7. An invitation was extended to the extension agronomists of the States in the North Central region to attend the North Central Weed Control Conference to be held at Springfield, Ill., on December 7, 8, and 9, 1948.

PERSONS PARTICIPATING IN CONFERENCE

Name	Specialty	Location
W. N. Bruce	Entomology	Illinois
G. C. Decker	Entomology	
M. E. Mansfield	Animal Pathology	
H. B. Petty	Entomology	
W. D. Scott	Agronomy	
H. K Smith	Livestock Loss Prevention	
O. C. Lee	Weeds	Indiana
G. E. Lehker	Entomology	
Henry Mayo	Animal Husbandry	
H. B. Cheney	Agronomy	Iowa
H. Gunderson	Entomology	
E. P. Sylwester	Crop Pests	
E. G. Kelly	Entomology	Kansas
L. F. Taylor	Animal Husbandry	
L. E. Willoughby	Agronomy	
R. L. Janes	Entomology	Michigan
H. F. Moxley	Animal Husbandry	
L. V. Nelson	Agronomy	
Ralph Crim	Agronomy	Minnesota
W. E. Morris	Animal Husbandry	
H. L. Parten	Entomology	
Frank Dillard	Animal Husbandry	Missouri
Ross Fleetwood	Agronomy	
G. D. Jones	Entomology	
W. W. Derrick	Animal Husbandry	Nebraska
D. L. Gross	Agronomy	
C. A. Sooter	Entomology	
F. G. Butcher	Entomology	North Dakota
G. E. Strum	Animal Husbandry	
R. B. Widdifield	Agronomy	
L. K. Bear	Animal Husbandry	Ohio
D. F. Beard	Agronomy	
C. R. Neiswander	Entomology	
T. H. Parks	Entomology	
C. L. Iverson	Animal Husbandry	South Dakota
J. J. O'Connell	Animal Husbandry	
E. E. Sanderson	Agronomy	
H. C. Severin	Entomology	

T. C. Allen	Entomology	Wisconsin
G. M. Briggs	Agronomy	
J. J. Lacey	Animal Husbandry	
J. H. Lilly	Entomology	
W. A. Baker	Entomology	PISAE, USDA
F. C. Bishopp	Entomology	EPQ, USDA
O. S. Fisher	Agronomy	PISAE, Ext., USDA
A. O. Foster	Animal Husbandry	BAI, USDA
Roy C. Jones	Dairy Husbandry	BDI, Ext., USDA
Karl Knaus	Extension	Ext., USDA
E. F. Knipling	Entomology	EPQ, USDA
Karl S. Quisenberry	Agronomy	PISAE, USDA
L. M. Stahler	Agronomy	PISAE, (Brookings, s. Dak.)

August 12, 1948

UNITED STATES DEPARTMENT OF AGRICULTURE
EXTENSION SERVICE
Washington 25, D. C.

The following table, recently sent out by Mr. Ray Cuff of the National Livestock Loss Prevention Board in Kansas City, was presented at the annual meetings in Chicago, but thus far has not been published.

RESULTS OF TESTS WITH CHLORINATED INSECTICIDES
FOR THE CONTROL OF HORN FLIES ON BEEF CATTLE

Material and Concentration	Number Treatments		Average No. Animals Treated		Average Days Protection	
	Kansas	Missouri	Kansas	Missouri	Kansas	Missouri
0.5 Percent DDT Wettable powder	4	2	493	82	30.3	44.5
0.5 Percent DDT emulsion	4	2	356	39	28.3	48.0
0.5 Percent Methoxychlor wettable powder	4	3	206	158	24.3	46.6
0.5 Percent D-3 wettable powder	4	3	325	42	25.0	50.2
0.5 Percent Chlorinated Camphene, wettable powder	4	3	220	33	26.7	42.0
0.25 Percent DDT wettable powder	4	2	139	39	19.2	28.5
0.25 Percent Chlorodane wettable powder	4	-	97	--	17.1	---
			1,836	393		

The interpretation of the table alone might be misleading. There are many factors that undoubtedly had a bearing on the results of these tests. For instance, in the immediate area of the tests in Missouri, there was much more fly control of the herds surrounding those under test than was the case in Kansas. Then too the season in Missouri may have been less favorable to the horn fly than the season in Kansas.

We would not expect as wide a migration of the flies in wooded areas as in open country, and this may have had some bearing on the results. We feel that these and other factors may have something to do with the long residual effect in Missouri as compared with that in Kansas, and we have no assurance that the same results would be obtained from year to year. We do feel that, through community action, the general level of population would be lowered and the build-up of flies would be much slower. This point should be an incentive for community-wide programs in horn fly control.

We do not know what distribution Mr. Cuff made of this information, but we thought it desirable to call your attention to some of the points to consider in interpreting the results given in the table.

M. P. Jones
Extension Entomologist

758(8-48)

December 1948 E-762

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

THE NEW INSECTICIDES FOR CONTROLLING EXTERNAL PARASITES OF LIVESTOCK

By Division of Insects Affecting Man and Animals

Since 1945, when DDT first came into use for controlling insects and ticks on livestock, several new insecticides have been developed which are now available to the public for the control of those pests. These insecticides are benzene hexachloride, chlordane, chlorinated camphene, methoxychlor, TDE, and piperonyl butoxide. The Bureau of Entomology and Plant Quarantine has during this short period endeavored to appraise the merits of these new materials for controlling various external parasites of farm animals. Although there is need for further investigations on the use of these new insecticides, the great demand for information already obtained by the Bureau has prompted the issuance of this preliminary report. Certain data obtained in cooperation with other agencies are included.

The major objectives of this report are (1) to summarize the results of research which has been conducted to date and, insofar as possible, to compare the performance of the different materials against various livestock pests; (2) to summarize briefly the available knowledge regarding the toxicity of the materials to animals; and (3) to issue guiding statements as to how the newmaterials may be employed if their use is warranted at this time. The Bureau is reluctant to offer such guiding statements at this time, but the materials are available and are being used by livestock growers in some cases without regard to the hazards involved and without the benefit of available knowledge regarding their effectiveness.

Because of the many insecticides and insecticide preparations currently available to the public for the control of several livestock pests, it is extremely important to determine which materials to employ for maximum efficiency, safety, and economy. Consideration must be given to the parasites involved, the types of animals, methods of application, stability of specific formulations, and other factors.

RESULTS OF TESTS WITH VARIOUS INSECTICIDES

Benzene Hexachloride

Benzene hexachloride has been tested rather extensively by State and Federal agencies, commercial companies, and other institutions associated with the livestock industry. It is generally available in the form of wettable powders and dusts and less generally as solutions and emulsion concentrates. The technical product consists of several

isomers and usually contains 10 to 12 percent of the gamma isomer, which is the most active one. Most wettable powders contain 50 percent of technical benzene hexachloride, or 5 to 6 percent of the gamma isomer. Some manufacturers are now producing grades that contain up to 95 percent of the gamma isomer.

The insecticide is a crystalline product with a persistent musty odor. This objectionable odor is less intense in some of the products of high gamma content.

Wettable-powder preparations have been used in most of the tests, but xylene emulsions have also been tested. In general no marked difference in effectiveness has been noted in the two forms. Benzene hexachloride is a contact insecticide, but it also has some fumigating action.

Cattle Lice

From the standpoint of initial killing action, benzene hexachloride is among the most effective insecticides for controlling lice on cattle. It kills the eggs as well as the motile forms by contact, and it also acts as a fumigant.

Benzene hexachloride has been tested against the short-nosed cattle louse (Haematopinus eurysternus (Nitz.)), the long-nosed cattle louse (Linognathus vituli (L.)), and the tail louse (H. quadripertusus Fahr.). Complete control of the first two species was obtained when animals were thoroughly sprayed with 0.5 percent of technical benzene hexachloride (0.05 to 0.06 percent of the gamma isomer) in wettable-powder sprays. A single thorough treatment with 0.25 percent of the technical material has given good control, but in tests conducted in Texas this concentration did not always give complete control. Both concentrations have given good initial control of the tail louse in a limited number of tests. Apparently complete control of this species has been obtained with a 1-percent spray.

Goat Lice

Wettable-powder and emulsion dips of technical benzene hexachloride have been tested against red and yellow goat lice (Bovicola spp.) on Angora goats. At 0.2-percent concentration a single dipping eliminated lice from the herd. Excellent initial control was obtained with 0.05-percent dips, but several months after treatment a few lice were present. DDT at the same concentrations has given similar results.

Hog Louse

Benzene hexachloride is also effective against the hog louse (Haematopinus adventicius Neum.). A single thorough treatment with 0.2 percent of the technical material has given good but not complete control in a limited number of tests. Other workers have reported complete control at 0.5-percent concentration.

Sheep Tick

In Oregon dips containing 0.05, 0.2, and 0.5 percent of technical benzene hexachloride have provided complete control of the sheep tick (Melophagus ovinus (L.)). Thorough treatments with 0.2-percent sprays (4 to 6 quarts per mature sheep with long fleece) were effective in limited tests, but complete control was not effected until several weeks after treatment. Ground derris (rotenone 5 percent), at rates of 4 and 8 ounces in 100 gallons of dip, also gave complete control of this insect. Rotenone as a dip seems to be the most economical treatment for controlling this pest, and from this standpoint is superior to any of the new insecticides.

Lone Star Tick

Benzene hexachloride has been tested against the lone star tick (Amblyomma americanum (L.)) on cattle at concentrations from 0.1 to 1.5 percent of the technical product. It has killed all stages of the tick at concentrations as low as 0.25 percent. However, even at 1.5 percent the residual action has not been marked. At Kerrville, Tex., a 0.5-percent spray protected animals for about 4 days, but after 1 week some ticks were beginning to engorge. Concentrations higher than 0.5 percent did not seem to prolong the protection to any marked degree. In comparative tests DDT failed to kill all engorged ticks at a concentration as high as 1.5 percent. However, DDT provided better protection against reinfestation than did benzene hexachloride. After 2 weeks the control obtained with sprays containing 0.5 and 0.75 percent of DDT was comparable with that obtained after 1 week with similar concentrations of benzene hexachloride. The 0.75-percent DDT spray provided about 75 percent protection for 2 weeks.

Winter Tick

Sprays containing benzene hexachloride have been tested on cattle and sprays or washes on horses for control of the winter tick (Dermacentor albipictus (Pack.)) in the vicinity of Kerrville. Good control of all stages resulted at a concentration as low as 0.1 percent of technical benzene hexachloride. Concentrations of 0.25 and 0.5 percent protected animals against reinfestation for about 2 weeks. DDT emulsions and wettable powders failed to kill all engorged ticks at concentrations up to 2.5 percent, but 0.5-to 0.75-percent concentrations provided protection for about 4 weeks.

Ear Tick

In laboratory and field tests benzene hexachloride was effective against the ear tick (Otobius megnini (Duges)) when applied as a spray. However, little is known about the most practical concentrations required to control this species or about the duration of effectiveness.

Flies

Benzene hexachloride is highly toxic to the horn fly (Siphona irritans (L.)) and the house fly (Musca domestica L.), but its residual

action is not sufficient to effect lasting control. Sprays applied on cattle for the control of horn flies at concentrations of 0.25 to 0.5 percent generally become ineffective in 3 to 4 days as compared with 3 to 4 weeks for DDT. In laboratory tests conducted at Orlando, Fla., deposits of benzene hexachloride up to 400 mg. per square foot failed to give complete control of house flies exposed for 2 hours 9 weeks after treatment, whereas DDT applied at rates from 50 to 400 mg. per square foot was completely effective at the end of 36 weeks.

Benzene hexachloride has been reported to provide some control of horse flies and deer flies. In tests conducted in Texas against Tabanus abactor Philip, all flies feeding on treated cattle for 1 to 2 days after spraying were killed. In Georgia some success against tabanids was indicated with mixtures of benzene hexachloride and methoxychlor. The destruction of tabanids that feed on treated animals during the indicated short period of effectiveness might reduce the population sufficiently to provide some control. However, further study is necessary to determine the value of benzene hexachloride in practical control of these pests.

Screw-Worm and Fleece Worms

Benzene hexachloride is highly effective as a larvicide for the screw-worm (Callitroga americana (C. and P.)) and fleece worms (Phormia regina (Meig.) and other secondary blow flies). However, insufficient tests have been conducted to determine its value as a practical control measure.

Common Cattle Grub

Benzene hexachloride in certain tests has given some kill of the common cattle grub (Hypoderma lineatum (De Vill.)). Its performance is erratic, however, and available formulations cannot be depended upon to provide satisfactory control at concentrations that are considered feasible from the standpoint of economy or safety.

Chlordane

Chlordane has been employed extensively for the control of certain household pests. It is a viscous liquid, readily soluble in a number of solvents, including petroleum oils. Recently chlordane has been offered for sale for the control of various livestock pests. Rather extensive texts have been conducted with this insecticide against most of the major pests of livestock. Both a wettable-powder preparation and emulsions have been used. Under some conditions chlordane exhibits a fumigating property in addition to its usual contact action.

Cattle Lice

Chlordane, in both wettable-powder (50 Percent) and emulsion-concentrate (25 to 50 percent) formulations, has been compared with DDT against several species of lice on cattle. It is indicated to be equal to DDT for controlling these insects. Complete control of both

long-nosed and short-nosed lice was obtained with 0.5-percent sprays. A 0.25-percent spray gave good but not complete control of lice with one treatment. The tail louse also appeared to be equally as susceptible to chlordane as to DDT. The concentration needed for practical or complete control has not been determined, but a 1-percent chlordane spray gave complete control in one test.

Goat Lice

Chlordane and DDT were found to be equally effective against red and yellow goat lice in tests conducted in Texas. A 0.2-percent dip, prepared from either wettable powder or emulsion concentrate, provided complete control, and no reinfestation occurred for at least 4 months. At 0.05-percent concentrations both materials controlled all motile forms, but some animals were found infested when examined 4 months later.

Hog Louse

In one test with a few animals chlordane gave apparently complete control of hog lice when applied as a wettable-powder spray at 0.2-percent concentration. DDT in the same test gave good initial control, but a few lice were found after 3 weeks.

Sheep Tick

Dips containing 0.05, 0.2, and 0.5 percent of chlordane gave complete control of sheep ticks. DDT also gave complete control, but chlordane eliminated the emerging adults more quickly. When applied as a spray at 0.2-percent concentration, chlordane was superior to DDT and comparable with benzene hexachloride.

Lone Star Tick

Chlordane has been tested against the lone star tick on goats and cattle at concentrations of 0.25, 0.5, 0.75, and 1.5 percent. All concentrations gave complete or almost complete control of the flat stages, and the 0.75 and 1.5 percent concentrations caused nearly complete kill of all stages. DDT failed to kill all the engorged forms at 1.5 percent concentration. At the same concentrations the two insecticides gave about equal protection against reinfestation. (The performance of DDT in these tests has been mentioned in the discussion of benzene hexachloride for tick control.)

Winter Tick

Chlordane is distinctly superior to DDT against the winter tick on cattle and horses. Complete or nearly complete control of all stages has been obtained with 0.75 percent sprays, whereas DDT at 1.5 percent killed only a small percentage of the engorged forms. Chlordane is also superior to DDT from the standpoint of protection against reinfestation. At 0.5 and 0.75 percent chlordane prevented reinfestation for about 2 months as compared with 1 month for DDT. Chlordane as a 5 percent dust has also given good control of winter ticks and proved superior to DDT.

Flies

Chlordane has been tested on animals exposed to horn flies in cages, and in field tests on dairy animals in Texas and beef animals in Kansas. The tests in Kansas were conducted in cooperation with the experiment stations and State colleges of Kansas and Missouri, and with the Livestock Loss Prevention Board of Kansas City. Wettable-powder sprays at concentrations of 0.25 and 0.5 percent, applied at approximately 2 quarts per mature animal, gave good control of horn flies and protected the animals for about 3 and 4 weeks, respectively. There was no clear-cut difference in effectiveness between DDT and chlordane, but chlordane appeared to be slightly inferior.

Chlordane is more toxic than DDT to house flies. Its residual action is long lasting but not equal to that of DDT. In laboratory tests at Orlando, Fla., surface treatments at the rate of 200 mg. of chlordane per square foot, applied in acetone solution, gave complete or almost complete kill of flies exposed for 2 hours as long as 28 weeks after treatment. DDT, however, was still completely effective after 36 weeks, even at the low rate of 50 mg. per square foot. Recently, reports of failure of DDT to control house flies have been received. Limited field tests have shown promise for chlordane as a substitute for DDT in such situations.

Chlordane applied as a 1 to 2 percent emulsion was effective for about 1 day against tabanids feeding on treated livestock.

Screw-Worm and Fleece Worms

Chlordane is one of the most effective insecticides tested against screw-worm larvae, and it also protects sheep from attack by fleece worms. However, insufficient tests have been conducted to determine its potential uses for controlling these insects.

Common Cattle Grub

When emulsion and wettable-powder formulations containing up to 1.5 percent of chlordane were applied to cattle, both as a wash and with a high-power sprayer, the mortality of cattle grubs was less than 20 percent. Dusts containing up to 5 percent of chlordane also proved ineffective.

Chlorinated Camphene

Technical chlorinated camphene is a waxy, crystalline material. It has no objectionable odor, and is readily soluble in most of the common solvents used in insecticide formulations, including petroleum oils. It is one of the newest insecticides being offered to the public for livestock-pest control. In most of the tests wettable-powders and emulsion concentrates were used. The wettable powders contained from 25 to 40 percent of the toxicant, and the emulsion concentrate from 25 to 65 percent with xylene or kerosene as the solvent.

Cattle Lice

When tested at concentrations of 0.25 and 0.5 percent, chlorinated camphene gave results that were comparable with those obtained with DDT, benzene hexachloride, and chlordane against both short and long-nosed cattle lice and the tail louse.

Goat Lice

Chlorinated camphene appeared to be at least equal, and perhaps superior, to DDT, chlordane, and benzene hexachloride against red and yellow goat lice. In limited tests apparently complete control was obtained with dips containing 0.05 percent or a slightly lower concentration of the insecticide. Dips at 0.2 percent concentration have kept goats free of lice for at least 4 months.

Hog Louse

Only one test, involving a few animals, has been run with chlorinated camphene against the hog louse. A wettable powder at 0.2 percent concentration gave apparent complete control of the lice, being superior to DDT and comparable with chlordane.

Sheep Tick

Against the sheep tick chlorinated camphene appeared to be superior to DDT when used as either a dip or a spray, but less effective than benzene hexachloride and chlordane. In a few tests complete control was obtained with dips containing 0.05, 0.2, and 0.5 percent of the insecticide. However, its action appeared to be slower than that of the other insecticides.

Lone Star Tick

Chlorinated camphene proved superior to DDT and equal to chlordane, but less effective than benzene hexachloride, against the engorged forms of the lone star tick. Its residual effect provided protection against reinfestation comparable with that given by DDT and chlordane. Sprays at 0.75 percent concentration gave good control of all stages and protection against reinfestation for 2 weeks, comparable with that given by DDT and chlordane.

Winter Tick

Chlorinated camphene was superior to DDT and comparable with chlordane against the winter tick on cattle and horses, when employed either as a spray or as a dust. Good control of all stages was obtained with sprays containing as little as 0.75 percent. This concentration protected against reinfestation for about 2 months. A 0.5 percent spray failed to control all the engorged forms, but prevented further reinfestations for 6 to 8 weeks.

Ear Tick

Chlorinated camphene was superior to DDT and comparable with chlordane and benzene hexachloride for controlling the ear tick. However, further studies are needed to determine its value for this purpose.

Flies

Chlorinated camphene at 0.5 percent concentration has given results similar to DDT for the control of horn flies. Although it is somewhat slower in killing flies coming to treated animals, and under certain conditons might appear to be inferior, final control has in general been comparable with that obtained with DDT.

Chlorinated camphene was less effective than DDT against house flies, from the standpoint of both initial killing action and residual action. Little information is available on the relative efficiency of the two materials against stable flies. Chlorinated camphene did not protect animals from attack by tabanids.

Screw-Worm and Fleece Worms

Chlorinated camphene was highly effective against young screw-worm larvae and the larvae of fleece worms. It provided excellent protection against fleece worm attack on sheep, when used at 2 percent concentration. However, little is known about the value of this material for controlling either of these parasites under practical conditions.

Common Cattle Grub

In small-scale tests chlorinated camphene did not control larvae of the common cattle grub.

Methoxychlor

Methoxychlor (also called the methoxy analog of DDT) is similar to DDT in both physical and chemical properties. Most of the tests have been made with 50 percent wettable powders and 25 percent emulsion concentrates, in general with equal effectiveness.

Cattle Lice

Sprays containing 0.5 percent of methoxychlor gave good control of short-nosed and long-nosed cattle lice and the tail louse in some, but not all tests.

Hog Lice

Methoxychlor was effective against the hog louse and perhaps comparable with DDT, but a single treatment with 0.2 percent spray did not give complete control.

Ticks

Against ticks methoxychlor was less effective than the other chlorinated hydrocarbon insecticides. Wettable-powder sprays up to 1.5 percent did not kill unengorged and engorged winter ticks andlone star ticks on cattle and horses, and animals became reinfested by the second week. In laboratory dipping tests it was inferior against the lone star tick and the ear tick. In tests in Oregon, however, it controlled sheep ticks when employed as a dip at 0.2 and 0.5 percent concentrations.

Flies

Methoxychlor gave good control of the horn fly on cattle. A 0.5 percent wettable-powder spray (2 quarts per mature animal) applied to dairy cattle in Texas and to beef cattle in Kansas provided 20 to 24 days' protection, as compared with 28 to 30 days for DDT. In Missouri both materials protected animals for about 6 to 7 weeks. Tests on treated animals exposed to flies in cages indicate that this material is slightly inferior to DDT.

In laboratory and small-scale field tests methoxychlor was effective against house flies and stable flies. Although generally its residual effectiveness was of shorter duration, under certain conditions it was superior to DDT. Preliminary tests in Texas and in Georgia indicate that this insecticide, alone and with benzene hexachloride, offers some promise in controlling tabanids.

TDE

TDE (also called DDD) is a crystalline substance closely related to DDT in chemical and physical properties. The types of formulations used are also similar to those of DDT. Tests conducted with both emulsion and wettable-powder formulations have thus far shown no difference in effectiveness.

Cattle Lice

TDE was about equal to the other chlorinated insecticides for the control of short-nosed and long-nosed cattle lice, and also of the tail louse. A 0.5 percent spray thoroughly applied gave good control of the first two insects.

Hog Lice

In preliminary tests run on a few hogs for the control of the hog louse, TDE was equal to DDT in initial kill. Neither material gave complete control at 0.2 percent concentration.

Sheep Tick

TDE gave good control of sheep ticks when employed as a dip at concentrations of 0.2 and 0.5 percent. It was about equal to methoxychlor but less effective than the other chlorinated hydrocarbon insecticides.

Ticks

In laboratory dipping tests against the lone star tick TDE was not so effective as chlordane, benzene hexachloride, chlorinated camphene, or DDT.

In a limited number of tests against the winter tick TDE was approximately equal to DDT but inferior to chlorinated camphene and chlordane. Sprays containing 0.5 to 0.75 percent of TDE did not kill engorged ticks but prevented reinfestations for about 1 month.

Flies

TDE gave satisfactory control of horn flies on beef and dairy animals. In general at 0.5 percent concentration (in a wettable powder) this material was about equal to methoxychlor and slightly less effective than DDT and chlorinated camphene.

In laboratory tests TDE was less effective than DDT against house flies and stable flies.

Piperonyl Butoxide

Piperonyl butoxide alone is somewhat insecticidal, but it is of chief interest for use in combination with pyrethrum, which is widely used in cattle fly sprays. The insecticidal action of pyrethrum is rapid and it is safe for use on warm-blooded animals, but it is costly and is unstable. The addition of piperonyl butoxide to pyrethrum increases the insecticidal action, and the duration of its effectiveness.

Emulsions containing 0.005 percent of pyrethrins and 0.05 percent of piperonyl butoxide, or 0.01 percent of pyrethrins and 0.1 percent of piperonyl butoxide, gave complete initial control of the short-nosed cattle louse, but young lice were present on the treated animals after 2 weeks.

The pyrethrum-piperonyl butoxide sprays provided considerable protection to animals against stable flies for several days. Some protection against tabanids was also indicated, although results reported by several investigators vary considerably with respect to duration of protection against different species. Not enough research has been conducted for conclusions to be drawn regarding their effectiveness against livestock pests in general.

TOXICOLOGICAL INVESTIGATIONS

The Food and Drug Adminstration is investigating the toxicity of the various newinsecticides to laboratory animals. The Bureau of Entomology and Plant Quarantine, in cooperation with the Bureau of Animal Industry and the Texas Agricultural Experiment Station, is conducting certain toxicological studies on livestock.

The references to the toxicity of the insecticides to small laboratory animals are taken from a recent paper by A. J. Lehman 1/, pharmacologist in the Food and Drug Adminstration. The data represent general averages for several kinds of laboratory animals. Since most of the studies are incomplete, and many of the formulations differed from those employed in treating livestock, the information indicates trends or approximate toxicity only.

The Bureau is conducting toxicological investigations (1) to determine the effects on livestock of various materials when applied externally and (2) to determine the amount of insecticide secreted in milk when applied to dairy animals in amounts and frequency necessary to control horn flies. The tests on livestock are being conducted at Kerrville, Tex., and the chemical analyses at Beltsville, Md. Some studies have also been made to determine whether products from animals treated with benzene hexachloride are tainted with its odor or taste. Investigations on absorption and storage of insecticides in animal tissues resulting from external treatments are under way, but sufficient data are available to include them in this discussion. Chronic-toxicity studies involving repeated treatments of livestock with the various insecticides over a period of years have not been undertaken.

Benzene Hexachloride

The different isomers of benzene hexachloride vary in their toxicity to higher animals. For the gamma isomer the mean lethal dose to laboratory animals, when administered by mouth, is approximately 125 mg. per kilogram of body weight, as compared with about 250 mg. for DDT. In oil solution it is readily absorbed through the skin; when it is administered in this way the mean lethal dose to laboratory animals ranges from 20 to 50 mg. per kilogram. On daily feeding gamma benzene hexachloride is less toxic than DDT, but it is much more toxic when applied to the skin.

At Kerrville high concentrations and frequent treatments were tested to gain information on the upper limits of toxicity. When mature or near mature animals were employed, no harmful effects were noted on 8 sheep, 8 goats, 4 cattle, 2 horses, and 2 hogs treated eight times at 4-day intervals with a dip or spray containing 1.5 percent of technical benzene hexachloride. A wettable-powder preparation was used on some of the animals and a xylene emulsion on the others. The Livestock Loss Prevention Board of Kansas City obtained similar results on 8 animals treated with a wettable-powder spray at the same concentration. At Kerrville 10 cows treated nine times at 2-week intervals with a 2 percent wettable-powder spray were without apparent harmful effects. However, when a wettable powder containing 50 percent of gamma benzene hexachloride was used, all 3 cattle treated once with a spray containing 1.5 percent of the gamma isomer were killed, and 1 out of 3 sprayed with

---

1/ Lehman, A. J. The Toxicology of the New Agricultural Chemicals, Bul. Assoc. Food and Drug Officials 12(3): 82-89. 1948.

0.75 percent gamma died and another was seriously affected but recovered. A 0.25 percent gamma spray had no ill effects.

Calves less than 3 months old are much more susceptible to benzene hexachloride than are cattle a year old or older. Xylene-emulsion sprays containing 0.05 percent of the gamma isomer killed some calves that were thoroughly saturated to simulate dipping. Wettable-powder sprays of the same gamma content were apparently less toxic, but toxic symptoms were evident in two of nine calves treated and one calf died. Few reports of death or injury among calves or cattle have been received following treatment with benzene hexachloride in actual use for pest control. However, these available toxicology data suggest that the margin of safety for benzene hexachloride applied to young calves is extremely narrow.

To determine whether the use of benzene hexachloride gave off-flavor or odor to meats of treated animals, tests were conducted with several kinds of animals. One pig received two thorough treatments 9 days apart with a spray containing 2.5 percent of technical benzene hexachloride. Two days after the second treatment 10 families cooked and tasted the meat. None of the families detected benzene hexachloride taste, but two of them detected the odor while the meat was cooking. Another pig was sprayed twice 4 days apart with 1.5 percent technical benzene hexachloride, and slaughtered on the sixth day. None of the families eating the meat reported benzene hexachloride odor or taste. In similar tests with a goat, a sheep, and a yearling calf one report of benzene hexachloride flavor or odor from each animal was received. Another calf and a pig treated eight times at 4-day intervals with a 1.5 percent spray and slaughtered 1 month after the last treatment showed no marked off-flavor or odor, although some individuals gave positive reports. In tests with six chickens exposed for one to several weeks to roosts heavily painted with a slurry of technical benzene hexachloride, conflicting reports were received but in one chicken marked benzene hexachloride odor was detected.

In these tests the concentration of benzene hexachloride was in excess of that needed for controlling the parasites. In a thorough test conducted in cooperation with the Missouri Agricultural Experiment Station and College, no off-flavor or odor was detected in meat from a cow dipped approximately 18 times during the course of 2 years in a wettable-powder dip containing 0.5 percent of technical benzene hexachloride. No reports of off-flavor or odor of meat from livestock treated with benzene hexachloride for practical pest control have come to the attention of this Bureau.

Chlordane

The acute toxicity of chlordane administered orally to laboratory animals was found to be about half that of DDT. However, the toxicity of a solution applied repeatedly to the skin is reported to be greater for chlordane.

At Kerrville five sheep, five goats, two cattle, and one horse were treated eight times at 4-day intervals with a 1.5 percent chlordane emulsion, and the same numbers of animals were treated with a wettable-powder preparation at the same strength. The test was repeated with a new lot of chlordane, but only five sheep and two pigs were treated with each preparation. In the first test none of the cattle or horses were killed with either preparation, but the sheep and two of the goats were killed by the emulsion and two sheep and two goats by the wettable powder; some of the animals died after the third treatment. In the second test none of the animals were killed.

The Livestock Loss Prevention Board obtained similar results in that sheep were killed by the severe treatment, and one of two cattle sprayed with the emulsion and with the wettable-powder suspension was killed.

In another test at Kerrville three of ten cattle died after four thorough treatments at 2-week intervals with a 2 percent wettable-powder preparation. No explanation can be offered for the variable results.

Weekly analyses of milk samples from two dairy herds sprayed four times with 0.5 percent wettable powder at intervals of about 1 month showed that small amounts of organic chlorine were present in the milk. Of 18 samples analyzed, 17 showed from 0.1 to 0.4 p.p.m. of organic chlorine. However, it is not certain that all the organic chlorine present can be attributed to the chlordane treatment.

Chlorinated Camphene

Chlorinated camphene was found to be about four times as toxic as DDT when administered orally to various laboratory animals. The mean lethal dose of chlorinated camphene, when administered orally to laboratory animals, was about 60 mg. per kilogram. Preliminary tests indicate that livestock are of similar susceptibility. When applied to the skin it is also far more toxic than DDT. Although the insecticide is rather toxic from an acute standpoint, preliminary chronic-toxicity studies reported by the Food and Drug Administration indicate that for certain animals the insecticide taken in the diet in small doses over an extended period of time is not so toxic as certain other insecticides that are more toxic on the basis of single acute doses.

When 20 sheep, 15 goats, 8 cattle, 4 horses, and 4 hogs, all mature or nearly mature, were treated eight times at 4-day intervals with 1.5 percent of chlorinated camphene, no adverse effects were noted on any of the animals.

However, young calves are more susceptible to this insecticide. After reports of its toxic effect on calves in Texas, tests were made on calves 1 to 2 months old. A single spraying with 1.5 percent emulsion (containing xylene and kerosene) or wettable-powder suspension caused toxic symptoms on some of the treated calves, and two treatments 4 days apart caused a few deaths. Single treatments of 0.75 percent concentration had no adverse effects on 12 calves.

Milk samples from dairy herds treated four times at about monthly intervals with 0.5 percent wettable-powder sprays were analyzed for organic-chlorine content. Of 43 samples analyzed, 27 were negative. When the results were positive, the amounts of organic chlorine ranged from 0.2 to 0.6 p.p.m. It is not certain that the organic chlorine present can be attributed to the chlorinated camphene.

Methoxychlor

Methoxychlor is the least toxic of the chlorinated hydrocarbon insecticides that have been investigated. The mean lethal dose to various laboratory animals when administered orally was about 6 grams per kilogram of body weight. Preliminary feeding tests also suggest a low chronic toxicity.

At Kerrville no adverse effects were noted when five sheep, five goats, two cattle, two hogs, and one horse were treated eight times at 4-day intervals with an emulsion containing 1.5 percent of methoxychlor.

Milk samples collected at weekly intervals from two herds of dairy cattle treated with a 0.5 percent wettable-powder suspension five and six times during the season were analyzed for organic-chlorine content. Only 3 of 42 samples analyzed showed organic chlorine (0.1 p.p.m.) present.

TDE

The average mean lethal dose of TDE for several laboratory animals was about 2,500 mg. per kilogram of body weight when the insecticide was administered orally. Preliminary feeding tests indicate that the chronic toxicity of TDE is also considerably less than that of DDT.

At Kerrville five sheep, five goats, two cattle, two hogs, and one horse showed no ill effects when treated eight times at 4-day intervals with 1.5 percent emulsion or wettable-powder preparation.

Samples of milk taken at weekly intervals from two herds of dairy cattle treated with TDE were analyzed for their TDE content by the colorimetric method. The animals had been treated five times with a 0.5 percent wettable-powder spray (approximately 2 quarts per animal). Of 20 samples analyzed, 8 were negative and 12 showed TDE present in amounts ranging from 0.1 to 1.2 p.p.m., the average being less than 0.5 p.p.m.

In comparison, all milk samples (total of 26) from herds sprayed with 0.5 percent of DDT contained DDT. The amounts ranged from 0.1 to 2 p.p.m., with an average of about 0.6 to 0.7 p.p.m. When 0.25 percent spray was used, the amount of DDT in the milk ranged from 0.1 to 0.7 p.p.m.

The mean lethal dose of piperonyl butoxide administered by mouth to various laboratory animals was about 12 grams per kilogram of body weight. Its acute toxicity was the lowest for all the insecticides. Pyrethrum, with which this material is usually combined, alone was also relatively nontoxic to warm-blooded animals.

SUGGESTIONS REGARDING THE USE OF THE NEW INSECTICIDES

Suggestions regarding the use of the new materials offered at this time are not necessarily final recommendations. The preliminary nature of the available information regarding their toxicity and performance does not permit definite conclusions to be drawn at present. Livestock growers who contemplate using any of the new materials should follow the recommendations of agricultural workers who are familiar with livestock-pest problems in experiment station, State colleges, and extension services of their state or community.

Benzene Hexachloride

If benzene hexachloride is to be used for controlling any livestock pests, it is recommended that only wettable-powder formulations be used. Products of high gamma-isomer content are the least objectionable from the standpoint of odor. This insecticide should not be applied on dairy animals or on meat animals that are to be slaughtered within 30 days. In view of its toxicity, particularly to young animals, the concentrations should be held down preferably to 0.25 percent of the technical material (0.025 percent of gamma isomer) and should not exceed 0.5 percent even when applied to older animals.

Chlordane

No harmful effects on livestock have been noted or reported when chlordane has been applied in insect-control operations. However, since toxic effects have developed in experiments with 1.5 to 2 percent spray applied repeatedly to livestock, additional tests with repeated treatments at lower concentrations should be conducted before recommendations are made for its use on livestock.

Chlordane shows promise for use against house flies in situations where adequate control cannot be obtained with DDT.

Chlorinated Camphene

From the standpoints of economy and efficiency chlorinated camphene is considered promising for the control of a number of livestock pests. However, some deaths of animals, principally young calves, have been reported when this insecticide has been employed in insect-control operations. Since the concentrations required for controlling certain livestock pests are near the toxic level for young animals, further investigations should be conducted with various formulations applied to farm animals of various age groups before suggestions are offered regarding its use against livestock pests.

Methoxychlor

The low toxicity of methoxychlor to animals is an important point in favor of this insecticide. Its acute toxicity is much lower than that of other chlorinated hydrocarbon insecticides. Furthermore, little or none of the material is secreted in milk of treated dairy cattle. Its use is therefore encouraged for controlling insects on dairy animals. Results to date indicate that for horn flies and lice on cattle the insecticide compares rather favorably with other available materials. It is suggested that cattle be treated with a 0.5 percent spray. For control of horn flies about 2 quarts of this spray should be applied to a mature animal. For control of lice from 2 to 6 quarts is recommended. Against horn flies about 3 to 3½ weeks' protection may be expected as compared with about 4 weeks for DDT applied at the same rate. The higher price of the insecticide and possible shorter period of protection may discourage its use on range animals.

Methoxychlor may be considered for controlling house flies under conditions where DDT has not given satisfactory control.

TDE

Although less toxic to animals than DDT, more information is needed on the effectiveness of TDE before it can be recommended for controlling certain livestock pests. The insecticide does provide satisfactory control of horn flies and lice on cattle. For this purpose a concentration of 0.5 percent is suggested.

Piperonyl Butoxide-Pyrethrum Insecticides

Because of the low toxicity of piperonyl butoxide-pyrethrum insecticides to animals, no hazards should ordinarily result from its use. For protection of dairy animals this insecticide preparation should be considered for control of lice, horn flies, stable flies, and tabanids. However, the Bureau does not have sufficient information at this time to suggest the best concentrations to use.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEVADA

UNIVERSITY OF NEVADA
AGRICULTURAL EXTENSION DIVISION
AND
U. S. DEPARTMENT OF AGRICULTURE
COOPERATING

February 12, 1947

EXTENSION SERVICE
COUNTY AGENT WORK

To - Agricultural Extension Agents
From - Thomas E. Buckman, Assistant Director for County Agent Work
Subject - Identification of the southern species of the cattle grub, Hyperderma lineata, and the
northern species, Hyperderma bovis.

County Agent Supervisory Circular Letter No. 7

Dear Agent:

While Dr. E. W. Laake was here with us I asked him to write out a statement regarding the way to identify the two species of the cattle grub. With the following description it will be possible for you to do your own identification work.

Dr. Laake's statement is as follows:

"It is very difficult to separate the southern from the northern species in the first and second instar. But in the third instar they are very easy distinguished by the structure of the posterior spiracles.

The surface of the spiracles of the southern species, Hyperderma lineata, is flat, (not concave or convex) where as the spiracle of bovis is always deeply concave or funnel form.

Another distinguished character of the two species is found in the armature (spines) which is completely absent on the 11th segament of bovis, and always present, at least on the ventral side, on the posterior portion of the 11th segament of lineata."

E. W. Laake

The eleventh segament is next to the anal segment upon which the posterior spiracles (two black spots) are located.

If you are in doubt, suggest that, after you have identified a specimen, send it to Dr. Laake, addrssed as follows:

E. W. Laake, Research Entomologist
Bureau of Entomology and Plant Quarantine
Kerrville Laboratory
United States Department of Agriculture
Kerrville, Texas;

to confirm your own conclusions as to the identity of the cattle grub larva you

have identified. After you do this several times I think you will be well enough acquainted with the identification procedure so you can be positive of the correctness of your own conclusions regarding the specie of cattle grubs found in your county or district.

Very truly yours,

Thomas Buckman

Thomas E. Buckman
Assistant Director for
County Agent Work

TEB:ps
cc E. W. Laake
Bureau of Entomology and Plant Quarantine
United States Department of Agriculture
Kerrville, Texas

PROGRESS

IN

WEED CONTROL

ON

NEVADA FARMS and RANCHES

A Report of the Cooperative Activities of the University of Nevada Agricultural Extension Service in 1948

COMPILED AND EDITED BY

THOMAS E. BUCKMAN

Assistant Director for County Agent Work

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION SERVICE

RENO

TABLE OF CONTENTS

STATE PROGRESS REPORT WEED CONTROL ACTIVITIES OF
NEVADA EXTENSION SERVICE - 1948

DATE	PLACE	WORK DONE	ACTION TAKEN & RESULTS
Oct.10 & 11, 1947	Minden	Program Planning Conference Weed Control and Weed Equipment. All Agents and County Agent Leader met with Dr. W. W. Robbins, the foremost weed control authority in the USA, and his assistant W. W. Harvey for two days, considering ways and means of controlling the most troublesome Nevada weeds in 1948.	Meeting held as scheduled. All Agents present.
February 2,3 & 4, 1948	Sacramento	County Agent Leader Thomas E. Buckman and Fred Batchelder attended Western Weed Control Conference at Sacramento, California.	Valuable information secured-Methods and equipment used.
February 3, 1948	Davis	County Agents Albright, Bunker, Gardella and Helphinstine, attended spray equipment meeting held in conjunction with Western Weed Control Conference. Thomas E. Buckman and Fred Batchelder were also present.	Same
February 9,1948	Davis	Thomas E. Buckman and Mark W. Menke of Elko County, Extension Agent, attended Farm Machinery Conference. Purpose chiefly to inspect weed control machinery.	Same
March 9, 1948	Lovelock	County Agent Batchelder held a Weed Spray equipment meeting at Lovelock. 85 people were present to view ten different kinds of spray machines. Meeting attended by Thomas E. Buckman and District Extension Agent Kirk Day of Winnemucca. Jeep sprayer on display.	Ranchers and county agents better acquainted with the use of the most modern and efficient equipment.

DATE	PLACE	WORK DONE	ACTION TAKEN & RESULTS
March 8, 1948	Fallon	County Agents York and Jensen put on a very successful weed equipment meeting. 15 kinds of sprayers were on display. Machinery dealers cooperated 100 percent and furnished an excellent luncheon to the 250 farmers who were present. The Homemakers' Clubs of the county farm bureau served the meal under the direction of Home Demonstration Agent. Mrs. Lena Berry. Thomas E. Buckman, Archie Albright, Louie Gardella and Warren Welsh of Lyon County attended this meeting. Lee Burge, representing the State Department of Agriculture gave an excellent talk on weed control. Various types of demonstration equipment was displayed by the Extension Service	Same
March 10,1948	Minden	Another weed equipment meeting was held at Minden. Fred Batchelder brought the Extension Service jeep sprayer to Minden. Representatives of the State Highway Department were present to look over equipment. Thomas E. Buckman and Archie Albright were present.	Same
March 15, 1948		County Agents completed plans for 1948 weed control, tests, demonstrations and campaigns in Pershing and Churchill counties respectively.	
April 15, 1948	Stockton	14 new refueling pumps suitable for low pressure weed spraying located in surplus property and purchased for testing and demonstration use by county agents in the following counties: Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lincoln, Lyon, Nye, Pershing, Washoe and White Pine. The Agricultural Experiment Stations at Knoll Creek, Elko County and Logandale, Clark County, and Joe Robertson offering a course in weed control in the College of Agriculture were furnished with a pump. The pumps were purchased by T. Buckman at a cost of $8 and were found to be equivalent to a $200 spray outfit.	This resulted in each agent & several other workers being furnished with a suitable demonstration kit at low cost & made such equipment available at the right time to all Counties. Read Agent's Progress Reports that follow.

DATE	PLACE	WORK DONE	ACTION TAKEN & RESULTS
April to September		County Agents at work on weed control in counties. Read Progress Reports for each county that follows to find results reported by each agent.	
August 1948		169 fuel pumps, 3 GPM and capable of producing 200 pounds PSI, suitable for weed control work secured by Thomas E. Buckman from army surplus. Demonstration kits using these pumps were put together under Mr. Buckman's direction and demonstrated to County Agents at a Supervisory agents conference, with all agents present, at the Knoll Creek Experiment Station, Elko County on August 17 and 18. Four different ways of using this equipment was demonstrated. Plans at this meeting were discussed for 1949 weed work in the counties, as well as Larkspur eradication on the range at the Knoll Creek Station. Control of halogeten was also a subject of discussion. The county agents made a number of suggestions at this conference to Director Fleming, Mark Shipley and Joe Robertson that were helpful in planning the poisonous plans research program the Agricultural Experiment Station is undertaking in 1942.	County Agents acquainted with weed sprayers that can be made from army surplus equipment.
November 1948	Reno	County agents Albright, McCartney, Charles York, Jim Jensen and Leonard Anker, Walter Neilesen of the Experiment Station, met with representative of the Fabricated Metalx Company, to perfect use of tractor power take-off weed sprayers and other weed spraying equipment. The factory representative came at the request of Mr. Buckman. The meeting was held in the Farm Mechanics Shop of the College of Agriculture. At this meeting it was proven that the surplus pumps previously mentioned were satisfactory for weed pumps,	(continued)

DATE	PLACE	WORK DONE	ACTION TAKEN & RESULTS
November 1948	Reno	and especially adapted for PTO installations. (169 pumps are available for demonstration use in 1949.) The Experiment Station tractor was used as a demonstrator. Director Fleming attended part of the meeting. Louis Titus, Farm Mechanics instructor was present and was very helpful in handling the equipment.	Same
November 1948	Reno	Plans were made to show the Extension Service models for weed demonstration kits at the County Agent Agronomy Conference to be held at Minden in January.	Same

---

GRAIN SPRAYED with 2-4-D in 1948

COUNTY	ACRES WHEAT & BARLEY	ACRES CORN
Churchill	6,000	400
Douglas	350	
Lincoln	170	106
Lyon	650	
Nye	30	
Pershing	12,000	
Washoe	20	
White Pine		50
	19,420	556

19,420 acres of wheat and barley
556 acres of corn

Progress Report for
1948 - Churchill County
Charles R. York, Agent

WEED CONTROL

A great deal of weed control work was done in Churchill County in 1948 with approximately 6,000 acres of grains having been sprayed with 2,4-D for control of weeds. The agent helped in conducting check plots which were later used as a field tour showing the value of spraying. In one instance a field which has never yielded a clean crop of grain in its history showed weeds only where strips were left intentionally for check plots. Where the grain was sprayed no weeds were apparent and combining was a simple task. In the check strips, sun flowers and bassia grew above eye level.

The Dodge Island Ranch spent approximately $1,300 for chemicals alone and yet Carl Dodge stated that they actually made money on all of their spraying operations because of the boost in their yields of grain. Their farm is severely infested with White Top. The Section Ranch, near the Dodge ranch, had a yield of 104 ton of grain for 111 acres, being the largest yield of grain by this farm per acre in many years. If nothing had been done, an almost complete stand of White Top would have been present. This entire place was sprayed with the exception of the alfalfa fields.

A great deal of good was done on ditch banks, levees and open fields in the control of White Top. These ranchers also stated that they had actually made money on their spraying operations because of the increased yields in grain. Many inquiries as to the amounts of 2,4-D to be sprayed on grain without kill or damaging production were made and as a result the agent sprayed two acres at the Newlands Field Station, stripping the plots with 1½ pints, four pints, and eight pints per acre, leaving check plots between with no treatment. About a month after application the eigh pint plot appeared to be somewhat burnt. However, when the grain started into the boot very little of this could be seen. These two acres were combined out by strips so as to get accurate yields. Just before combining, two young farmers, the superintendent of the Experiment Station, and the agent guessed the yields for interest's sake. Then the yields were taken showing that ones opinion as to yields of grain standing in the fields, could not reliably be taken. Where the grain was sprayed with eight pints of 2,4-D per acre, the yield was the heaviest with 128 pounds on a 5 foot strip. The lightest yield was that between the eight pint plot and the four pint plot yielding only 86 pounds per five foot strip. The 1½ pint and four pint strips varied only one pound in yield, producing 107 and 108 pounds. All other check plots produced less grain than the sprayed plots. The amine salt liquid 2,4,-D was used in this plot work and cannot be used for determining the effect of ester 2,4,D.

Lovelock has also started a similar project and with cooperation of the two counties, a satisfactory program should be in operation early in the Spring of 1949. The Irrigation District, State Highway, and County Commissioners have agreed to completely control areas under their jurisdiction so it is up to the farmers to complete the program by controlling their own premises. The ACP committee has discussed at several meetings, the problem of weed control and have decided to allocate at least part of the ACP money to go toward weed control on the various farms.

/Sgd/ CHARLES R. YORK.

Statement - September 3, 1948 - Churchill County -

6600 acres of small grain were sprayed with 2,4-D
400 acres of corn was sprayed with 2,4-D

2,4-D excellent for spraying small grain and corn; also very good for controlling weeds in ditches. Does a fair job on white top, Russian knapweed, but will not control camels thorne. Does very good job on annual weeds and most other broad-leaf plants. Will not control broad-leaf milk-weed. Should be applied on plants during stage of succulent, vigorous growth.

We have found that heavy application of 2,4-D amine liquid salts up to 8 pints per acre did not harm grain.

Most effective kill has been obtained by the use of fog nozzles.

/sgd/ ØHARLES R. YORK
County Extension Agent

It is apparent from the above work that grain can stand more of the amine salt liquid 2,4-D than it would be economical to use.

In February of 1948, a weed control demonstration was held with about eight of the major pump and spray outfits demonstrating their machines, nozzles and equipment. Approximately 250 farmers attended the demonstration showing the interest in weed control.

It has been found that 2,4-D is not the answer to the control of Russian Knapweed, but only partially effective in killing knapweed. Also camel thorn has been found to be very resistant to killing by 2,4-D and as a result of this the irrigation district has seen fit to arrange irrigation facilities so as to submerge the only patch of camel thorn in Churchill County. Where the camel thorn was completely submerged, complete killing has been accomplished but where the plant was tall enough to have its head above the water, the roots were still alive when frost came. It is apparent that complete eradication of this noxious weed will be complete by the end of 1949.

Many farmers have purchased or built up spray rigs for weed control. Some are of the high-pressure type and others the low volume, low pressure type. Several farmers have power take-off points on their tractors. Only one custom spray operator is in operation in the county but he was kept busy all the time for approximately two months during the proper spraying season in the Spring of 1948. It appears to the agent at this time that nearly everyone in Churchill County will do some type of control work during 1949.

Through interest aroused by the State Department and the County Agent in weed control plots and demonstrations, the county has become weed control conscious and as a result, the county commissioners appointed a Weed Committee to set up and coordinate an over-all weed control program for Churchill in 1949. Men appointed were -

1.	Carl F. Dodge, Jr. Chairman	Rancher
2.	Virgil Getto	Farm Bureau
3.	Charles York	Extension Service
4.	George Coleman	State Highway
5.	Thomas Kent	Businessmen
6.	John Mall	T.C.I.D.
7.	Mario Peraldo	TCID-& Rancher
8.	Claude Smith	Press
9.	George Pomeroy, Jr.	Commissioners
10.	Lee Birge	State of Nevada
11.	John R. Hannifan	Chamber of Commerce

Progress Report for
1948 - Clark County
J. H. Wittwer, Agent

WEED CONTROL

"(a) Hoary Cress; (3) Wild Morning Glory; (8) Russian Knapp Weed

The foregoing weeds present the greatest problem of noxious weed infestations in Clark County, Nevada. Reports to date from various sources indicate that each can be eradicated if the proper chemical is used in exactly the proper manner. An opportune time came to attend a weed control demonstration July 1, 1948, at Azusa, California, where eighteen different treatments were given non-noxious weedsin a citrus orchard. During the proceedings of this demonstration, contacts were made with commercial spraying contractors who were positive that Russian Knapp weed could be controlled with chemicals. Details with type and kind of equipment for effective control were secured. One cooperator in this county with a badly infested farm of 200 acres irrigated crop land has been secured, and who is in line to secure the necessary equipment and spray material with which to give the Knapp weed a substantial trial beginning early in the year 1949. With an eradication program effectively carried out on this farm, preventive measures will protect infestation of approximately 4,500 acres of the best agricultural lands of the area since these acres lie immediately below this 200 acre farm on stream from which those 4,500 acres are irrigated. Owing to speculative aspects of this type of noxious weed control, it is noted that with effective control of the Knapp weed, control of Hoary Cress and wild morning glory will follow."

Tomato Plant Experiments Moapa Valley 1948
Ray K. Petersen

LAND USED FOR PLOT WORK

"Four acres of land from the Leonard Marshall farm was rented the previous year, to carry on this program. The land is classified by the Soil Conservation Service as Class I land. This soil on this plot is a rather light sandy clay loan, this type is generally preferred for tomato plant culture. This land, when rented, was thoroughly fouled with Johnson Grass, however, this was largely cleaned up by cultivation (further discussion on this will be found under Weed Control.)"

PREPARATION FOR SEEDING

A good seed bed was developed and was prepared by using plow, spike tooth harrow and Eversman leveler. There was no application of fume this year for the control of nematode. It was felt that inasmuch as fume had been applied last year and in view of the fact that the land had been laid fallow for the previous year with frequent cultivation, it was assumed that the use of fume would not be necessary.

WEED CONTROL

The results obtained on the control of Johnson Grass by intensive cultivation were very gratifying. Only a few isolated plants came up and could not be considered of sufficient importance to be a factor.

The task of hand weeding is slow and expensive. If some means could be devised whereby the weed problem could be at least in a measure eliminated, the growing of tomato plants would be materially simplified.

CULTIVATION AND WEED CONTROL

The results noted during the previous season's planting were greatly influenced by a heavy growth of Johnson grass. Therefore, the following steps were taken to eliminate the reoccurence of Johnson Grass. The land was disced three times and then dry plowed with a Moldboard plow, then run over with a John Deere Killifir Weeder, then dry plowed again with a disc plow and run over again with the Killifer Weeder, then the land was allowed to lay until Winter. During the coldest part of the winter the land was plowed twice more so that the remaining Johnson Grass Roots would be exposed to the frost.

OBSERVATIONS:

The following conclusion was based on interviewes with all tomato plant growers:

The cost given for weeding varied all the way from twenty-five dollars per acre to one hundred and fifty dollars per acre. Cost will vary from acre to acre, season to season and on how much thinning is done in conjunction with weeding. All farmers were of the opinion that experimental work should include specific work on Weed control.

Mr. Petersen plans to work on pre-emergence spraying in 1949 to determine if weeding costs cannot be reduced.

Progress Report for
1948 - Douglas County
Leonard Anker, Agent

WEED CONTROL

White Top (Lepidium draba) and Canadian Thistle (Cirsium spp.) have been considered as the most dangerous and widespread noxious weeds in Douglas and Ormsby counties. An estimated 1200 acres of White Top and 200 acres of Canadian Thistle existed. Both had been steadily on the increase for the past two years.

With the advent of 2,4-D, the campaign to control these two weeds was inaugurated with the advise of the Extension Advisory Committee.

In cooperation with the Nevada State Department of Agriculture, the Douglas County government had sponsored a White Top eradication program during the depression years. Control was to have been accomplished by using "atlacide" and continuous cultivation. This program had partial success, but there were few cases of eradication. The program ceased in about 1936.

To properly demonstrate the correct application of 2,4-D, a war surplus gas pump was obtained by the extension service and converted into a sprayer. To show proper mechanical equipment, a sprayer equipment demonstration was held in Minden. Seven spray rigs were demonstrated. Experts explained the use of 2,4-D.

The Douglas-Ormsby Agricultural Conservation Association provided 100% payment for the use of 2,4-D on these two noxious weeds at the rate of $1.75 per pound of actual 2,4-D acid used. This provided financial assistance.

Actual demonstrations were started May 10th. Twenty-three cooperators used the demonstration sprayer. Most cooperators used the ester form of 2,4-D in a 44% solution. Two or three quarts of stove oil were added to form an emulsion which stuck better to the plants. Various rates of application were made.

A demonstration was conducted on the George Heidtman ranch, comparing the results of a 44% ester solution with a 64% triethanelene salt solution. Application was made at the rate of 1½ pints per acre on morning glory, mustard and willows in grain fields. One gallon of stove oil per acre was added for a spreader; approximately 17 gallons of water per acre were used as a vehicle.

Both morning glory and mustard were susceptible to both solutions. The ester form achieved a quicker kill. Willows were killed by both forms, but the salt with the higher concentration proved more satisfactory.

Application of the same materials only at twice the strength in the same amount of water was made on Canadian Thistle. The ester form accomplished an 80% kill, while the salt made a 40% kill. Grain was slightly damaged by the oil.

On the August Schacht ranch, various ratesof application were made on White Top. In an extremely heavy infestation, a 44% ester solution was made at 3 quarts, 2 quarts, and 1½ quarts per acre. Two varieties of White Top were in evidence. Their maturity dates were about fifteen days apart. Results were a little difficult to accurately evaluate. Little difference was apparent in observations made during the first thirty days. An estimated 80% kill was achieved on each part of the field. The earlier maturing variety was slower to die, probably due to the fact that it was in the bud and early blossom stage.

New shoots emerged from the lateral rhizomes of both types: however, the early maturing plants evidently produced more. Strawberry clover was not killed.

The year's results showed that proper timing and correct rates of 2,4-D were most important. White Top could be controlled effectively without too much difficulty. Canadian Thistle is much more difficult to control, but 2,4-D is the best method. Eradication of large areas of both is difficult, but can be accomplished on a long-time plan.

STATEMENT

"September 13, 1948

Mr. Thomas E. Buckman
Asst. Director for County Agent Work
University of Nevada
Reno, Nevada

Dear Tom:

With reference to Supervisory Letter No. 9, I would estimate the area in Douglas and Ormsby counties that was sprayed with 2,4-D to be about 500 acres. This, of course, represents a good deal of spot spraying on noxious weeds.

Most of the crops that were treated were grain crops, with a small amount of pasture spraying. A good deal of the spraying was in non-crop areas.

Weeds controlled were mustard, morning glory, white top, Canada thistle, bull thistle, dandelions, plantain, wild iris and willows.

The reaction to 2,4-D as a weed killer is generally good. The A.C.P. committee for these two counties allows full payment on the use of 2,4-D for controlling Canada thistle and white top. They believe it to be the best solution in controlling most noxious weeds.

A general preference has been found for the ester forms of 2,4-D, and due to the smaller fields, most of the application has been made with ground rigs.

Sincerely yours,

Sgd/ Leonard Anker
District Extension Agent"

PROGRESS REPORT - 1948
ELKO COUNTY
Mark W. Menke

WHITETOP AND OTHER WEED CONTROL

The gradual spread of noxious and poisonous weeds has grown to such proportions that ranchers decided some action was necessary to control them.

In January a community meeting was held in Starr Valley in cooperation with the Starr Valley Soil Conservation District Supervisors. Plans were made for a weed survey to be made and a community weed control project was set up. A survey of the community revealed that Canadian thistle was the most widespread weed infesting the ranches, range and watersheds; whitetop, burdock, Russian knapweed and European morning glory were also of importance and needed control.

The Agent attended a weed control and farm machinery meeting at Davis, California where considerable information on weed control machinery was secured.

A trailer and other second-hand equipment was bought and a demonstration weed sprayer was made at a cost of $110.00 for materials plus several days work. Surplus Army hand sprayers were distributed to twelve ranchers for use in spraying small patches of noxious weeds in Starr Valley, mostly.

Weed spraying demonstrations were held on the following:

Place	Weed	Date	Stage of Growth	24-D Used	1st Yr. Results	Final Results
71 Ranch	Whitetop	6/16	late bloom	salt	good top kill	
				amine	" " "	
				ester	" " "	
	Dandelions	6/16	late bloom	salt	fair " "	
James Wright	Canadian Thistle	6/25	bud	ester amine	?	
Doug Smith	Whitetop	6/24	late bloom to seed	ester	good top kill	
William Lane	Canadian Thistle	7/2	bud	ester	" " "	
	Whitetop		bloom	"	fair " "	
	Russian Knapweed		bud	"	poor " "	

These weeds showed some regrowth and were sprayed again on September 10.

Place	Weed	Date	Stage of Growth	24-D Used	1st Yr. Results	Final Results
County Court House	Dandelions	6/14	late bloom	amine	fair to poor	
Leonard Hopkins	Morning glory	7/6	bud to early bloom	ester	excellent	
Carl Supp	"	"	full bloom	"	"	
Frank Winchell	Canadian Thistle	7/8	bud			
C. H. Black	Canadian Thistle	7/19	"	ester	"	
				amine	"	
				salt	"	
	Water Hemlock	7/19	bloom	ester	?	
	Willows	7/19		ester	good	
Oscar Goodale	Canadian Thistle	7/21	bloom	ester	good	
Brennen	Canadian Thistle	8/12	mature	ester	poor	
			bud	"	good	
			bloom	amine	good	
			small	"	?	

These demonstrations will be followed up until it is determined what length of time and amount of 24-D is required for a complete kill if such can be secured.

A preliminary check of the results showed that Canadian thistle started to twist within 24 hours after the ester and amine forms were applied. After two weeks the weeds appeared to be in a very unhealthy condition, not entirely dead, but dying. The same results were secured on morning glory but results on knapweed and whitetop appeared to be much slower and much less effective. Many of the sprayed plants continued to bloom and form seed pods but on close inspection at least 95% of the pods contained no seeds.

These demonstrations and others put on involved extensive weed patches, in all probability covering 20 acres of solid weed infestation.

Material used in these demonstrations was 65 pounds of 60% salt, 10 gallons of 40% amine and 25 gallons of 44% ester.

Results on all types of weeds showed that best results were received when the plants were in a stage of rapid succulent growth and with good moisture in the soil. In very dry soil or after mature growth had been reached, the results were poor.

The possibility of dusting or spraying large areas of willows, rabbit brush and sagebrush by airplane is being discussed and will be investigated for next year.

The Agent devoted 44 days to work in connection with weed control work, most of this about equally divided between field demonstrations, work on weed demonstration equipment and office work in study of weed control methods and materials. Three news stories were published, 99 farm visits were made, two circular letters prepared, seven meetings held and twelve method demonstrations given.

Considerable interest is manifest in eastern Nevada and elsewhere by the killing of 21 head of cattle at several points between Carlin and Osino by Halogeten glomeratus. Little seems to be known about control of this poisonous weed.

STATEMENT

In reply to your supervisory letter #9, this is to advise that I have used 2,4-D rather extensively in a demonstration way here in Elko County this year. I have used the 60% powder, the amine solution and 37% the ester solution. So far as I can determine from top kill, all three types do a good job if properly applied in sufficient strength.

I do not like the powder form because it is difficult to keep in suspension, it becomes lumpy and hard, and is much more of a nuisance in mixing than the liquid form. It is especially not adapted for equipment without good agitation. The other two forms have proven very effective so far as top kill is concerned, but I have come to the conclusion that in the future we will use and recommend the ester form only, for tough perennial weeds. At present prices it is the cheapest, contrary to all reports put out by experiment stations and others. It requires much less of it per 100 gallons of water. Of course, in spraying grains and where fumes are a problem then the ester form cannot be used and of the others become necessary.

The weeds we are primarily interested in controlling here are Canadian thistle, morning glory, white top and Burdock. Morning glory, Burdock and Canadian thistle are easier to kill than whitetop.

The general reaction is that weed spraying should be a regular procedure on a large number of farms; on some it is already indispensable. I would judge that about 40 acres of weeds were sprayed here this year.

Very truly yours,

/Sgd/Mark W. Menke

Mark W. Menke
County Extension Agent

PROGRESS REPORT
1948 - Humboldt County
J. Kirk Day ,District Extension Agent

A great deal of work was done with the use of 2,4-d in the control of willows. Good to excellent results were obtained along ditches, but where the willows completely covered large areas, the results were not too satisfactory.

Plans have been made for greater weed control work in the spring; especially in grains. More work will definitely be done to control and finally eliminate white top.

Some results were obtained from the work done to control Puncture Vine, but one or two more years will be needed before eradication is completed.

PROGRESS REPORT
LINCOLN COUNTY - 1948
Ferren W. Bunker, CountyAgent Caliente,Nevada
September 10, 1948

During the past season, the Lincoln County Extension Agent rigged up a power sprayer with a 18 foot boom for spraying weeds, and also aided a farmer to rig up another sprayer with a power take off for his tractor. These two outfits with one owned by Pahranagat Valley High School Agricultural Department were the only sprayers in Lincoln County used for weed control spraying on a commercial scale. This is the first year that any weed control work has been done in Lincoln County. Approximately 100 gallons of Butul Esters was purchased through the County Extension Office for the spraying of various weeds. Crops which were sprayed most extensively were small grains, corn and native meadows. My record shows that there were 106 acres of corn, 170 acres of small grains, and 50 acres native meadow. The foregoing information regarding acreage is only the acreage that I have fairly accurate tab on. There may be additional amounts of spraying done through out the County that would enlarge these estimates.

All acres of obnoxious weeds were treated such as; Russian knap weed 100 acres, white top 8 acres, morning glory or bind weed 50 acres. In most instances, the spraying of weeds and crops meant the difference in receiving a fair go good crop in comparison to no crop at all. Spraying done on native meadows was to kill Yerba-manza. This work was just begun this year with the idea of testing the effectiveness of using 2,4-D for its control.

Lincoln County
Continued

Weeds successfully controlled with varying amounts of 2,4-D were: Yerba-manza, white top, russian knap, morning glorin, Canadian Thistle, Russian Thistle, bassia, lamb quarter, pig weed, sunflower, cocklebur and mallow, least controllable was the poverty weed. Areas of this weed were sprayed with very little control.

One of our biggest problems in the coming year in our weed control program, will be the elimination of Yerba-manza in Pahranagat Valley Meadows. This weed has practically taken over the meadow lands of the area and made them very unproductive. It is also an obnoxious weed from the stand point of causing milk and meat that is produced from it to have a very foul odor.

Farmers have indicated that during the coming year they are planning to spray more extensively their corn and small grains as well as the extermination of Yerba-manza from the meadows.

I am looking forward to a much more active weed control program in 1949 due to the effectiveness of our work this year.

/Sgd/ FERREN W. BUNKER

ANNUAL REPORT
NORTH LANDER COUNTY
J. Kirk Day

V. WEED CONTROL

One rancher has started control of Russian Knapweed by means of a commercial weed killer called Atlacide. Results this spring were fair with an observed kill of approximately 45%. Applications of various known weed destroying chemicals have been applied and results will be available during spring growth.

SOUTH LANDER COUNTY
James G. Jensen

Approximately 5 acres of white top was sprayed with 2,4-D in Monitor Valley. There has been some spot work done on other ranches in the County. No spraying has been done in crop control of annual weeds.

ANNUAL REPORT
LYON COUNTY
Louie A. Gardella

Annual and Perennial Weed Control in Grain

Over 650 hundred acres of grain was sprayed with 24-D by plane and ground rigs for control of annual and perennial weeds in grain fields. Results were satisfactory on most treated fields. This program has become a standard practice among farmers.

The following statement was made September 3, 1948:

350 acres of grain were sprayed by airplane.
300 acres were sprayed by ground rigs.
Acreage was evenly divided between wheat and barley.
Mostly salt was used; but about one third of the acreage was sprayed with Ester.
12 ounces of acid eq. for salt.
6 to 8 ounces of acid for ester.

Results were generally good.

Weeds Sprayed for In Order of Damage Done.
1. Bassian (Iron weed)
2. Sunflowers.
3. Sweetflower.
4. Pig weeds
5. Misc. weeds
6. Morning glory
7. Whitetop

Several very good results were obtained, where crop would have been an almost total loss because of Bossia of grain had not been sprayed.

8 to 10 miles of Roadside and Ditch Bank were sprayed with 24,D for control of willows and other weeds. Some weedkiller oil (Shell No. 20) was used.

An area over about 50 acres with willows was sprayed by plane. Results,

I think, will be satisfactory. The dosage in this case was doubled.

Some interest in killing grasses and brodclover on ditches with oil was developed. Looks pretty good.

Several miles of Ditch were hand sprayed for control of Water hemlock. Results were good.

Wild Iris

The Agent sprayed several plots in the Sweetwater area with several strength solutions of 24-D and with oil mixtures. Judgment could not be passed on these plots because of the dry conditions which occurred in late summer.

The programs of Wild Iris control should receive considerable more time and effort since a very large percentage of our higher pastures are being taken over by Wild Iris.

Water Hemlock

During 1948 the Agent estimates that over eighty head of cattle were poisoned in Lyon County by eating Water Hemlock. The plant is found on all live streams.

Considerable work on control of this poisonous weed was affected when spraying for Willow control on ditch banks with 24-D was done. Also, several farmers and ranchers treated their ditches with hand sprayers specifically for Water Hemlock control. Where ditches were so sprayed the results were very good. The process is simple and can be done at a very low cost. Since the livestock losses have been heavy and since the costs of treatment are low, the Agent expects considerable control work to be done in 1949.

Willow Control

Ditch companies, ranchers, and farmers all showed considerable interest in willow control on ditch banks. A considerable acreage was done by commercial operators.

White Top Control

Probably not more than one hundred and fifty acres of land in southern Lyon County is infested with White Top. The Agent knows of only six farms on which this plant is found in Mason and Smith Valleys. The Agent made an inspection of the farms on the Carson River and found a considerable growth on nearly all farms. The Fernley area also has considerable acreage infested with White Top.

Two fairly large grain fields heavily infested with White Top were sprayed by commercial operators with 24-D but results were not satisfactory.

White Top Control (Continued)

The Agent hand sprayed several small plots and obtained a good top kill. The Agent believes that repeated sprayings with 24-D over a period of several years will result in permanent kills but farmers are indifferent to the program and considerable work will have to be done to insure control.

Canadian Thistle

The Agent located two small areas on two different ranches on which Canadian Thistle is growing. Due to lack of time no attempt to control was made.

Wild Iris

Results obtained on approximately thirty-five acres sprayed with 24-D in 1947 were fairly good. Over fity percent kill was noted in treated areas. Due to the fact that the plant is large and resistant, at least two years of consecutive treatment will have to be made. Due to the lack of irrigation water, the treated fields were not properly irrigated in 1948 and it was impossible to determine what proportion of the kill could be accredited to 24-D and what portion to drought.

NYE COUNTY

WEED CONTROL

There were approximately 30 acres of new wheat that was sprayed to control various noxious weeds.

Other weeds sprayed in this area were Russian Knapweed, Morning Glory, Water Hemlock, White Top and Willows.

The spray has proved effective with 75% to 95% kill. The lowest percentage kill was on the Knapweed which was estimated at 75% kill, while the other weeds sprayed were estimated at 90% kill, thus giving conclusive proof of the merits of spraying with 2,4-D.

/Sgd/ MICHAEL GALLI
District Extension Agent

PROGRESS REPORT FOR 1948
OF PERSHING COUNTY.
Fred C. Batchelder,
County Extension Agent

WEED CONTROL

Weed control is the most important Extension Project in Pershing County and consequently most of the agent's time during the summer, was spent on this project.

The agent attended the Tenth Annual Weed Control Conference at Sacramento on February 1 and 2, where he received much valuable information on weed control equipment. Early in March, the agent outfitted a War Surplus Jeep with a small spray outfit made from a War Surplus gas refueler pump.

On March 9, a weed control equipment demonstration was held at which the agents' sprayer was shown. Several types of sprayers were shown by their dealers including: Spray-rite, Simer, Rotoflex, Bean, Shaw Jabsco, and Flexrotor. The same demonstration was held at Fallon and Minden and the agent showed the Jeep outfit at both places. Although the Weather was bad during these three days, the attendance at all three meetings was good. As a result of the demonstration, one farmer built his own sprayer and one farmer purchased a sprayer.

In April, the writer sprayed ten acres of onions with 25 gallons of diesel oil and one quart Sinox General, as a preemergence spray three days before emergence in an attempt to kill volunteer barley. The grain was retarded but not killed but when the field was hand weeded, it was found that the sprayed area was much cheaper to weed than the unsprayed.

From May 4 to July 30, the writer spent a large part of his time spraying ditches and small fields with the Jeep outfit for farmers. The farmer was asked to furnish the material and operating expenses. Several different sprays were used and tests showed that for most broad-leaved weeds in ditches, 1 to 1½ pints Butyl Ester per acre did the best job. On watergrasses and foxtail, 1 quart Sinox General, 7 gallons diesel oil and 93 gallons water did a better job than straight Shell Weedkiller No. 20. Straight diesel oil and Sinox at 1 quart to 25 gallons did about the same as the water emulsion. The emulsion requires constant agitation while the straight oil did not. About 3,000 gallons of weed killer was applied by the writer during the summer, at the normal rate of 50 gallons per mile of ditch 12 feet wide. This makes a total of 60 miles of ditch sprayed. The spray was applied with a boom attached to the front bumper of the Jeep wherever possible and by a 50 foot hose where the Jeep could not be driven close enough to the ditch.

In addition to the Jeep, the agent kept 10, 3 gallon hand sprayers available in the Extension Office for use of farmers in spot spraying. These sprayers were in constant use throughout the summer and did much to acquaint farmers with the value of weed control. Nearly every farm has small patches of whitetop and the most effective way of controlling it is by spot spraying.

Due to the large size of grain fields in the county, the most practical way to spray weeds is by airplane and this year there were three airplanes spraying companies active in the county. In answer to a questionnaire, they claim to have sprayed the following acreages:

Roberts Aircraft Co.	9,000
Borges Dusting Co.	4,000
Mr. Long	2,000

In view of the fact that there are only about 13,000 acres in grain this year, these figures seem exaggerated; but,, at least 2,000 acres were sprayed twice. This was done to try to get a better kill on whitetop and because Bassia weed sent up a second crop after the first spraying. Nearly every field of grain in the county was sprayed at least once.

This is the second year of large scale weed spraying in grain fields and the entire county is taking on a new look. Now it is more common to see clean fields then weedy ones and visitors to the county frequently mention the clean grain fields they see.

Airplane spraying started on May 10 and lasted until after September 1. Most of the spraying was done with one pint of Butyl Ester in seven gallons of water although after the grain had emerged from the boot, the agent advised the use of 1½ pints Amine Salt. Only one case of 2,4D damage was noted. It was on Hannchen Barley sprayed with one pint Ester as it emerged from the boot. The stems twisted at each node and although they straightened out again, the yield was reduced.

On July 12,250 gallons of Coal Tar Naptha water weed killer was applied to the Old Channel Ditch with the Extension Service Bean 35 sprayer at 400 pounds pressure. The ditch capacity had been reduced from 120 second feet to 40 second feet by water weeds and within a week after spraying, the capacity was back up to 70 feet.

The Coal Tar Naptha was applied at the rate of five gallons per second feet of flow applied in one hours time.

The writer believes that spraying Whitetop in the early seed stage may be the most effective time, therefore, plots 16x200 feet were sprayed on July 7,9,14 and 23 on the Tule Camp. One half of each plot was sprayed with Butyl Ester and the other half with Amine Salt at regular rates of application.

In August, Lee Burge of the State Department of Agriculture called an impromptu meeting of farmers and businessmen in an effort to start some kind of organized weed control. A committee of 20 key farmers and businessmen were appointed and at a later meeting, a steering committee consisting of Fred Batchelder, County Agent, Robert Leighton, Water District Engineer, Harry Munk, G. A. Momberg and Wilson McGowan were appointed. This committee will met with the

Water District Directors and County Commissioners this winter to try formulate a combined weed control prgject for the next summer.

CONCLUSION

Weed control was practically unknown in Pershing County two years ago and now almost every field of grain has the weeds sprayed on it, farmers are spot spraying noxious weeds and considerable ditch spraying is being done. In addition, there is a movement towards systematic county weed control.

The writer believes that weed control has become a standard part of farm operations and is one of the most important parts.

WEED CONTROL WITH 2 - 4 D in WASHOE COUNTY

September 9, 1948

2-4-D was used to kill Morning Glory, Plantain, Dandelion, Poison Parsnip, Willows, White Top and Klamath Weed.

The spraying was done mainly on roadsides, ditchbanks, pastures and lawns.

The Sherwin-Williams "Weed-no-More" was the main brand used, however Purina Lawn Weed Killer was used too.

About 300 acres were treated and the results were good.

We found that Elm trees are very susceptible and in some cases where lawns were treated the Elms died.

Washoe County, Nevada
Annual Report Archie Albright

OBJECT:

To furnish farmers assistance on controlling weeds in their crops.

GOALS	ACCOMPLISHMENTS
1. Formulate plans for weed control demonstrations.	1. Plans were completed for weed control in 1949.

A Weed Control Conference was attended in Minden Nevada in January - October 1948 to agree on Weed Control methods for the Counties. Mr. W. A. Harvey and W. W. Robbins of the University of California were present to give detailed information on chemicals for weed control.

A check was made with the State Department of Agriculture on the types and amounts of weeds in Washoe County. It was found that poison parsnip was the predominant weed with the following weeds being found in small amounts, heary cress, yellow star thistle, Canada Thistle, quack grass, fox tail, puncture vine, Klamath weed and various others not considered serious.

Since Mr. Thomas Bradshaw, County Quarantine Officer, works on weed control during the summer, the weed situation is not considered too serious.

A second meeting with Mr. Burge of the State Department of Agriculture and Mr. Bradshaw brought out the thought that farmers should be reminded of the weeds needing some control. As a result Mr. Burge appeared at the Farm Center Meetings and asked for a representative from each center to be on a County Weed Committee to make plans for a County Wide Weed district to initiate a program for control on public and private property. Very little interest was shown by those present for such a County Wide program.

Two weed sprayers were purchased during the year to demonstrate control by chemicals. These two sprayers one a gasoline engine operated and the other a tractor power takeoff will be used to demonstrate weed control in 1949.

A few demonstrations were prepared with a hand pump to kill plantain and dandelion. One farmer sprayed 20 acres of grain with good results.

Mechanical methods of control were digging by hand and burning parsnips on farms where spraying would not be feasable. And the very successful burning the weeds in onions before the onions come up.

Killing moss in ditches was demonstrated with very good results. 75 gallons of beno-clor 30 was applied to the Orr Extension Canal. About 4 1/2 miles were cleared of moss for about $160. The saving in water this year plus the ease of clearing the moss makes the application worth while.

One man can apply the 75 gallons of Beno-Clor 30 in 2 hours while mechanical cleaning takes at least 8 hours for four men and doesn't compare with the job done by the chemical.

The Beno-Clor works on the moss in such a way that the moss disintegrates and therefore causes no clogging of head gate. The Beno-Clor also kills snails, and crayfish that cause troubles.

The Orr Extension used Beno-Clor in 1947 and had much less moss in the same area of the Canal in 1948. Controlling the moss also lessens the cleaning job because fewer silt deposits are left in the ditch in the fall after the irrigation season.

WHITE PINE COUNTY
ANNUAL REPORT
WILLIAM N. HELPHINSTINE

WEED CONTROL

The Agent attended one day of a weed control converence at Davis, California. An excellent demonstration of equipment was held. The agent obtained invaluable information and ideas on weed control measures. The conference enabled the Agent to assist cooperators in the selection of spray machinery best suited for their particular needs.

Swallow Brothers were assisted by the Agent in obtaining and assembling a spray outfit for weed control work. They sprayed approximately 50 acres of corn being grown for silage. The spraying was started too late for best results. The cooperators said that they would have lost most of their crop if the spraying were not done. They plan to start control measures earlier next year so that the weeds don't get such a head start on the crop. They also plan to spray all the isolated spots of noxious weeds on their ranch.

Follow up work was done by the Agent on the kirkeby ranch in Spring Valley where several demonstration plots were established in 1947. It was estimated by the cooperator and the Agent, that approximately an 85 percent kill was obtained on plots treated for control of morning glory where two applications of 2-4-D were applied. He continued the plots this year with one application of 2-4-D. It is anticipated that most of the remaining plants will be eradicated. The few that are left will probably have to be hoed for complete eradication.

Weed control work was carried on by cooperators throughout the County for control of morning glory, white top, Canada thistle, to name the most troublesome. Varied degrees of success were reported. The Agent believes that probably the most important factors that resulted in poor control was due to treating too late when the soil moisture was low and the weed too mature.

The weed control program in the county can be improved by.

a. Urging cooperators to start control work earlier in the season.
b. Encourage and assist cooperators in obtaining weed control machinery.
c. Urge cooperators to do more control work in their legumes prior to emergence in the spring.
d. Alfalfa production.

KLAMATH WEED CHECKED BY

AUSTRALIAN BEETLE

Berkeley, Feb. 4 - A shiny, blue-green beetle, no bigger than a ladybird, is successfully checking the spread of one of California's most undesirable weeds.

Klamath weed appeared in the state in 1900, and since then has taken over some 400,000 acres of open-range grazing land. Livestock that feed on it, become scabby, soremouthed and underweight. Chemical control has proved expensive, and impractical in inaccessible areas.

In 1944 a natural enemy of the weed, the Klamath weed beetle, was imported from Australia, and the University of California, in cooperation with the United States Department of Agriculture, started a program to fight the weed by biological control. After establishing the fact that the beetle would rather starve than feed on anything but Klamath weed, it was released in selected areas of the state.

J. K. Holloway and Dr. C. B. Huffaker of the College of Agriculture, Berkeley campus, now reveal that approximately 97 per cent of the 122 beetle colonies, can be considered established. This completes the first phase of the program. The second, the distribution and development of colonies in all infested counties, is underway. The last phase, the actual control of Klamath weed on the range, will require millions of beetles, and will take several years to conclude.

NOTE:

Klamath weed was discovered in Washoe Valley, Washoe County, twenty miles south of Reno last summer.

T. E. B.

WEED CONFERENCE
TENTATIVE PROGRAM

DATE: October 10, 1947

PLACE: Court House, Minden, Nevada

PURPOSE: To map out a program for 1948 whereby Nevada County Agents could be of most assistance to Nevada Farmers and Stockmen in meeting their weed control problems.

10:00 A.M. Opening Remarks - Thomas E. Buckman, Assistant Director for County Agent Work, Conference Chairman

10:10 A.M. Introductions

10:20 A.M. Dr. W. W. Robbins, Botanist
University of California
College of Agriculture
Davis, California

11:20 A.M. Discussion

12:00 A.M. Adjourn

12:15 P.M. Lunch - Minden Inn

1:30 P.M. Equipment for Spraying Weeds - W. A. Harvey, University of California, Davis, California

2:30 P.M. Results of Weed Control Field Test Plots to Date
Lee Burge
Harry Galloway
Inspectors, Nevada State Department of Agriculture

3:30 to 4:00 P.M. Discussion

4:15 P.M. Adjourn

Date: October 11, 1947
Place: Court House, Minden, Nevada

10:00 A.M. Dr. W. W. Robbins
Mr. W. A. Harvey
How to Plan and Lay Out Effective Weed Control Tests and Demonstration Plots and Follow Up Needed.

11:00 A.M. Equipment Available for County Agent Tests and Demonstrations in 1947 - Thomas E. Buckman

11:30 A.M. Demonstration of Equipment - Mr. Buckman, assisted by Fred Batchelder and Leonard Anker

1:00 P.M. Adjourn

EXTENSION WEED CONTROL CONFERENCE
MINDEN, NEVADA
October 10-11, 1947

The meeting was called to order at 10:25 A.M. in the Courtroom, Courthouse, Minden, by Thos. E. Buckman, Assistant Director for County Agent Work. Mr. Buckman introduced Dr. W. W. Robbins and Mr. W. A. Harvey, weed control specialists of the University of California at Davis, and said that they would lead discussion during the meeting. He also introduced Lewis E. Harris, George B. Millard, John F. Mudge, of the Sherwin Williams Company, and Mr. R. L. Westholm of the Shaw Company.

Mr. Buckman said that the purpose of the meeting is to map out a plan for control of weeds in Nevada. He told how the chemical companies and equipment manufacturing companies were all helping with all of their resources but that farmers look to the Extension Service for local information. He pointed out that a knowledge of available materials and how to use them is necessary to answer farmers questions. He said that every county in the state was represented at the meeting.

Upon introducing Dr. Robbins, Mr. Buckman suggested that each agent secure a copy of the book "Weed Control" by Robbins, Crafts and Raynor when it is revised in the near future. Dr. Robbins was called upon to lead the discussion on the principal progress in weed control during the last few years. He emphasized that more has been done in weed control in the last five years than in all previous history. He said that about half a million acres was sprayed for weed control in California in 1947.

Principal Achievements in Weed Control in Last Few Years --

I. Development of selective herbicides.
   1. 2,4-D Principal development.
   2. Dinitro Compounds - Sinox, Sinox W., Dow Selective, Dinitrosol W, Chipman Selective
   3. Oils

A. Crops on which Selective herbicides are used:
   1. All cereals including rice - 2,4-D and Dinitros
   2. Corn and milo - 2,4-D
   3. Carrots and related crops - oils
   4. Turfs - 2,4-D
   5. Onions, flax, peas, garlic - dinitro selective
   6. Alfalfa - dinitro selectives

II. Development of fortifying agents
   1. Dinitro compounds)
   2. Pentachlorophenol) used with oil and
   3. Sulphur) oil-water emulsions

III. Low Volume Applications
   Used to use 100 to 150 gallons per acre, now can go as low as 3 gallons -- made possible by 2,4-D because it doesn't have to cover much of plant to be effective.

IV. Control of weeds in alfalfa) Established stands
) Seedling stands
Kill all weeds while they are young.

V. Pre-emergency spraying.
Dr. Robbins described the treatment of sugar beet plots at Davis as follows:

(Ridges were made in fall and left to settle all winter. Weeds came up in spring and beet seeds were planted in the weeds. Plots were sprayed before beets came up with dinitros and oils in different strengths. Good kill was secured with as little as 30 gallons Diesel Oil per acre. Beets came up without competition and were far ahead of unsprayed beets.

VI. IPC - Certain grasses susceptible when applied to land -- now being worked on at Beltsville, Maryland.
PMAS - Crab grass susceptible.

Dr. Robbins pointed out that selectivity is a physiological function and not necessarily a structural function. In other words, some narrow leaved plants, such as onions, are susceptible to 2,4-D and broad-leaved plants, such as roses, are not. He said that you can expect 100% results and that you will probably get some injury to the beneficial plants, and not to put all the reliance on chemicals because the best weed control is still good farming practices.

At this point, Mr. Harvey took the floor to explain the methods used in California on weed control in alfalfa. At Davis on seeding alfalfa, three to six pints of Dow selective, or three to six quarts of Sinox W in from 20 to 100 gallons of water per acre, gave good results in killing broad-leaved weeds in alfalfa. The two chemicals used for alfalfa spraying are Dinitro selectives and Sinox W. This is different from the old Sinox in that it is a selective and the old Sinox was not.

Dosage differs on the size of the alfalfa and weather conditions. Large alfalfa and dry weather both call for a larger dosage than small alfalfa and wet weather. Hot weather may cause the alfalfa to burn and the best time to spray is when the alfalfa has three leaves and before it is much larger than that. It is best to watch the size of the weeds and get them as young as possible. Applications can be made by plane or ground rig. The time of day is not very important. During high humidity, plants are more succulent and need less chemical to kill them. Adding wetting agents may destroy the selectivity and cause injury to alfalfa.

Established Alfalfa Stands

Mr. Harvey says formulas are more varied and from 30 to 35 gallons of diesel oil (common stove oil is not suitable because it is a selective) plus one quart of Dow General or Sinox, plus 80 to 100 gallons of water per acre can be used. The important thing is to cover most of the weed volume and spraying should be done before the alfalfa is too high. The smaller the weeds, the more effective the spraying will be. If not many grasses are present, twenty gallons of oil may be enough. In thick grass, 60 gallons of oil may be needed. The grass must be practically covered with oil and the older the stand of grass, the harder it is to kill since the crown must be killed. The oil is the grass killer and the Dow or Sinox do not enter in. Average cost is about $9.00 per acre to spray.

Established alfalfa is oil tolerant and has been sprayed with up to 150 gallons of diesel oil per acre without injury. It won't hurt to continue spraying year after year as there is no evidence that oil stays in the ground. In seed production, it is best to start with a seedling spray and follow up with the established alfalfa spray. If the alfalfa is in rows, it may be possible to lower the nozzles and spray under the alfalfa.

Adjourn for Lunch and Reconvene at 2:10 p.m.

Archie Albright and Louie Gardella reported that the pre-emergency spraying of onions didn't prove too successful because of the second growth of weeds. They reported that burning with kerosene worked the best.

Mr. Harvey said dinitros worked well in California but that weed control is always a local problem as local conditions caused varied results. Albright said that in Washoe County they burned off the first crop of weeds but that they got a second crop which must be sprayed.

The Shaw Company representative told about their weeder which was developed in the South for cotton and is being used in California; it is a two burner using propane. He believes he can furnish one to the Nevada Extension Service for experimental work.

Mr. Harvey suggested trying sodium pentachlorophenate at about 80 gallons per acre. It can be obtained as Dowicide G or Monsanto Santobrite. The Sherwin Williams representative said that local conditions have a lot to do with strengths of chemicals that plants will tolerate.

Louie Gardella asked what can be done with wild Iris and reports that it is very serious pest in pastures in Lyon County. He said that in tests he had received good results by spraying with Chipman 40%, 2,4-D salt at the rate of one quart with one quart diesel oil per acre in water. Lee Burge said that 1 1/2 pounds of 60% 2,4-D salt with diesel oil seemed to work. The best time to spray is in the bud stage and not later than when the first blossoms appear.

Lee Burge reported on his experimental work. He reported that the following treatments seemed best on the given plants:

Yurba mansa (in southern Nevada)	- 2,4-D Rate of 1 1/2# to 2# acid per acre
Willows	- 2,4-D plus 2 to 4 gallons of diesel oil, followed by burning when dry. Re-spray the regrowth -- Total coverage is necessary but an atomized spray is satisfactory. Spraying should be done before July first.
Chicory	- 2,4-D
Rosebushes	- Ammate and Atlacide; 2,4-D will not work
Members of Carrot family, such as Water Hemlock & Parsnip	- 2,4-D

White Top	- 2,4-D at proper time, and chlorates and atlacide or sodium chlorate. 7# of Borax plus 1# of chlorate to square rod. Apply to ground and wet the ground to wash it in. 2,4-D will s top seed formation.
Leafy Spurge	- Chlorate as soil applicant - 2,4-D will not work.
Morning Glory	- 2,4-D
Canadian Thistle	"
Sunflowers	"
Ulia	"
Buckwheat	"
Sandburr	2,4-D may work
Pigweed	2,4-D
Bassia	"

The only time grain germination was impaired was when the grain was sprayed after it had passed through the dough state according to tests made by Burge. Harvey reported that he had never found germination damage although he had not tried spraying after the grain was matured. Each agent was urged to write to the State of California, Department of Agronomy, Bureau of Chemistry, at Sacramento, and secure a list of brands of 2,4-D for sale in California.

Spot spraying is a local problem and all of the above factors enter in. Mr. Harvey emphasized that the best way to completely cover a spot is to mark out a zone and spray the entire zone because if you don't, you are bound to miss some of the plants on the edge of the spot.

Treatment for Dodder, as given by Dr. Robbins, is oil the patches and burn them rapidly. Bad infestations should be plowed up. This is the only effective treatment. For Puncture Vine, he said to spray with straight diesel oil because this kills the burrs that have taken root. Don't move the plant because it will scatter seed and the oil will penetrate most of the dry seed around the plant.

Meeting adjourned until 9:30 a.m. October 11th.

Mr. Harvey said that the action of 2,4-D, is faster in warmth but as long as it is warm enough for growth of plants, 2,4-D will act.

Discussion of Equipment by Mr. Harvey

You need equipment that will put on any volume from 300 gallons down to the lowest volume you will ever use per acre. New processes call for as low as 2 1/2 gallons per acre. Established alfalfa should be sprayed at from 80 to 120 gallons per acre and grain sprayed at from 10 to 2 1/2 gallons per acre.

Equipment should have the following:

Pump, motor, tank, agitator, boom, nozzles, screening, speedometer, pressure regulator, and gauge.

Pump - 100# pressure for weeds.

Motor - Best to have separate motor and not use power take-off, especially for large volumes.

Tank - Size should depend on type of spraying, large tank for large volume work, etc.

Gauge - Put as close as possible to outlet and mount them on a short piece of pipe so no liquid will get into them. Get a gauge that will accurately register the pressure you want. For low pressure, a 50# gauge is enough. An Essick compressed air sprayer is handy but may need additional agitators. The Sherwin-Williams man showed pictures of a tractor mounted sprayer being put out by their company. Bronze gear driven pumps are available from the Alanell Pump Distributors, 1523 18th Street, Sacramento. Their No. 4 pump is about the right size.

Mr. Harvey talked about Experimental Plots:

In putting out experimental plots, it is very necessary to have replicas. Single series are no good; at least duplicates and triplicates are better. Leave plenty of check strips with 2,4-D because drift will bother the edges. Strips should be scattered around the field. One long strip isn't as good as 2 or 3 short ones farther apart.

For low volume work you need a field boom because a hand boom variates too much. A little variation makes a lot of difference.

For alfalfa sprays you can use a hand boom if you know how much it is delivering. Run the boom into a bucket to measure rate of delivery.

Try to make strips the size of the harvester, if you want yield tests. Make strips width of combine. Another way is to take square rod or square yard samples, or 1/1000 acre samples -- any given size. Take at least three samples per plot and the same from check plots. To pick at random, throw something into plot and use a frame to put there. Then harvest within frame.

Plots should be laid out at random across field so that some strength doesn't hit twice in same area.

Buckman spoke on Weed Control Organization within the State.

He said the State Department of Agriculture has done a lot of experimental work and is still doing it, and that the county agents are doing a lot of the same type of work. He would like to form a cooperative effort with Lee Burge as project leader for the state. The University of California will give all possible assistance and Mr. Buckman and Mr. Titus are now working on equipment.

In response to questions from Ray Peterson, Dr. Robbins said that for Johnson Grass and Bermuda Grass the best treatment is to plow with a mold board plow and spring tooth harrow after the plowing to drag the roots out. Do this repeatedly as the grass starts to grow again. He also said that straight stove oil should be alright for a pre-emercency tomato spraying and that a pint of dinitro per 50 gallons of oil might be added to get Bermuda grass.

Mr. Harvey said that very little data was available on airplane applications, that the airplanes have the advantage of low volume spraying because of their greater speed, and that each sprayer seems to have his own type of applicator and no standardization has been done. No organized experimenting has been done and each sprayer is more or less on his own.

Dr. Robbins explained the weed control program at the Davis Experimental Farm. He said that each department furnishes their pro-rata share of money and a full time man with skilled helpers works under the Department of Botany and that since this arrangement, the farm has greatly reduced its weed problem and that when each department tried to handle their own, the farm became very weedy.

The meeting was removed to the outside of the Courthouse where Mr. Buckman demonstrated three types of equipment that can be used for demonstrational work and the Shaw Company representative showed a small pumping outfit that he loaned to Mr. Buckman for experimental work.

Meeting adjourned at 1:15 P.M.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION SERVICE AND
U. S. DEPARTMENT OF AGRICULTURE COOPERATING
STATE OF NEVADA

II. PROJECT: Control of White Top (Lepidium draba), Canada Thistle, Morning Glory and Water Hemlock.

The noxious weeds mentioned above together with wild iris are very generally scattered throughout Carson Valley and cause many of the local farmers considerable concern. They do not occur in large masses, but usually in spot infestations where modern control methods should not be too difficult. The most severely infested white top area is in the northwest section of the valley. The worst Canada Thistle is located in the central part of the valley along the Markleville highway from the Waterloo lane south to the State Line. Water hemlock is also found in much of this area, and follows the general slope of the slough lands through to the northwestern part of the valley. Morning glory infests much farmland in southeastern Carson Valley extending from the extreme southeastern end to the north central region. It is most noticeable in top-grade crop land, especially where grains and alfalfa are grown. Grass pastures seem to control it.

Problems in connection with these weeds in the past are as follows:

1. General lack of knowledge of local farmers as to the damage inadequate control measures can cause.
2. Heavy expense incurred in noxious weed control.
3. Ineffectiveness of many herbicides during the past.
4. Lasting soil sterilization effects of herbicides.
5. No adequate machinery developed for applying these herbicides during past years.
6. General disinterest of many farmers in the program.
7. Discontinuation of the program during World War II.

During the latter part of 1946 the Agent, through his office, purchased a small pressure spray outfit with forty feet of hose and a ten gallon tank. This machine was used for small demonstrations on white top and thistle and on a few small patches of willows. Although these demonstrations were carried on as late as September 1 to 20, very good results were noted on the control of these weeds. All willows were killed completely, while the other weeds were top-killed and did not come back until the spring of 1947. At that time they looked chlorotic and growth during early summer was slow. Weed killer used was Chipman powder. It was applied in water solution at the rate of two pounds per 100 gallons of water. All weed killers used in 1946 and 1947 contained a 2.4-D base.

The Nevada County Agent leader was able to obtain early in 1947 several dozen surplus army decontaminator spray units of 3-gallon capacity. Twelve of these were loaned to Douglas County. This fact was publicised. Ten units were loaned by the local office to farmers desiring to control noxious weeds, and they were all kept busy during the entire summer. The agent worked with these farmers showing them how to use these pieces of equipment and instructing them in the use of 2.4-D herbicides. The above-mentioned 10-gallon spray rig was also in constant use. Good results were noted on 95 percent of farms using this weedkiller. These small outfits were excellent for controlling small spot infestations. No complete kills

were recorded, although two sprayings during the summer definitely reduced all infestations. Interesting results will be observed in 1948.

A commercial spray outfit owned by a local man was very effectively used on heavier infestations of both Canada Thistle and white top in the central and northern portions of the valley. It is believed that a greater educational program must be effected in 1948 if the full benefit of this custom outfit is to be realized.

Considerable publicity was given to the program in 1947 through such media as the local paper, personal and circular letters and personal contact. The response was very gratifying. It was estimated that about 75% of the farmers whose lands were infested with weeds participated in the program. Several small demonstrations acquainted farmers with 2.4-D and its application. The use of a power spray rig owned by the State Department of Agriculture showed the value of larger-scale work on a heavy growth of morning glory and thistle covering several acres.

Cooperation of the Douglas County Commissioners and the Nevada State Highway Department lent impetus to the program. Work was done in the rights-of-way in thistle, white top, water hemlock and willow control by these groups. The Highway Department plans to purchase a large spray rig to control these weeds along its entire rights-of-way in Douglas County in 1948. Such coordination of effort as displayed by both groups of officials helps farmers to see the value of control work. The latter felt that if noxious weeds were controlled along the highways and county roads that greater effort should be exerted on their own parts to prevent plants going to seed and reinfesting roads adjoining their farms.

A pre-emergence demonstration was carried on in the latter part of March, 1947, on an alfalfa field located half a mile from Minden. An airplane was used to spray a solution of Sinox General and diesel oil on a dormant section of alfalfa for weed control. Two quarts of Sinox were used with 30 gallons of oil. The alfalfa was completely dormant as were all weeds, including dandelions and bronco grass (Bromus tectorum). A pathway approximately 150 wide and three hundred yards long was sprayed along the eastern end of the field. The alfalfa was three years old. Between the time of spraying and the time plant growth began the field was soaked by several rain and snow storms. Plants began to grow with the first warm weather. The alfalfa came up normally at first with no sign of weeds. By the middle of June the alfalfa was showing more healthy growth in the sprayed area than over the rest of the field, and all weeds were completely lacking, while wild mustard, dandelions and bronco grass were thriving in the unsprayed area and offering the hay crop serious competition. When the field was cut on June 25th the sprayed area was still weed-free. It was estimated that growth of alfalfa produced 10% more hay where the demonstration had been carried out, and the hay was entirely free of weeds.

Observations:

1. Time of day seems to make little difference when a 2.4-D weedkiller is applied to noxious weeds (in relation to the percentage of kill.)
2. Although late fall application of 2.4-D fails to give a good kill it is believed that a weed plant is weakened sufficiently so that zero winter temperatures help to secure plant control.

3. Farmers should be advised as to the best varieties of 2.4-D Weedkillers available for economical use. A few unscrupulous herbicide manufacturers have made a racket of their businesses and are taking advantage of herbicide users, especially in price.
4. Contrary to popular belief 2.4-D has proved effective to wild rose control on young plants with heavy applications.
5. Two, Four-D is most effective in this area in white top and Canada Thistle and morning glory control when applied at a rate 25% heavier than directions on the can indicate. The regular rate of application will control water hemlock, willows and dandelions. Two years' work with this weedkiller has demonstrated this observation.
6. Pre-emergence spraying may be worthwhile in this area while hay prices are high, although a local airplane sprayer will charge $8.00 per acre for applying the solution. He furnishes all ingredients. More work should be done experimentally.
7. 2.4-D apparently has no toxic effect on the soil.
8. It is recommended that better results are obtained if the land is irrigated no sooner than two days prior to the application of 2.4-D. The vigorous plant growth following the water makes the herbicide more effective.
9. An effective weed control campaign depends on the cooperation it receives in a given area. Such a campaign should be started upstream and upwind in an area such as Douglas county so that a minimum seed transmission will be received on a treated section.
10. In cases where poor farmer cooperation is received the State Weed Control law should be invoked through cooperation of the State Department of Agriculture, its administrators. Farmers who wish to cooperate are handicapped if their neighbors feel otherwise,
11. Ninety percent control of Canada Thistle has been achieved in this area with one application of 2.4-D under optimum conditions. The best control noted here on white top has been about 30% in any one year, with either one or two applications.
12. Education of farmers is more than half the battle in controlling noxious weeds. Demonstrations are the principal educational media.
13. Douglas county, in the early 1940's, spent nearly $30,000 in an effort to control white top with a chlorate weedkiller. Results were poor and expensive. In many cases these demonstrations had an undesirable effect. Some of these farmers are now assertedly from Missouri. (This doesn't mean they are Democrats--- it means they must again be shown). Results are what they are all looking for.

PRELIMINARY PROGRESS REPORTS

WEED CONTROL WORK OBSERVED

BY

COUNTY EXTENSION AGENTS

-1947 -

--ooOoo--

PAGE NUMBER

Annual Narrative Report - 1947
Charles R. York, County Extension Agent

Churchill County, Nevada

(1) Weeds

(8) Weed Control

The weed control program in Churchill County for 1947 has been rather extensive as anticipated a year earlier. The wide use of 2-4-D in controlling weeds has proven to be very effective on the majority of our plants of the noxious type.

On a Russian Knap weed on sandy growth, 2-4-D sprayed three times almost completely controlled a half acre plot very thickly infested with knap weed. The State Department made the statement it was 100% kill. However, there were a very few straggling plants left in the area which were taken care of with 2-4-D this summer.

2-4-D did not look too favorable in the control of camel thorne as at least 50% stand was left after 3 sprayings during the summer of 1946 and one in the spring of 1947. At any rate, the complete eradication of camel thorne will be rather expensive in any manner used. It is the agent's opinion that the cheapest and surest method of eradication on this particular three or four acres plot would have been complete submergence of water of the area for one summer but due to lack of irrigation facilities this method could not be followed.

There are 14 high-pressure spray rigs in the County at present and almost without exception all have been used to some extent on weed control-mainly in the control of white-top. Results on white-top have been rather spasmodic with very good kills, as high as 95% on some plots where the spraying was done early while the plants were in a thrifty, growing condition; and very poor or no results obtained where the plants were more mature and in a less vigorous growing state. In fact, it appeared after the sprayings in 1946 that the growth in stands in the spring of 1947 were much more vigorous and thick than they had been at the time of spraying the year before, possibly showing just enough stimulation of chemicals to make for better growth. A good many acres of white-top have been sprayed on various farms in 1947 and some very definite results will be seen in the spring of 1948 as to the effectiveness of 2-4-D on white-top at various stages of growth.

The 2-4-D has proven almost completely effective in killing willows where a complete coverage was had. However, some airplane spraying of willows was conducted in the Truckee Canal by the Irrigation District with practically no results and this was attributed to the fact that the willows were not covered thoroughly.

Approximately 250 acres of weed was sprayed by airplane with excellent results in the control of annual weeds, thus giving a very clean crop in the infested area that produced nothing but weedy grain before.

Several small control plots were sprayed with high-pressure machines in grain fields for the control of annual weeds with excellent results obtained. The estimated cost, including labor, would run approximately $3.50 an acre by this ground method but the grain producers felt that this would be a very small charge for it if they had insurance of clean wheat and the added fact that the whole acreage could be harvested with no spots too weedy for harvesting.

Cooperative Extension Work
in
Agriculture and Home Economics
State of Nevada
Las Vegas, Nevada

October 3, 1947

Mr. Thomas E. Buckman
Assistant Director
University Extension Service
Reno, Nevada

Dear Mr. Buckman:

In reference to your telegram of September 29th, I submit the following information on weeds and weed control work for Clark County:

Two of the most troublesome weeds in this area are Johnson grass and Bermuda grass. We have attempted control measures on these two pests by, first, a comprehensive program of summer cultivation and to a lesser extent by the use of fuel oil sprays.

I have requested a sample amount of the new grass killer Isopropylphenylcarbamate for experimental work on a small scale, however we have not yet had a chance to try it. From the results they have obtained in the control of quackgrass by using relative small amounts of the chemical, it appears promising in the control for both Johnson and Bermuda grass.

Probably our most important item in weed control is the control of annuals in row crops. Some control in this respect has been achieved by clean cultivation by use of fuel oil as a pre-emergency spray and by the tedious and far more expensive method of weeding by hand. Any information we could get to help along this line would be of primary importance.

Other weeds that we may consider, too, would be the bind weed or wild morning glory, Russian knap weed, and to a lesser degree, puncture vine. Although we have done no control experimental work on these particular weeds, I have observed that they have been sprayed with 2 4-D with varying degrees of success.

We have been carrying on a program for the eradication of Johnson and Bermuda grass on the experimental plot. I can give you the details of this work and the results obtained when I get up there.

Sincerely yours,

Ray K. Petersen
County Extension Agent

RKP:lt

COUNTY AGENT PROJECT
Progress Report
October 8, 1947

PROJECT NUMBER
State Office #
Elko County #

WEED CONTROL

Weed control work in 1947 was not conducted on a planned project basis due to the fact that conclusive evidence on the cost and effectiveness of new weed killers had not been thoroughly demonstrated. However, so many magazines, news stories, and radio articles were put before the public in relation to the effectiveness of 2-4-D that ranchers became very weed conscious and frequently called in the office for information on weed control methods.

The weed problem in Elko County is of such greater proportions involving large acreages of public domain, forest reserves, public roads, railroads, and private land that the Agent is not yet convinced that an effective weed control program can be carried out. However, in April 100 lbs. of 60% 2-4-D powder was ordered to be used by a number of ranchers in an experimental and demonstrational manner.

Most of the news stories give only the favorable reports on the use of 2-4-D and they select the most outstanding successes and usually say nothing of failures. Therefore, most ranchers have an exaggerated opinion of the effectiveness with which 2-4-D will work, and for that reason the Agent has discouraged rather than encouraged any large scale weed control attempts until more information is available. Also, little or no equipment has been available with which to properly apply any type of weed killer.

During the spring and summer 18 ranchers used 2-4-D on small weed patches and in practically all cases where the weeds were thoroughly covered the tops died down. However, observations show that very few of the ranchers applied the weed killer thoroughly. Practically all of them missed weeds which continued to grow. The extremely dry summer prevented any re-growth in most areas and the near effectiveness of the 2-4-D will not be known until next year.

Among the weeds which are widespread and need controlling are: White Top, Canadian Thistle, Burdock, Russian Knapweed, Wild Iris, Rosebushes, Willows, Leafy Spurge, Bull Thistles, European Morning Glory, and Plantian.

The Agent feels that there is little use in launching a widespread and expensive campaign for weed control as long as ranchers continue to buy livestock feed which is full of weed seeds of all kinds and feed this material in the fields, or in corrals, or feed lots, where the manure is later hauled out and spread on the land or used in the streams for irrigation dams. More weeds can be spread by this method than can be controlled. A campaign to buy noxious weed free , seed would appear to be just as essential as buying - - - - - - - - . An An effective weed control program can not be limited by county boundaries. It would appear that a coordinated plan covering the entire state should be worked out.

Sgd. Mark W. Menke

Mark W. Menke, County Extension Agent

University of Nevada
Agricultural Extension Division
U.S. Department of Agriculture
Humboldt and Lander County
Farm Bureaus Cooperating

County Agent Work
Extension Service

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEVADA
WINNEMUCCA, NEVADA

October 6, 1947.

Mr. Thomas E. Buckman,
Assistant Director for
County Agent Work,
University of Nevada
Reno, Nevada

Dear Mr. Buckman:

This is in reply to your letter of September 29, 1947.

The largest weed control program in this area, has taken place on the Lye Bros. Ranch located in Paradise Valley. Mr. Lye purchased a 150 gallon, 7 gallon per minute sprayer. In place of the spray gun a trailing boom was constructed about 10 feet long with spray type nozzles set at approximately 18 inches apart for the entire length.

Phenox-50 Weed Killer manufactured by the California Spray Chemical Company was used at the rate of 2½ pints per 100 gallons of water. Approximately 80 acres of White Top and Russian Knapweed were sprayed in late June and again in August. Good to excellent results were obtained on White Top whereas poor to fair results were obtained on Russian Knapweed.

Many ranchers in this area have commenced weed control, with the use of 2-4-D, along their irrigation ditches in hopes that they can control wild parsnip, which is poisonous to livestock, and willows which choke their irrigation systems. Good to excellent results have been obtained; however, a more efficient type of knapsack sprayer is definitely needed for this type of spraying.

Control of Russian Knapweed was begun this year in Northern Lander County Area, by Extension Agent Trigero. Control with the use of 2-4-D, was inaugurated, but results were poor. Experimental work with Atlacide was begun in August. An area of approximately 4 acres was sprayed at the rate of 3-4-pounds per square rod using a mixture of about 1½ pounds of Atlacide per gallon of water. Full results of the Atlacide treatement will not appear until the spring, but from present observation results should be from good to excellent.

More experimental work is necessary in this area in regards to the rate of application of 2-4-D, and a better type of back-pack sprayer is needed.

The following is a list of the most troublesome weeds in this area: White Top, Russian Knapweed, Bindweed, Canada Thistle, Dock, Wild Parsnip, and Willows.

I believe this covers the weed control work in this area; however, this report does not cover the work done by Elwyn M. Trigero, as I have been unable to locate any reports of this nature by Mr. Trigero.

Very truly yours,

Sgd/ J. Kirk Day,
District Extension Agent

JKD:g

Cooperative Extension Work
in
Agriculture and Home Economics
State of Nevada, Yerington
October 4, 1947

Thomas E. Buckman
Assistant Director for
County Agent Work
University of Nevada
Reno, Nevada

Dear Mr. Buckman:

I'm sorry I cannot give a better progress report on Weed Control but following is a brief review of the work done in Lyon County, during 1947:

White Top:

An area of about 2 acres was treated in Fernley, with 2-4-D. Results have not been checked but I do not consider it a good job.

Smith Valley:

An area of about ½ acre was treated with 2-4-D (liquid) the solution contained ½ gal. 40% acid equivalent and in 100 gals. of water.

The solution was both sprayed on the top growth and enjected into the soil. Approximately 150 gals. of solution was applied. The results are as yet conclusive. However, approximately one month after application no green shoots were noted. This method of application may offer a means of "spot" control and irradication. One small area in Mason Valley was treated once in 1947. This was the third year of treatment and I was able to observe one shoot in August. I think the area is now cleared out.

We have little White Top in Mason and Smith Valley. The known areas are:

Roberti Ranch - Smith Valley - 20 acres
East Walker Rancho Santa Margarita - Mason Valley - 30 acres.
Guild Ranch - Mason Valley - 5 acres
Fernley - 300 acres or more

Canadian Thistle:

One acre near Fulstone Orchard, Smith Valley. Recognized this year for first time.

Russian Knap Weed:

One area - 20 acres - on Santa Margarita Ranch.

Morning Glory:

All over - no control obtained with 2-4-D and none will be attempted.

Water Hemlock:

Widely scattered - no attempt made to control but can be done easily with 2-4-D.

Willows:

Plenty - no control attempted but 2-4-D is very effective. About 50 acres sprayed by plane (very young) using 1½ pint per acre. Very good results.

Approximately 500 acres of grain sprayed by plane using 1½ pint per acre for control of Bassia, Sunflowers, Morning Glory, etc. Results good where weeds were young.

Wild Iris:

Our worst pasture pest at higher elevations. Covers probably over 10,000 acres of pasture in Lyon County and grazing areas near by.

Five acres treated with 1½ pint per acre, in Mason Valley, by plane. Results seem good but will have to wait until spring of 1948 for final results. Did not kill white, alsike and cow clover as expected. Treated approximately 15 acres with 1 quart per acre in 100 gal. water. This was done with a power sprayer and two men directing hoses. The plants were too old when treated but have not checked results. Costs were high but believe this method can be used to advantage in pasture having scattered plants. Believe 2-4-D will do the work if applied when plants start to bloom.

Sorry I cannot give you more information but will add to this, at the meeting.

I think we can lick nearly any weed if 2-4-D is applied right.

Several other things to think about.

Burners for control of Annual Weeds in alfalfa, also insects.

Control of weeds in onions with chemicals, and control of weeds in alfalfa with chemicals.

Very truly yours,

Louie A. Gardella,
County Agent

COUNTY AGENT PROJECT
Progress Report

PROJECT NUMBER:
State Office # 625
Pershing Co. # 56

NAME OF PROJECT: Weed Control

The principal weeds in Pershing County are White Top, Bassia (or alkali weed), Russian Kanpweed and Sunflower. Their importance is in the order named above. White Top grows everywhere-on ditch banks, fence rows and in the grain and hay fields. It is so bad that about 70 acres of potatoes had to be abandoned on one ranch. Knapweed is still a localized weed but on several ranches it is spreading and getting to be a serious problem. Alkali weed is the worst weed we have in the grain fields and has always resulted in a large acreage of grain being unharvesteable because of the weed, especially in the Lower Valley. Although sunflowers do not do as much damage as the other weeds, they are troublesome.

Some work on test plots had been done here by the State Department of Agriculture with 2-4-D in 1945 and 1946, but no conclusive results had been obtained.

Actual weed control work was started on April 7 and the following is taken from my May monthly report with the conclusions added.

"Representatives of the California Spray Chemical Company, the Niagara Spray Chemical Company, the Veith Chemical Company, Albers Deming Company, Agair Airplane Dusting Company and Borges Dusting Service, all were active in the county during the month and the agent spent several days with them in studying their products and their techniques of applying it.

On April 7, the Agair Corp. sprayed a test plot of winter wheat badly infested with White Top on the Nevada Nile Ranch using 1½# of Dupont 77% powder in 15 gallons of water. This field has been observed until the present time and approximately 50% of the weeds were completely killed and 40% of those remaining have been stunted to the point where they do not have any affect on the grain.

When the grain was harvested very little White Top showed but the Knapweed was as thick as places where no spraying had been done. So, evidently, the 2-4-D did an effective job on the White Top but did not affect the Knapweed.

Due to the hardness of local water, it has been concluded that powder will not work in this area and that all spraying should be done with 2-4-D liquids".

On May 7 the Borges Company started spraying with Phenox 50 (a 50% by weight liquid salt) and as soon as results were seen by farmers, Borges was deluged with orders and continued spraying until about the middle of August. They sprayed a total of 4850 acres of grain and 150 acres of willows during the summer. Phenox 50 at the rate of 1½ pints in 15 gallons of water per acre was used on all but 150 acres of this work. This 150 acres was sprayed with 2-4-D ester at the rate of 3/4 to one pint in 15 gallons of water per acre and results were about the same.

COUNTY AGENT PROJECT - Continued
Progress Report

PROJECT NUMBER:
State Office # 625
Pershing Co. # 56

Principal weeds sprayed were White Top, Knapweed, Bassia and Sunflower. The grain was sprayed at all stages from six inches in height to the milk stage and in no case was the grain injured. The only places that a poor job was done is where the weeds had almost reached maturity. There were a few cases of this kind and although the weed was affected by the spray, it did not knock it enough to do any good. The best jobs were done on alkali weed when it was about one foot high. In some cases poor coverage was made because the plane did not overlap its swaths and this is one thing that must be watched because it causes undue criticism of the 2-4-D.

Bassia, or alkali weed, seems to be the hardest weed to kill because it will wilt and stop growing as soon as it is sprayed, but in some instances it was found to be alive two months after the spraying took place. It also germinates over a period of about two months in the spring and if the ground is sprayed too early, the second growth of weeds will be almost as bad as if it had not been sprayed. The best results seemed to occur when spraying was done a few days after irrigation.

No effective work was done on Knapweed although considerable land infected by it was sprayed. It may be that killing the White Top gives the Knapweed a better chance to grow.

On a test plot of Alkali weed using Phenox 50 (California Spray) Weed Tox 40 (Veith), Phenox 2-4-D Dry 60%, and Weed Tox Ultra Speed, at five different strengths ranging from one pint to one quart in 100 gallons of water per acre and also using kerosene on some plots, the only favorable results were from Phenox 50 and it seemed to have the same effect whether used at 1½ pints or 1 quart and with or without kerosene. However, the kerosene gave the quickest kill.

A small plot of White Top that had formed seed pods and had entirely quit growing was sprayed with Phenox 50. This plot only produced 1/22 as many seeds as a similar volume of plants from an unsprayed plot. The germination test shows that although these seeds did not look as plump as the unsprayed seeds that the germination was about the same percentage. The sprayed germinated 20.7% and the unsprayed 23.2%, but the fact that there were 22 times as many unsprayed seeds seems important.

On Dock that was sprayed after it had gone to seed, the germination was only 2% but no tests were made on unsprayed Dock seed.

The practice of pre-irrigation is becoming popular on farms badly infested with alkali weed and seems to materially reduce the weeds in the crop. This practice consists of irrigating the land and causing the weeds to come up before the crop is planted. After a good growth of weeds is secured, the land is disced and planted in the regular manner. In most cases the crop will come up without further irrigation and comparatively free from weeds. This has been practiced on all types of grain, alfalfa and in one case potatoes. The potatoes seemed to be weed free but after they matured, the weeds grew up much thicker than on potatoes that had not been pre-irrigated. It also caused the potatoes to be planted about two weeks later than they would have been if they had not been preirrigated.

COUNTY AGENT PROJECT - Continued
Progress Report

PROJECT NUMBER:
State Office # 625
Pershing Co. # 56

CONCLUSIONS

From the work done so far, I conclude that the best material for weed control in grain is 1½ pints of Phenox 50 in 15 gallons of water per acre applied by plane and I also believe if this is applied by power sprayer to fence rows and ditch banks, it will be very beneficial.

Present indications are that 2-4-D salt will not be effective on Knapweed but will be effective on White Top, Bassia and Sunflowers as well as the other common weeds. However, eradication of these weeds would probably take several years and it is doubtful if complete eradication of a large area could ever be effected.

The practice of pre-irrigating has worked very well and will probably prove to be a good practice on all annual weeds.

Sgd: Fred C. Batchelder

County Agent

Reno, Nevada
October 4,1947

Mr. Thomas E. Buckman
Assistant Director for
County Agent Work
University of Nevada
Reno,Nevada

Dear Mr. BuckmanL

Weed control program in Washoe County is handled almost entirely by the County Commissioners, who have a man on the pay roll full time during the summer months to work on noxious weeds. This man is under the supervision of the State Department of Agriculture also.

The work being done by the County is on the control of white top, yellow star thistle, puncture vine and this year a program was started on the control of poison parsnip. This program did not develop very well for some unexplained reason.

The County Extension Office concentrated on onion weed control. We have continued to urge the use of pre-emergence burning, and nearly 100% of our onion acreage was burned this year at a very great saving to the growers. Upon the second weeding, sulphuric acid, sinox and stove oil have been tried, but results have not been satisfactory enough to justify general use of these materials.

2-4-D have been used on both thistle and plantain in pastures and meadows in a demonstrational way with good results. At the present time we are searching for a selective weedacide that will kill quack grass and nut grass.

We have not put on an extensive program in Washoe County of weed control because the noxious weeds have been controlled by the County and our farmers have not been bothered with weeds in their grain crops and hay crops to any extent. However, we shall continue to expand the program on the control of such weeds as the bull thistle and plantain.

Yours very truly,

/Sgd/ ARCHIE ALBRIGHT
County Extension Agent
Washoe County

COUNTY AGENT'S REPORT
Progress Report
October 6, 1947

PROJECT NUMBERS:
State Office # 272
White Pine Co. # 29

NAME OF PROJECT: Weed Control

Hoary Cress

On June 10 the agent assisted inthe treatment of several isolated plots of White Top on the ranch in Spring Valley.

2-4-D (Weedicide) was used at the rate of 1¼ ozs. per gallon of water. The solution was applied by means of a power sprayer at approximately 400 lbs. pressure, thus a very misty and penetrating spray resulted. The White Top was just coming into bloom.

These plots were inspected during August by the agent. The tops were very brown and dry, and at that time it appeared that about a 95% kill was obtained. Some roots, however, still seemed to show signs of life.

Several plots of White Top were treated on a ranch in White River Valley during June.

2-4-D (Weedicide) was used at the rate of 1 oz. per gallon of water. Treatment was made with a hand operated spray rig on a warm still morning. Approximately three weeks later the rancher applied a second application to two of the plots in an alfalfa field which apparently had not retarded as much as the other areas. The other plots were on drier ground which were not irrigated.

The agent inspected the ranch in October and found that there were very few living White Top plants on plots in the alfalfa which had been treated twice and had been irrigated several times. It is estimated that approximately a 90% kill was obtained. It was also noted that only about 10% of the alfalfa thus far had been killed.

The White Top on the other areas had been very much retarded, and apparently about a 50% kill was obtained.

One densely populated plot of White Top was plowed under about the first of June. Approximately six weeks later when the heavy regrowth had appeared and just coming into bloom an application of 2-4-D spray of approximately 1½ ozs. per gallon of water was applied. When inspected about two months later it is estimated that approximately a 95% kill was obtained.

Canadian Thistle:

A field of about 30 acres which was densley populated with Canadian Thistle was sprayed with a solution of 1½ ozs. of 2-4-D per gallon of water. It was applied by means of a power sprayer at approximately 400 lbs. pressure. The field was inspected about a month later. It was found that most all of the thistle that had been sprayed was drying up, or were badly retarded. However, many new plants had emerged. It was planned by the rancher to treat this area twice, but due to other work this was not done. The field was again inspected in September. There were many dead thistle visible and others that were stunted, but due to the numerous younger plants which had emerged after spraying, an estimate of the kill could not be made.

Sgd. Wm. N. Helphinstine.

RECOMMENDATIONS FOR WEED CONTROL RESEARCH IN NEVADA

1. Soil treatment before planting
   pre-emergence, contact, residual post emergence.

2. Control of poisonous plants such as Larkspur and Halogeton.

3. Control of deep rooted perennials such as Knapweed, Canadian thistle, Whitetop, Iris.

4. Weeds in established stands of alfalfa.

5. Control of rabbit brush and related species by air.

6. Collect and disseminate all information as it becomes available.

COMMITTEE RECOMMENDATIONS
January 13, 1949

By County Agents Weed Committee

Fred Batchelder, Chairman
Charles R. York
Mark W. Menke
Archie R. Albright
John H. Wittwer

Nevada Extension Crops Program Planning Conference

PROCEEDINGS
AND OTHER MATERIAL

JANUARY 12-14, 1949
MINDEN, NEVADA

Compiled and Edited by
THOMAS E. BUCKMAN
Assistant Director for County Agent Work

University of Nevada
Agricultural Extension Service
Reno

TABLE OF CONTENTS

Page No.

Page No.

Page No.

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEVADA

UNIVERSITY OF NEVADA
AGRICULTURAL EXTENSION DIVISION
AND
U. S. DEPARTMENT OF AGRICULTURE
COOPERATING

EXTENSION ADMINISTRATION OFFICE
UNIVERSITY OF NEVADA
RENO, NEVADA

December 16, 1948

To - County Agents: Albright, Anker, Batchelder, Bunker, Day, Gardella, Jensen, Helphinstine, Menke, Wittwer, York, Davis and Whelan.
Subject - Subject Matter Supervisory Conference, at Minden, Nevada, January 12, 13 and 14, 1949.
From - Thomas E. Buckman, Assistant Director for County Agent Work.

Dear County Extension Agents:

You are requested to attend the County Agents' Subject-Matter Supervisory Conference I am holding at Minden on January 12, 13, and 14. We will have two full days of conference. You should plan to arrive on or before 6:00 P.M. on the 12th as there will be an evening meeting.

My purpose for having an evening session on the 12th is so that you can become acquainted with the four specialists who will present subject-matter to us. This will help you later on when you begin to work in your county on some of the problems that will be discussed.

These men are: E. R. Jackman, Agronomy Specialist, Oregon State College, Corvallis, Oregon.

C. A. Sunesan, Agronomy Division of Cereal Crops Diseases, College of Agriculture, Davis, California.

Frank Parsons, In Charge of Seed Certification, University of California, Davis, California.

L. G. Jones, Alfalfa Weed Control, College of Agriculture, Davis, California.

We will have an exhibit of weed spraying equipment. Also a duster. Mr. Arrigoni of the Fabricated Metal Company, Oakland, California will also be present. Others present will be: Oliver F. Smith, Director Charles E. Fleming, V. E. Spencer, William Goodale, Howard Sommers, Joe Robertson of the College of Agriculture, and Otto R. Schulz, Extension Soil Conservationist.

There may be a few others present who are interested in agronomy problems.

Agents nearby should plan to attend the full conference and not return home overnight.

If you do not have another place to stay, make your reservations directly to the Minden Inn at once, sending a copy of your reservation letter to Leonard Anker and to myself, so Leonard Anker and I will know just where you are going to stay. At the present time plenty of space is reserved for all of us at the Minden Inn, but we do not want to reserve more space than we need.

Please acknowledge this letter upon receipt.

Very truly yours,

Thomas E. Buckman

Thomas E. Buckman
Assistant Director for County Agent Work

P R O G R A M

COUNTY AGENT AGRONOMY SUBJECT-MATTER CONFERENCE
COURT HOUSE - MINDEN, NEVADA
JANUARY 12, 13 AND 14, 1949

--ooOoo--

January 12, 1949

6:00 p.m. REGISTER AT MINDEN INN, Minden, Nevada

7:30 p.m. COURT HOUSE

OPENING REMARKS - INTRODUCTION OF GUESTS - APPOINTMENT OF COMMITTEES -
Thomas E. Buckman, Assistant Director for County Agent Work, Nevada Extension Service

8:00 p.m. PRODUCTION OF SMALL GRAINS UNDER IRRIGATION -
C. A. Sunesan, Agronomy Division of Cereal Crops Diseases, University of California

DISCUSSION -
Leaders - C. A. Sunesan and Frank Parsons, In Charge of Seed Certification, University of California

9:00 p.m. ADJOURN

January 13, 1949

COURT HOUSE

8:30 a.m. SMALL SEED PRODUCTION IN OREGON AND WESTERN STATES -
E. R. Jackman, Crop Specialist, Oregon State College

DISCUSSION -
Leader - E. R. Jackman

10:00 a.m. RECESS - 15 Minutes

10:15 a.m. FUNDAMENTAL RESEARCH SHAPES THE PATTERN FOR NEW VARIETIES -
C. A. Sunesan

DISCUSSION -
Leader - C. A. Sunesan

11:00 a.m. ORGANIZATION OPERATION PARTICIPATION OF A CROP IMPROVEMENT ASSOCIATION -
Frank Parsons

DISCUSSION -
Leaders - C. A. Sunesan and Frank Parsons

12:00 Noon ADJOURN FOR LUNCH

1:15 p.m. ASSEMBLE AT COURT HOUSE YARD immediately after lunch to inspect weed control and spray equipment; also power-duster on Court House grounds.

2:00 p.m. CONTROL OF WEEDS IN ALFALFA -
L. G. Jones, University of California, Davis, California

DISCUSSION -
Leaders - L. G. Jones; and Dr. O. F. Smith, Associate Pathologist, University of Nevada

3:00 p.m. RECESS - Fifteen Minutes

3:15 p.m. PROGRAM FOR ALFALFA VARIETY TEST PLOT WORK IN NEVADA IN 1949 -
Dr. Oliver F. Smith

DISCUSSION -
Leaders - Dr. Oliver F. Smith and Thomas E. Buckman

4:00 to
6:00 p.m. COMMITTEE WORK

6:00 p.m. ADJOURN FOR DINNER

7:00 p.m. DINNER at MINDEN INN -
The group will meet with Gardnerville Kiwanis Club. Price $1.50
Subject -
"LOST - 280,000,000 # of MEAT"
E. R. Jackman of Oregon
(Note: Subject selected without consulting speaker, but by request of Kiwanis Club Program Chairman)

9:10 p.m. KIWANIS CLUB PROGRAM ENDS -

9:15 p.m. RECONVENE AT MINDEN INN - Round Table Discussion -
Topics to be selected by group

10:00 p.m. ADJOURN

January 14, 1949

COURT HOUSE

9:00 a.m.	PROGRAM CONTINUES - Topics to be selected by group and announced at this time.
12:00 Noon	ADJOURN FOR LUNCH
1:30 p.m.	PROGRAM CONTINUES - Topics to be selected by group.
2:30 p.m.	COMMITTEE REPORTS -
3:00 p.m.	CONFERENCE ENDS

The following committees were appointed by Mr. Buckman, Conference Chairman, and, Assistant Director for County Agent Work:

Extension, Agricultural Experiment Station County Agent Advisory Committee for Weed Control Research Work in 1949:
Fred Batchelder, Chairman
Charles York
Mark Menke
Archie Albright

Grain Committee:
Fred Batchelder
Kirk Day
William N. Helphinstine
Leonard Anker
Charles York

Clover Seed Production:
Charles York
Louie Gardella
Mark Menke

Alfalfa Seed Production:
Louie Gardella, Chairman
Charles York
William N. Helphinstine
Lynn Davis

Crop Improvement Association:
Joe Robertson
Thomas E. Buckman
O. F. Smith
John Wittwer
Otto R. Schulz

Alfalfa Weed Control for Hay Production:
Louie Gardella, Chairman
Charles York
William N. Helphinstine
Lynn Davis

Advisory Member of the above Committees were:
E. R. Jackman, Crops Specialist, Oregon State College, Corvallis, Oregon.
C. A. Sunesan, Agronomy Division of Cereal Crops Diseases, College of Agriculture, Davis, California.
Frank Parsons, In Charge of Seed Certification, University of California, Davis, California.
L. G. Jones, Alfalfa Field Work, College of Agriculture, Davis, California.
O. F. Smith, Bureau Plant Industry, U.S.D.A., University of Nevada, Reno, Nevada.
Joe Robertson, College of Agriculture, University of Nevada, Reno, Nevada.

REGISTER OF THOSE WHO ATTENDED THE CONFERENCE

Thomas E. Buckman, Assistant Director for County Agent Work, U. of N., Reno, Nev.
Otto R. Schulz, Extension Soil Conservationist, U. of N., Reno, Nevada.
Archie R. Albright, County Extension Agent, Reno,Nevada.
Leonard A. Anker, District Extension Agent, Minden, Nevada.
Fred C. Batchelder, County Extension Agent, Lovelock, Nevada.
Ferren W. Bunker, County Extension Agent, Caliente, Nevada
Lynn H. Davis, Asst. County Extension Agent, Las Vegas, Nevada.
J. Kirk Day, District Extension Agent, Winnemucca, Nevada.
Louie A. Gardella, County Extension Agent, Yerington, Nevada.
William N. Helphinstine, District Extension Agent, Ely, Nevada.
James G. Jensen, Asst. District Extension Agent, Fallon, Nevada.
Mark W. Menke, County Extension Agent, Elko, Nevada.
Robert J. Whelan, Asst. County Extension Agent, Ely, Nevada.
John H. Wittwer, County Extension Agent, Las Vegas, Nevada.
Charles R. York, County Extension Agent, Fallon, Nevada.
Warren Welsh, Asst. County Extension Agent, Yerington, Nevada.
Lyle McCartney, Asst. County Extension Agent, Reno, Nevada.
E. R. Jackman, Crops Specialist, Oregon State College, Corvallis, Oregon.
C. A. Sunesan, Agronomy Division of Cereal Crops Diseases, College of Agriculture, Davis, California.
Frank Parsons, In Charge of Seed Certification, University of California, Davis, California.
L. G. Jones, Alfalfa Field Work, College of Agriculture, Davis, California.
Oliver F. Smith, Reno, Nevada.
Joe Robertson, Reno, Nevada.
Joe Arrigoni, Fabricated Metals Co., Oakland, California.
Stan Hall, Western Implement Merchandisers, 610 Sixteenth St., Oakland 12, Calif.
Sherman-William Products Co., Oakland, California.
Forest Willhite, Newlands Station, Fallon, Nevada.
Lee Hansen, Mgr. Minden Cooperative Creamery, Minden, Nevada.
Lester Springmeyer, Mgr. Nevada Tractor and Implement Co.
Mr. Haslund, Pacific Tractor, Richmond, California.
Herb Samuels, Farm Editor KOH, Reno, Nevada.
G. A. Momberg, Smith, Nevada.
Clarence Henningsen, Gardnerville, Nevada.
Bill White, Minden, Nevada.
and other farmers who did not register
Members of Gardenrville Kiwanis Club and farmer guests - Evening Session

COUNTY AGENTS SUBJECT MATTER CONFERENCE, MINDEN, NEVADA, JAN. 12, 13 & 14, 1949

Notes taken at evening talk of C. A. Sunesan on Jan. 12, 1949, by Fred Batchelder

All new varieties of grain have a wide adaptability. For example Arivat, Gem, Glacier and Beecher barleys were all derived from an Atlas, Vaughn cross in Calif. Arivat was developed in Arizona and became a southern variety, Gem and Glacier were developed in Montana and became a Northern variety and Beecher was developed in Utah and became an intermediate variety. Therefore, it is not necessary to test each new variety. The best thing to do is get the ones bred or developed under conditions like your own and then test them under local conditions using information obtained from other sources.

Mr. Sunesan was asked to discuss varieties for Nevada and gave the following:

Trebi: Late and week strawed but still within 10% as good as any variety for Nevada. A good pasture barley.

Velvon: Liked for livestock feed because of smooth awn but will not produce as good as Gem. It is a good nurse crop because it doesn't tiller as much as some others. Velvon is not very frost resistant in bloom stage and most frost damage in Nevada occurs at this stage.

Gem and Glacier are both good for grain production but not as nurse crops.

Utah Winter is the best winter barley for Nevada. Winter barley should be planted so that it will either be just through the ground or else in the 5 or 6 leaved stage when it goes dormant.

Calif. Mariout barley tolerates a higher concentration of salts both at seedling and maturity than any other crop plant known. It will take up to 3/10 of 1% salt at seedling and 1% at maturity. It is a hard flinty barley suitable for grinding but not for rolling. It tolerates late planting and makes a good nurse crop. It was almost extinct in 1936 and now it is the most popular barley in Calif. It is a short stemmed, hard, flinty, barley.

Elgin and Rex Winter wheats are both good but Rex hasn't proven out in Fallon.

Elgin and Orfed are the best winter wheats for Nevada and should replace Turkey. They are both short strawed, white, club type wheats. They should be planted as early in the fall as possible and be in the 5 or more leaved stage before dormancy. Grains poorest chance for survival is in the 2, 3 or 4 leaf stage, because at that time it has cut loose from the seed but hasn't roots to support it. Orfed is a cross Turkey X Federation. Elgin is a short strawed winter habit, Big Club.

The protein content depends a lot on the nitrogen in the soil and the total yield. A low yield generally gives a higher protein than a high yield. There isn't much difference in yield between varieties.

For grain pastures a type that will hug the ground is wanted. Trebi is better than Velvon. Big Club, Baart, White Federation wheats come in that order for pasture.

Rust comes from Mexico and California most of the time. If they have an attack of rust in the spring we can expect it in the fall.

Certified seed is always scarce in California and is almost impossible to get from the growers at this time of year.

Other things being equal an awn or wheat increases yield about 8% and test weight 1 pound per bushel. This means that when they breed the beard off Baart or any other variety they have decreases both yield and test weight. This has been the case in all tests regardless of location.

The tendency in wheat breeding work at this time is to shorten the straw. A new strain of Baart will be released in 1951 that will be 30% shorter than the present Baart. Contrary to beliefs, a long straw doesn't increase the yield of wheat.

It is important to remember that an improved strain of a variety is exactly like the old variety except that it has some new characteristic bred into it that makes it better. In other words, Big Club and Big Club 43 are essentially the same except that Big Club 43 has one new characteristic bred into it, to make it better.

Hybrid grain increases yield from 20 to 25 percent but some of the difficulties of producing seed on a commercial scale haven't been worked out. However, commercial hybrid grain is just around the corner.

5,000 BARLEY VARIETIES YIELD 16 HEALTHY ONES

DAVIS, Feb. 4.--Sixteen scald resistant barley varieties have been placed in a trust fund for plant breeders by the University of California, say Dr. O. C. Riddle and C. A. Suneson, agronomists on the Davis campus.

Plant breeders all over the world can dip into this pool and breed scald resistance into their local barley. This was first done when the College of Agriculture used the Turk variety to breed the scald and mildew resistant Atlas 46, released to California farmers last year. Argentina plant breeders are now using several other California-developed scald resistant varieties.

This treasure of scald resistant barley has been gathered in many years of experiments by the College of Agriculture. In describing its success, Riddle and Suneson make a strong case for both foreign plant exploration and systematic testing of the introductions with a specific objective in mind.

Prior to 1933, some 5,000 barley varieties were tested for yield and adaptation. With reference to scald, nothing better was found than the weakly resistant Winter Tennessee variety. Then, from 1933 to 1941, about a thousand varieties were screened. They included many of the American collection of world barleys and, most important, the focus of the tests was definitely on scald resistant than the Winter Tennessee, were discovered.

RECOMMENDATIONS OF THE GRAIN COMMITTEE

Committee: Fred Batchelder, Chairman
J. Kirk Day
Wm. N. Helphinstine
Leonard A. Anker
Charles R. York

C. A. Sunesan, and
Frank Parsons, Advisors

1. Each agent should get a report on alkali tolerance of clovers, legumes, and grains from the Riverside Salinity Laboratory. These can be gotten through M. R. Miller, University of Nevada Agricultural Experiment Station, collaborator on this project and member of this Station's Advisory Committee.

2. Some counties should acquire a portable seed cleaner and treater.

3. Get a few of the better farmers in each community to raise good seed and educate farmers into using local seed, but be sure they buy good seed.

4. Fertilize winter grain pasture. Light application (15 lbs. of 20% Nitrogen) whenever you can detect chlorosis in the fall. Several light applications are much better than one heavy one.

5. Date of planting tests should be carried on for winter grains.

6. Rate of seeding tests should be carried on. Sunesan recommends 60 to 100 lbs. per acre under irrigation depending upon weediness, fertility, and condition of seed bed.

7. Winter grains should be either barely emerged or else beyond 5 leaved stage when they go into dormancy.

8. Nevada should have one central experimental plot for testing new varieties developed in the region. After a test there they could be released to the counties for further testing if they looked good.

9. Sunesan listed some sources of obtaining small amounts (up to 100#) of grain seed for test work.
   Clinton Oats - Iowa State College
   Orfed & Elgin Wheat - Extension Agronomist, Pullman, Washington.
   Gem & Glacier Barley - Idaho Crop Improvement Assn., or Aberdeen Experiment Station.
   Big Club 43 - Farm Advisor, Fairfield, California.
   Other grains - Frank Parsons, California Crop Improvement Assn., Davis, Cal.
   Pendleton Field Station, Pendleton, Oregon.
   Harlan Stevens, Aberdeen, Idaho. Aberdeen Field Station.
   Glacier can also be secured from Co. Agent, Minden, Nevada.
   Big Club 43 may be secured from Co. Agent, Lovelock, Nevada.

Wheat varieties were listed by Sunesan as follows: Early for Southern Nevada; Intermediate for Central Nevada; and, Late for Northern Nevada. Listed in order of preference:

EARLY	INTERMEDIATE	LATE
WHEAT		
Ramone	Baart 38 (early Baart)	Big Club 43
White Federation 38	Lemhi	Red Federation
Idead		Bluestem (Australia)
		Dicklow
		Onas (bearded 1951)

WINTER WHEAT

All regions
Orfed
Elgin
Marcus
Reo (smut resistant Turkey)
Wasatch (smut resistant Turkey from Utah)

BARLEY		
(Use early barley for nurse crop)	Trebi	No late variety
Arivat (South)	Velvon	Utah Winter best winter barley
Glacier (North)		Calif. Mariout recommended as a late seeding nurse crop on alkali soil
Gem		

OATS FOR GRAIN

Clinton (white) (nurse crop)	Uton (white)(Improved strain of Swedish Select)	Calif. Red (Pasture & Hay)
	Kanota (Red)(nurse crop)	

RYE

Balboa Winter (pasture & grain)
(Southern Nevada)

If several counties in Western Nevada are interested, we could fix up a portable pilot plant, using surplus equipment to do a similar job in Western Nevada. However, it would require some cash outlay for the actual cleaning equipment. We could provide transporation and gasoline motors for powering such an outfit and some other equipment.

T.E.B.

September, 1948

NEW GRAIN CLEANER IN MONTEREY COUNTY FOR FARM BUREAU USE

Monterey County Farm Bureau members recently began operation of the new $12,000 grain cleaner at the storage elevators of Farm Bureau State Delegate Paul Aurignac near San Ardo, according to George Gearhart, county executive secretary. The cleaner, adapted to barley, beans, wheat, oats and vetch, is said to be the most modern field cleaning machinery being used on the West Coast, and is the only one of its kind in Monterey County.

Operated by a 22-horsepower motor and mounted on the bed of a two and one-half ton truck, the cleaner will handle up to 80 sacks of grain per hour. In one series of operations requiring a few seconds, it disinfects the grain with Ceresan dust, separates the chaff from the seed, eliminates all but the normal, healthy grain, and deposits it in sacks free from dust, dirt and foreign matter.

There is an air compressor for cleaning all grain off the machinery prior to transferring it from one area to another. It is equipped with 18 different screening devices for variations in grain type and condition. There is a second truck that accompanies the grain cleaner which carries spare materials and crew members.

The cleaner was assembled in approximately three months by H. A. Wood of Paso Robles, who is supervising the "breaking in" period of its use. Foreman of the regular crew is Archie Asabez of Paso Robles. Francis Bresette of Paso Robles is filler and sack sew ing attendant. The grain cleaner will be used in processing grain on Farm Bureau members' fields throughout the county.

Julius Trescony of San Lucas is chairman of the committee directing the operations of the machinery.

This book is not only valuable for what it contains but also for the list of manufacturer's who make seed cleaning and treating machinery.

T.E.B.

New Manual for Commercial Treaters, Seedsmen, and Processors

A new Du Pont booklet, "How to Treat", gives information for setting up a seed-treating operation. It has charts giving general recommendations for use of the chemicals to destroy seed-borne fungi, check soil-borne fungi, and help control certain other diseases that reduce the market value of untreated crops.

The various types of portable and stationary seed-treating machines now on the market, as well as the new slurry treater, are described and illustrated. In the slurry method, developed by Du Pont, the disinfectant is applied in a liquid suspension rather than as a dust or powder.

The manual says operators of elevators, gins, and other processing plants have found that such a treating service assures them a better quality crop to market, in addition to the profits from the treating service itself. And seedsmen satisfy their customers with treated seed that will generally result in a better stand and a better crop. They find also that seed treated according to state and federal recommendations is easier to sell than untreated seed, and that satisfied customers come back year after year.

NOTE: Copy of booklet, "How to Treat", will be sent on request. Address Editor, Du Pont "Agricultural News Letter," Wilmington 98, Delaware.

NOTES TAKEN ON TALK BY FRANK PARSONS, PRES. INTERNATIONAL CROP IMPROVEMENT ASSN.

Certification is a means of keeping track of the pedigrees of seeds.

Forty states and Canada have seed certification programs.

The California Seed Law works efficiently. So does certification work in many states.

At present Nevada alfalfa seed certification is not recognized in other states. This should be remedied by having the State Department of Agriculture submit their certification standards to the International Seed Improvement Association and have them approved. Then Nevada seed would be recognized internationally.

The statement below was Mr. Parson's answer to a question by Mr. Herb Roundtree, Smith, Nevada, a Lyon County farmer who is growing seed and interested in small seed production.

The local market for Nevada seed cannot be very great. Accordingly Nevada farmers will have to reach out for other markets, if we are to go into small seed production.

COUNTY AGENT PROJECT
Progress Report
November 9, 1934

PROJECT NUMBER:
State Office #403
Douglas County #29

NAME OF PROJECT: Wheat Variety and Date of Planting Tests

Herewith is submitted a progress report on the rod row wheat tests made in Douglas County in 1934 to get further data on the yield of different varieties of wheat under the same conditions at different planting dates during the year. This is the second year that these tests have been carried on.

Seed samples were secured from Davis, California through the assistance of Dr. G. A. Wiebe, Assistant Agronomist, Bureau of Plant Industry, Davis, California, and through the help of Thomas E. Buckman, Assistant Director for Agriculture, Nevada Extension Service, Reno, Nevada.

Plantings of the wheat varieties this year were made with a Planet Jr. garden seeder operated by hand. While a little difficulty was encountered in getting proper distribution of seed throughout the sixteen foot rows due to the varietal differences in the size of kernals, the use of the Planet Jr. was highly satisfactory.

The land used in the wheat test would probably classify as a medium river loam of medium color.

Harvesting was done by hand with a shears with one sixteen foot row out of each replication being harvested and each row sacked and handled separately. The sheaves were marked and all placed in sacks and sent to Davis, California, where the yields were gotten by threshing in a model threshing machine, the sample accurately weighed and the bushel weight obtained. The yield calculated in bushels was changed in order to put it into the common usage in Douglas County of tons or pounds. The bushel yields per acre were changed to pound weights in being submitted to the farmers in this county.

The yield of each variety, and the plantings of five replications of three rows each is averaged below showing the yield per acre of the first and second plantings. An average of both plantings in the order of their yield per acre in pounds, showing the highest yielding variety first, along with the difference in yield due to earlier or later plantings, the length of growing season and notes on the growing habits and attack by diseases.

The first planting of wheat was put in about mid-season compared to farmers plantings. Farmers planted much earlier this year than last because of the threatened drought which made it necessary to plant earlier to mature wheat before the failure of the spring run-off. The seasonal planting in 1933 was delayed by snow on the ground and wet ground shortly thereafter through February making the earliest plantings in 1933 the first of March, while in 1934 a few farmers with high dry land planted the first of February.

The first planting of the red row tests of wheat was made two weeks earlier than in 1933 with the second planting one week earlier. The first planting was slightly injured by a hard frost on April 1st and 2nd. This frost injured wheat on land that was dry on farmers plantings at the same time but not that that was wet. A heavy hail storm on May 26, rather an unknown occurance in Douglas County, caught the first planting heading out breaking some of the stems and bruising the sides of the young heads some of which were still in the boot causing them to deform and turn. These bruised spots did not mature grain.

The second planting at the time of the hail storm was not yet far enough along to be injured by the hail. The hail storm was followed by fifteen days of sultry and rainy weather with a light rain on nearly every day and three moderate rains during the period. While these rains did much to alleviate the drought conditions in Douglas County and to supplement the run off which had already fallen below any previous record for that season of the year it damaged the grain crop by making conditions ideal for spreading rust infestations.

Practically all the varieties of wheat in the test were attacked, but the rust was especially heavy on the second planting as the wheat had just been irrigated before the rain started and was kept wet. The late maturing varieties in the first planting and all the second plantings showed very serious reduction in yield evidently due to rust. Following this rainy period in late May and early June the water supply continued to dwindle and the second planting of wheat could not be irrigated in July when it should have had one more irrigation to complete maturity.

This combination of rust and lack of irrigation water caused the second planting which had been growing luxuriontly up to that time, to fail to fill properly and caused a crop failure. In this case the wheat was headed taller than the first planting due to weather conditions and then dried up. Only a single row out of each variety was harvested as the wheat was so badly shrivelled.

Free use of land in this test was given by J. H. Stodieck. He took a keen interest in the crop and irrigated the plot himself, he also helped with the planting and harvesting without charge.

TABLE I - Summary of Wheat Test

Eighteen foot rows, three rows to a replication, five replications. First planting made March 2, 1934. Second planting made April 6 - 7, 1934.

Varieties	Rust	Straw Thickness	Height	Length of Growing Period	Yield per Acre in #	Weight Per Bushel	Yield per acre in bushels Second planting
Bunyip	Serious	Coarse	48 in.	144	2334.1	60	13.0
Marquis	Slight	Fine	50 in.	148	2246.2	63	28.5
Ramona	Serious	Medium	40 in.	138	2010.4	60	17.5
Baart	Slight	Fine	48 in.	140	1915.9	62	18.5
Big Club	Slight	Coarse	40 in.	144	1871.8	60	17.5
Onas	Medium	Fine to M.	44 in.	140	1798	58	9.5
Poso	Slight	M.Coarse	38 in.	144	1748.2	62	23.5
White Federation	Serious	Medium	36 in.	135	1656.4	60	12.0
Federation	Serious	Medium	42 in.	138	1617	55	8.5
White Australian	Medium	Medium	52 in.	150	1601.2	58	11.5
Hard Federation	Serious	Medium	34 in.	135	1571.8	60	6.5
Hard Baart	--	--	--	--	--	--	20.5
Dicklow	Medium	Coarse	48 in.	150	1317.3	49	7.5

The heaviest yielding variety this year was Bunyip which grows much after the habit of White Australian. It is slightly shorter strawed and matures in approximately 10 days less time. This variety did not do well last year but better than White Australian did this year.

Marquis, a small red kerneled variety has always proven a safe crop on most of the land in this county. It came through with a better yield this year on replications of the second, or late, planting than any of the other varieties. This habit of yielding high in late plantings was noted last year where it was eighth out of eleven varieties in the first replication and fourth out of twelve varieties in the second. The kernel is small and hard. From the standpoint of utilizing the grain, very little of this wheat is manufactured into flour, it is used as poultry feed and is too hard to be favorably accepted.

Ramona, a new variety, while seriously affected by rust out yielded its cousins the Federations by a considerable margin. A field planting of this variety planted along side of White Australian drew considerable attention in the county this year. It was easily two feet shorter than the White Australian and matured about 20 days earlier. It rusted badly and there was some indication of other trouble in the field while the White Australian seemed to be in good condition, but when it came to the threshing the Ramona outyielded the White Australian by over 400 pounds per acre.

Early Baart, fourth this year and fifth last year, has always been a favored wheat with some of the farmers in this valley and both yields stood up well in these tests, considering that varieties that outyielded it last year were replaced by varieties that yielded less last year.

The Club varieties of wheat did not come up to the heavy yields of last year but showed themselves as giving a considerable yield in spite of being affected with rust. Their yields are more consistent than several other varieties.

The rest of the wheat varieties tested this year were fairly good as seen in the above table except for the failure of the Federation wheat this year which can be partially explained by rust damage.

These tests show that Ramona, a wheat similar to Federation, should be substituted for Federation if its field tests give the same results as the rod row tests. The tests also show that farmers here have a wide range in dates in which to plant wheat without serious reduction in yields resulting. A new factor has to be considered however. This wheat test was started with two objectives, one to determine the heaviest yielding variety, the second to determine the affect of the date of planting on yields especially as some farmers were seeking the cause for a diseased condition appearing in many early planted wheat fields. Some of the trouble can be traced to early frosts at the time the wheat is germinating, but even under these conditions the tests show that the early planted wheat out yields late planted wheat. No outstanding choice of the heaviest yielding variety has been established due to conflicting results which may be blamed on widely varying crop seasons, but certain varieties are shown to be outstanding and more satisfactory than others. From this standpoint the test should be continued.

The cause of the diseased appearance of the early planted wheat is possibly Hessian Fly, but due to the fact that the damage has not been serious

or general throughout the county and has never completely ruined yields it has not been studied from that standpoint.

Rust has been known to affect wheat in Douglas County, and in some years to seriously affect the yield, but the rust this year proved to be heavier and more general than has been noted for years. This combined with lack of irrigation water in mid summer in several cases also caused a partial loss of crop on other farms and threshing reports show much shrivelled wheat.

As a whole most of the farmers realized that they were going to be short of water and those who did not have good water rights planted earlier than the first planting of wheat made under this test. A complete reversal in yields compared to last years was noted. In 1933 in both plantings the tall and later maturing varieties outyielded the earlier maturing varieties. In 1934 mid season varieties out yielded the others. Certain varieties could not resist rust as well also is shown by this years planting. It is also noted that varieties that grew taller last year were not as tall this year while other varieties not growing so tall last year were taller this year.

Comparing the season, 1933 was cooler in the spring while 1934 was warm except for an unusual frost in early July which in some cases was blamed for shrivelled wheat. This frost froze some heads in the milk and dough stage.

The results shown in the above table on wheat yields are not fully satisfactory due to the failure of the second replication and also to a wide variation from the yields of last year, evidently due to weather conditions, rust and so forth.

SUMMARY

This test could well be continued for another year to give further data on date of planting and also show the reliability of certain varieties through varying conditions. A third test should fairly well establish one or more varieties as the heaviest yielding variety, also close observation of present yields on different soils should be watched as a further variation.

COUNTY AGENT PROJECT
Progress Report
November 1, 1935

PROJECT NUMBER:
State Office #403
Douglas County #29

NAME OF PROJECT: Wheat Variety and Date of Planting Tests

This project has been carried on for three years and shows a wide variation in results. It was planned to show what varieties were best suited to local conditions by early and late planting and maturity dates, and the yields per acre.

The work was carried on by the county agent on the farm owned by J. H. Stodieck. Seed for the various varieties were secured from G. A. Weibe, Assistant Agronomist, Bureau of Plant Industry, Davis, California.

This year's project was with wheat alone and ten varieties were planted in three replications on two different dates--March 28 and April 21. Each replication consisted of three rows eighteen feet long of each variety and grouped together. The land was prepared under field conditions and the first planting made under favorable conditions. The second planting was planted, without any further preparations to the land than that given the first planting, with the result that weeds were much more prevalent and destroyed the test value of the second planting. Seeding was done with a Planet Jr. seeder set to deliver the same measure by volume of seed per row.

The varieties planted this year were selected from those showing the best average results in the same test during the last two years, and were intended to show the superiority of certain varieties over a series of years, and to average the wide variations in yields shown in the last two tests.

Weather conditions this year were typical of usual conditions every year and should have been favorable to heavy wheat crops. The early spring was cool and the cold weather held through until late May, with a week of warmer than usual weather the first week in May followed by a cold wave and a severe frost. The first planting had sufficient moisture to germinate but the second did not and had to be irrigated to germinate. This delayed germination slightly and gave the established weeds a better chance to grow.

A visit to the plot on May 14th showed all of the first planting up and in excellent condition except for the Ramona, White Federation, and Baart, which looked thin. These probably were affected more by the late frost than the other varieties. The second planting was up, but still thin in some rows.

The first planting developed in good condition and escaped most of the late rust which swept over the county in the fall. The second planting retarded by weeds, mainly black mustard, was caught by the rust and made practically useless to harvest. Only a few varieties for comparison were harvested.

Harvesting was done by hand shears, sixteen feet of each variety from one row of the three planted in each replication was harvested, and the wheat tied

in sheafs and shipped to Davis, California for threshing.

The results of the test are shown below:

Variety	Yield in lbs. per acre. Ave. 3 replications (Planted Mar.28)	Yield in bu.	Weight per bushel
1. Poso	2675.25	43.5	61.5
2. Baart	2429.7	39	62.3
3. Onas	2204.92	39.8	55.4
4. Bunyip	2101.77	36.3	57.9
5. Ramona	1958.8	33.2	59
6. Big Club	1822.14	31.8	57.3
7. Federation	1721.5	31.3	55
8. Marquis	1717.4	27.7	62
9. Pacific Bluestem	1567.5	27.5	57
10. White Federation	1178.1	19.8	59.5

These results would show that Poso, a new variety being developed in California, and a soft white club sheat, made the heaviest yield. Poso is a medium early maturing wheat (10-15 days earlier than Pacific Bluestem) standing forty four inches high, and has a heavy straw which prevents lodging. This wheat was of good quality as indicated by the weight per bushel. That some of these varieties were injured by rust can be seen from the light weight per bushel, especially the Onas wheat which produced more bushels than Baart but less by weight by over two hundred pounds per acre. It has been noted that the red wheats are more resistant to rust than any others.

The late planted wheat this year matured in 10-15 days less time than the early planting, but this means that it must be irrigated at least once more to fully mature. With low water supplies in the summer this is a mighty important factor. Farmers generally will plant early to take full advantage of the spring run-off for irrigation of wheat.

A classification by yields of the first planting each year follows:

AVERAGE OF 3 YEARS FIRST PLANTING YIELDS IN ORDER OF HEAVIEST YIELD.

Variety	1933[1]	1934[2]	1935[3]	3 yr. ave.	Height in.	Type of straw	Days to mature.
Early Baart	3466	1915.9	2429.7	2603.8	52	fine, no lodging	140
Poso	3340	1748.2	2675.25	2587.8	44	coarse	145
Ramona	3304	2010.4	1958.8	2424.4	40	medium	140
Bunyip	2805	2334.1	2101.77	2413.6	47	medium	145
Onas	3320	1798	2204.92	2407.6	46	coarse to medium	140
Pacific Bluestem	3957	1601.2	1567.5	2375.2	54	medium to light	155
Big Club	3330	1871.8	1822.14	2341.3	45	coarse	145
Marquis	2854	2246.2	1717.4	2272.5	50	light	150
Federation	2940	1617	1721.5	2092.8	42	coarse to medium	140
White Federation	1870	1656.4	1178.1	1534.8	40	medium	135

*1 No rust damage
*2 Heavy rust. Damage especially on late varieties.
*3 Medium rust. Damage heavy on late varieties. Early varieties ripening as rust appeared.

From this result the Early Baart wheat has the best record. While the report shows that Early Baart suffered from rust it maintained a higher average through the full three years test. It is a medium early maturing wheat and in spite of its size is a desirable variety. This variety has been grown in the county in the past and has met with favor on all but the heavy lands on the East side of Carson Valley.

The next variety, Poso, is a new club variety developed in California. It has not been grown in Nevada, although, other Club wheats find favor in Nevada counties. Under field tests this variety should make big yields. The stem is strong and fairly short and will probably do better on the heavy land where Baart has not met with favor.

Ramona is another new variety that is very similar to Federation--resembles Federation closely in characteristics but it has a larger kernel with a reddish tinge. A nine-tenths acre field in a field trial in 1935 yielded 1800 pounds or at the rate of a ton to the acre.

Bunyip has been grown in the county in the past and only the lack of good seed has kept it from being planted the last few years. In appearance and date of

maturity it is between Onas and Pacific Bluestem.

Onas has not been given much of a trial in the county, but with other varieties as shown outyielding it there is little reason for introducing it.

Pacific Bluestem (White Australian) is grown to a large extent on the granite sand soils on the West side of Carson Valley where it is one of the few varieties that will grow long enough to stand handling easily. When not attacked by rust it is one of the best local varieties, but rust seems to damage it seriously.

Marquis is a fine quality wheat and is a sure crop variety, but it seems to be behind in these tests from the standpoint of yields.

Both Federations seem to suffer heavily from rust damage but in the past Federation, often called White Federation, locally, has made heavy yields on land where the straw grows to a satisfactory length.

This project has shown satisfactory results in determining varieties that should be used in field trials but has done nothing toward determining the best time for planting. The planting of wheat in this area is usually determined by winter weather conditions. Following heavy winters wheat may be planted in late March and April, while in light winters it may be planted as early as the first of February. This early planted wheat sometimes suffers from frost damage, but is planted early to mature it before the spring run-off is gone, so that water is the controlling factor in the date of planting. A heavy yielding early variety then is more desirable than a late maturing variety, although, the late maturing varieties usually yield heavier crops.

COUNTY AGENT PROJECT
Progress Report
November 9, 1934

PROJECT NUMBERS:
State Office # 402
Douglas County # 28

NAME OF PROJECT: Barley Variety and Date of Planting Tests

Herewith is submitted a progress report on the tests made in Douglas County, Nevada, on barley in rod rows in 1934 which were made to get further data on the yield of different varieties of barley under the same conditions at different planting dates during the year. This is the second year that these tests have been carried on.

Seed samples were secured from Davis, California, through the assistance of Dr. G. A. Wiebe, Assistant Agronomist, Bureau of Plant Industry, Davis, California, and through the help of Thomas E. Buckman, Assistant Director for Agriculture, Nevada Extension Service, Reno, Nevada.

Plantings of the barley varieties were made with a Planet Jr. garden seeder operated by hand. While a little difficulty was encountered in getting proper distribution of seed throughout the sixteen foot rows due to the varietal differences in the size of kernels, the use of the Planet Jr. was highly satisfactory.

The land used in the barley tests would probably classify as a medium river loam of medium color.

Harvesting was done by hand with a shears with one sixteen foot row out of each replication being harvested and each row sacked and handled separatel y. The sheaves were marked and all placed in sacks and sent to Davis, California, where the yields were gotten by threshing in a model threshing machine, the sample accurately weighed and the bushel weight obtained. The yield calculated in bushels was changed in order to put it into the common usage in Douglas County of tons or pounds. The bushel yields per acre were changed to pound weights in being submitted to the farmers in the county.

The yield of each variety, and the plantings of five replications of three rows each is averaged below showing the yield per acre of the first and second plantings. An average of both plantings in the order of their yield per acre in pounds showing the highest yielding variety first, along with the difference in yield due to earlier or later plantings, the length of the growing season and notes on the growing habits and attack by diseases.

The 1934 barley variety tests were made on the farm of George Hellwinkel with the following varieties being planted: Trebi, Hannchen, Atlas, Arequippa and California Coast. The first planting was made March 22 and the second planting April 13. The first planting was made at about the time when most of the local farmers were busy planting their barley while the second planting was made after about 80% of the barley had been planted by local farmers. However, the farmers rushed their plantings knowing that the snow fall in the mountains was light and that irrigation water would be short before mid-season. For this reason with early plantings they had a better chance to mature their crop.

The weather during the growing season this year was excellent for the barley and the plantings are a true indication of what can be expected. Farmers crops this year were good with few exceptions, with the barley being well filled, plump and the yield very heavy. Some damage was done by hail on May 26 on the early planting of the Rod Row Tests. Heavy frost was experienced in April but caused no serious damage.

The second series of replications was under a slight disadvantage due to the fact that the land was prepared for both plantings at the same time and the land for the second planting lay idle until these replications were planted which allowed weeds to grow. However, the barley grew fast enough to choke out these weeds though the weeds grew higher in the second planting than in the first.

TABLE I

Eighteen foot rows, three rows to a replication, five replications. First planting made March 22, 1934. Second planting made April 13, 1934.

	Height				Days growing Period	
Varieties	First Planting	Second Planting	First Planting	Second Planting	First Plant.	Second Plant.
Trebi	42 in.	42 in.	Some leaning	Some leaning	125	115
Hannchen	44 in.	44 in.	Some leaning	Upright	115	105
Atlas	40 in	42 in	Upright	Upright	115	105
Arequippa	48 in.	48 in.	Lodging badly	Some leaning	120	110
Calif.Coast (Native)	42 in.	44 in.	Some leaning	Upright	125	115

TABLE II

YIELDS

Varieties	1st Planting Yield per Acre in #	2nd Planting Yield per Acre in #	Average Yield both Plantings	Difference in favor of late plant	Weight Per Bushel
Trebi	4305.6	5168.8	4737.2	863.2	52#
Hannchen	3707.2	4396	4051.6	688.8	56
Atlas	3415	4390	3902.5	875	50
Arequippa	3305	4090	3698	785	50
Calif.Coast (Native)	3 410.4	3724	3567.4	313.6	49

The yields this year were exactly in the same order as last year for the same varieties. The results were highly satisfactory and can be taken to prove essential points which were supposed to be true before the test was put on. The first shows the Trebi barley as the best suited to local conditions. It is the heaviest yielding variety and desirable in every way except for a tendency to shatter in harvesting more than other varieties. Farmers often think they are losing too much grain but the yield from Trebi is higher in spite of this loss.

It can also be seen from the above table that the second planting of each variety yielded heavier than the first plantings, from 875 pounds per acre to 313 pounds per acre. We grant that on dry years it is better to plant early than to risk crop failure for lack of irrigation water. Also that some years it would be cheaper to plant early when the winter moisture is still able to bring up the crop rather than to irrigate before planting to get proper germination. When water conditions are favorable the planting dates from April 1st to 20th should give heavier yields of better quality barley under our climate conditions than earlier planting. This is true of Trebi barley as well as other varieties although Trebi barley will stand more spring frosts which occur here to some extent every year.

The local farmers habit of planting barley as soon as they can get their land into condition after finishing their wheat plantings can easily be changed to suit this time. Observation shows that the warmer years with higher temperatures during late June and July give heavier yields of barley than cool summer growing weather.

The temperature on our warmest days seldom gets more than 93 degrees here. These temperatures are not sufficient to cause rapid maturing of barley but rather help to increase the yields where irrigation water is sufficient to keep the planting in healthy condition.

This years rod row results show that the advantage of early plantings to hasten maturity is not very great. In all cases the late plantings matured in an average of a 10 day shorter growing period than the earlier plantings. Thus it is shown that while taking less time to grow, therefore, taking no more irrigation water, the later plantings still produced a heavier crop.

The weight per bushel of these varieties is a good indication of the quality produced. The weight per bushel of Hannchen was 56 pounds, Trebi 52 pounds, while the lowest weight was California Coast at 49 pounds.

Local observation shows that on years when barley yields are heaviest that spring wheat yields are lower. While the differences are slight it would appear that the temperature causes this difference as hot years correspond with heavy barley crops and cool seasons with biggest wheat crops. This can be used as an argument for later planting of barley as it advances to maturity in the warmer weather.

Trebi barley is a medium to short strawed variety, maturing in 115 to 125 days, and is a six row type. The kernels are medium sized, very round and plump with very little fiber. It stands up fairly well but shatters easily in

a binder if it gets ripe.

Hannchen, the second heaviest yielding barley, is a two row type, medium in length, fine strawed, but does not lodge easily. The kernel is a light amber color, very small but plump with little fiber.

Atlas, the third heaviest in yield is a short, stiff strawed upright growing barley, early maturing and a six row type. The kernels are medium colored, plump and of a good size but rough.

Arequippa is a long strawed barley that under our conditions would lodge badly. It matured in 110 to 120 days. The kernels are dark colored, long, and have considerable fiber.

California Coast is a medium tall growing variety of fairly strong straw. A six row type maturing in 115 to 125 days. The kernel is medium sized, dark amber in color, rather long and has considerable fiber. It is lighter weight than any of the varieties tried this year.

SUMMARY

This report shows that Trebi is easily the best yielding variety and should be grown in favor of all varieties until another variety either yielding higher or of better quality can be produced. This brings to a satisfactory conclusion the barley test from the variety yield standpoint.

From the date of planting standpoint this years test shows the advantage of later planting. If time permits this should be proven more to establish the best dates for such planting in a varying season, but this information should be presented for farmers consideration as it stands.

NOTES TAKEN ON E. R. JACMAN'S TALK BY FRED BATCHELDER

For seed production you want a dry harvesting period with cool nights to make a long ripening period. Oregon has a wet spring and dry summer which makes it ideal. Oregon produces more grass, alsike, Ladino and cover crop seed than any other state.

It is very important to apply nitrogen to grass for seed production. Nitrogen is needed to help rot the old grass as well as act as a fertilizer. Type of soil doesn't make too much difference and irrigation or dry farming doesn't either if you use nitrogen. A good rule to go by follows:

1st year apply 100 lbs. Sulfate of Ammonia per acre.
2nd year apply 200
3rd year apply 300
4th year apply 400
5th year apply 500
Every year thereafter apply 500 lbs. If you go beyond 500 lbs., seed yield increases, but grasses lodge before seed forms. This applies to irrigation or dry land.

The seed yield will keep on increasing but application of over 500 lbs. yearly causes the grass to lodge too early in the year. It doesn't make any difference if the grass does lodge later in the year after the seed is mature.

By applying large amounts of nitrogen, the carrying capacity can be increased tremendously in grass. Grass grows only because it can get nitrogen although a phosphorus deficiency might nullify the nitrogen. No top has been reached in production by application of nitrogen. In other words an increase in rate of application has always given an increased yield.

The most successful seed grower is the one whose seed production fits into the normal rotation such as a potato grower. Seed doesn't take much fertility off the farm, especially if straw and manure are returned.

Rates of seeding:
Ladino 3 lbs. per acre broadcast
Alsike 5 lbs. per acre broadcast
Red clover 10 lbs. per acre broadcast
All grasses 3, 4, or 5 lbs. per acre in 30 inch rows whether irrigated or not.

Kenland Red clover is a new strain that surpasses all other red clover but it will not be available before next fall. It should be best for seed production in Nevada.

Practically every Brome plant is different than the one next to it so it is easy to start new strains. Therefore, every breeder has his own strain. Manchar and Bromar produced at the SCS breeding station, Pullman, Washington, should be good in Nevada. One is Smooth and the other Mountain but Jackman did not say which was which.

Intermediate wheatgrass is better than crested wheatgrass above 5,000 ft. but it isn't as drougth resistant.

Oregon plants grass seed in 30 inch rows whether irrigated or not. Only small operators sprinkle. Art King, Extension Soils man has charge of sprinkler irrigation in the Willamette Valley where most of it is done.

Planting grass in rows is gaining in popularity and seems to increase the yield. For instance the average yield of crested wheat broadcast is 100 to 200 lbs. per acre and in rows is 800 to 1000 lbs. per acre.

In Utah they dust alfalfa in early spring with DDT and then dust again just before bloom and they almost eliminate the Lygus bug. A report on this is available from the Utah Experiment Station. If dusting is done early in the morning it doesn't hurt the bees much. All bees in the field at time of dusting are killed and a few more die the first couple of days so they generally dust part of a field at a time. They find that the bees tend to gather where it has already been dusted because of the lack of competition from the Lygus. They do not remove their hives when dusting. They use 2 stands of bees per acre and get good results. Pollen carrying bees trip about 30% of the flowers while nectar carriers only trip about 3% but good results are obtained with honey bees just the same. Present information indicates that DDT will not hurt the ground under average conditions. It takes at least 12 lbs. actual DDT per acre to do any damage.

There does not seem to be any difference in results between dusting and spraying. Use the same amounts of DDT either way. Ground rigs and planes give the same results.

Birdsfoot Trefoil (Lotus Corniculatus) is alkali resistant and should do well in Nevada.

Beardless Wild Rye (Elymus Triticordes) is good on alkali. It is flood and drougth resistant and fair for hay. Seed is available from Joe Banasco, Plush, Oregon.

Meadow foxtail (head like Timothy) stands flooding and alkali but is not drougth resistant. It is hard to get a stand because it needs very shallow planting.

Alta Fescue is better than Meadow Fescue if cut early. It is better yielding, longer lived, and stands some alkali.

Ziwadki alkali grass (Z. Lemmons) will not grow unless alkali is present. It is a fair producer. Lemons alkali grass is about the same. Nuttels grass or slender spear grass is also about the same. All of these are good where there is bad alkali.

A good place to study grass seed production in rows is at La Grande, Oregon. There are 15,000 acres grown in rows there. Weeds are controlled by 2.4D and hand weeding. It is seeded by adapted beet seeders and Planet Jr. seeders. Most of it is cut by specially adapted binders and harvested in stationary threshers. Jackman can furnish plans.

Hand weeding of grass for seed pays because in cleaning weeds out of seed as much as 25% of the seed is sometimes lost.

GRASS SEED PRODUCTION

In general fertilize as follows:

1st year 100 lbs. with Ammonium Sulphate
2nd year 200 lbs.
3rd year 300 lbs.
4th year 400 lbs.
5th year 500 lbs.

If you go beyond 500 lbs., seed yield increases but grasses lodge before seed forms. This applies both on irrigated and dry land. Grass crowns grow bigger each year. As the crowns grow they require more Nitrogen. Straw in the process of rotting draws Nitrogen. The same thing is true of straw that is plowed under in a grain field.

Potato farming and grass seed production work well together.

Production of grass seed is not hard on soil fertility where the straw is returned to the land. Row planting at 30" width produces more seed than broadcasting seeds either with a grain drill or special equipment is suitable.

Crested wheat grass should be profitable on good sites on dry land.

Each year a higher percentage of grass seed is grown in rows.

Intermediate wheat grass should be a good crop with more water than crested wheat requires.

Alta Fescue is more hardy and more productive than Meadow Fescue but must be cut early or is very coarse.

Alkali land grasses are beardless wild rye (Elymus Triticoides) and Meadow Foxtail (Alopecurus Pratensis) and Alkali Grass (Z. Lemmons).

Mark W. Monke, Chairman
Robert J. Whelan
James G. Jenson

COMMITTE REPORT
ON
CLOVER SEED PRODUCTION IN NEVADA

Committee: Charles R. York, Chairman
Louie A. Gardella
Mark W. Menke
Advisor: L. G. Jones

Clover seed has not been produced extensively at any time in Nevada. However, there have been occasions when farmers have hit a very good clover seed crop so that it is believed that clover seed can be raised in Nevada the same as alfalfa seed has been produced. Quoting E. R. Jackman, Extension Crop Specialist in Oregon, "Two important requisites for good clover seed production are: (1) dry summer months, and (2) cold nights for long maturing allowing for good colored seed."

Considerable acreage in Nevada appears to be adaptable for seed production. However, damaging insects are present in all areas. Pollinating insects are generally present in all areas of Nevada.

The factors of production are controllable and are as follows:

1. Flowers must be tripped and pollinated; beneficial insects (bees) must be present to do this. Bees are responsible for the tripping and cross pollination of 90 to 95% of the seed set in clover. Cross pollination is necessary for good healthy, vigorous seed set. Self pollination in clover and alfalfa does not lead to healthy seed.

2. Harmful insects must be controlled. Lygus is the outstanding damaging insect to the production of clover seed; also thrips, grasshoppers, weevil, aphids and nematodes. Most effective control for lygus is DDT at about one pound per acre applied either as a 5% dust or spray with sufficient water to cover foliage. First application to be at 10% bloom before bees are brought into the field. If control is not effected and numbers build up to damaging stage, dusting should be repeated. In checking for lygus, one nymph per sweep is sufficient to cause damage and call for a retreatment. Do not expect the same high results from dusting in clover seed production as has been achieved in alfalfa seed production.

   a. Mildew is a disease affecting seed production. There is no recommended control.

   b. Crown rot affects most red clover. However, Kenland is a variety of red clover resistant to crown rot and is recommended.

3. Control of weeds. Weeds affect available water supply for plants and reduces production. Weeds to be controlled by any method applicable to area--spraying with oil, cultivation, and hand weeding. Spot spraying with 2.4D and selective sprayings in weeding stage.

4. Harvesting
Mow and windrow Ladino Clover by the use of windrower on the mowing machine. Pick up with a hay-hog chopper and blow into a tight box wagon. Follow rows with a suction pickup to gather any seed that may have been left on the ground. Haul to a combine and thrash the seed.
Red Clover. Most satisfactory is windrowing and thrashing with a pickup combine. Combining of a standing crop is satisfactory if pickup reel is attached to combine. This method is recommended where wind and other factors make it advisable. Seed should be dried, if not, germination will be reduced. (Heating for 24 hours lowers the germination of seed.) Damp seed should be spread in drying shed or on canvas-es not to exceed 6" in depth so as to eliminate heating.

All factors of good culture apply to clover seed production. Plants should be matured in healthy growing condition at all times.

Clover should be planted broadcast rather than in rows as is recommended for alfalfa production. Seeding rate of about three pounds for ladino and ten pounds for red clover. Irrigate when necessary to keep plant in healthy condition. Soil is not necessarily a big factor as long as clover plants make satisfactory growth. To grow seed one should attempt to plant the best seed available. Plant certified, registered or, if possible, foundation seed.

(Release Tuesday Afternoon, Dec. 28)

DDT INCREASED CLOVER SEED YIELD 30 PER CENT

DAVIS, Dec. 28.--Dusting a lygus infested ladino clover field with DDT brought at least a 30 per cent increase in yield in a case recorded by Luther G. Jones, agronomist in the University of California on the Davis campus.

A farmer in Sacramento County discontinued grazing ladino clover preparatory to seed production on June 15. Approximately five weeks later he found all 400 acres heavily infested with lygus. A count showed an average of 18 insects per sweep. About one third of the acreage was dusted with 5 per cent DDT, using 30 pounds per acre. Three days after dusting the lygus count was repeated. While on untreated areas the count averaged 20 bugs a sweep the dusted portion of the field had less than one lygus per sweep.

At harvest time, according to the farmer, the yield of the dusted area was one third greater in sacks per acre than the undusted part, and the clean-out was about 20 per cent less.

"Dusting under these conditions," the College of Agriculture agronomist comments "seems very profitable for the production of ladino clover as the yield was increased from about 75 to 120 pounds of clean seed per acre."

Friday, Jan. 21, 1949

SEED CROPS ARE MAJOR INDUSTRY IN OREGON

Thirteen important kinds of Oregon seed crops had a farm value of a little less than $13,000,000 in 1948. Seeds included are: alfalfa; red, alsike, ladino and crimson clovers; and the ryegrasses. Altogether more than fifty kinds of forage, cover crop, lawn and vegetable seeds are produced commercially in Oregon. In the past, the thirteen kinds covered in government estimates accounted for around two-thirds of the total value of seeds produced in the state.

Value of the thirteen kinds has held between $12,500,000 and $13,000,000 for the last three years. Increasing prices have offset declines in production. Acreage and tonnage in 1948 were about a fifth less than in 1946. Even though acreage and production in 1948 were the smallest since 1939, the farm value was the highest for the period. The total worth was nearly three times as much as in 1939.

RED CLOVER DOWN

Most seed crops brought good prices and moved to market faster than usual during the fall of 1948. Red clover was an exception. The large crop moved a little slower than usual and at prices somewhat less than in 1947. Growers had sold about 65 per cent of the commercial crop in the country by December 15. Prices advanced slightly after mid-November to average about $42.50 a hundred pounds at mid-December. This was about 15 per cent less than a year earlier but still about 40 per cent above the wartime average. United States production of red clover in 1948 was about 40 per cent larger than in 1947 due chiefly to more acreage.

About seven-eighths of the small 1948 alfalfa seed crop moving into commercial channels had left farms by mid-December. Prices declined slightly during the month ending December 15 but were still well above 1947 and average.

CALIFORNIA LADINO

California has increased ladino clover-seed production much faster than Oregon, producing an even 1,000,000 pounds in 1942, according to the first after-harvest estimates. This was two-thirds of the national crop. Oregon produced about 29 per cent. Idaho grew the balance reported. During the 1942-46 period, Oregon grew about 41 per cent of the total, but the total during that period was less than half the volume in 1948.

ALFALFA VARIETY TRIALS FOR 1949

BY

OLIVER F. SMITH

Alfalfa variety trials thus far conducted have determined pretty well which of the available varieties are best adapted for most alfalfa growing areas of the state. Forage yields have been determined on field test plots located near enough to Reno to be handled from headquarters and observational plots have been established in some counties too far from Reno to make the taking of yields feasible.

Tests should be continued to keep informed on the new strains of alfalfa being developed at the Nevada Agricultural Experiment Station and at other State Experiment Stations. Yield test will be conducted on the Experiment Station at Reno and in one or two of the nearby counties. In addition to these tests, it is desirable to have observational plantings in some of the other counties interested in alfalfa hay production. Much information can be obtained from observational plots on disease resistance, winter survival, and general vigor of the different alfalfas.

It is suggested that county agents interested in variety test plots in their county arrange for the use of an area of land and the seeding will be cared for by O. F. Smith. The area chosen for the test should be good alfalfa ground and, as near as possible representative of the alfalfa land in the county. Usually a good procedure is to arrange with some farmer for the use of a small area of ground in a field he is seeding to alfalfa, then the area can be irrigated and cared for in connection with the regular field operations of the farmer.

The size of the area needed will depend on the type of field test, the number of replications and the number of alfalfas included in the seeding. This can be arranged after you have indicated an interest in a variety test.

Address all correspondence regarding variety test plots to: O.F.Smith, Agricultural Experiment Station, University of Nevada, Reno,Nevada. Send a copy of such correspondence to Thomas E. Buckman, Assistant Director for County Agent Work, University of Nevada, Reno, Nevada.

NOTE: Beginning in 1949 each county agent should keep a record of the acreage of Ranger and the number of farms on which Ranger is grown.

Commencing with 1949 we will make a state survey of acreage planted with Ranger.

Additional alfalfa variety trials should be made under the supervision of the Experiment Station project leader Dr. Oliver F. Smith, and as suggested in the statement regarding "Alfalfa Variety Trials" which is above, in order to make observations of new varieties that have been developed since earlier test plots were established in the counties.

Thomas E. Buckman

NOW IS THE TIME FOR COUNTY AGENTS TO PUT ON A GROW MORE RANGER CAMPAIGN

BY
THOMAS E. BUCKMAN
Assistant Director for County Agent Work

Name of Proposed Project: Grow More Ranger Alfalfa Goal: 50% or More Ranger Alfalfa by 1954 in _____ County.

Alfalfa is one of the most important crops in Nevada. It is the most important cultivated crop grown in the state, year in and year out. It is grown in all of the state's seventeen counties. Everyone who lives in Nevada knows, what it is, whether they live in town or country. Approximately 108,000 acres are devoted annually to alfalfa production. It's most important roll is that of furnishing feed for livestock.

When the country was first settled or as comparatively recently as thirty years ago, high yielding stands of alfalfa could be maintained for fifteen or twenty years or longer. However, in the early thirties, farmers and county agents began to notice that stands began to thin rapidly three or four years after seeding. Ed Harriman of Fallon was the first to observe this rapid thinning of stands. At first, this was thought to be due to winter killing; but an examination of a number of fields by R. J. Haskell, Plant Pathology Specialist of the Extension Service at Washington, D. C., and Fred R. Jones, Plant Pathologist of the U.S.D.A., called to state by the writer, proved the difficulty to be bacterial wilt.

Accordingly after bacterial wilt was determined as the principal factor that made new seedings in three or four years necessary, the U.S,D.A., through its research division, at the request of the Extension Service, supported by the state's leading farm organization, established a cooperative alfalfa investigative project to determine the alfalfa varieties that could be planted to increase the duration of new seedings of Nevada alfalfa. When the project was set up in 1940, Dr. Oliver F. Smith was appointed leader. Having completed the first phase of the investigative work Dr. Smith wrote Nevada Agricultural Experiment Station Bulletin No. 182 - "Diseases of Nevada Alfalfa in Nevada and Their Influence on Choice of Varieties", at the request of Director Charles E. Fleming. This excellent bulletin provides additional background for a state-wide campaign to increase the acreage planted to Ranger and other improved varieties.

Seed supplies of Ranger are now available in large enough quantities that rapid strides can be made. No longer will Nevada farmers be unable to secure seed. No longer will county agents be hampered in their efforts to assist farmers to secure seed resistant, as Ranger seed is now being provided in comparatively large quantities.

Results obtained to date warrant county agents advocating, where wilt is a serious factor in hay production and the stem nematode is absent, the

planting of:

1. Ranger, or
2. Buffalo; and,

where, neither bacterial wilt nor stem nematodes is present, the planting of:

1. Baltic
2. Cossack
3. Grimm
4. In some areas Ladak, where only one cutting, can be secured.

Nemastan should be seeded where the stem nematode is prevalent and severely damages alfalfa.

According to my way of thinking the time has come for each county agent to start in 1949 a campaign to plan Ranger alfalfa. The goal for each county should be, to have 50 per cent of the alfalfa acreage in Ranger within five years or by 1954. Nevada farmers are already well informed as to the desirablility of planting Ranger alfalfa. Right now the big job is to get concentrated action by the growers to make definite plans for their 1949 and 1950 plantings.

Suggestions for writing a county wide
GROW MORE RANGER
Project Plan (Campaign Stage)

By
Thomas E. Buckman

(Attach note to completed project giving: I. Sub-project name, and II. Name of project. New project numbers are put on in State Office.)

COUNTY AGENT PROJECT

PROJECT NUMBER:
State Office No.
County No.

(Heading)
COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION DIVISION AND
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING.

I. SUB-PROJECT: (Sub-Project name and number; also status of project in parenthesis (test) (demonstration) or (campaign). Use index for naming Nevada projects in deciding sub-project name. Type name selected on a separate sheet of paper and attach with clip)
(This is a campaign) This will be V-F-(9) Grow More Ranger.

II. NAME OF PROJECT: Grow More Ranger
This is the popular name of your project. Do not include index number if it is the same as the sub-project name.

III. LEADER:

IV. LOCATION: (County)

V. DATE EFFECTIVE: January 1, 1949

VI. OBJECT: (General purpose of project)

VII. FACTS:
(1) Give economic background.
(2) History of Extension work done.
(3) Give the agricultural subject matter basis for the work by allusion to references or in detail.
(4) Give reasons why the project was adopted, necessity for, etc.
(5) Cite research: Refer to A.E.S.Bul. 152, Extension Tests.

VIII. GOALS:

(1) Results to be achieved this year (current yr.).
(2) Results to be accomplished over a term of years; for example (long time) "It is planned to locate six permanent plots in various sections of the county to annually measure yields, and after the first year to call each year thereafter a demonstration field meeting at this plot. By 1953 it is hoped that the work will be far enough ahead to have a general campaign so that a clean-up can be held in 1954 and thus finish the project by 1955".

Or: No. of demonstrators, 1949 - 16
1950 - 16
1951 - 16
No. of cooperators, 1949 - 3
1950 - 5
1951 - 7
No. of farms using better seed, 1949 - 20
1950 - 30
1951 - 40
1952 - 50
1953 - 65
1954 - 75

The object in this case is to influence 75 alfalfa growers to plant Ranger as recommended by the extension service, or 50% of _____ County alfalfa acreage.

IX. DUTIES OF EACH COOPERATING AGENCY:

Extension Agent: (List duties of)

Demonstrator: (List duties of)

(A demonstrator is a farmer, farm woman, boy or girl, who under the direction of the extension service, conducts a result demonstration).

Cooperator: (List duties of)

(A cooperator is a farmer, farm woman, boy or girl, who accepts a recommended practice and cooperates with the extension agent in establishing the practice on a county-wide basis or cooperates in a test).

Specialist: (List duties of) (Experiment Station Project Leader: O. F. Smith)

(Procedure - plans for test, demonstration or campaign depending upon status of project). Proposed project is in the campaign stage. Use tests and demonstrations to put over campaign to increase Ranger acreage.

X. CALENDAR FOR 1949:

WHEN	WHAT	WHO
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

DATE: _____ _____
Director of Extension

DATE: _____ _____
Extension Agent

Suggestions for a Grow More Ranger 4-H Club Project

Made by Thomas E. Buckman as a means of supporting the

Grow More Ranger Campaign

that will be launched in nearly every county of the State

(The same idea can be worked out for a group
of young farmers 20 to 25 or any farmers over 21)

(Heading)
COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION DIVISION AND
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

COUNTY AGENT PROJECT:

PROJECT NUMBER:
State Office #101
Esmeralda Co. #21

I. SUB-PROJECT: VIII-A Agricultural Club Work

II. NAME OF PROJECT: Grow More Ranger Alfalfa Club

III. LEADER: Name of Leader

IV. LOCATION: _____ County

V. DATE EFFECTIVE: January 1, 1949

VI. OBJECT: Generally, to increase the acreage of high yielding alfalfa in Nevada.
Specifically, to increase greater interest in production of Ranger and other approved alfalfa.

VII. FACTS:

1. The extension advisory committee recommends that 50% of the alfalfa acreage in _____ County be planted to Ranger alfalfa by 1954
2. The present acreage of Ranger alfalfa in _____ County is _____ acres.
3. 4-H Clubs are one of the best known methods of stimulating interest in production.
4. 4-H Clubs are a project listed in the Nevada Banker's Agricultural program.
5. The _____ Bank offers $50.00 prize money if 10 Ranger club members are secured and grow 100 acres of Ranger.
6. _____ seed growers offer 25 lbs. of Ranger seed to the best all-round Ranger club member.

VIII. GOALS:

1. Enroll 10 Ranger club members.
2. Hold achievement program.
3. Train crops judging and demonstration teams.
4. Hold one club tour.
5. Secure 80% completions.

IX. DUTIES OF EACH COOPERATING AGENCY:

Extension Agent:

Form Ranger alfalfa club. Help secure and select suitable seed. Furnish publicity to local papers. Attend five or more club meetings. See that record books are complete October 1st. Score each field first, second, and third cuttings.

Club Leader:

Attend five or more club meetings.
Help secure seed.

Club Members:

Attend meetings.
Purchase seed
Plant according to instructions and keep records as instructed.
Participate in Achievement Day Program or Fair.

Business Men and Bankers:

Promote interest in Ranger Alfalfa Clubs.

County Farm Bureau

Award suitable county prizes.
Write inspiring letters to each member.

X. CALENDAR FOR 1949:

WHEN	WHAT	WHO
Jan.	Talk up Ranger Club work at Farm Center meetings; visit parents; secure prices on seed.	Extension Agent
Feb.	Secure leader; sign up club members; secure seed. News articles in papers.	Extension Agent

COUNTY AGENT PROJECT:

PROJECT NUMBER:
State Office #192
Storey Co. #21

CALENDAR 1949 (Cont'd.)

WHEN	WHAT	WHO
March	Organize club, explain duties of club officers. Give instructions as to care of ground. Visit club members.	Extension Agent & Club Leader
April	Club meetings, discuss irrigation of alfalfa, determine if the club wishes to have a judging team. Select judging team.	Leader
May	Club meeting. Seed judging contest between members. Crops judging team selected. Visits to club members.	County Agent & Leader
June	Club meetings. Train crops judging team.	Leader
July	Discuss at club meeting possibility of club members making an exhibit at State Fair. Train judging team; encourage club members to attend Club Camp and club picnic.	Extension Agt. & Leader
August	Club Camp	Extension Agt. & Leader
Sept.	Each club member participate in an exhibit of Ranger alfalfa at State Fair, judging team enters crops judging contest.	Extension Agt. Leader Club Members
Oct.	Club meeting. Key Banker awards pins to members completing work. Projects completed for year. Reports made to leader and county agent.	Extension Agt. Leader Club Members
Nov.	Make plans for 1950.	

Date: _____ _____
Director of Extension

Date: _____ _____
Extension Agent

Suggestions as to what might be entered in a county project under:

VII. FACTS. In the Grow More Ranger Alfalfa Project

By: Thomas E. Buckman

1. Alfalfa is the largest and most important cultivated crop grown in _____ County. Its most important role is furnishing feed for livestock. _____ County has _____ head of cattle, _____ head of sheep.

2. _____ County had _____ acres of alfalfa in 1930. The acreage has steadily declined since that time until 1945, when ____ county farmers started to plant increased acreages of approved varieties of alfalfa. Five farmers planted trial plots of Ranger and yields of _____ tons per acre were secured by each of the five cooperators. Now that yields of Ranger have been established as the most productive in the state and county wherever bacterial wilt reduces yields and reduces the longevity of stands, it is the opinion of the county extension advisory committee that a campaign should be made in 1949 to the end that _____ County will have _____ acres of Ranger by 1954.

3. University of Nevada Agricultural Experiment Station Bulletin No. 182 (give title), provides subject matter material for the proposed campaign.

4. The University of Nevada Agricultural Experiment Station has available for consultation as Project Leader. Dr. Oliver F. Smith, Associate Pathologist.

5. Sufficient certified Ranger seed is available for planting the proposed acreage and at lower prices. (Availability at present may depend on purchase of seed immediately after harvest. In order to bring this about it is thought that the state extension service take action in 1949 to set up a central purchasing agency to make Ranger Seed purchases, to supply all farmers who are interested in planting Ranger).

6. 4-H Club work is an effective means of securing the adoption of approved farm practises, such as the planting of Ranger alfalfa. 4-H Club work can be utilized in _____ County as a means of securing the increased acreage by 1954. It is the opinion of the Extension Advisory Committee (If it is, Age, interest, and number of prospective club members will determine this) that a Ranger 4-H Club be organized in _____ County in 1949.

7. _____ County has the following agencies and personnel that can be of assistance in promoting the Grow More Ranger Alfalfa campaign in _____ County.

   A. _____ County has _____ high school vocational agriculture departments. (In order to promote increased acreage of Ranger in _____ County, the VoAg teachers should be contacted and asked to cooperate in the campaign.)

Suggestions as to what might be entered in a county project under:

VII. FACTS. In the Grow More Ranger Alfalfa Project

By: Thomas E. Buckman

1. Alfalfa is the largest and most important cultivated crop grown in _____ County. Its most important role is furnishing feed for livestock. _____ County has _____ head of cattle, _____ head of sheep.

2. _____ County had _____ acres of alfalfa in 1930. The acreage has steadily declined since that time until 1945, when ___ county farmers started to plant increased acreages of approved varieties of alfalfa. Five farmers planted trial plots of Ranger and yields of _____ tons per acre were secured by each of the five cooperators. Now that yields of Ranger have been established as the most productive in the state and county wherever bacterial wilt reduces yields and reduces the longevity of stands, it is the opinion of the county extension advisory committee that a campaign should be made in 1949 to the end that _____ County will have _____ acres of Ranger by 1954.

3. University of Nevada Agricultural Experiment Station Bulletin No. 182 (give title), provides subject matter material for the proposed campaign.

4. The University of Nevada Agricultural Experiment Station has available for consultation as Project Leader. Dr. Oliver F. Smith, Associate Pathologist.

5. Sufficient certified Ranger seed is available for planting the proposed acreage and at lower prices. (Availability at present may depend on purchase of seed immediately after harvest. In order to bring this about it is thought that the state extension service take action in 1949 to set up a central purchasing agency to make Ranger Seed purchases, to supply all farmers who are interested in planting Ranger).

6. 4-H Club work is an effective means of securing the adoption of approved farm practises, such as the planting of Ranger alfalfa. 4-H Club work can be utilized in _____ County as a means of securing the increased acreage by 1954. It is the opinion of the Extension Advisory Committee (If it is, Age, interest, and number of prospective club members will determine this) that a Ranger 4-H Club be organized in _____ County in 1949.

7. _____ County has the following agencies and personnel that can be of assistance in promoting the Grow More Ranger Alfalfa campaign in _____ County.

   A. _____ County has _____ high school vocational agriculture departments. (In order to promote increased acreage of Ranger in _____ County, the VoAg teachers should be contacted and asked to cooperate in the campaign.)

B. _____ County has _____ local seed houses who furnish alfalfa seed to farmers. (It is suggested you contact each firm and acquaint them with the campaign for more Ranger alfalfa acreage in _____ County.)

C. _____ County has _____ weekly newspapers. The editors are farm minded as the two papers combined have a _____ ranch or farm subscribers. (They should be informed as to the objectives, goals, progress made, etc.)

D. _____ County has a radio station that reaches all farmers within a radius of fifty miles of _____. (The news staff of the station should be informed of the objectives of the program, progress made, etc.)

E. _____ County has implement dealers who sell farm machinery. All such dealers should be informed about the campaign to increase alfalfa acreage in _____ County.

F. Productive Marketing Association County Committees.

G. Soil Conservation Service, District Supervisors.

H. University of Nevada Agricultural Experiment Station Workers resident in _____ County.

Suggestions made above in parenthesis, if they apply, should go into the calendar of the Grow More Ranger project.

DEFINITIONS AND EXTENSION TERMS THAT WILL BE USEFUL TO COUNTY AGENTS IN WRITING UP COUNTY EXTENSION PROJECTS ON CROP IMPROVEMENT AND MAKING PROGRESS OR OTHER REPORTS

1. A COMMUNITY is a more or less well-defined group of rural people with common interests and problems. Such a group may include those within a township, trade area, or similar limits. A community is one of the several units into which a county is divided for conducting organized extension work.

2. A COOPERATOR is a farmer or homemaker who agrees to adopt certain recommended practices upon the solicitation of an extension worker. The work is not directly supervised by the extension agent, and records are not required, but reports on the success of the practices may be obtained.

3. DEMONSTRATIONS are of two kinds--method demonstrations and result demonstrations.

   A METHOD DEMONSTRATION is a demonstration given by an extension worker or other trained leader for the purpose of showing how to carry out a practice. Examples: Demonstrations of how to can fruits and vegetables, mix spray materials, and cull poultry.

   A RESULT DEMONSTRATION is a demonstration conducted by a farmer, homemaker, boy, or girl under the direct supervision of the extension worker, to show locally the value of a recommended practice. Such a demonstration involves a substantial period of time and records of results and comparisons, and is designed to teach others in addition to the person conducting the demonstration. Examples: Demonstrating that the application of fertilizer to cotton will result in more profitable yields, that underweight of certain children can be corrected through proper diet, that the use of certified seed in growing potatoes is a good investment, or that a large farm business results in a more efficient use of labor.

   The ADOPTION OF A FARM OR HOME PRACTICE resulting from a demonstration or other teaching activity employed by the extension worker as a means of teaching is not in itself a demonstration.

4. A DEMONSTRATION MEETING is a meeting held to give a method demonstration or to start, inspect, or further a result demonstration.

5. A RESULT DEMONSTRATOR is an adult, a boy, or a girl who conducts a result demonstration as defined above.

6. A FARM OR HOME VISIT is a call by the agent at a farm or home at which some definite information relating to extension work is given or obtained.

7. FARMERS (or FAMILIES) ASSISTED THIS YEAR should include those directly or indirectly influenced by extension work to make some change during the report year as indicated by:

   (1) Adoption of a recommended practice.
   (2) Further improvement in a practice previously accepted.
   (3) Participation in extension activities.
   (4) Acceptance of leadership responsibility.
   (5) Or by other evidence of desirable change in behavior.

8. A PROJECT LEADER, LOCAL LEADER, or COMMITTEEMAN is a person who, because of special interest and fitness, is selected to serve as a leader in advancing some phase of the local extension program. A project leader may be either an organization or a subject-matter leader.

9. A LEADER-TRAINING MEETING is a meeting at which project leaders, local leaders, or committeemen are trained to carry on extension activities in their respective communities.

10. LETTERS written should include all original letters on official business. (Duplicated letters should not be included.)

11. An OFFICE CALL is a call in person by an individual or group seeking agricultural or home-economics information, as a result of which some definite assistance or information is given. A telephone call differs from an office call in that the assistance or information is given or received by means of the telephone. Telephone calls may be either incoming or outgoing.

12. A PLAN OF WORK is a definite outline of procedure for carrying out the different phases of the program. Such a plan provides specifically for the means to be used and the methods of using them. It also shows what, how much, when, and where the work is to be done.

13. An extension PROGRAM is a statement of the specific projects to be undertaken by the extension agents during a year or period of years.

14. RECORDS consist of definite information on file in the county office that will enable the agent to verify the data on extension work included in this report.

15. A PROJECT is a definite systematic organized plan for carrying on some phase of the extension program of work. It provides for what is to be done, how much, when, where, how, and by whom, and extends over a duration of time.

16. A TEST is a trial or experiment to determine the value of an agricultural commodity or practice, involving a substantial period of time, a record of results and comparisons.

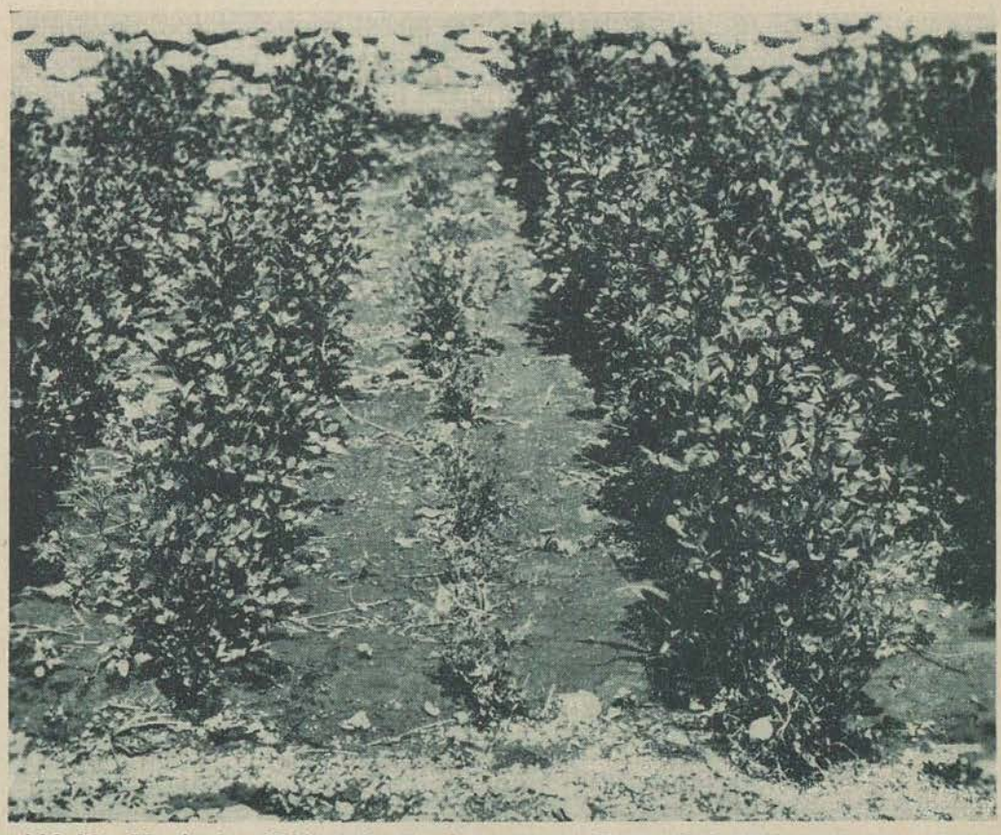
17. A CAMPAIGN is a series of organized events leading to the adoption of an agricultural or home practice by a large group of people.

THE UNIVERSITY OF NEVADA
AGRICULTURAL EXPERIMENT STATION

Bulletin No. 182 RENO, NEVADA October 1948

Diseases of Alfalfa in Nevada and Their Influence on Choice of Varieties

By
O. F. SMITH



Alfalfa Varieties Differ in Resistance to Bacterial Wilt. Center Row is a Susceptible Variety (Grimm) Which Has Been Killed by Wilt, Whereas, the Rows on Either Side are Wilt-Resistant Progenies.

PUBLISHED BY THE UNIVERSITY OF NEVADA
RENO, NEVADA

NEVADA AGRICULTURAL EXPERIMENT STATION

BOARD OF CONTROL

HON. JOHN CAHLAN (1951) ..... Las Vegas
HON. CHRIS H. SHEERIN (1951) ..... Elko
HON. MARY R. HENNINGSEN (1949) ..... Gardnerville
HON. SILAS E. ROSS (1949) ..... Reno
HON. ALBERT HILLIARD (1951) ..... Reno

OFFICERS

JOHN O. MOSELEY, M.A., A.B., (Oxon.) A.M. (Oxon.) LL.D. ..... President
CHARLES H. GORMAN,, Honorary M.S., LL.D. ..... Comptroller and Vice President
WALTER E. CLARK, Ph.D. ..... President Emeritus
CAROLYN BECKWITH ..... Secretary Emeritus
ALICE TERRY ..... Secretary

STAFF

CHARLES E. FLEMING, B.S.A., Director ..... Chief in Range Management
AGNES L. SCHMITH ..... Administrative Secretary and Librarian
GLORIA GHIGLIERI ..... Assistant Librarian
WALTER NEILSON ..... Assistant in Range Management
MARK A. SHIPLEY, B.S. ..... Associate in Range Management
CHESTER A. BRENNEN, B.A. ..... Economist in Range Management
GRANT H. SMITH, JR.,* B.S. ..... Assistant Economist in Range Management
HENRY JOHNSON ..... Assistant in Range Management
EDWARD RECORDS, V.M.D. ..... Veterinary Science
LYMAN R. VAWTER, D.V.M., M.S. ..... Associate in Veterinary Science
M. R. MILLER, M.S. ..... Chemistry
V. E. SPENCER, M.S. ..... Associate in Soils Research
WILLIAM A. GOODALE, B.S. ..... Assistant in Soils Research
LOIS CAZIER ..... Clerk Technician
RAY K. PETERSON, B.S., M.S. ..... Horticulturist
GEORGE HARDMAN, M.S. ..... Irrigation
HOWARD G. MASON, B.S. ..... Estimating and Planning
F. B. HEADLEY ..... Farm Development
J. E. CHURCH, Ph.D. ..... Meteorology
CARL ELGES, JR.,* M.S. ..... Assistant in Meteorology
O. F. SMITH,† B.S., M.S., Ph.D. ..... Associate Pathologist

*Military leave. †In cooperation with the U. S. Department of Agriculture.

DISEASES OF ALFALFA IN NEVADA AND THEIR INFLUENCE ON CHOICE OF VARIETIES[1]

By O. F. Smith[2]

Alfalfa is one of the most widely grown and important crops in Nevada. In recent years alfalfa acreage has decreased to an area in 1947 of approximately 108,000 acres (Figure 1). It is at present grown on 22% of the total cropland and 48% of the cultivated land in the State (Figure 2). In harvested acreage alfalfa is exceeded only by

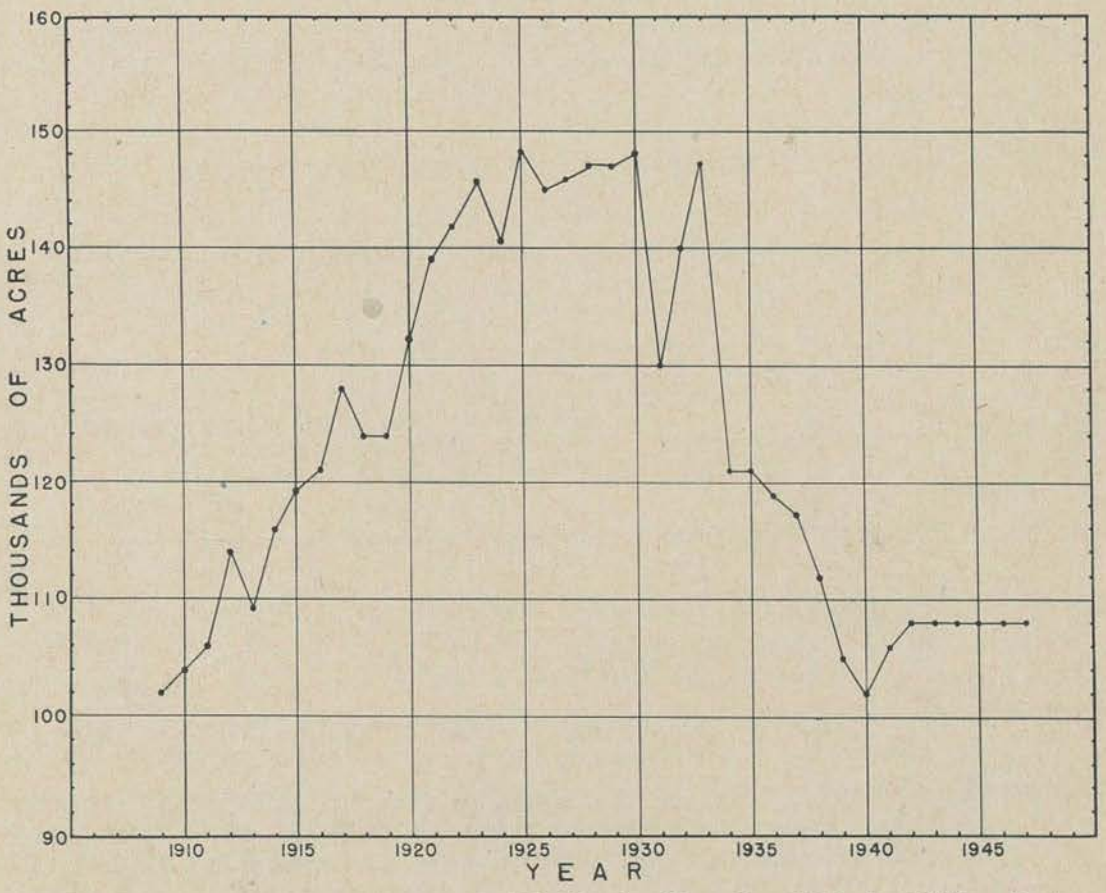


FIGURE 1. Annual Acreage of Alfalfa in Nevada, 1909 to 1947. Data from 1909 to 1923, inclusive, are unofficial estimates based on official U. S. Department of Agriculture estimates of all tame hay acreage. Data from 1924 to 1947 are official U. S. Department of Agriculture estimates supplied by the Bureau of Agricultural Economics.

wild hay. Its most important role is that of furnishing a high quality feed for livestock. Alfalfa is the highest yielding of the commonly grown hay crops, is high in protein and minerals, and is a good source of Vitamin A.

---

[1]Cooperative investigations between the Nevada Agricultural Experiment Station and the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

[2]Associate Pathologist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

In the early days of alfalfa growing in Nevada high production of good quality hay was maintained after seeding for fifteen to twenty years and little thought was given to the problem of maintaining stands. Alfalfa thrived wherever irrigation water and suitable land were available, and good production over a period of years was taken for granted. Insects, such as alfalfa weevil, aphids, grasshoppers, and

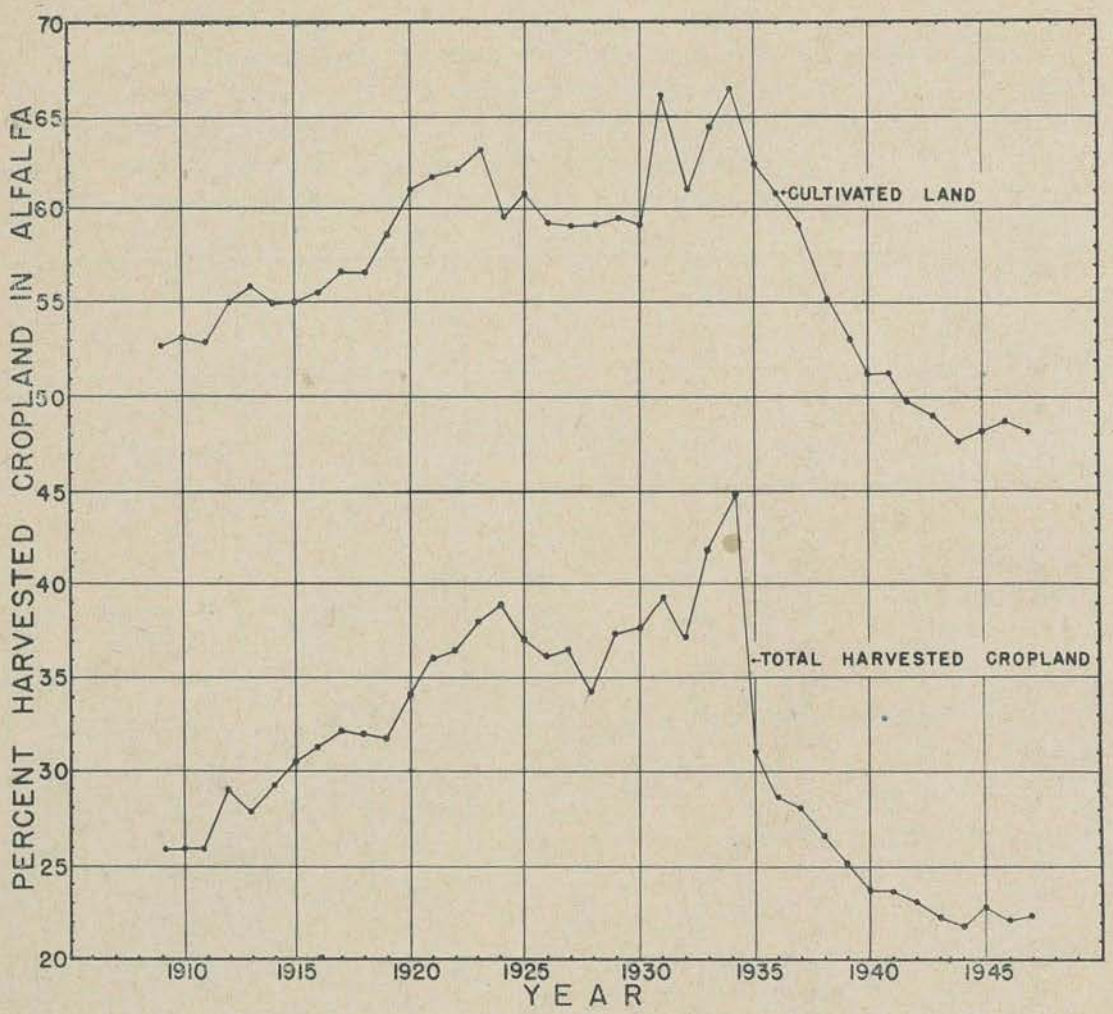


FIGURE 2. Percent Cropland in Alfalfa in Nevada, 1909 to 1947. Upper Line Shows Percent of Cultivated Land in Alfalfa and Lower Line Shows the Percent of Total Harvested Cropland in Alfalfa. Data from 1909 to 1923, inclusive, are unofficial estimates based on official U. S. Department of Agriculture estimates of all tame hay acreage. Data from 1924 to 1947 are official U. S. Department of Agriculture estimates supplied by the Bureau of Agricultural Economics.

cutworms sometimes made inroads on alfalfa production, but sporadic damage from these pests was easily detected and combated.

In the early thirties, alfalfa stands in many parts of Nevada began to thin rapidly three or four years after seeding. In 1936 it was definitely established that bacterial wilt is one of the main factors contributing to the shortened life of stands.[3] In addition to bacterial wilt

[3]F. R. Jones, Senior Pathologist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, visited Nevada in 1936 and definitely established the presence of the bacterial wilt disease of alfalfa.

there are other diseases and environmental conditions which tend to shorten life of stands and reduce yields, but damage from bacterial wilt is so widespread and severe that it has caused considerable loss to the alfalfa growers of the State.

It is well known from experiment station tests (4, 14, 18)[4] and farm experience that varieties and strains of alfalfa differ in disease resistance, cold resistance, growth habit, and yield. Since 1940 the Nevada Agricultural Experiment Station in cooperation with the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, has been conducting tests to determine which varieties are best suited to combat many of the factors which contribute to shortened life and reduced yields of alfalfa in Nevada. Also new alfalfas are being developed for areas where those grown at the present time are unsatisfactory. It is the purpose of this bulletin to bring together information obtained thus far from these investigations.

DISEASES OF ALFALFA*

Diseases are important factors in the production of alfalfa in Nevada because they reduce both the yield and quality of hay. Many diseases occur in the State, but only those of rather common occurrence will be considered.

BACTERIAL WILT

According to Jones (6) bacterial wilt is the most important disease of alfalfa in the United States. In Nevada it does more damage than all other diseases combined. It is generally distributed over the State, but usually becomes severe only in areas where sufficient irrigation water is available to provide vigorous plant growth throughout the growing season.

The first symptoms of wilt likely to attract attention are a dwarfing and yellowing of the entire plant. Stems are short, leaves are small, yellowish-green in color, often curled upward at the edges, and growth of the entire plant is slow (Figure 3). Such plants are most conspicuous after cutting when the new growth is about 8 or 10 inches tall.

When diseased plants are dug and the roots cut diagonally below the crown a brownish-yellow discoloration is seen just beneath the bark. The discolored wood is also seen when bark is stripped from the root.

The bacteria which cause this disease live in the soil. They may be spread by irrigation water, by wind-blown soil, or soil transported by farm machinery. They may also be spread from infected to healthy plants by the mower sickle or grazing animals.

The only known method of effective control lies in the use of resistant varieties. Various cultural treatments have been investigated for control of the disease, but none have been effective. Some highly resistant varieties have been introduced into the United States from other countries, but they are poor seed producers and are highly susceptible to many of the foliage diseases. Much experimental effort is being directed toward breeding new varieties which will have a high

[4]Numbers in parentheses refer to literature cited at end of bulletin.

*The scientific names of casual organisms are listed on page 14.

degree of resistance to wilt and will also be desirable in other respects. The first fruits from this research effort was the development of Ranger and Buffalo alfalfas to be discussed later in the bulletin. See p. 17.

BACTERIAL STEM BLIGHT

Bacterial stem blight occurs in the central and northern part of the State but its prevalence varies from year to year. It appears on the first crop during cool wet weather following temperatures low enough

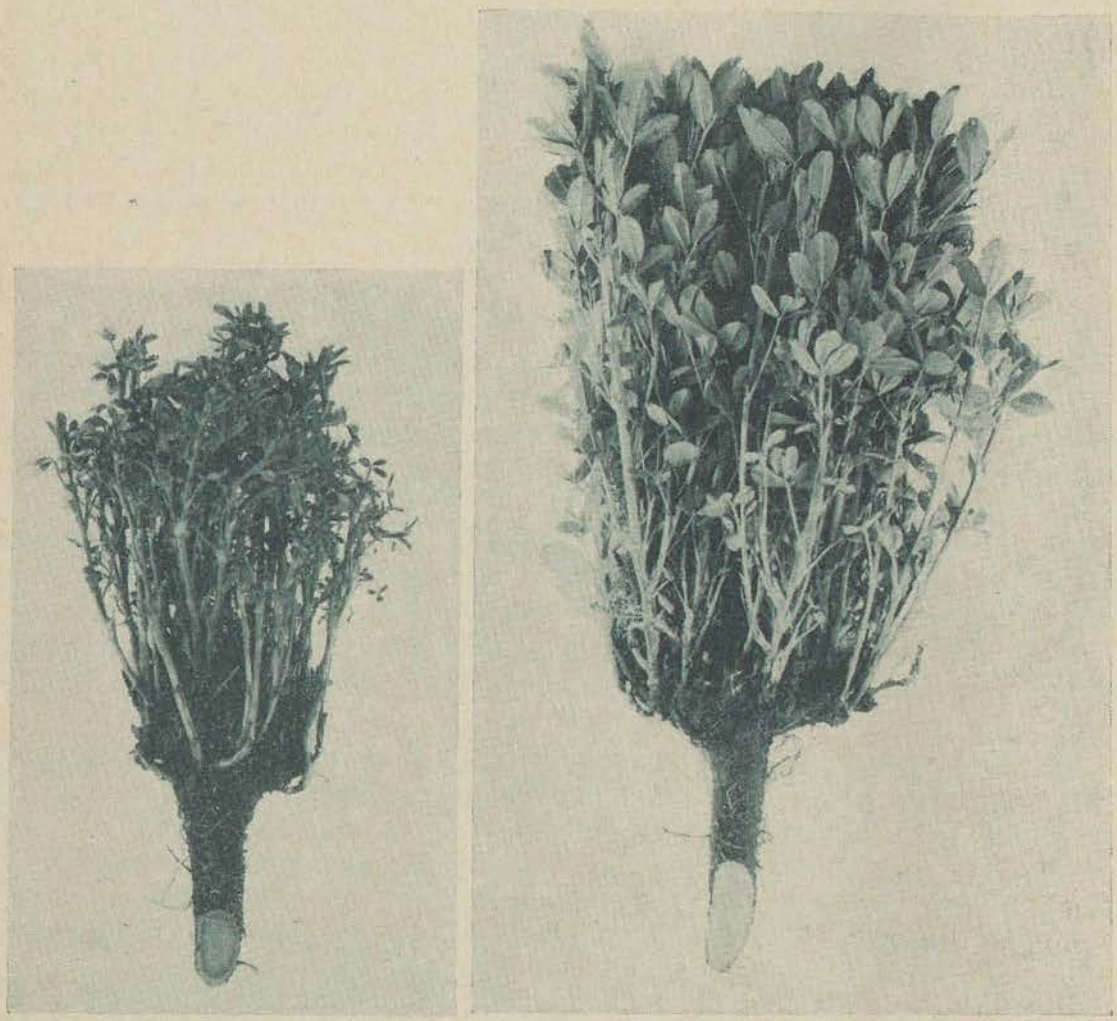


FIGURE 3. Alfalfa Plant with Bacterial Wilt Disease (left), **Healthy Plant** (right). Bacterial wilt causes dwarfing and yellowing of plants. A brownish-yellow discoloration just beneath the bark of the tap root is also characteristic of the disease.

to injure the young stems. Under such environmental conditions, the disease causes a reduction in growth and yield of infected plants.

The disease is primarily on the stems, but it may also occur on the leaves. It is characterized during the early stages of development by olive-green, water-soaked lesions. Stem lesions several weeks old normally become dark brown or nearly black in color. This color is further accentuated by secondary invaders. The black-stem disease organism, page ...., invades practically all old lesions and causes confusion between bacterial stem blight and black stem (7).

Whenever severe damage by bacterial stem blight occurs the alfalfa should be harvested. The new growth will be free from the disease unless the shoots are injured by cold.

CROWN WART

Crown wart occurs in the western part of Nevada but it is not important. The casual fungus invades young crown buds of the plant near the surface of the soil, causing them to grow into irregularly

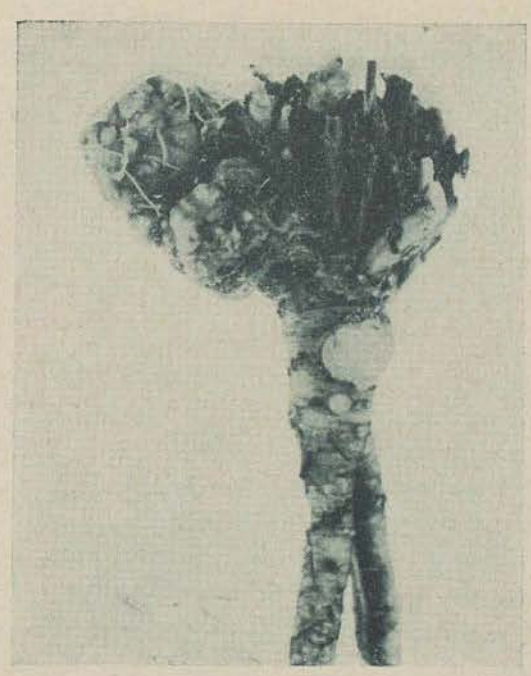


FIGURE 4. Crown of Alfalfa Plant Showing Large Gall Produced by the Crown Wart Fungus.

shaped white galls of various sizes (Figure 4). The galls appear in the spring, mature by early summer, and disintegrate by midsummer.

DOWNY MILDEW

Downy mildew is common on alfalfa in Nevada, but rarely causes severe reduction in yield. In stands over a year old, the disease is confined largely to the first crop on young leaves at or near the top of the plant. Infected areas are usually irregular in outline and may involve more than half of the leaf. The upper side of infected areas is pale green at first, becoming yellow or purple later. Infected leaves are curled downward, and on the underside a fine grayish fungus growth appears. In fall seeded alfalfa infection often develops on the young plants the year of seeding.

LEAF SPOT

This disease is generally present on alfalfa in Nevada but it is seldom destructive. It is most likely to cause defoliation when wind and rain lodge alfalfa and the leaves are kept damp for prolonged periods, thus providing conditions favorable for development of the disease.

Leaf spot is so named because of the circular brown or black spots

on the leaves. At the center of mature spots is a disk which is the fruiting structure of the causal fungus. The fungus lives over winter on undecayed leaves.

Varieties differ in resistance to the disease. Strains of Turkistan origin are usually more susceptible than common or variegated varieties.

YELLOW LEAF BLOTCH

Yellow leaf blotch is seldom important in Nevada. Like leaf spot it will reduce yield and quality of hay by causing defoliation under conditions favorable to disease development.

The disease is characterized by yellow elongated blotches which develop parallel to the direction of the leaf veins. On young blotches, small, orange-colored bodies develop, especially on the upper surface of the leaf. These are the fruiting bodies of the casual fungus and they soon turn brown to black with age. Lesions also develop on the stems, but less commonly than on leaves.

BLACK STEM

Black stem is rarely important in Nevada. The disease develops during cold wet conditions of early spring and late fall, but seldom develops during the summer.

The symptoms of black stem disease are dark brown or black lesions on stems and leaves. Stem lesions first appear as small black spots which enlarge rapidly and sometimes girdle the stem. The blackened areas occur most commonly near the base of affected stems. Leaf lesions first appear as small definitely limited dark brown spots but enlarge to various sizes and shapes. Severely spotted leaves turn yellow and drop from the plant.

ROOT ROT

Root rot occurs on alfalfa in Nevada only in the southern portion of the State where warm summer temperatures are favorable to its development. The causal fungus infects the roots, causes them to decay and eventually kills the plants. Damage varies from year to year but alfalfa stands are often severely injured.

The fungus first infects the bark of the root and gradually works its way into the woody cylinder until the root is rotted through. Wilting of the tops is usually the first sign of root infection and is always preceded by root decay. Infected plants often die within one or two days after the first signs of wilting.

In the field, the disease spreads in all directions from a small localized infection, killing the plants in a well-defined, somewhat circular area. At the margin of this area is a zone of dead and dying plants beyond which are apparently healthy plants (Figure 5). Surviving plants usually have tap roots which have been rotted off and are kept alive by means of one or more normal lateral roots above the decayed portion of the tap root.

Development of the disease is favored by fairly moist soil, but is affected unfavorably by either very dry or very wet soils. It is most severe at relatively high soil temperatures, optimum development occurring about 75° F.

Crop rotation is the most satisfactory method of control, although soil treatments have shown some promise in Arizona (9). Streets recommends that badly infected alfalfa fields should be plowed and planted to nonsusceptible crops for three years. Moderately or slightly infected fields may be treated with ammonium sulphate or manure and the infected areas replanted in the fall. Corn, small grains, sorghums, millet, and all grasses are immune, also asparagus, garlic, and onions. Tomatoes are moderately susceptible (10).

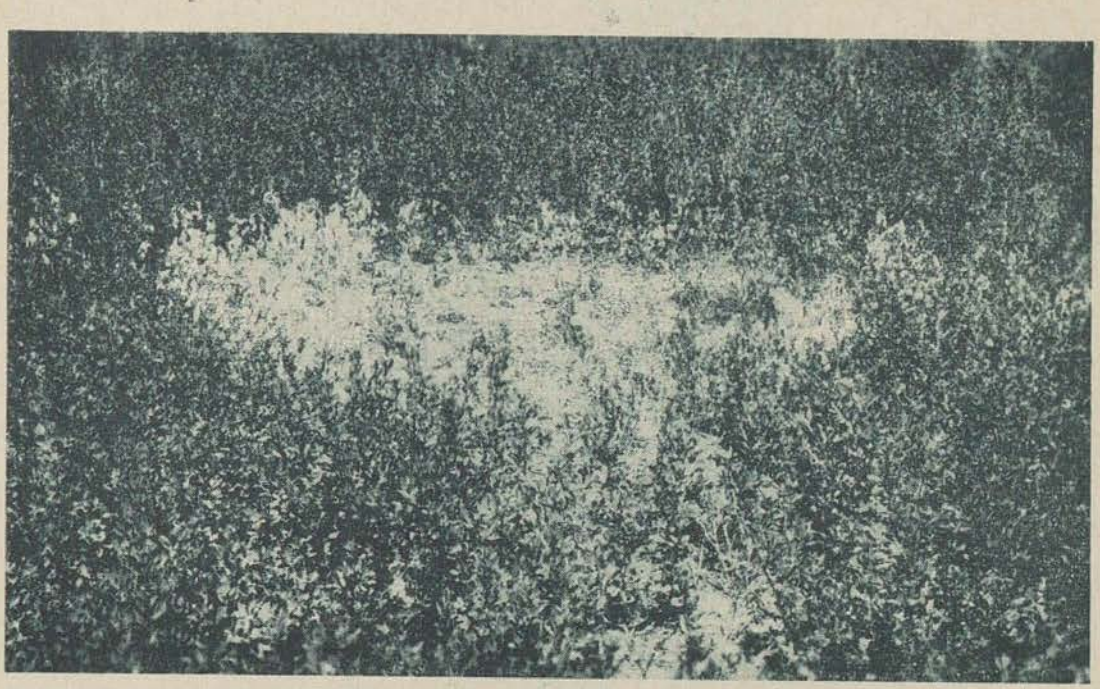


FIGURE 5. A Small Root Rot Area in One-Year-Old Field of Alfalfa near Logandale, Nevada.

STEM NEMATODE

The stem nematode causes injury in some of the important alfalfa producing regions of western Nevada. Damage varies from year to year and may result in a reduced production of hay, or a killing of the alfalfa stand in two or three years. Injury usually is most prominent in the spring and early summer, as moist spring weather apparently favors nematode infection.

Nematode injury is located principally in the crown, affecting the young buds and stem bases. Infected buds become thickened, deformed, and usually do not elongate into stems (Figure 6). Later in the season, particularly where damage has not been severe, infected plants are often dwarfed, have a reduced number of stems, some of which may be yellowed and distorted. Such plants often have stems swollen at the base and dark brown in color. Also they are brittle and easily broken off. Infected shoots sometimes have swollen areas near the tip or at nodes along the stem.

The nematodes which cause this disease may be distributed from infected areas to neighboring fields through the movement of soil and irrigation water. Also they may be transported in infected hay, or in poorly cleaned seed.

Crop rotation is helpful as a means of control (3, 11). Heavily infested fields should be plowed and seeded to other crops for at least two or three years with special care to eliminate all alfalfa and clover plants. Crops suitable for rotation include wheat, corn, barley, potatoes, and grasses.

Control by the use of resistant varieties offers good possibilities. At

FIGURE 6. Alfalfa Plant Infected with Stem Nematodes. Infected buds are swollen, deformed, and usually do not elongate. Stems infected at the base are enlarged, dark brown in color, and easily broken off.

present, Nemastan is the only variety known to be resistant to stem nematode, but this variety is a poor seed producer and does not produce satisfactory hay yields. It is being used in developing an alfalfa having desirable characteristics in addition to resistance to the stem nematode.

ROOT KNOT NEMATODE

Root knot nematode is very prevalent in Nevada. The nematodes live in the soil and attack young fine roots causing galls which appear as small scattered tubercle-like growths (Figure 7). Galls are usually sharply defined, but in some instances affected roots may be decidedly

swollen. Scattered galls may be confused with nodules formed by nitrogen-fixing bacteria. The nitrogen-fixing bacteria galls are usually rare on heavily nematode-galled plants.

The extent of damage to affected plants is not clearly understood at present, but severely affected seedling plants (Figure 7) are stunted in growth. Infection usually is more severe on sandy soils than on heavy soils, and is favored by high soil moisture.

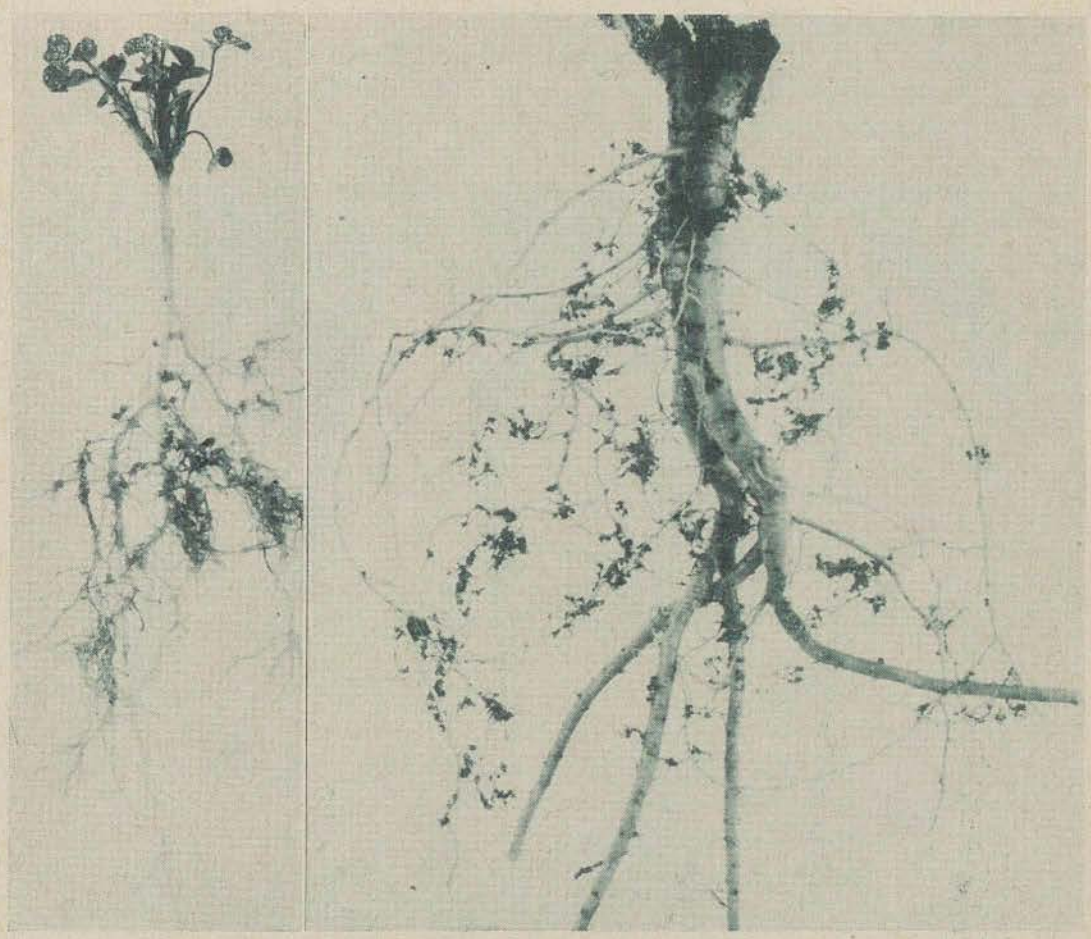


FIGURE 7. Alfalfa Plants Heavily Galled by Root Knot Nematodes. Plants from U. S. Newlands Field Station, Fallon, Nevada. Plant at the left was seeded August 26, 1941, and photographed November 1941.

WINTER INJURY

Winter injury to alfalfa in Nevada is sometimes severe. Fields have been observed where at least 95 percent of the plants were dead from this cause. Injury occurs to plants of all ages but is more likely to kill young stands seeded the previous fall or spring. When injured plants are dug in the spring the upper part of the tap root is found to be dark brown or black (Figure 8), and appears as a collar rot at the base of the crown (15, 16). The injured area usually begins in the crown and extends downward, sometimes a distance of two inches. When injury to the root is shallow, plants recover and eventually slough off the affected tissue, leaving a root surface slightly roughened where the injury occurred. Severely injured stands have always proved to be a nonwinter-hardy variety, but injured plants have been found in cold resistant varieties.

NAMES OF DISEASES AND SCIENTIFIC NAMES OF ORGANISM WHICH CAUSE THE DISEASES OF ALFALFA DISCUSSED

Bacterial Wilt, *Corynebacterium insidiosum* (McC.) Bergey et al.
Bacterial Stem Blight, *Phytomonas medicaginis* (Sack.) et al.
Crown Wart, *Urophlyctis alfalfae* (Lagerh.) Magnus.
Downy Mildew, *Peronospora trifoliorum*, DeB.
Leaf Spot, *Pseudopeziza medicaginis* (Lib.) Sacc.
Yellow Leaf Blotch, *Pseudopeziza jonesii* (Fckl.) Nannf.
Black Stem, *Ascochyta imperfecta*, Pk.
Root Rot, *Phymatotrichum omnivorum*, (Shear.) Duggar.
Stem Nematode, *Ditylenchus dipsaci*, (Kuhn) Filipjev.
Root Knot Nematode, *Heterodera marioni* (Cornu) Goodey.

FIGURE 8. Winter Injury to Young Alfalfa Plants. Plant at extreme left was uninjured; other plants show different degrees of injury.

DESCRIPTION OF VARIETIES

A thorough description of alfalfa varieties in the United States is given in U. S. Department of Agriculture Farmer's Bulletin 1731. (17) Therefore, information given here will be restricted to what is considered of most importance to individuals interested in alfalfa production in Nevada.

COMMON ALFALFA

The common alfalfas are the ordinary, purple flowered, nonpubescent sort. Most of them are from seed which was introduced into California from Chile, South America, about 1850. Common alfalfa grown in Nevada is still often referred to as Chilean or Chilean type.

Through long cultivation under different climatic conditions, regional strains have evolved which differ mainly with respect to cold resistance and growth habit. Usually they are named after the State in which they are commonly grown.

The strains which have developed in the north recover more slowly after being cut than those produced in the south; they go dormant earlier in the fall and are more cold resistant. Those developed in Modoc County, California, Utah, and Kansas, and regions farther north are sufficiently winter hardy for Nevada conditions, but those from the southern regions are likely to suffer serious winter injury in the central and northern part of the State.

Some of the common varieties give high yields until damaged by bacterial wilt or stem nematodes, but none are resistant to either of these diseases.

ARGENTINE ALFALFA

According to Westover (17) "Practically all Argentine alfalfa belongs to the Common group, although several more or less distinct strains have developed as a result of having been grown under widely varying conditions of climate and latitude. Most of the seed brought to the United States is produced south of Buenos Aires where climatic conditions are much less severe than those at a similar latitude in this country and, therefore, are not conducive to the development of a hardy strain. The tests thus far conducted in the United States indicate that some Argentine strains are less hardy and that the hardiest are no hardier than Kansas Common. For this reason Argentine alfalfa cannot be sown with safety any farther north than Kansas alfalfa is known to succeed."

Conflicting reports are received from farmers of Nevada regarding success with Argentine alfalfa. Some report good success and others report losing stands in two or three years after seeding. Strain differences undoubtedly account for some of these results. Since Kansas Common has so far proved hardy enough for winter conditions at Reno it is reasonable to expect that some strains of Argentine will also be hardy enough to stand winter conditions in this general area, whereas, the nonhardy strains will not.

In a single-row nursery of introductions which was seeded on the U. S. Newlands Field Station at Fallon, Nevada, in 1941, the row of Argentine (F. P. I. 142,062) was 100 percent killed during the winter of 1941–1942. That same winter, California Common and Arizona Common growing in field plots were also injured.

Tests elsewhere (4, 14) show that Argentine alfalfa is susceptible to bacterial wilt. This character and the uncertainty of its ability to withstand winter conditions in central and northern Nevada make it advisable not to seed Argentine alfalfa in those areas.

COSSACK

Cossack alfalfa is a cold resistant variety introduced into the United States from Russia in 1907 by the United States Department of Agriculture. It is one of the highest yielding varieties tested in Nevada when free of bacterial wilt and stem nematode.

LADAK

Ladak was imported to the United States from northern India by the United States Department of Agriculture in 1910. It produces a very high yield in the first cutting, which makes it well adapted to areas where there is only sufficient water for one or two crops a year. It is slow to recover after being cut, and goes dormant early in the fall.

In tests in Nevada it has yielded 91 percent as much as Ranger. The variety is susceptible to the stem nematode, but is moderately resistant to bacterial wilt. Under irrigation where wilt damage is severe it will maintain a stand one to two years longer than Grimm.

Foliage of Ladak has proved to be more resistant to freezing temperatures in the spring than the foliage of any other variety tested in Nevada.

GRIMM

Grimm alfalfa was imported to Minnesota from Germany by Wendelin Grimm in 1857. In its early history this alfalfa attracted considerable attention because of its high degree of cold resistance.

In Nevada tests it has been a high-forage yielder unless injured by bacterial wilt, but due to its high susceptibility to this disease it will not maintain full production longer than two or three years where damage from bacterial wilt is severe. It is also susceptible to the stem nematode.

BALTIC

According to Westover (17) "There is no authentic record of the introdution of Baltic alfalfa into this country, although there is no doubt that the original stock came from Europe. The name Baltic was first applied to it in 1906 for the reason that it had been grown for about ten years near Baltic, South Dakota."

Baltic is sufficiently winter-hardy for Nevada conditions, but it has not been grown commercially in the State. In test plots it has yielded well until damaged by bacterial wilt or stem nematodes.

HARDIGAN

Hardigan is a selection from Baltic made at the Michigan State College of Agriculture. The selection was made on the basis of its ability to produce large yields of seed and its adaptation to conditions of northeastern United States.

It has not been grown commercially in Nevada, but in test plots it has yielded less than Baltic. It is susceptible to bacterial wilt and the stem nematode.

HARDISTAN

Hardistan is a strain of Turkistan which gained prominence in Nebraska and was named Hardistan by the Nebraska Agricultural Experiment Station. It is cold resistant and highly resistant to bacterial wilt, but is very susceptible to leaf spot, yellow-leaf blotch, and stem nematode.

In test plots on wilt-infested soil it has yielded 93 percent as much as Ranger over a five-year period and maintained a full stand. It has not been grown commercially in Nevada to any extent, mostly because seed has not been available.

ORESTAN

Orestan is a strain of Turkistan which was imported by the United States Department of Agriculture. In tests by the Oregon Agricultural Experiment Station this introduction did very well and was named Orestan. It is cold resistant, highly resistant to bacterial wilt, but is susceptible to leaf spot, yellow-leaf blotch, and the stem nematode.

In all Nevada tests it has yielded 96 percent as much as Ranger. Mostly because of a scarcity of seed this variety has not been grown extensively in Nevada.

RANGER

As described by Tysdal (12) Ranger is a synthetic variety produced through the cooperative efforts of the Nebraska Agricultural Experiment Station and the Division of Forage Crops and Diseases, United States Department of Agriculture. It may be called a multiple strain variety synthesized from five selections originating from the varieties Cossack, Turkistan, and Ladak.

Ranger alfalfa exhibits considerable variability both in habit of growth and flower color. It is distinctly variegated in flower color, but only occasionally, if at all, are yellow flowered plants observed. The plants differ in habit of growth from decumbent to upright. The variety has a greater rapidity of recovery after cutting than Ladak or Cossack, being about the same as Grimm in this respect.

The outstanding characteristic of Ranger is its high degree of resistance to bacterial wilt. This character enables it to maintain stands much longer than wilt-susceptible varieties where this disease is serious on alfalfa. It is more susceptible to the leaf spot diseases than Cossack or Grimm, but not as susceptible as Hardistan. It is susceptible to the stem nematode.

It is about equal to Grimm in cold resistance. For all Nevada tests it has been the highest-yielding variety.

BUFFALO

Buffalo alfalfa was produced through the cooperative efforts of the Kansas Agricultural Experiment Station and the Division of Forage Crops and Diseases, United States Department of Agriculture (12). It is a selection from an old strain of Kansas Common known to have been grown in Kansas before 1907.

Like all common alfalfa, Buffalo has a bluish-purple flower ranging from a light blue to a reddish purple. When grown by itself it cannot be distinguished from ordinary Kansas Common.

The outstanding feature of Buffalo is its high degree of resistance to bacterial wilt. This character enables it to maintain stands and produce high yields longer than wilt-susceptible varieties.

In Nevada tests, Buffalo has proved to be one of the high-yielding varieties. In tests so far conducted it has produced 95 percent as much as Ranger. But like Ranger it is susceptible to the stem nematode.

NEMASTAN

Nemastan is a strain of Turkistan which was imported by the United States Department of Agriculture. This strain was found to be resistant to the stem nematode in Utah in 1933 and 1934 (2). It was tested

in Nevada in 1941 and 1942 where it attracted attention because of its outstanding resistance to this nematode. In 1943 (13) the United States Department of Agriculture, cooperating with the experiment stations of Nevada and Utah named it Nemastan and increased it for use in nematode-infested areas of these States.

Nemastan is purple-flowered and resembles Common alfalfa. It is upright in growth habit and recovers rapidly after being cut. In tests so far it has been sufficiently winter hardy for Nevada conditions.

Where the stem nematode is not a factor in alfalfa production, Nemastan produces about 83 percent as much as Ranger and therefore is recommended only where the stem nematode is a factor in alfalfa production.

This variety is also resistant to bacterial wilt but not as resistant as some of the other Turkistan alfalfas, such as Hardistan or Orestan.

COMPARATIVE VARIETY TESTS

Since 1940 field tests have been conducted to determine what variety or varieties of alfalfa are best adapted to Nevada conditions. Seedings were made in Churchill, Douglas, Elko, Pershing, Washoe, and White Pine Counties. Hay yields were determined on plots near Reno, and observations only were made on plots located too far from Reno to make harvesting of plots feasible. All harvested plots were cut three times each season. Twenty varieties were used in the tests. All plots were located where an ample supply of irrigation water was assured and on land reasonably well suited for alfalfa hay production.

Because of warmer climate and the presence of the root rot organism in southern Nevada, conditions for growing alfalfa are quite different than in other parts of the State.

Variety test plots were established in 1948 in Clark County, but results are not far enough advanced to make definite variety recommendations possible for that area.

VARIETY TESTS IN CHURCHILL COUNTY

Ten varieties and nine strains were seeded on the U. S. Newlands Field Station, Fallon, Nevada, in August 1942.* Each variety was replicated four times in 5-row plots 5.5 feet wide and 25 feet long.

Yields were determined from 1943 to 1947. Nearly all varieties produced high yields the first and second years, but production began to decline in most varieties in the third-crop year. In the fifth year, some varieties such as Baltic and Arizona Chilean yielded only about half as much as they did in the second year, whereas, Ranger and Buffalo produced 95 percent and 90 percent, respectively, of their second-year production. For the five-year period, Ranger averaged one ton per acre per year more hay than the best wilt-susceptible variety, Grimm. Buffalo yielded 95 percent as much as Ranger for the five years (Table 1).

*Cooperative investigations with F. M. Willhite, Associate Agronomist, Division of Soil Management and Irrigation, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture.

TABLE 1

Comparative yields and estimated percent stand of ten varieties and nine strains of alfalfa grown in field plots on the U. S. Newlands Field Station, Fallon, Nevada. Plots seeded August 21, 1942.

	Tons Per Acre (12% Moisture)						Percent Stand	
Progeny	1943	1944	1945	1946	1947	Average	1942	1947
Ranger	6.24	8.66	8.68	7.87	8.21	7.93	100	100
A172 Nebraska	5.82	8.64	8.73	8.01	8.09	7.86	100	100
A176 Nebraska	5.71	8.59	8.74	7.88	8.07	7.80	100	100
A114 Nebraska	6.25	8.72	8.43	7.61	7.74	7.75	100	100
A115 Nebraska	6.38	8.62	8.67	7.45	7.50	7.72	100	100
Buffalo	5.64	8.56	8.48	7.39	7.71	7.56	100	100
A95 Nebraska	5.57	8.59	8.39	7.46	7.79	7.56	100	100
A147 Kansas	5.94	8.53	8.40	7.38	7.56	7.56	96	94
Hardistan	5.71	8.44	7.82	7.07	7.43	7.29	100	100
A8 Kansas	6.25	8.86	7.70	6.55	7.00	7.27	100	97
Grimm	6.46	8.71	7.48	6.19	6.01	6.97	100	88
Orestan	5.44	7.86	7.42	6.71	7.20	6.93	100	100
A179 Utah	6.51	8.75	7.20	6.08	5.75	6.86	100	85
Kansas Common	6.79	8.88	7.33	5.55	5.40	6.79	100	82
Ladak	6.17	7.54	7.22	6.34	5.90	6.63	100	95
A169 Nebraska	4.67	7.16	7.13	6.59	6.89	6.52	90	90
Arizona Chilean	6.41	8.73	6.25	4.87	4.45	6.14	100	63
Baltic	6.23	8.27	5.96	4.33	4.09	5.78	100	57
Viking	5.46	7.30	5.87	4.88	4.72	5.65	100	92
Significant difference[1] (19:1)	.78	.66	.70	.59	.46	.44		

[1]This means, for example, that in the fifth year the odds are 19 to 1 or greater that Ranger would yield more than any other strain or variety excepting A172 and A176 Nebraska, if the test were repeated.

Thinning of stands, due to bacterial wilt, was the major factor causing reduction in yield after the second year. All varieties had full stands the first and second years and the wilt-resistant varieties, Ranger, Buffalo, Orestan, and Hardistan all had full stands at the end of five years. Stands of wilt susceptible varieties, Baltic and Arizona Common, were reduced 43 percent and 37 percent, respectively, five years after seeding (Table 1). No disease other than bacterial wilt appreciably influenced longevity of stands or hay production during the five-year period nor was there any apparent winter injury to any variety.

VARIETY TESTS IN DOUGLAS COUNTY

In Douglas County, variety test plots were established near Minden on August 26, 1940. Sixteen varieties were replicated four times in plots twenty feet long and approximately four feet wide. The plots were located in an area where bacterial wilt does serious damage to alfalfa.

Hay yields were taken from 1941 to 1945. Nearly all the varieties produced high yields the second year of production, but yields of wilt-susceptible varieties declined rapidly in later years. In the second year of production the highest yielding wilt-susceptible varieties, Cossack, Baltic, Grimm, and Kansas Common, yielded as much as the two best yielding wilt-resistant varieties, Ranger and Orestan. In the fifth year these wilt-susceptible varieties yielded only about one-half as much as Ranger or Orestan. Furthermore, Ranger and Orestan produced about

as much the fifth year as they did the second year, whereas, the above-mentioned wilt-susceptible varieties produced about half as much the fifth year as in the second year (Table 2).

TABLE 2

Comparative yields and estimated percent stands of 16 varieties of alfalfa grown in field plots at Minden, Nevada. Plots seeded August 26, 1940.

Variety	Tons Per Acre (Air Dry)						Percent Stand	
	1941	1942	1943	1944	1945	Average	1941	1947
Orestan	6.48	6.07	5.41	5.32	5.05	5.66	100	93
Ranger	5.61	6.26	5.63	5.18	5.36	5.61	100	94
Hardistan	6.27	5.96	4.87	4.55	4.89	5.31	100	88
Dakota Common	6.39	6.76	5.36	4.25	3.74	5.30	100	61
Cossack	6.55	6.02	4.69	3.37	3.34	4.79	100	17
Kansas Common	6.10	5.81	5.04	3.77	3.17	4.78	100	40
Ladak	5.39	5.97	5.13	3.46	3.94	4.78	100	70
Ladak	5.49	6.01	5.09	3.43	3.75	4.75	100	70
Baltic	6.87	6.51	4.41	2.22	2.56	4.51	100	9
Utah Common	5.48	5.67	4.76	3.44	3.01	4.47	100	21
Calif. Common (South. grown)	6.39	5.13	4.73	3.17	2.82	4.45	100	8
Grimm	6.12	6.35	4.11	1.86	2.28	4.14	100	12
Calif. Common	5.53	5.07	4.41	2.51	2.12	3.93	100	8
Hardigan	6.09	5.83	3.92	1.72	1.87	3.89	100	20
Ariz. Common	5.48	4.96	3.89	2.05	1.90	3.66	100	9
Nevada Common (Minden)	4.60	4.96	3.97	2.07	2.06	3.53	100	6
Calif. Common (Modoc County)	4.50	4.99	4.02	2.14	1.78	3.49	100	6
Significant difference (19:1)	.59	.61	.70	.50	.55	.46		

Thinning of stands due to bacterial wilt was the major factor which caused reduction in yields after the second year. All varieties had full stands for the first two years, but in the third year plants of the wilt-susceptible varieties began to die of bacterial wilt. Four years after seeding, stands of the wilt-susceptible varieties were drastically thinned (Figure 9), and seven years after seeding many were killed, approximately 90 percent, whereas, Ranger, Orestan, and Hardistan had 94 percent, 93 percent, and 88 percent stands, respectively.

Winter conditions of 1941–1942 caused injury to California Common and Arizona Common alfalfas. Spring growth was slow to start and the plants lacked the healthy dark-green appearance of young shoots or uninjured varieties (Figure 10). When injured plants were dug and examined the crown and upper part of the tap roots showed characteristic winter injury as described on page 13. In a nearby hay field which was seeded half to California Common and half to Grimm, the California Common suffered winter injury, was slow to commence spring growth, and many weeds established themselves among the alfalfa plants. The Grimm alfalfa was uninjured, grew vigorously in the spring, and very few weeds became established.

During the period of May 12 to May 19, 1943, freezing temperatures injured top growth of alfalfa in the vicinity of Minden, Nevada. Temperatures as low as 18° F. were recorded. Alfalfa growth was about ten inches high and contrasting differences were noted in the degree of injury to the different varieties. Ladak was the least injured of any

FIGURE 9. 1, Ranger; 2, Grimm; 3, Orestan. Where bacterial wilt damages alfalfa wilt-resistant varieties, Ranger and Orestan, maintain stands longer than wilt-susceptible varieties such as Grimm. Plots seeded on Dangberg farm, Minden, Nevada, August 26, 1940. Photographed September 14, 1944.

FIGURE 10. Winter Injured California Common Alfalfa in Field Plots on Dangberg Farm, Minden, Nevada. Left, Cossack; center, California Common; right, Hardistan. The winter injured variety is slow to commence spring growth, and the foliage lacks the healthy, dark-green appearance of uninjured plants. Photographed April 26, 1942.

variety, only the tops of a few stems were frozen. The foliage of Arizona Common, California Common, and Orestan was severely damaged. Injury to Ranger, Baltic, Cossack, Kansas Common, Hardistan, and

FIGURE 11. Top Growth of Alfalfa Injured by Freezing Temperatures. Left, Grimm; right, Orestan.

Dakota Common was moderate, being comparable to damage to Grimm, as shown in Figure 11.

VARIETY TESTS IN PERSHING COUNTY

The variety test plots in Pershing County were seeded near Lovelock, May 11, 1943. Twelve varieties were replicated five times in plots four feet wide and 25 feet long. Yields were determined the following three seasons. In this area bacterial wilt has not been observed in fields fewer than eight years old and the disease at present is not a serious factor in hay production. Thus, the three-year test was considered sufficient to give the relative yielding capacity of the different varieties in that region.

All varieties except California Common from Modoc County produced high yields for the three-year period. The lower yields in all varieties in the third year was due to a less favorable growing season. All varieties retained a full stand at the end of the three-year test.

The results given in Table 3 clearly show that for this area where bacterial wilt is not a factor in alfalfa production varieties such as Cossack, Baltic, or Ladak yield about the same as Ranger.

VARIETY TESTS IN WASHOE COUNTY

In a few areas in western Nevada including parts of Washoe County bacterial wilt and stem nematodes both injure alfalfa. Bacterial wilt is the more widespread and is more consistant in doing damage, but stem nematode causes severe injury when environmental conditions favor its development. Nemastan is the only variety known to be resistant to the stem nematode and it is also quite resistant to bacterial

wilt. In forage production it is inferior to high-yielding varieties. This variety and seven others were replicated three times in plots four feet wide and 30 feet long on the Nevada Agricultural Experiment Station Farm at Reno, Nevada. The plots were seeded August 20, 1943, and yields determined the three following seasons. Results (Table 4) shows that Nemastan produced about one ton per acre less hay than Ranger or other high-yielding varieties. Neither bacterial wilt nor any other environmental factor thinned the stand of any variety during the three years.

TABLE 3

Comparative yields of 12 varieties of alfalfa grown in field plots near Lovelock, Nevada. Plots seeded May 11, 1943.

Variety	—Tons Per Acre (12% Moisture)— 1944	1945	1946	Average
Ladak	8.08	8.62	7.02	7.91
Ranger	7.48	8.50	7.39	7.79
Baltic	7.71	8.58	6.91	7.73
Kansas Common	7.17	8.52	7.35	7.68
Cossack	7.42	8.19	6.73	7.44
Dakota Common	7.25	8.04	6.99	7.43
Grimm	7.44	8.19	6.62	7.42
California Common	7.19	7.95	7.00	7.38
Arizona Common	6.92	7.68	7.18	7.26
Utah Common	6.76	7.98	6.74	7.16
Orestan	7.13	7.91	6.36	7.13
California Common (Modoc County)	6.35	7.35	6.18	6.39
Significant difference (19 : 1)	.34	.49	.44	.26

TABLE 4

Comparative yields per acre of hay (12 percent moisture) of eight varieties of alfalfa grown in field plots at Reno, Nevada. Plots seeded August 26, 1943.

Variety	—Tons Per Acre (12% Moisture)— 1944	1945	1946	Average
Ranger	5.40	7.33	8.38	7.04
Orestan	5.21	7.47	8.18	6.95
Dakota Common	5.36	7.39	7.17	6.64
Ladak	6.07	6.87	6.58	6.51
Cossack	5.55	7.08	6.74	6.44
Baltic	5.57	6.97	6.25	6.26
Nemastan	4.20	6.30	7.07	5.84
California Common (Modoc County)	5.08	5.86	6.27	5.74

Since none of the high-yielding varieties are resistant to both bacterial wilt and stem nematodes it is desirabe to develop a high-yielding variety which is highly resistant to both diseases. Nemastan is resistant to the stem nematode and selections from that variety are being used as a source of stem nematode resistance in developing an alfalfa which will produce a high yield and be resistant to the stem nematode and bacterial wilt.

Polycross progenies (open-pollinated seed from selected plants grown in isolation with a large number of other selected plants) from Nemastan plants have thus far produced high yields and are resistant to bacterial wilt and stem nematode. Nine of these progenies and the varieties Ranger, Buffalo, and a local strain were seeded in duplicate plots three feet wide and thirty feet long, August 21, 1945. Insufficient seed of the polycross progenies prevented a more extensive seeding at that time.

TABLE 5

Comparative yields and estimated percent stand of nine polycross progenies of selections from Nemastan, two varieties, and one local strain grown in field plots at Reno, Nevada. Plots seeded August 15, 1945.

Progeny	—Tons Per Acre (12% Moisture)—			—Percent Stand—	
	1946	1947	Average	1945	1947
C–89	6.13	8.85	7.49	95	95
N–48	5.86	8.40	7.13	100	100
N–39	5.10	8.26	6.68	100	100
C–84	4.69	8.24	6.47	100	100
C–86	5.10	7.77	6.44	90	80
N–51	4.80	7.56	6.19	100	100
N–35	4.62	7.83	6.23	100	90
N–30	4.71	7.39	6.05	100	100
C–83	4.06	6.77	5.42	92	90
Ranger	4.36	6.07	5.22	95	50
Local Strain (Nevada)	4.73	5.21	4.97	100	50
Buffalo	4.86	4.80	4.83	85	50

The plots were located where heavy infection from stem nematodes and bacterial wilt was very likely to occur. Hay yields (Table 5) determined in 1946 and 1947 show that progenies from all the selections yielded higher than Ranger, Buffalo, or the local strain, and the highest yielding progenies produced as much as any of these varieties have produced in Nevada tests when they were not injured by stem nematodes. The low yields of Ranger, Buffalo and the local strain in this test were due to damage by the stem nematode (Figure 12). At the end of two years these nematode susceptible varieties have approximately 50 percent stands, whereas, nematode resistant polycross progenies have full stands.

SUMMARY OF YIELDS

Yields of all tests are summarized in Table 6. Relative yields based on Ranger as 100 are given in the last column. Ranger was seeded in all tests and was the highest producing variety. Ladak yielded more than Ranger in the three-year test in Pershing County, but for all tests it produced 91 percent as much as Ranger. Buffalo was included in only one test and produced 95 percent as much as Ranger. It maintained a full stand during the five-year test. Dakota Common produced 95 percent as much as Ranger and in the five-year test in Douglas County where bacterial wilt is prevalent it maintained a stand longer than other Common varieties. The southern Commons have proved to be generally inferior to other alfalfas. Orestan and Hardistan yielded 94 and 93 percent, respectively, of Ranger. These two varieties have also yielded less than Ranger in both forage and seed production in other parts of the country and therefore have been practically eliminated as commercial varieties. On the other hand Ranger is being rapidly increased and seed is now available on the market.

SUMMARY

Alfalfa is one of the most important crops in Nevada. Approximately 22 percent of the harvested cropland and 48 percent of the cultivated land in the State are devoted to alfalfa production. Its most important role is that of furnishing feed for livestock.

In the early days of alfalfa growing in Nevada high production of good quality hay was maintained for fifteen to twenty years or longer,

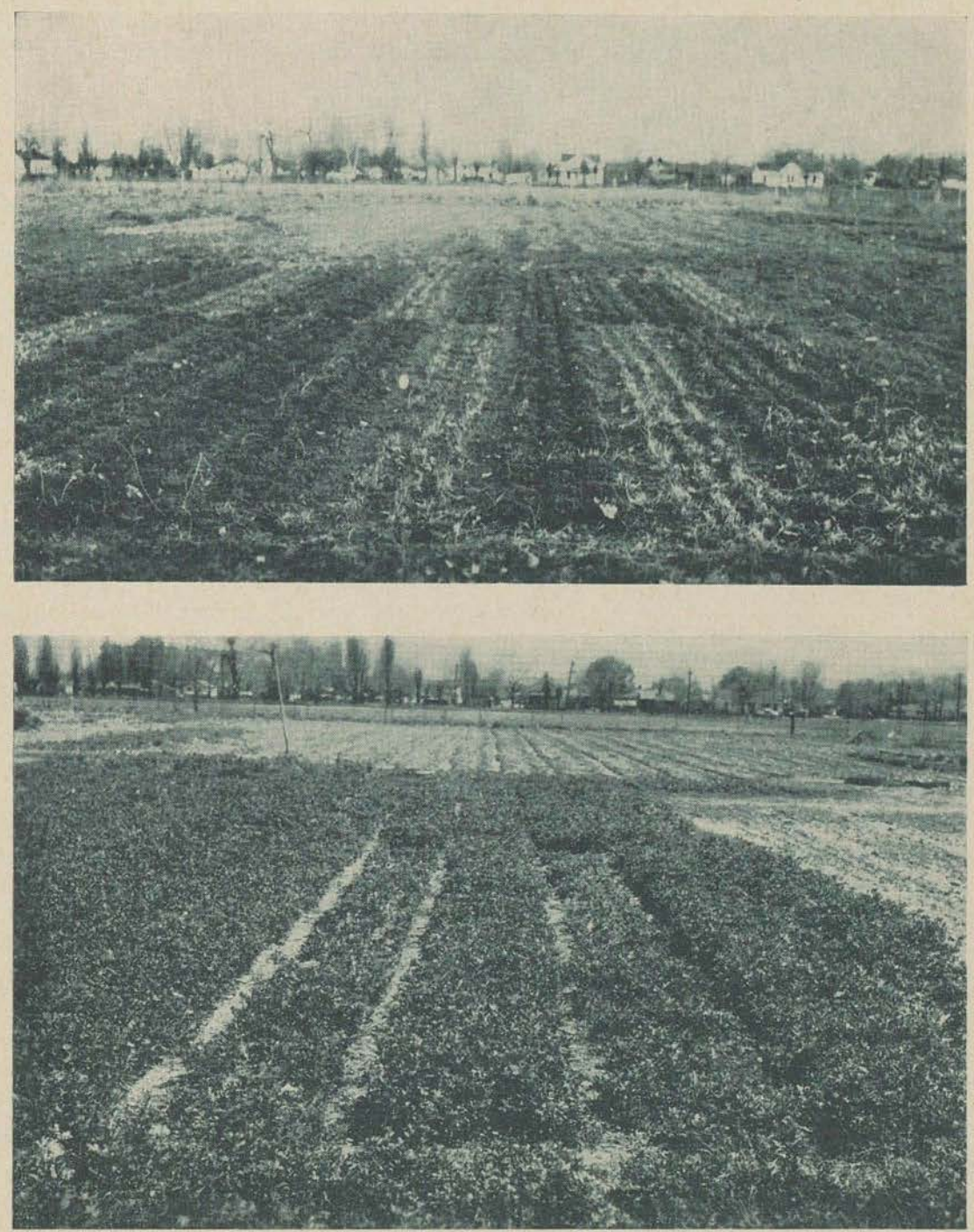


FIGURE 12. The Stem Nematode Checks Spring Growth of Alfalfa and Reduces Yields. Heavily Infected Plants are Often Killed. Above—Plots showing no spring growth, due to stem nematode damage, are Ranger, Buffalo, and a local strain. Other plots are stem nematode resistant polycross progenies of selections from Nemastan. Photographed March 18, 1947. Below—Same as above. Photographed April 7, 1947. Plots seeded August 15, 1945.

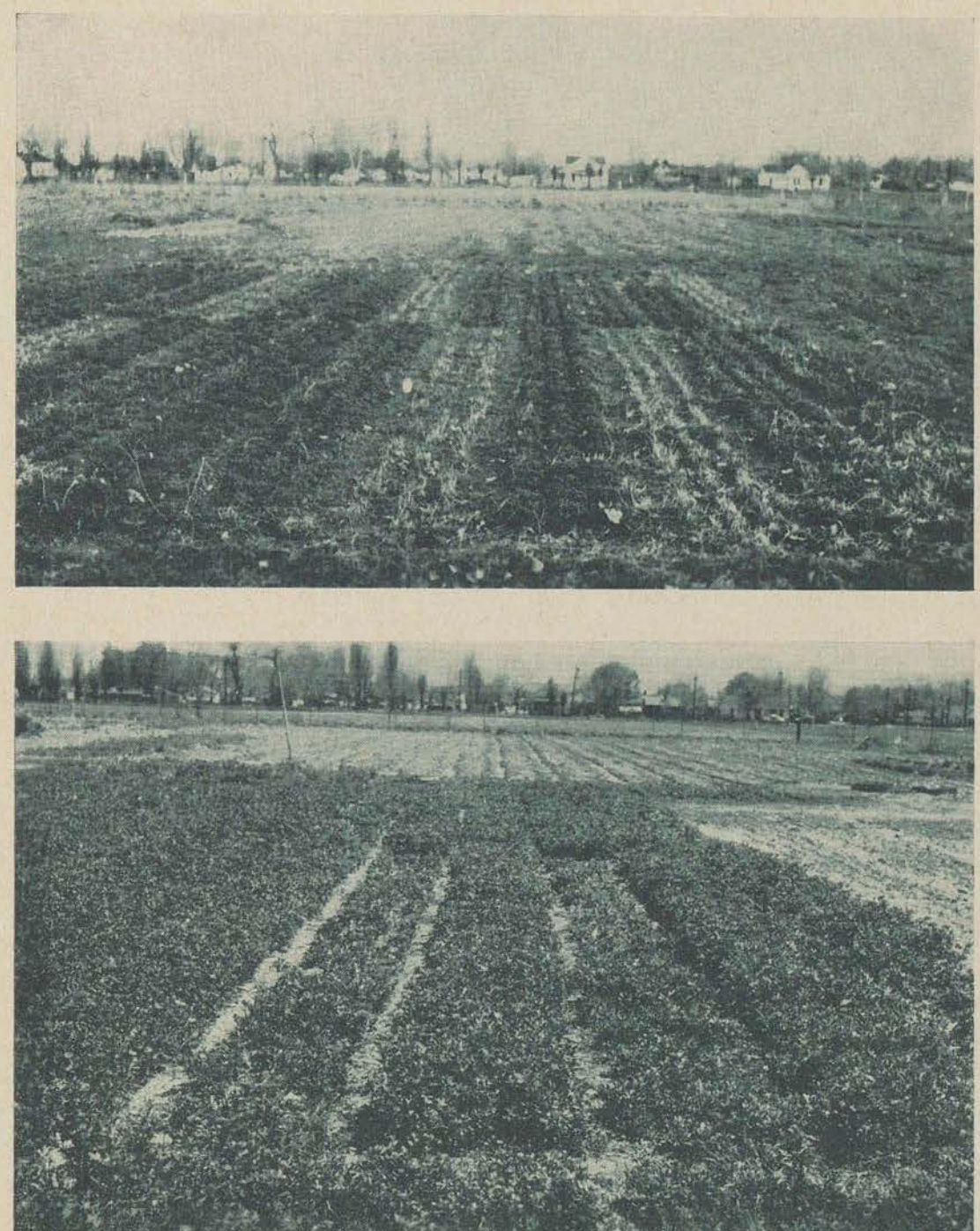


FIGURE 12. The Stem Nematode Checks Spring Growth of Alfalfa and Reduces Yields. Heavily Infected Plants are Often Killed. Above—Plots showing no spring growth, due to stem nematode damage, are Ranger, Buffalo, and a local strain. Other plots are stem nematode resistant polycross progenies of selections from Nemastan. Photographed March 18, 1947. Below—Same as above. Photographed April 7, 1947. Plots seeded August 15, 1945.

but in the early thirties stands in many areas began to thin rapidly three or four years after seeding.

TABLE 6

Summary of yields in tons per acre of alfalfa grown in field plots in Nevada.

Variety	Churchill County, 5 years 1943–1947	Douglas County, 5 years 1941–1945	Pershing County, 3 years 1944–1946	Washoe County, 3 years 1944–1946	Percent of Ranger
Ranger	7.93	5.61	7.79	7.04	100
Buffalo	7.56	.....	.....	.....	95
Dakota Common	.....	5.30	7.43	6.64	95
Orestan	6.93	5.66	7.13	6.95	94
Hardistan	7.29	5.31	.....	.....	93
Cossack	.....	4.79	7.44	6.44	93
Ladak	6.63	4.78	7.91	6.51	91
Kansas Common	6.79	4.78	7.68	.....	90
Grimm	6.97	4.14	7.42	.....	87
Utah Common	.....	4.47	7.16	.....	87
California Common	.....	3.93	7.38	.....	86
Arizona Chilean	6.14	.....	.....	.....	86
Baltic	5.78	4.51	7.73	6.26	85
Nemastan	.....	.....	.....	5.84	83
Arizona Common	.....	3.66	7.26	.....	81
California Common (Southern grown)	.....	4.45	.....	.....	79
California Common (Modoc County)	.....	3.49	6.39	5.74	76
Viking	5.65	.....	.....	.....	71
Hardigan	.....	3.89	.....	.....	69
Nevada Common (Minden)	.....	3.53	.....	.....	63

Several disease organisms affect alfalfa in Nevada, by reducing production and shortening the life of stands. Bacterial wilt is the most widespread and destructive of all the diseases. It occurs in practically all the alfalfa-growing areas of central and northern Nevada and causes severe damage in most areas where sufficient water is available to provide good plant growth throughout the season. Under liberal use of irrigation water, which is favorable to development of bacterial wilt, stands of susceptible varieties often live only three or four years after seeding. The only known means of control is by the use of resistant varieties.

Bacterial stem blight develops in the central and northern part of the State when cool wet weather occurs. Heavily infected fields should be harvested early. The subsequent new growth is usually free from the disease. The stem nematode is present in a few areas of western Nevada and when conditions are favorable for development this eelworm will kill a stand of nematode susceptible plants in two or three years.

Root rot does considerable damage to alfalfa in the southern portion of the State. Severely damaged stands should be plowed and the land seeded to a resistant crop such as a small grain which is resistant to the causal fungus.

Other diseases which occur on alfalfa in Nevada but seldom do appreciable damage are: crown wart, downy mildew, black stem, leaf spot, and yellow leaf blotch. Root knot nematodes occur on alfalfa roots, but the extent of damage to the plant is not clearly understood.

Alfalfa variety test plots have been grown in several counties in the State to determine which varieties are best adapted to Nevada conditions. Results obtained to date warrant the following conclusions: Where bacterial wilt is a serious factor in alfalfa hay production, and the stem nematode is absent the wilt resistant varieties, Ranger or Buffalo should be used. So far Ranger has given a little higher hay production than Buffalo, but both have proved highly resistant to bacterial wilt and have maintained full stands in field plots for eight and five years, respectively. This is the maximum number of years the respective varieties have been under observation and it is not known at present how much longer they will maintain good stands. Orestan and Hardistan are good wilt-resistant varieties, but they have not yielded as well as Ranger or Buffalo, and seed is not available. For areas where neither bacterial wilt nor stem nematodes are factors in hay production, Baltic, Cossack, Grimm, and in some areas Ladak, are equally as good as Ranger or Buffalo. Ladak is recommended for areas where only one cutting during the season is obtained, because of its relatively high yield in the first crop. Of the varieties tested, the top growth of Ladak is the most resistant to freezing temperatures which occur in the spring. In areas where the stem nematode seriously damages alfalfa, Nemastan should be seeded. This variety is highly resistant to stem nematode and is quite resistant to bacterial wilt. Selections from Nemastan are being developed which combine resistance to bacterial wilt and stem nematode with high forage and seed yield.

LITERATURE CITED

1. Allen, M. W.
1942. Report on Nematode Investigations in Western Nevada During the Season of 1942. (Unpublished data.)

2. Evans, R. J.
1948. Letter Correspondence. April 23.

3. Godfrey, G. H.
1923. The Eelworn Disease; A Menace to Alfalfa in America. U. S. D. A. Cir. 297.

4. Grandfield, C. O., and Throckmorton, R. I.
1945. Alfalfa in Kansas. Kan. Agr. Exp. Sta. Bul. 328.

5. Jones, F. R.
1918. Yellow Leaf Blotch of Alfalfa Caused by the Fungus *Pyrenopeziza medicaginis*. Jour. Agr. Res. 13: 302–329.

6. Jones, F. R.
1940. Bacterial Wilt of Alfalfa and Its Control. U. S. D. A. Cir. 573.

7. Rader, William E.
1942. Stem Blight of Alfalfa in Utah. A Complex of Two Distinct Diseases. Masters Degree Thesis, Utah State Agricultural College.

8. Rogers, C. H.
1938. The Relation of Moisture and Temperature to Growth of the Cotton Root Rot Fungus. Jour. Agr. Res. 58: 701–709.

9. Streets, R. B.
1938. Control of *Phymatotrichum* (Cotton or Texas) Root Rot in Arizona. Ariz. Ext. Cir. 103.

10. Taubenhaus, J. J. and Ezekiel, Walter N.
1936. A Rating of Plants with Reference to Their Relative Resistance or Susceptibility to *Phymatotrichum* Root Rot. Texas Agr. Exp. Sta. Bul. 527.

ALFALFA SEED PRODUCTION COMMITTEE REPORT

Committee: Louie A. Gardella
Charles R. York
William N. Helphinstine
Lynn H. Davis
Advisor: L. G. Jones, Davis, California

Alfalfa seed production has been carried on for a considerable time in Nevada but not highly developed and production has decreased in recent years. Considerable acreage in Nevada is adaptable to seed production. Damaging insects are present in all areas in Nevada and polinating insects are generally present in all areas. Factors of production are controllable and are as follows:

1. Flowers must be tripped and pollinated and beneficial insects (bees) must be present to do this. The tripping and cross pollination is effected ninety to ninety-five per cent by bees.

2. Harmful insects must be controlled. Lygus is the outstanding damaging insect to production of alfalfa seed but also thrips, grass thrip, particularly seed chalcid, grasshoppers, weevil, aphids, (nematode) and others also cause damage. Most effective control for lygus is DDT at about one pound per acre applied either as a dust (5%) or spray with sufficient water to spray foliage well. First application to be at ten per cent bloom before bees are brought into the field. If control is not effected and numbers build up to damaging stage, dusting should be repeated. One nymph per sweep is sufficient to cause damage.

3. Control of weeds. Weeds affect available water supply for plants and lower production. Weeds to be controlled by any method applicable to area (spraying with oil, and cultivation, or hand weeding).

4. Harvesting - (More lack in harvesting than any other factor). Most satisfactory method is windrowing and thrashing with a pickup combine. Combining of standing crop is satisfactory if pickup reel is attached to combine. This method is recommended where wind and other factors make it advisable. Seed should be dried, if not, germination will be reduced. (Heat for twenty-four hours lowers germination of seed). (Six inches deep in drying shed).

All factors of good culture apply to alfalfa seed production. Plant should be maintained in healthy growing conditions at all times.

Row planting will generally give greater production than broadcasting. (Plant in rows thirty-six to forty-four inches and made to fit machinery available). Seeding rate one to two pounds per acre in rows and if close drilled, ten pounds.

Irrigate when necessary to keep plant in healthful condition. Soil is not a big factor as long as alfalfa plant makes satisfactory growth.

To grow seed, seedlings should be made from registered or foundation seed.

Recommended varieties include: Ranger, Ladak, and Cossock for most all of Nevada.

ALFALFA SEED COMMITTEE

/s/ Louie A. Gardella
Louie A. Gardella, Chairman

ALFALFA WEED CONTROL, FOR HAY PRODUCTION
COMMITTEE REPORT

Committee: Louie A. Gardella
Charles R. York
William N. Helphinstine
Lynn H. Davis
Advisor: L. G. Jones, University of California
at Davis, California.

Annual weed control for established stands of alfalfa does not seem profitable or practical in Western Nevada under present prices and uses of alfalfa as costs are considered too high. When production drops too low due to reduced stands and annual weeds are numerous, it is suggested that the stands be plowed and the fields reseeded.

For control in seedling alfalfa, it is suggested that the fields be mowed and spot sprayed with either Dinitro and oil or 2,4D. Application rates of oil thirty-five to forty gallons and one quart of sinox plus enough water to make mixture up to one hundred and forty to one hundred and fifty gallons per acre.

Weed control is necessary where seed production is carried on.

ALFALFA SEED COMMITTEE

/s/ Louie A. Gardella
Louie A. Gardella, Chairman

NOTES ON TALK BY LUTHER JONES ON ALFALFA WEED CONTROL, BY F. BATCHELDER

No one method of weed control does the whole job. Using all chemical control is just as bad as not using any chemicals.

Cultivation is one of the cheapest methods where it can be used.

Other methods are:

1. Rotation of crops.
2. Moving
3. Roguing or hand weeding
4. Sanitation. More than 90% of all noxious weeds were introduced in the seed or by irrigation water.

WEED CONTROL IN SEEDLING ALFALFA

Use selective spray. The best time is when weeds are in 2 to 5 leaved stage and alfalfa is in an early stage.

Dow Selective and Sinox Selective have given best results so far. Use according to directions on can. Generally 20 to 40 gallons total spray per acre by plane and 40 to 150 gallons by ground rig. Mixtures consist of 4 to 8 pints selective spray in diesel oil.

Increase dosage in fair weather, dense stands or large weeds. Don't use above 85° F. and have plenty of soil moisture.

Cost ranges from $7.00 to $10.00 in California.

ESTABLISHED STANDS

Diesel oil and the Dinitros of Dow or Sinox General type. It is almost impossible to kill alfalfa with this. Even 320 gallons per acre only slowed up recovery, and did not hurt stand.

It kills both weeds and annual grasses and also perennial grasses that are so young they haven't stooled.

35 to 40 gallons of oil, plus 1 quart Dinitro is standard mixture. For dense stand of weeds add water, for increased foilage increase oil.

Dry weather and dry soil makes it harder to kill weeds.

NEW CHEMICALS

PCP (Pentachlorophenol) is being used to reinforce oil or take its place. Use 5 lbs. PCP to 10% oil and 90% water. (cheap and available.)

Weed-killing oils put out by oil companies are good but expensive. We must find a substitute for oil because there isn't enough oil to go around for many years.

IPC is effective on grass but is still in short production and very high. 3 lbs. applied dry per acre before germination or after germination mixed in water shows good results. Alfalfa and clover was not affected by 4 lbs. per acre so it may have a place in grass control on ditches. It is not effective on water grasses.

TCA (Trichloroacitate) is something like IPC but doesn't seem to be as good.

RECOMMENDATIONS FOR WEED CONTROL RESEARCH IN NEVADA

1. Soil treatment before planting
   pre-emergence, contact, residual post emergence

2. Control of poisonous plants such as Larkspur and Halogeton.

3. Control of deep rooted perennials such as Knapweed, Canadian Thistle, Whitetop, Iris.

4. Weeds in established stands of alfalfa.

5. Control of rabbit brush and related species by air.

6. Collect and disseminate all information as it becomes available.

Committee Recommendations
January 13, 1949

By County Agents Weed Committee
Fred Batchelder, Chairman
Charles R. York
Mark W. Menke
Archie Albright
John Wittwer

WEED CONTROL EQUIPMENT ON DISPLAY WAS:

1. University of Nevada Extension Service Power Takeoff Tractor Mount on an International Model H. Tractor, owned by the Nevada Agricultural Experiment Station.

2. University of Nevada Extension Service, Skid Mounted, Gas Engine, weed or livestock sprayer capable of developing over 200 pounds pressure and delivering 3 GPM, owned by University of Nevada Extension Service.

*3. Spray Rite PTO Sprayer, Model 300, for Ford and Ford Ferguson Tractors.

4. Hydro Speed Sprayer for Ford or Ford Ferguson Tractors.

5. Gustafson Duster made of aluminium for use of Ford Tractor. (Suitable for row crop, alfalfa weevil, alfalfa or clover seed production).

6. Teejet Spray Nozzles made by Spraying Systems Co., Bellwood, Illinois.

* The manufacturer is making up outfits like this for John Deere Model M, Case, International and the Oliver Tractors.

NEVADA CROP REPORT - ANNUAL SUMMARY, 1948.
(Issued December 27, 1948 BAE)

Some data for years prior to 1948 have been revised. The 1948 figures are subject to revision.

Crop and Year	Acres harvested	Yield per acre: Tons	Yield per acre: Bushels	Production: Tons	Production: Bushels
Winter wheat:					
Average 1937-46	5,000	.84	28.0	3,930	131,000
1947	6,000	.81	27.0	4,860	162,000
1948	6,000	.78	26.0	4,680	156,000
Spring Wheat:					
Average 1937-46	13,000	.79	26.4	9,870	329,000
1947	15,000	.90	30.0	13,500	450,000
1948	16,000	.93	31.0	14,880	496,000
ALL WHEAT:					
Average 1937-46	17,000	.80	26.8	13,800	460,000
1947	21,000	.87	29.1	18,360	612,000
1948	22,000	.89	29.6	19,560	652,000
Oats:					
Average 1937-46	7,000	.63	39.3	4,288	268,000
1947	8,000	.66	41.0	5,248	328,000
1948	9,000	.66	41.0	5,904	369,000
Barley:					
Average 1937-46	18,000	.35	35.3	15,192	633,000
1947	20,000	.89	37.0	17,760	740,000
1948	22,000	.89	37.0	19,536	814,000
Corn, all (in terms of grain):					
Average 1937-46	3,000	.88	31.4	2,436	87,000
1947	2,000	.90	32.0	1,792	64,000
1948	2,000	.76	27.0	1,512	54,000
ALL GRAINS:					
Average 1937-46	45,000	.79	32.2	35,716	1,448,000
1947	51,000	.85	34.2	43,160	1,744,000
1948	55,000	.85	34.3	46,512	1,889,000
Potatoes:					
Average 1937-46	2,700	.56	186	15,060	502,000
1947	2,300	.63	210	14,490	483,000
1948	1,500	.60	200	9,000	300,000
Alfalfa hay:					
Average 1937-46	108,000	2.41	- -	261,000	- - - -
1947	108,000	2.70	- -	292,000	- - - -
1948	106,000	2.60	- -	276,000	- - - -
All tame hay, including alfalfa					
Average 1937-46	162,000	2.04	- -	331,000	- - - -
1947	171,000	2.23	- -	381,000	- - - -
1948	171,000	2.15	- -	367,000	- - - -
Wild Hay:					
Average 1937-46	244,000	1.05	- -	256,000	- - - -
1947	259,000	1.10	- -	285,000	- - - -
1948	267,000	1.05	- -	280,000	- - - -
ALL HAY:					
Average 1937-46	406,000	1.45	- -	587,000	- - - -
1947	430,000	1.55	- -	666,000	- - - -
1948	438,000	1.48	- -	647,000	- - - -
Onions:					Unit
Average 1937-46	320	- -	514	161,000	50-lb sacks
1947	550	- -	600	330,000	"
1948	400	- -	550	220,000	"

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics
Office of Agricultural Statistician, 474 Federal Building, Salt Lake City, Utah.

WINTER WHEAT REPORT - DECEMBER 1, 1948.

In NEVADA 6,000 acres of winter wheat was planted in the fall of 1948 for harvest in 1949, all on irrigated land. This is about the same acreage as in the preceding two years. As of December 1, 1948, the indicated yield per acre on this planted acreage for harvest in 1949 was 24 bushels, compared with 26 bushels for 1948 and 27 bushels for 1947. Production in 1949 is indicated at 144,000 bushels, compared with 156,000 bushels in 1948 and 162,000 in 1947.

State	1937-46	1948	1949	1937-46	1948	1949
	Thousand Acres			Thousand Bushels		
NEVADA. . . .	5	6	6	131	156	144

LIST OF PUBLICATIONS OF INTEREST TO COUNTY AGENTS

"Distribution of the varieties and classes of wheat in the U.S. in 1939." USDA Cir. 634

"Classification of wheat varieties grown in the U.S. in 1939." USDA Tech. Bulletin 795.

"Classification of barley varieties in the U.S. 1944."USDA

"Portable Seed Cleaners"- California Extension Circular

"California Agriculture"- Publications Office, Univ. of Calif., Berkeley, Calif.

"Farm and Home Science"- Utah Agric. Experiment Station, Logan, Utah.

"Crops & Soils"- American Society of Agronomy, One year $3.00, 1910 Monroe St., Madison, 5, Wisconson.

"The Grazier"- E. R. Jackman, Oregon State College, Corvalis, Oregon.

"Weeders' Readers," Rex Warren, Oregon State College, Corvalis, Oregon.

"Diagnosis and Improvement of saline and alkaline soils." U.S. Regional Salinity Laboratory, Riverside, California.

"How to Treat" Free of charge - write Editor, Du Pont, Agricultural NEWS Letter, Wilmington 98, Delaware.

A P P E N D I X

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF NEVADA

UNIVERSITY OF NEVADA
AGRICULTURAL EXTENSION DIVISION
AND
U. S. DEPARTMENT OF AGRICULTURE
COOPERATING

EXTENSION ADMINISTRATION OFFICE
UNIVERSITY OF NEVADA
RENO, NEVADA

61 1

Intraservice Letter

March 13, 1946

To - All Agricultural Agents
From - Thomas E. Buckman, Assistant Director for County Agent Work
Subject - Suggestions for a DDT dusting demonstration to increase alfalfa seed production (for control of Lygus bug)

Circular Letter No. 29

Dear Agent: --

I wish to suggest that you seriously consider one or more DDT dusting demonstrations to increase alfalfa seed production, if any alfalfa seed is produced in your county or district. Rather remarkable results were secured in several states in 1945.

Enclosed you will find copies of data I have accumulated that will tell you how to do the job. I can furnish you with as many additional copies of the enclosures as you desire.

It appears that very good control of Lygus bug can be obtained by a single application of a 5 or 10 percent DDT in phrophyllite, preferably the latter, at the rate of 20 pounds per acre, just as the first blossoms are beginning to open.

In discussing alfalfa seed production with Dr. O. F. Smith, I have learned that last summer, (1945) he secured remarkable results in alfalfa seed production by dusting his alfalfa seed plot on the University campus, with 10 percent Technical Grade DDT in phrophyllite. Using a small hand duster to dust an area 60 by 90 feet, Dr. Smith secured 45 pounds of seed from this small area. Nothing at all was harvested from the balance of Dr. Smith's seed plot, which was about 3/4 of an acre in size, that was not dusted with DDT. The yield, secured on the dusted portion of the plot was at the rate of 360 pounds of alfalfa seed per acre.

Dr. Smith's results alone are sufficient to indicate to me that this would be a very good test and demonstration for Nevada county agents to try out in 1946, even if results in other states were not just as convincing.

Circular Letter No. 29
March 13, 1946

In nearly every community you will find someone who is interested and experienced in raising alfalfa seed. Find this man in your county and he will be the one for you to work with. If you do dust an area for a test and demonstration, you should locate it so the straw can be burned following threshing.

According to the 1945 census report, Nevada had over 1000 acres of alfalfa harvested for seed production. Acreage production was 138 lbs. per acre. 79 farms reported seed production. Many other Nevada farmers undoubtedly tried alfalfa seed production, but failed. In most cases, failure was caused by prevalence of the Lygus bug which punctures the tender growing or fruiting parts of the alfalfa by puncturing the tissues, causing "blasted buds", excessive flower fall, and brown, shriveled, worthless seeds.

Alfalfa has been known to yield 1200 to 1300 pounds of seed per acre. Such yields probably have resulted from a desirable combination of weather, no Lygus bugs, alfalfa weevil or other such pests and a great many beneficial insects to trip flowers at the right time.

In 1940, Nevada farmers harvested 1461 acres of alfalfa seed with an average production of 138 lbs. per acre. Compared to Dr. Smith's yield on the University campus estimated at 360 lbs. per acre and yields secured in other states (read enclosures) makes it look like dusting with DDT will be a great aid to alfalfa seed production.

But it should be remembered that alfalfa fields can blossom profusely and still not produce a seed crop, due to absence of beneficial insects and that destruction of harmful insects such as the Lygus bug, alone will not insure seed crops.

If you decide to put on a DDT alfalfa seed dusting demonstration in 1946, you should locate your DDT and equipment soon, so you will have it on hand when you need it.

The NACO Manufacturing Company, 7631 Roseberry Avenue, Huntington Park, Los Angeles, California, are putting out a powerful hand duster that you could use in this and other DDT and dust insecticides. If interested, write for the description and cost of the Root duster.

The CHEMURGIC Corporation, Richmond, California, can supply 10% Technical Grade DDT in pyrophyllite, delivered to Reno at $13.75 per hundred pounds.

In case you are interested in other DDT mixtures, this company can supply the following in 50 pound bags:

50% DDT Concentrate in Solution
50% Wettable Dust
17% DDT in Sulphur Wettable Spray
5% DDT 25% Sulphur in inert carrier
5% DDT in Sulphur 85% inert carrier
5% DDT Dust
2% DDT in Sulphur

Very truly ~~yours~~,

THOMAS E. BUCKMAN
Assistant Director for
County Agent Work

Enclosures:

1. Bugs of the Genus Lygus Affecting Alfalfa.
2. Henet Valley (California) and Palo Verde Valley (California) Yield Summary Alfalfa Dust with DDT for Lygus Control and Letter, N. L. McFarlane to Thomas E. Buckman.
3. Letter re C. M. Packard to Thomas E. Buckman
4. Summary 1945 Experiment with DDT for Control of Alfalfa Seed Insects, Delta, Utah, (F. B. Lieberman)
5. Experiments with DDT, Sabadilla, and Pyrethrun (by F. B. Lieberman) May 1945. E-658

Copies to:

County Farm Bureau Presidents and Secretaries, AAA County Chairmen.
Dr. O.F. Smity, U. of N.

CO-OPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS

STATE OF CALIFORNIA
Riverside County
Room 7, Post Office Building
Riverside, California
February 20, 1946

Mr. Thomas Buckman,
Agricultural Extension Division
University of Nevada
Reno, Nevada

Dear Mr. Buckman:

Attached you will find two mimeographs which we prepared for use in this county showing the effect of DDT on controlling Lygus in alfalfa for seed. The total acreage represented in the two reports is probably about 350 acres. In the Palo Verde Valley, the dust was flown on by plane; in the Hemet Valley the dust was put on with a Howery-Berg duster attached to a Farm-All tractor.

The Lygus counts in the fields at Hemet, on the average, were not as high as they were in the Palo Verde Valley. We believe that the higher Lygus count in the Palo Verde Valley accounts for the greater yield on the DDT treated area in the Palo Verde Valley. Each of the fields in these two reports were checked before and after the dusting by entomologists from the University of California.

I was responsible for the collecting of seed yields from the treated and untreated parts of the fields. In most cases, we divided the field in half and dusted half of the field and left the other half undusted. I rode the combines or was at the thrasher and followed the seed through the cleaning plant so that I believe that the seed yields are correct.

Very sincerely,

N. L. McFarlane
County Agent
U.S.D.A.

MLM:lj

12-17-45

Hemet Valley
Yield Summary Alfalfa Dusted
with DDT for Lygus Control

Alfalfa dusted with 30 pounds 5% DDT dust by ground duster unless otherwise noted.

Bedded Alfalfa

	Pounds Yield in Clean Seed per Acre			
	Check		DDT	Increase or Decrease
Burkhardt Ranch	147.1		248.6	101.5
Chas. Granger (home)	148.1		326.2	178.1
Chas. Granger (bean ranch)	194.6		297.0	102.4
Hickey Ranch	201.7		210.1	8.4
Leland Houk (home)	98.7		180.4	81.7
Leland Houk (pump)	78.9		88.3	9.4
Leland Houk (E. of shop)	140.3	(S)	119.6	20.7
Leland Houk (E. of shop)	140.3	(N)	188.0	47.7
M. A. Perry	295.6		349.8	54.2
Average	161.2		223.1	61.9

Row Alfalfa

Hickey Ranch	149.4	267.9	118.5
M. A. Perry (1 year old)	138.6	181.4	42.8
M. A. Perry (5 year old)	174.4	275.8	101.4
Average	154.1	241.7	87.6
Average of All	159.4	227.7	68.3

Prepared by
N. L. McFarlane
County Agent
Room 7, Post Office Building
Riverside, California

PALO VERDE VALLEY
YIELD SUMMARY ALFALFA DUSTED WITH DDT FOR LYGUS CONTROL

30 lbs. DDT Dust per ac.		Lbs. Clean Seed Per Ac.			% Increase
	Strength	Check	DDT	Increase	
Allied Farms	5%	158.8	267.2	108.4	68.26
R. H. Ehlers	5%	376.7	500.3	123.6	38.81
Wm. Evje	5%	302.1	489.5	187.4	62.03
J. C. Freeman (a)	5%	227.8	300.1	72.3	31.73
J. C. Freeman (b)	5%	136.5	183.4	46.9	34.35
A. H. Gaymen	5%	300.5	479.6	179.1	59.60
Geo. T. Scott	5%	133.5	176.6	43.1	32.28
Geo. T. Scott	3%	133.5	177.4	43.9	32.88
John L. Thomas	3%	85.0	99.4	14.4	16.94
John L. Thomas	5%	85.0	118.4	33.4	39.29
John L. Thomas	10%	85.0	105.9	20.9	24.58
Fred J. Toole	3%	171.3	252.8	81.5	47.57
Fred J. Toole	3%	181.5	360.4	178.9	98.56
Fred J. Toole	5%	181.5	428.8	247.3	100.36
Fred J. Toole	10%	181.5	385.9	187.2	100.26
		2740.2	4325.7		
Average		182.6	288.3	105.7	
% Increase		57.88%			

10% Sabadilla	Lbs. Dust per acre	Check	Sabadilla	
J. C. Freeman (B)	63	136.5	169.5	≠ 33.0
Fred J. Toole (A)	40	255.7	260.8	≠ 5.1
R. S. Williams	52	273.5	251.9	- 21.6
		665.7	682.2	
	Average	221.9	227.4	5.5

Prepared by N. L. McFarlane, Agent
Room 7, Post Office Building,
Riverside, California

PALO VERDE VALLEY
Comparison Cleanout and % No. 1 Seed
of Alfalfa Dusted With DDT for Lygus Control

		% Cleanout		% No. 1 Seed	
		Check	DDT	Check	DDT
Allied Farms		40.81	34.33	91.05	91.95
R. H. Ehlers		16.10	21.73	96.36	96.01
Wm. Evje		11.85	10.46	95.76	90.74
J. C. Freeman	A	18.34	20.71	92.80	93.16
J. C. Freeman	B	22.28	21.73	90.48	91.29
A. H. Gaymon		28.70	3.63	97.97	93.74
Geo. T. Scott	5%	21.18	11.87	85.60	98.35
Geo. T. Scott	3%	21.18	24.88	85.60	97.66
John L. Thomas	3%	23.04	22.57	84.55	85.96
John L. Thomas	5%	23.04	19.14	84.55	84.32
John L. Thomas	10%	23.04	20.20	84.55	90.60
Fred J. Toole	3%	31.44	11.38	84.11	87.15
Fred J. Toole	3%	23.46	14.86	88.26	89.52
Fred J. Toole	5%	23.46	14.60	88.26	83.52
Fred J. Toole	10%	23.46	15.79	88.26	87.45
Total		351.38	267.88	1338.16	1361.42
Arith. Average		23.42	17.85	89.21	90.76
Difference		5.57%		1.55%	

Difference not large enough to be significant.
Cleanout may border on a significant difference.

Prepared by N. L. McFarlane, Agent
Room 7, Post Office Building, Riverside,
California.

10/15/45

February 25, 1946

The following statement from McGraw-Hill Book Company, Second Addition, 1939, New York, is of interest in connection with dusting alfalfa seed plots with DDT for lygus control.

Thomas E. Buckman, Assistant Director for
County Agent Work

BUGS OF THE GENUS LYGUS AFFECTING ALFALFA

IMPORTANCE AND TYPE OF INJURY. - Several species of Lygus injure the tender growing or fruiting parts of alfalfa by puncturing the tissues with their piercing-sucking mouth parts to obtain food. In addition to the physical injury a toxic reaction upon the plant cells near the puncture apparently results from their feeding. In alfalfa, the feeding of Lygus bugs causes "blasted" buds, excessive flower fall, and brown shriveled worthless seeds. In many western areas the species Lygus hesoerus constitutes approximately 80 per cent of the Lygus population on alfalfa - producing seed. Alfalfa seed fields often fail to produce a profitable crop due to the damage caused by these bugs.

PLANTS ATTACHED. - These species of Lygus are general feeders and are found on many herbaceous plants and also on trees. The cultivated crops damaged in the western and southwestern states are alfalfa, cotton, beans, and probably sugarbeets grown for seed. Weed hosts include winter mustard, lamb's quarter, mare's-tail, and slim aster.

DISTRIBUTION. - The species of Lygus considered here occur throughout the Rocky Mountain and Pacific states.

LIFE HISTORY, APPEARANCE, AND HABITS. - In most regions these species of Lygus pass the winter as adults in hibernation, but in warmer climates the adults can be swept from plants all winter. Eggs and nymphs have been found in southern Arizona in all months except December. At an average mean temperature of 85.5°F. the egg stage requires about 8 days, the five nymphal instars about 11 days. A generation requires from 20 to 30 days in the summer under the climatic conditions of Arizona. The adults (Fig. 297) are about $\frac{1}{4}$ inch long by 3/32 inch broad, flattened, oval, and show a variation in color, from pale greenish to yellowish brown. Eggs are found in the flowers, buds, bracts, nodes, and internodes. The egg is slightly curved, elongated, and bears a lid on its truncated apex. When the nymphs first hatch they are very pale green and have an orange spot on the middle of the abdomen. Shortly after feeding begins, they become darker green in color and the third, fourth, and fifth instars have four noticable black spots on the therax.

CONTROL. - As yet no fully satisfactory control has been developed for the species of Lygus attacking alfalfa. However, recent investigations indicate that the starting of the alfalfa seed crop at the same time in all fields throughout a neighborhood keeps the infestation low during the development of that crop; whereas, fields producing seed at other times, in

many cases receive migrations of adults resulting in extremely high infestations and heavy damage. Clean cultural practices, such as clean cutting of the hay crop preceding the seed crop, result in a great reduction of the nymphal population.

Page 431 - 1 This article condensed from a paper prepared for this purpose by Lloyd L. Stitt of the Bureau of Entomology and Plant Quarantine.

Page 432 - References. - Idaho Agr. Exp. Sta. Res. Bul. 11, 1933; U.S.D.A., Tech. Bul. 5, 1927; Jour. Econ.Ento., 29: 454-457, 1936.

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine
Washington, D. C. 25

March 4, 1946

Mr. Thomas E. Buckman
Assistant Director for
County Agent Work
Cooperative Extension Work
University of Nevada
Reno, Nevada

Dear Mr. Buckman:

Mr. M. P. Jones has referred your letter of February 15 to him requesting information on the use of DDT dust for the control of Lygus bugs in seed alfalfa fields to this office. In reply we are enclosing processed publication No. E-658 and also a brief summary recently prepared by Mr. F. V. Lieberman of our Delta, Utah station on the results of his experiments during 1945. It appears from Mr. Lieberman's experiments, which have been the most extensive of any that we know of, that very good control of Lygus spp. and alfalfa weevil can be obtained by a single application of a 5 or 10 percent DDT dust, preferably the latter, at the rate of 20 pounds per acre, just as the first blossoms are beginning to open.

We have not yet recommended the use of DDT dust on alfalfa grown either for seed or for hay, because of the current uncertainty relative to the poisoning hazards involved if the thrashings or hay are fed to livestock. Although experience to date indicates that the danger of direct poisoning may be of no consequence, the recent discovery that DDT is secreted in the fatty tissues and in the milk fat of animals to which it is fed leads us to hesitate in making any definite recommendations until the residue hazard has been more thoroughly investigated. We realize, however, that many farmers are likely to go ahead and use DDT dust on their seed alfalfa this year, and feel that any who do so should be cautioned not to feed the thrashings to livestock, at least until more is known about the residue hazards involved.

In addition to the experiments conducted by our field stations at Delta, Utah and Tempe, Arizona, DDT has been tested for the control of Lygus and other insects attacking seed alfalfa by the California, Idaho, Utah and possibly other State Experiment Stations.

Very truly yours,

sgd/ C. M. Packard, In Charge,
Division of Cereal and Forage
Insect Investigations

Enclosures - 2

SUMMARY: 1945 experiments with DDt for control of alfalfa seed insects, Delta, Utah substation, U. S. Bureau of Entomology and Plant Quarantine, P. O. Box 565, Delta, Utah (F. V. Lieberman).

Methods: All insecticides were applied with a tractor-mounted and -operated crop duster. The duster was equipped with 12 V-type nozzles spaced approximately 16 inches apart, each being individually connected by flexible tubing to a common fan chamber. The dusts were discharged several inches above the tops of the alfalfa plants and the duster had a 15-foot canvas trailer attached to the boom. The tractor was operated at a speed of approximately 3.75 miles per hour and the fan of the duster at slightly more than 4000 r.p.m.

Dosages: The most important experiments were conducted in the Delta tract on second-crop seed alfalfa. In these experiments three dosages were applied; namely, (1) 0.6 pound of DDT per acre, (2) 1 pound of DDT per acre and (3) 2 pounds of DDT per acre. Twenty pounds of dust per acre were applied in each case, 3, 5, and 10 percent dilutions being used to provide the above-listed dosages, respectively. The dusts were all factory-prepared and the carrier was pyrophyllite.

Application: A single application was made in each experiment. The applications were planned to be timed with the beginning of hatching of nymphs of Lygus from eggs laid in the seed growth. Actually, most of the plots were dusted somewhat (about one week) before that time because the crop was beginning to bloom, Lygus hatching being tardy. Treatments were confined to the prebloom stage to avoid possibility of killing pollinating bees. A scattering of bloom had appeared in all plots by the time the dusts were applied but bee visitors to the field were still negligible. Dusts were applied July 13-15.

Plots: Our experimental plots averaged 4.5 acres. This large plot size was used to overcome the effects of DDT drift and to assure normal visitation by pollinating bees.

Population counts: Lygus was the only insect for which population counts were made during the second-crop period. One hundred strokes of a 15-inch insect net were used in each plot to determine population level. Counts were made the day before dusting, 3 days after dusting, and each week thereafter for six weeks. Control estimates are based on the average of these sweepings made in each plot following dusting.

Results:

Data given (all averages)	No. plots	Treatments: check plot	Pounds of DDT per acre: 0.6	1.0	2.0
Average Lygus population	3	264	129	105	77
Percent control		-	51	60	71
Seed yield (lbs. per acre)		179	207	237	314
Increase in seed yield		-	28	58	135
Value of increase (42¢ lb.)		-	$ 12	$ 24	$ 57
Average Lygus population	5	235			48
Percent control		-			80
Seed yield (lbs. per acre)		116			209
Increase in seed yield		-			93
Value of increase (42¢ lb.)					$ 39

Discussion: The above-tabulated results typify our data for this season. Similarly successful experiments were performed on second-crop seed alfalfa at Gandy, Utah and on first-crop seed alfalfa in the Delta tract. Improved control and greater yield may result from two prebloom applications on slow-growing first-crop seed growth but there seems to be no reason to attempt more than one application on second-crop alfalfa under our environmental conditions. The seed yield affords a measure for estimating the residual effectiveness of the three dilutions and testifies to the sound condition of pods at harvest. Control of Lygus was quite spectacular for 3-4 w eeks and the increase thereafter did not warrant additional treatment since the crop was largely set by that time and since another treatment would involve danger to pollinating bees. Excellent control of alfalfa weevil on first-crop seed growth was obtained sirultaneous with control of Lygus. Applications to second-crop growth for control of Lygus gave a 70 percent or better reduction of alfalfa weevil adults in the field at the end of August (most plots). The 2 -pound applications of DDT gave good control of thrips, aphids and leafhoppers common to our seed fields; the smaller dosages were less effective except on leafhoppers. A large-scale experiment at Gandy, Utah in which 70 percent of alfalfa within flight range of pollinating bees (both wild and domestic) was dusted with DDT showed that general prebloom treatment of seed alfalfa would not be harmful to these beneficial insects.

May 1945 E-658

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

EXPERIMENTS WITH DDT, SABADILLA, AND PYRETHRUM DUSTS FOR CONTROL OF LYGUS SPP. ON SEED ALFALFA

By F. V. Lieberman

Division of Cereal and Forage Insect Investigations

In past years insecticidal control of Lygus spp. on alfalfa grown for seed has been unsuccessful, largely because immediate reinfestation resulting from continual hatching of nymphs and immigration of adults has required several applications of the contact poisons tested and has rendered effective control impractical and prohibitive in cost. In a field-plot test of three insecticidal dusts on seed alfalfa during the summer of 1944 at Gandy, Millard County, Utah, DDT (1-trichloro-2, 2-bis(p-chlorophenyl)ethane), one of the two new materials being given preliminary trial, was found to be highly toxic to Lygus s pp., effective for weeks after application, and definitely promising as a satisfactory control for these bugs.

Since cross-pollination of alfalfa flowers is now considered essential to profitable seed production, this experiment was made at an isolated ranch settlement where alfalfa-visiting wild bees, especially Nomia melanderi Ckll., sometimes called the alkali bee, occur in numbers adequate for effective pollination of the crop. In this locality both Lygus hesperus Knight and Lygus elisus Van D. occur, the latter heavily predominating.

Twenty-five plots, 60 feet wide by 145.2 feet long, were laid out side by side in a single row without use of buffer strips. One plot in each consecutive 5 was selected at random for dusting with 10 percent of DDT in pyrophyllite, 10 percent of ground sabadilla seed in a 1:8 mixture of hydrated lime and Georgia talc, 20 percent of ground sabadilla seed in a 1:3 mixture of hydrated lime and Georgia talc, or 10 percent of pyrethrum extract in pyrophyllite (0.2 percent pyrethrins); the fifth plot was employed as a check. Applications were made with a duster mounted on the rear of a farm tractor and operated off its pulley. Its 22-foot boom was carried at plant-top level and trailed by a 15-foot canvas apron. The tractor was driven lengthwise of the plot 3 times, each dusted strip being lapped somewhat to assure complete coverage. The speed of the tractor was approximately 3.7 miles per hour. Dusting and all subsequent operations in handling, harvesting, and threshing the crop closely approached actual farm practice. Population counts taken in the plots were based on 25 strokes of a 15-inch insect net.

To avoid repelling or killing alfalfa-visiting bees, the insecticides were applied before many of the plants had produced flowers, or while they were essentially in the prebloom stage. Used at this time none of the insecticides showed repellent effects on the wild bees; they visited the plots in proportiom to intensity of the bloom. No kill of wild bees is believed to have occurred, but mortality would be extremely difficult to observe or determine in the field. No domestic honeybees are present in the Gandy area.

Effectiveness of the different treatments in destroying Lygus is shown in table 1. Results of dusting with DDT are based on all five plots treated. Inadvertent irrigation prevented redusting of two plots treated with each of the other insecticides used; data from these plots are therefore exclused in the presentation. Population data for three check plots are also omitted, because they were affected materially in varying degree by drift from DDT plots adjacent to their south borders. The best-yielding sabadilla and pyrethrum plots were those located next to plots dusted with DDT, which indicates that these plots also were affected by DDT drift. It was impossible, however, to distinguish the effect of the DDT from that of the sabadilla or pyrethrum. The data from these plots have therefore been included without correction for this effect.

Of the two check plots for which data are given in table 1, the first is highly representative of the unaffected portions of all three check plots omitted. In check plot 2, which had a much lower initial Lygus population than any other plot, treated or untreated, the slower increase in population allowed bloom to occur and seed to set before infestation became severe.

DDT was outstandingly successful in accomplishing Lygus control because of its ability to remain toxic throughout the period required for flowering and podding of the seed crop. One dusting of the alfalfa growth reduced and held the nymphs to negligible numbers. The sabadilla and pyrethrum dusts gave substantial population reductions, considering concentration and dosage of each, but with rapid hatching of eggs the population of nymphs was speedily rebuilt to menacing strength, and economic destruction of reproductive parts of the plants was resumed. The fact that DDT was much more effective than the other insecticides in killing Lygus adults is difficult to appreciate from the data in table 1. Reinfestation by flight occurred daily in all plots, irrespective of treatment; it was greatest in the more succulent plots. Higher mortality of adults in the DDT plots is indicated by the fact that early morning sweepings yielded few adults on these plots than on the others, whereas during the flight period later in the day adult abundance on DDT-treated growth became progressively closer to that on other treated alfalfa. Furthermore, since some adults swept from DDT plots were unable to coordinate leg movements, it was evident that mortality rather than emigration was responsible for their comparative scarcity in these plots in the morning.

Table 1.--Effectiveness of DDT, sabadilla, and pyrethrum dusts in suppressing Lygus populations on alfalfa grown for seed, July-August 1944. Treatments applied July 19 and 26.

Dust	Dosage (pounds per acre)		Stage	Average number of Lygus bugs per net stroke					
				Days after first dusting					
				0	3	7	9	22	33
	First treatment	Second treatment		Days after second dusting					
						0	2	15	26
DDT 10%	27.5	None	Nymphs	6.6	0	0	0	0.1	0.1
			Adults	1.6	.2	.9	.6	1.0	.3
Sabadilla: 20%	29	32.5	Nymphs	5.1	1.2	5.0	1.0	5.3	5.1
			Adults	2.1	.5	2.3	.1	2.4	.8
10%	25	32.5	Nymphs	6.1	1.5	2.9	1.7	5.8	3.9
			Adults	2.1	.7	1.2	.2	1.7	1.1
Pyrethrum 10% 1/	14	16	Nymphs	8.3	2.6	4.0	3.4	8.2	3.6
			Adults	1.7	1.0	.8	.7	2.0	.8
Checks (untreated):									
No. 1	None	None	Nymphs	6.1	9.3	9.7	-	6.6	1.7
			Adults	1.3	1.7	1.0	-	.1	.0
No. 2	None	None	Nymphs	2.7	4.1	5.6	-	12.3	5.7
			Adults	2.4	2.8	2.3	0	3.2	.5

1/ Duster failed to deliver this dust at desired dosage of 25 pounds per acre.

Weather may have influenced the effectiveness of all dusts used. No precipitation occurred during the 59-day interval from dusting to cutting of the crop. However, the period was characterized by excessive wind, frequently strong enough to be suspected of removing insecticidal dust.

All treatments were definitely beneficial as measured by the extent of flowering and setting of pods. After the pods had been formed in plots receiving two treatments of 20 percent sabadilla dust 7 days apart, the appearance of these plots indicated a prospective yield approximately equivalent to that of the plots dusted once with DDT. Lygus feeding on seed in immature pods and the sharply curtailing effect of an early severe frost substantially reduced the promising yields of these plots as well as those of most others. The entire plots were harvested for seed. Results of threshing, recleaning, and examination of seeds from pod samples taken just before frost are given in table 2.

Yields from plot to plot under the same treatment varied widely. This variation is attributable mainly to a corresponding difference in plant succulency due to variations in soil moisture within the field and intensified by precipitation deficiency. Late in August intensely drying winds reduced yield prospects in all plots, particularly in those already dried to excess. Variation in succulency and also in yield was greatest among the DDT plots. Tardy spot irrigation at various times during the flowering and podding period only added to the variation in plot condition without giving the benefit that timely watering could have provided. Nevertheless, the better yields under each treatment represent those that may be expected under normal seasonal and field conditions.

Without extensive tripping of flowers it would have been impossible to obtain the very high yields realized from the two DDT plots that were only slightly affected by drought and frost. Observations showed that, in proportion to the bloom on the plants, pollinating bees were no more abundant in treated plots than they were on a large adjacent acreage of blooming alfalfa that was untreated. These high yields were produced under bee activity normal to the locality. They are not theoretical yields achieved by extreme concentration of pollinating insects onto small patches of blooming plants.

Table 2.-- Yield and quality of seed from alfalfa field plots dusted with DDT, sabadilla, or pyrethrum, 1944.

Treatment	Yield (pounds per acre) Thresher-run seed	Yield (pounds per acre) Recleaned seed	Percent shrinkage 1/	Number of seeds examined	Percent of seed in pod samples -- Viable: Normal color	Viable: Off-color	Not viable: Immature	Not viable: Destroyed by- Lygus	Not viable: Destroyed by- Chalcids
DDT 10%	345	322	6.6	501	81	9	7	3	0.3
	650	593	8.8	505	79	16	3	2	.6
	725	629	13.3 2/	504	79	6	11	3	.6
	285	264	7.4	502	58	18	14	9	1.2
	135	118	12.9 2/	505	86	6	1	6	1.4
Av.	428	385	9.8		77	11	7	5	0.8
Sabadilla:									
20%	83	57	31.1 2/	453	63	15	10	12	0.2
	343	283	17.5	500	51	12	22	13	1.8
	285	214	24.9 2/	501	55	8	21	15	1.0
Av.	237	185	24.5		56	12	18	13	1.0
10%	85	69	19.4	249	57	14	12	16	0
	200	187	6.4	499	39	16	24	18	3.0
	183	146	20.3 2/	500	55	9	24	11	1.0
Av.	156	134	15.4		50	13	20	15	1.3
Pyrethrum	70	50	28.6 2/	499	33	18	31	17	0.2
	148	128	13.6	106	40	12	22	26	0
	115	89	22.2 2/	501	21	5	40	34	1.0
Av.	111	89	21.5		31	12	31	26	0.4
Checks:									
No. 1	30	23	21.8	8	25	13	25	38	0
No. 2	260	179	31.1 2/	500	28	7	60	5	0.4
Checks af-	188	169	10.0	436	65	15	14	5	0.5
fected by	310	285	8.2	513	69	12	13	6	0
DDT drift	175	147	16.2 2/	500	46	12	18	21	3.4
Av.	224	200	11.5		60	13	15	11	1.3

1/ Determined from 100 to 300-gram portions of total plot yields. Yield of recleaned seed calculated by use of these percentages.

2/ Thresher operated with inadequate power; shrinkage was larger than it would have been otherwise.

The cleanliness of thresher-run seed due to the excellent protection of developing pods by DDT is shown by the low shrinkage in recleaning and the small proportion of insect-damaged seed found in pod samples (table 2). Field observations indicated that the crops in all DDT-treated plots were maturing slightly faster than in the other plots. These observations were confirmed by the smaller percentages of immature seeds found in pod samples as indicated in table 2. A slight tendency to dry out the alfalfa plants as they neared maturity appeared to be creditable to DDT, but further observations under conditions less influenced by drought and drying winds are needed to decide this point. The remarkable protection given the check plots that received drift of DDT dust indicates that direct application of dosages of this insecticide lower than those used in this experiment will give adequate kill.

The pods from DDT-treated plots contained an average of 4.77 seeds per pod; pods from plots treated twice with 20 percent sabadilla, 10 percent sabadilla, or pyrethrum dust contained an average of 2.56, 2.92, and 2.91 seeds, respectively. The lower averages in the sabadilla and pyrethrum treatments were due to the more frequent occurrence of pods with only 1 or 2 seeds. Samples from check plots 1 and 2 averaged 1.33 and 3.55 seeds per pod, respectively, the former being representative of the condition that would have prevailed in the treated plots if they had remained untreated. Many pods in these areas contained no seeds at all. In fact, the 8 seeds present in the sample from check plot 1 (table 2) represent the total production on 25 stems. Check plots affected by drift of DDT averaged 3.06 seeds per pod. Seeds in pods from DDT plots were slightly smaller than those from the check or other treated plots, although no definite relationship to probable causal factors could be established.

A composite sample of recleaned seed from the DDT plots had a commercial purity of 99.25 percent (premium grade); an official commercial germination test indicated viability to be within normal range for alfalfa seed of this area during the fall season. Quick-germinating seeds averaged 40.75 percent and hard seeds 53.75 percent to give a total estimated germination of 94.50 percent.

Samples of the alfalfa for analysis of DDT residues were taken from treated plots just before and after threshing, 95 to 96 days after the treatment was applied. No rain but much drying wind occurred during the 59-day period between treatment and cutting. Three rains totaling about 3/4 inch fell during the 36-day period between cutting and threshing. During this period the alfalfa was in coks and was turned three times. The analysis indicated that the DDT residues were not over 17 parts per million (p.p.m.) in the alfalfa before threshing and less than 10 p.p.m. in the chaff after threshing. Although these residues exceed the current tentative DDT tolerance of 7 p.p.m., in view of the high degree of Lygus control secured in the 1944 tests it seems likely that dosages can be reduced sufficiently to bring the DDT residues within the tolerance and still maintain satisfactory Lygus control and economically profitable seed production.

In this experiment collection of actual data on reduction of insect population was restricted to Lygus. However, large aphid and thrips populations that existed in all plots at the time of dusting were practically eliminated in the DDT-treated plots and slightly reduced in the other treated plots. DDT was also observed to reduce populations (nymphs and adults) of Nabis ferus (L.), ladybirds, and grasshoppers. Most of the specimens of these common alfalfa-field insects observed in the DDT plots after they were dusted probably were immigrants.

Further information is needed on the best dosages and mixtures of DDT for use against Lygus spp. infesting alfalfa, on timing of applications to avoid the killing of honeybees and other alfalfa-pollinating bees, and on the livestock-poisoning hazard resulting from DDT residues on alfalfa, especially that which may be pastured or cut for hay instead of seed.

Alfalfa Seed Production

(Excerpt from Annual Report
of Louie A. Gardella)

Production of Alfalfa seed has been carried on by farmers in Lyon County for many years. Yields during early history of seed production were good but have continued to decline and the industry has not expanded as it should have because of the low yields.

The agent, early in 1946, obtained information on Lagyus bug control with DDT and contacted several alfalfa seed producers with the proposal that they treat seed fields with DDT dust. Two growers treated a total of 37 acres, although one grower later abandoned all ten acres which had been treated. The other grower, with 27 acres, harvested his entire acreage. The dusting was done too late and only twenty-five pounds of 5% dust was used instead of the recommended thirty pounds of 10% dust. In spite of these two handicaps, the yields were more than three times the average of untreated fields harvested in the county, as shown in the following table:

Number of Growers	Treatment	Acres	Total yield clean seed	Average seed production per acre
1	Dusted with 25 pounds 5% DDT	27	6,392#	237#
8	No treatment	137	9,303#	67#

Nineteen forty-six was a very poor seed year in this area, most of the growers abandoning their acreages in mid-summer and cutting the field for hay. The agent is confident that had the dusting on the dusted field been done ten days sooner and at a heavier rate, the yield would have been considerably higher.

A check seed plot was also established on the A. L. Farias farm. In this case, approximately one-fourth of an acre of alfalfa was sprayed with a solution containing .25% DDT. This check plot was a part of a large field intended for alfalfa seed and was entirely surrounded by untreated alfalfa.

The grower, in the latter part of July, decided that the untreated portion of the field would not yield seed and cut the crop for hay. The sprayed one-fourth acre was allowed to mature seed and was not harvested until late in October when much of the seed could not be harvested because it had already dropped to the ground. In spite of this loss, the grower harvested 90 pounds of clean seed or at the rate of between 300 and 350 pounds of seed per acre. The bloom of both treated plots was much better than on any surrounding fields. No loss of honey bees was reported by bee men.

Several growers have already indicated their desire to dust seed fields in 1947. It is the agent's opinion that DDT dusting for alfalfa seed production will become a standard practice and that the yields and acreage devoted to seed production will be materially increased.

GROWING ALFALFA FOR SEED

Luther G. Jones

Alfalfa hay is produced on substantially more than 35 million acres throughout the world. In addition, a proportionately large acreage is devoted to alfalfa seed production in those regions where climatic and soil conditions are conducive to seed setting and maturity. Argentina has perhaps the largest acreage, with 14 million acres for hay and a large acreage devoted to seed production.

The acreage devoted annually to the production of alfalfa hay in the United States is near 12 million acres, a part of which is also devoted to the production of seed. The total seed acreage in the United States is about 1,063,000. The average acreage grown to hay annually in California, ranges from 750,000 to an expected all time high this year of 1,025,000 acres; there are about 25,000 acres used in the production of seed. The average annual seed production in California is around 3½ million pounds, however, last year 4½ million was produced. The United States production in 1946 was 82½ million pounds cleaned. We export about 800,000 pounds of seed per year and import 4 to 10 million pounds per year. Last year from July to September we imported 3 million--2 2/3 million from Argentina, 250,000 from Canada and 100,000 from the Union of South Africa.

Over 7½ million acres of the alfalfa grown in the United States is grown in 14 North Central States, bounded on the east by Ohio and on the west by Colorado. In these states, as in California, bacterial wilt (Phytomonas insidiosa McCulloch) is a serious threat to the economical production of alfalfa hay. Bacterial wilt annually destroys hundreds of thousands of acres of alfalfa, with aggregate losses equivalent to those that would be experienced by farmers as a result of flood drought, or any other major disester. These losses include not only the crop destroyed by the disease, but also the cost of seeding and the loss of production of the land until a new crop is established. If, through the use of resistant strains, growers could maintain stands

of alfalfa for even two years longer, they would be able to save millions of dollars.

Through testing more than 1,000 different strains of alfalfa, introductions from all over the world, a few strains and varieties were found to have resistance to bacterial wilt in varying degrees, and through patient work of breeding and selection disease resistance has been bred into useful varieties and these superior alfalfa varieties are now gradually coming into their own.

Here in California we are fortunate to have climatic conditions, other things being favorable, conductive to high yields of alfalfa seed, giving us a chance, if used advisedly, to hold an inside track in the production of improved alfalfa seed for the Great North Central States area where more than 20 million pounds of improved seed could be used yearly.

In recent years there has been sufficient information obtained through numerous experiments to show that future research looking toward successful seed production might well be conducted along four specific lines. (1) the relations of beneficial insects to seed production. (2) the relation of harmful insects to seed production. (3) plant growth, and (4) plant selection.

The necessity for tripping alfalfa flowers by beneficial insects for successful seed production can no longer be questioned. Lack of an abundance of pollinating insects is probably the most important limiting factor in alfalfa seed production at this time.

To illustrate: It has been found that in an open pollinated field where a good seed set is in evidence 89 to 100 per cent natural crossing occurs as a result of insect activity. Alfalfa flowers thus tripped produce on an average of 69 per cent pods with 3.8 seeds per pod. There are about 250,000 seeds in 1 pound of alfalfa, and it is estimated that 84,960 flowers would have to be tripped to produce 1 pound of seed. A 500 pound yield per acre would require the tripping of more than 42½ million florets per acre.

The insects responsible for tripping alfalfa flowers are bumblebees, megachile, honeybees, nomia, halicetus, calliopsis, andrenids and others. Humming birds are also known to visit alfalfa and do a good job of tripping (rate per minute B 17, Ho 7, M 15, N 9, Hmgbd 20). It is believed that the honeybee is responsible for nearly 80 percent of all crop pollination performed by insects. A strong colony of honeybees in good pollen location may gather 45 to 65 pounds of pollen during a year. To gather 1 pound of pollen, bees from one hive must visit more than 8 million flowers. That makes approximately 360 to 520 million flowers visited by bees from a normal beehive during one year.

It would be well to bear in mind that the above record is of pollen collecting honeybees only. The nectar collecting bees would certainly visit fully as many flowers making 720 million to one billion flowers visited by bees from a normal hive, during one year. Vansell has pointed out that there is a favorable correlation between the seed produced in one large seed producing area and the number of beehives moved into that area each year.

Year	Hives	Lbs. Produced
1928	14,200	3,200,000
1929	10,900	2,100,000
1930	1,100	750,000
1931	2,800	800,000
1935	9,700	3,564,000
1936	10,800	3,168,000

Harmful insects are undoubtedly of great importance in alfalfa seed production where they occur in abundance. Lygus is one of the more important harmful insects. There are 3 species of lygus that have been tagged as very detrimental to alfalfa buds, flowers and seed, L. elisis, L. hesperus and L. obleniatus. Other important harmful insects are the alfalfa plant bug adelphacorus sp., Says plant bug chlorochroa Sayii, chalcis fly, Bruchaphagus funebris, alfalfa weevil Hupera postica, potato leaf-hopper Empoasca fabae, grasshoppers melanaplus spp., alfalfa caterpillar, thrips, and others.

Stem nematodes are also included as pests of alfalfa in certain seed producing areas.

The advent and use of DDT has been, and will continue to be if used correctly, a tremendous boon for alfalfa seed production. There are wide variations in the recommended uses of DDT. Almost everyone that has done any work with it has his particular slant on its use. However, to get effective control within minimum risk to bees, alfalfa should be dusted in the late bud stage. The dosage may be 10 per cent 20 pounds per acre or 5 per cent 30 pounds per acre. If DDT dust is applied over a large acreage after the bees are active, there will be considerable bee mortality as a result of poisoning.

The third phase to be discussed in the successful production of alfalfa seed is, Plant Growth in Relation to Seed Production: The lodging of alfalfa changes the physiological condition of the plant and is associated with recurrent growth that is harmful to seed production. The correcting of soil deficiencies is important to increased seed production. High food reserves in the roots of the plant are beneficial to high seed production. Thickness of stand is another factor among a host of factors related to this problem and inter-related soil fertility problems. In general, relatively thin planting with a normal, steady, almost vigorous growth of plants without sufficient stimulus to start much new growth from the crown appears to give the best possibilities. In planning the time for the crop to come into bloom average weather conditions and the period of maximum beneficial insect and minimum harmful insect populations should be taken into consideration. Crops that compete for beneficial insects should not be grown in seed areas at the time pollination is in progress. The seed crop should be produced if possible at a time when native wild flowers, weeds, etc., furnish a minimum of competition for beneficial insects. To carry out the above plan may involve the

re-investigation of almost all of the cultural practices as related to seed production. The local relationship of beneficial and harmful insects, plant competition and favorable seed setting weather may be the answer to the question of how may we grow good yields of alfalfa seed year after year.

The fourth point to be discussed is the selection of plants in the production of good seed crops. Self fertile plants would certainly have a tendency to increase yields of seed, as this would eliminate the necessity of insect pollination. However, to date this would be a hazardous practice since continuous in-breeding would reduce the seed and forage yield to a point that would nullify all the advantages of such a variety. In selecting for high seed productivity, the self-fertility and cross-fertility relationships should be given serious consideration; selecting toward self-sterility for plants that may be used in the production of hybrid alfalfa, some of the new hybrids and polycrosses in yield tests have shown seed increases of 40 per cent and hay yields of 25 per cent more than the standard varieties. Plants also differ in ease of tripping permitting nectar collecting bees to trip and pollinate a high percentage of the flowers.

Diseases are responsible for crop failure. Selection of strains resistant to mildew, leaf spot, etc., are entirely possible. There are wide variations in seed production of plants within a given variety. California Common spaced plants selected at random and tested in 1946 showed yields of from 10 to 236 grams per plant. The average yield was near 120 grams, or a yield of about 900 pounds per acre. Had the average been 236 grams per plant there would have been a yield of nearly 2,000 pounds per acre.

Summary

Seed production studies have shown that less than 5 per cent of the flowers set seed without tripping. Rain, sun, and wind cause some tripping, but is unimportant for seed production. Tripping and cross-pollination are caused chiefly by beneficial insects and that almost without exception all

fields have an insufficient beneficial insect population.

The control of harmful insects is necessary to assure good seed production. The method of control may be cultural or by the use of insecticide, but whatever method used the protection of beneficial insects should be emphasized.

Crop rotation and management are important factors being concerned with bringing the crop into bloom, to take advantage of favorable seed setting weather, and to reduce the competition between the seed crop and other plants for beneficial insects to a minimum.

Plant growth, lodging, soil deficiencies, root reserves, thickness of plantings, soil moisture, harmful insect, beneficial insects, and the weather are all factors affecting seed production.

Finally the matter of plant selection is important in building toward a superior alfalfa. An alfalfa resistant to wilt, mildew, leafspot diseases, an easy tripper and self-sterile. Hybrid alfalfa is attractive because resistance to diseases, insects, nematodes, etc., could theoretically be bred into and controlled in a hybrid more easily than the same factors could be incorporated in the standard varieties.

California Certified Seed News --------- March, 1947

IOWA-GROWN ALFALFA SEED

By
CARL J. DRAKE

Alfalfa seed can be produced in Iowa. We have found that out here at the Iowa Station in experiments this past summer and in cooperative tests with a few Iowa farmers.

Our tests show that when you control the many different kinds of insects which attack alfalfa, the plant will produce seed.

In our tests here at Ames we used plots of approximately ½ acre in size. There were six of these plots sprayed twice with D.D.T. Scattered among them were six other plots that were not treated. The tests at Ames were cooperative between the Entomology, Agronomy and Agricultural Engineering sections.

When these plots were harvested, we obtained 100 pounds of seed to the acre from the sprayed plots and less than half that much -- about 45 pounds -- from the untreated plots. But much of the seed produced on the untreated plots was so light that when it was cleaned, we had only 14 pounds of cleaned seed to the acre. On the sprayed plots, there were 77.5 pounds of cleaned seed.

We also produced a half ton more hay per acre from the plots that were treated.

Although germination tests were not made, we think much of the seed removed in recleaning probably would not have grown if planted because of insect injury.

Now of course these results are for only 1 year. The weather and other factors might bring about higher or lower seed production than this in other years. The tests do show, however, that it is possible to produce alfalfa seed in Iowa. For years we have assumed that you just could'nt produce alfalfa seed in Iowa. Now we know that you can.

FARMERS' RESULTS

The farmers who cooperated in trying out D.D.T. for control of insects to produce alfalfa seed this year reported yields of from 1 to between 4 and 5 bushels of seed to the acre on treated areas. Alongside these fields, farmers reported yields as low as 9 pounds of seed an acre from untreated fields.

Two fields of red clover were treated in cooperation with farmers. One of these fields with one treatment yielded 15 bushels from a 15-acre field, or 1 bushel of seed to the acre. This was recleaned seed -- seed ready to plant. An untreated field near by was reported to have produced only 3 bushels of seed on 20 acres.

FIELDS FOR SEED

Our information to date indicates that those who wish to produce alfalfa seed are likely to have the best results if they use only small fields. We suggest not more than 5 to 10 acres. Seed these fields if possible where they border sodland and open timber. We suggest this because then there is a better chance for wild bees to aid in the pollination. It is a good plan to stagger the cutting. That is, cut a strip, then a week or so later cut another and so on. This will give the pollinating insects a better chance on all flowers.

Best yields are likely to occur on moderately high, well-drained land near woodland and thickets with open unshaded areas. On soil that is too rich, the crop may grow so tall that it falls over before the seed has formed. When the plants lodge badly, they produce little seed. The fallen plants lose many of their leaves and pods before harvest time.

Fields that are highly fertilized for the oat crops preceding the first year in alfalfa often have fallen plants that do not produce well.

WHEN TO APPLY D.D.T.

Our experience in this business of producing seed is limited, but we believe that if you want to try producing seed by dusting or spraying with D.D.T., then you should cut the first crop for hay. Use the second crop for seed.

We suggest that you apply the first dust (10 percent D.D.T.) at the rate of 15 to 18 pounds to the acre when the plants are about 8 to 10 inches tall.

Then follow with a second dusting at the rate of 20 to 25 pounds to the acre just as the flowers begin to appear in the field. If you spray, apply about 2 pounds of 50 percent D.D.T. to the acre the first spraying and 4 pounds the second spraying.

The use of D.D.T. will not kill off your pollinating honeybees and wild bees if you dust or spray before the blossoms are open. Never treat legumes when the flowers are open.

The heavier application which we recommend for the second dusting is meant to be large enough to protect the plants through the blossoming and pollinating period and until the seeds are formed.

ADDING IT ALL UP

This venture of producing alfalfa seed in Iowa is new. We look upon it here at the Iowa Station as a great boon in our crop breeding work. For years our breeders have been limited to merely testing varieties of alfalfa produced somewhere else. We could not produce seed, so there could be only limited breeding work. Now this will enable us to carry on alfalfa breeding.

No part of the alfalfa escapes injury from insects -- the leaves, flowers, buds, stems, roots are all troubled. With the use of D.D.T. we can control most of these insect pests sufficiently to produce seed in Iowa. However, D.D.T. does not control grasshoppers, and there is some question about other insects. New dusts are out which may be mixed with D.D.T. to control grasshoppers.

If you saw any of our dusted plots this last year, no doubt you were amazed at the difference in the lucious green growth, the greatly increased flowering of the treated plots. There was a big difference, and it all added up to this: We got seed where we dusted, very little where we didn't.

Reprint from the January, 1947, Iowa Farm Science FS-154
Vol. 1, No. 7, page 10

ALFALFA SEED PRODUCTION STATISTICS

Payments made under the 1947 Agricultural Conservation Program.

Table #5

HARVESTING SEED
Practice C-1 - Rate $.10 per pound

County	Extent in Payment Units Pounds	Credit Value Dollars	Total Acres	Total No. Farms
Churchill	4,790	70	44.5	1
Clark	13,859	203	86.8	10
Elko	1,080	108	35.0	3
Humboldt	1,020	70	20.0	1
Lincoln	1,920	91	26.0	3
Lyon	30,170	1,146	388.0	28
White Pine	33,044	863	312.5	22
Totals	85,883	2,551	912.8	68

Rate $.10 per pound not to exceed $3.50 per acre or $70 per farm. Seed harvested principally alfalfa and clovers.

According to the 1945 Census Report Nevada had over 1,000 acres of alfalfa harvested for seed production.

Average yield was 138 pounds per acre. This was before DDT dusting for lygus bugs was discovered.

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

C. W. CREEL

DIRECTOR

Annual Report of Extension Work in Agricultural Economics and Marketing

(Project No. 6)

for

January 1st, to December 31st

1948

L. E. CLINE

Extension Marketing Specialist

INDEX

NEVADA AGRICULTURAL EXTENSION SERVICE
EXTENSION WORK IN AGRICULTURAL ECONOMICS
Report January 1st 1948 to December 31st 1948.

L. E. CLINE

MAJOR PHASES OF PROJECTS COVERED		PERCENTAGE OF TIME DEVOTED TO ENTIRE PROJECT
VI	Agricultural Economics and Marketing	100 %
	Dairy Marketing Organizations	25 %
	Agricultural Outlook	15 %
	Poultry and Eggs Production and Marketing	15 %
	Turkey Production and Marketing	15 %
	News Story Writing	10 %
	Marketing Hay	5 %
	Farm Supply Purchasing	5 %
	Miscellaneous Activities	10 %

Date Submitted: Jan. 12 1949 Signed: L E Cline
Project Leader

Date Approved: _____ Signed: _____
State Director of Extension

Date Approved: _____ Signed: _____
Director of Extension Work
U. S. Department of Agriculture

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

PROJECT VI — Agricultural Economics and Marketing

SUB-PROJECT PHASE — Dairy Marketing and Organizations

Cooperative marketing has been a major activity of this office in Nevada since 1931 and since that time producers of practically all farm crops have participated in organized effort for marketing a portion of their crops. This cooperative activity has covered dairy products, alfalfa hay, alfalfa seed, turkeys, poultry and eggs, wool, livestock, potatoes, vegetables, and vegetable plants. The organizations that were established were for the purpose of promotion and marketing of surplus agricultural products.

During the periods when these products were not in surplus position, the marketing associations discontinued operations. Such may be the situation for poultry and eggs, alfalfa hay, and dairy products by the beginning of 1949 unless there is a radical increase in these commodities. The rapidly increasing population of the state will make it necessary for producers of many farm crops to go into their production on a substantial scale. It is anticipated that the shortage of production will stimulate increases of the major products and provide a sufficient volume of products to keep the associations active.

Although production for many of the major crops in Nevada is reaching a small proportion in comparison to the demands, it is important that the cooperatives continue operations so that the bargaining power of the producers of these commodities may not be lost.

In the past these cooperatives have served a very useful purpose in retaining for their members bargaining power which they need. Most of the organizations will no doubt continue to function and be in position to serve the producers, when an occasion arises.

Because of the close association of this office with the marketing of agricultural products it will be in a position to render aid in marketing operations for commodities needing such assistance.

At the present time the following cooperative organizations are functioning: One hay marketing organization with seven meetings attended during the year, with a total attendance at meetings of 80 persons; one bull association with four meetings attended with a total of 32 in attendance; five dairy marketing associations with 30 meetings attended with a total attendance of 226; two turkey associations with 16 meetings attended with a total attendance of 126; one poultry association with six meetings attended with a total attendance of 51; one livestock association with ten meetings attended with a total attendance of 81; one cooperative purchasing organization with twelve meetings attended and a total attendance of 150; The Southern

Nevada Vegetable Association with four meetings held had a total attendance of 36.

This makes a total of 89 meetings of cooperatives held during the year with a total attendance of 782.

The five dairy associations have been an outgrowth of discussions by the dairy committee of the Nevada State Farm Bureau this year. The dairymen and the distributors in western Nevada have long felt the need of a cooperative organization that would have supervision of the supply and price of the Reno Milk Shed, and the Associated Nevada Dairymen, formed this year, is the outgrowth of these meetings. The membership of this dairy organization consists of the following county associations of producers:

The Newlands Dairymen at Fallon, Nevada
The Washoe Dairymen's Association at Reno, Nevada
The Lyon County Dairymen Inc. at Yerington, Nevada
The Minden Cooperative Creamery Co. at Minden, Nevada

The fifth organization is called the Associated Nevada Dairymen Inc. with headquarters in the State Farm Bureau Building in Reno, Nevada. Membership in this regional organization at present consists of the four producer associations mentioned above. This regional organization coordinates the activities of the four locals, and serves as a bargaining agent for the producer group.

MARKETING OF DAIRY PRODUCTS

For a number of years the marketing of dairy products in the western part of the state has come up for discussion at the annual meetings of the Nevada State Farm Bureau. The discussions usually resulted in emphasizing the need for a united effort directed toward an over-all organization of dairymen covering the production of milk from all sources in the Milk Shed of Reno. At the present time dairy products from the producers in Washoe, Douglas, Lyon and Churchill look to the Reno area as a major market for their commodity. Any condition affecting the supply and demand of the Reno area immediately reacts on the supply and demand in the above mentioned localities.

This situation finally became so acute that the producers of the areas mentioned called a meeting in January of this year with the hope that some organized effort could be launched to bring the producers together for the purpose of establishing a uniform price for their products based on united action. Already there was in existence a producers' organization in Washoe and in Douglas Counties. Additional organizations were promptly created in Churchill and Lyon Counties.

The four organizations were set up along uniform lines for the purpose of facilitating local participation in a regional dairy marketing organization to be formed and known now as the Associated Nevada Dairymen. This over-all organization, known as the Associated Nevada Dairymen, Inc. was created for the purpose of facilitating contact between the producers and distributors. This is the first time such an organization has been perfected in the state.

The need for such an organization set up was shown by the prompt action taken by the local and regional associations, during the months October,

November, and December to adjust prices for dairy products based on the production and distribution costs.

The action taken resulted in an increase of 8 cents per pound butter fat in the Churchill, Washoe, Lyon and Douglas area and an increase of 2 cents per quart of milk in the distributing areas contributing to the Reno Milk Shed supply. This prompt action on the part of producers and distributors met with no objections on the part of those participating.

The organizations affected by this new plan appear to be in harmonious agreement for the first time in the history of dairy production in the region. This Extension project phase was promoted and brought into being through the efforts of this office cooperating with the producer groups.

In addition to assisting in setting up these marketing organizations, further cooperative effort will be carried on in the production of grade A dairy products, and the producers in these organizations are assuming their share of the responsibility for producing grade A milk, thus relieving the inspection service to some degree.

In connection with this dairy project thirty meetings were attended with a total of 226 in attendance. This office also prepared the Articles of Incorporation and By-Laws for the two new local organizations and the regional which were adopted by the producers, and which were filed with the Secretary of State and the Counties in which the organizations are operating. This office also assisted the various producing and distributing groups at arriving at an acceptable price for the producers and distributors.

Approximately 25% of the time of this office is devoted to marketing cooperative organizations.

In addition to the five dairy cooperatives which have already been completed this year and discussed above, preliminary steps have been taken to establish a cooperative producers and marketing association in Eastern Nevada. This organization when put into operation will cover the production and marketing of dairy products in the Ely consuming area and the production area of Preston and Lund. It is contemplated that this organization, when formed, may be affiliated with the Associated Nevada Dairymen, Inc.

Further developments along these lines will be undertaken in the new year. At the present time there is a scarcity of dairy products in Eastern Nevada. A promotion program for Eastern Nevada is needed. This office has been asked to assist in this promotion program.

The cooperating agencies were State and County Farm Bureau organizations, county agents, dairy producers and distributors, and the representative of this office.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

PROJECT VI — Agricultural Economics and Marketing

SUB-PROJECT PHASE — Agricultural Outlook

This office receives, free of charge, all the principal market and price situation reports of interest to this office, which are published by the U. S. Department of Agriculture, Bureau of Economics. These reports, 35 in number, are studied and made the basis of news stories and circulars prepared by this office.

During the year 1948 six news stories have been prepared from this material as follows:

1. Sheep and Wool Production and Prices in U. S. and in Nevada
2. Turkey in Short Supply for Nevada and United States
3. Abundant Grain Supply for Nevada
4. Grain and Live Stock Prices Favorable to Live Stock Growers in United States as a Whole
5. Grain Prices in Nevada Favorable to Live Stock Growers in Nevada
6. Nevada Poultry Production Favored by Decreasing Grain Prices

This office considers outlook news stories to be the principal means of passing outlook material from this office to farmers of the state. Additional means of disbursing this information is through meetings and correspondence and office conferences.

Approximately 15% of the time of this office is devoted to outlook work.

During the past year a list of all these publications, some received daily, some monthly and some annually, was assembled by this office, mimeographed and mailed out to each county agent for the purpose of keeping them informed on the reports available.

Additional lists are made available to new county agents and to others interested in the subject matter.

Considerable time is given to reviewing this literature as it comes to this office.

The cooperators in this project are the Nevada Extension News Service, the local and State wide newspapers, U. S. Agricultural Bureau of Economics, and the representative of this office.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

PROJECT VI — Agricultural Economics and Marketing

SUB-PROJECT PHASE — Poultry and Eggs Production and Marketing

The poultry and egg project has consumed approximately 15% of the time of this office. The time has been spent in attending the State Poultry Association's Meetings and otherwise counciling with the directors on the possibilities of increasing the membership patronage of the Nevada Poultry Producers, Inc., which has been the largest marketing agency over a number of years and the only egg and poultry marketing cooperative available for Nevada poultrymen.

Unfortunately, poultry and egg production for Western Nevada has been losing ground since the last war began, because of prevailing high prices for grain in contrast to egg and poultry prices, and more recently because of the government campaign to reduce poultry and egg production to save grain supplies for export to Europe for human consumption. This adverse condition for producing eggs and poultry has resulted in a general depression of the industry to a point where the volume of product going through the local poultry cooperative was too small to justify operations. At the present time the local poultry cooperative is planning to discontinue operations January 1st, 1949. This organization is currently solvent and owns its own plant and may resume operations at any time if the outlook for increased production improves.

During the life of the association, it has accumulated considerable assets in the form of cash, real estate buildings and equipment, which will be disbursed among the members or held for possible rejuvenation of the association.

This office will be available for assistance in poultry production or marketing if conditions seem favorable.

During the life of this association which will be temporarily closed in January, this office, as well as Extension offices of Churchill, Lyon and Washoe Counties have rendered considerable aid in assisting in every way possible to perpetuate the organization. Other agricultural industries that offered greater profits attracted the poultry producers of the area, and reduced the poultry producers in number to such an extent as to make the operation of the plant unprofitable. For a number of years the margin of profit has been too small to attract poultrymen or to encourage them to continue in the business.

The lack of volume of production in the area served which caused the association to cease operations, is a common experience with any business operation.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

NAME OF PROJECT VI — Agricultural Economics and Marketing.

SUB-PROJECT PHASE — Turkey Production and Marketing.

Turkey production and marketing has been one of the important projects of this office since 1931 when the office was inaugurated. At that time Churchill and Lyon counties were the most important producers of turkeys in the state and other localities in Washoe, Douglas, Clark and Lincoln counties were growing turkeys in smaller numbers.

The experiences of these early growers were encouraging, and although prices were much lower considered less than at present, substantial profits were made because of low feed costs and use of home labor.

Participation in cooperative marketing was quite general at that time. There was a sufficient number of turkeys produced at the various shipping points to make it worth while to use cooperative facilities that were available. There was no difficulty in accumulating car load lots of turkeys, which are necessary in cooperative marketing.

The cooperative turkey marketing plan, which was made available soon after the industry was developed in Churchill county, has continued to be used up to the present time with very little change in its essential methods. The association has had a very successful history of operations.

The method of preparation of turkeys for market has undergone some radical changes since 1931. At the start of cooperative operations, the birds were only partially picked, leaving flight and tail feathers and a good proportion of the pin feathers. During this period of development refinements have been made until now in order for turkeys to grade prime they must be free of all feathers, including pin feathers. The quality of the birds, also, has been improved. They are now required to be much fatter than previously and must be packed in one layer paper lined boxes of 100 to 125 pounds to the box.

These revolutionary requirements of dressed turkeys, while meeting with grower opposition at the start, have been continued by marketing agencies, until today standard packs of turkeys with the above refinements are being offered the trade with practically no opposition on the part of the growers.

Cooperative marketing of turkeys in Nevada was begun in 1928 by Churchill county extension service. At that time the turkey growers pooled their turkeys and solicited sealed bids for car load lots to be sold on published grades, which were the "Diamond N" or top grade, choice or second grade and third grade, or commercial. This was the first attempt in selling specified grades in car load lots with a down payment of ten percent and the balance on shipment of the turkeys.

The plan was readily accepted by buyers. Following this initial effort at cooperative marketing, the turkey growers of eight western states formed the Northwestern (now Norbest) Turkey Growers Association in 1931 in Salt Lake City.

Previous to the formation of this regional association the turkey growers of the eight states had formed local and state organizations and were then qualified to become members of the Northwestern Turkey Growers Association.

At the present time thirteen local organizations have been organized in nine states and have united with the present Norbest regional turkey marketing association for the purpose of marketing turkeys cooperatively. Nevada has been a member of this organization from its inception.

It will be interesting to note that for the 1947 turkey marketing season, this association marketed for its members 43,000,000 pounds of turkeys.

The Norbest Association were pioneers in offering for sale in car load lots oven dressed and drawn, quick frozen turkeys. While this innovation met with considerable resistance on the part of the buyers on the start, the custom is growing fast in acceptance and every indication is that it will eventually replace the New York method of dressing and packing. The acceptance on the part of the wholesalers and the increasing demand of the consumers for this method of marketing will tend to revolutionize the processing procedure.

Since it will be necessary to have the use of modern turkey dressing plants, including cold storage facilities and federal inspection, to properly dress and refrigerate turkeys, it may be expected that the smaller dressing plants or small home operations will have to give way to these larger scale operations which can provide the ultimate in facilities.

For the past two years the Nevada Turkey Growers' Association have been using the facilities of the Norbest Turkey Growers Association at Sacramento, California for dressing its turkeys. In order for the Nevada Turkey Growers' Association to take advantage of this modern dressing plant, it has been necessary for them to transport by especially built trucks the Nevada turkeys to Sacramento. This arrangement will no doubt continue until near by facilities have been provided for the Nevada turkeys.

This office has facilitated in every way possible the production and marketing of turkeys in the state and this has been made one of the chief projects. All cooperative meetings have been attended and at each meeting information as to price and outlook has been given. Visits have been made to turkey growers' farms and council and advice given as to methods of production, marketing and disease control. Feed rations have been worked out along with disease prevention methods for the turkey growers.

Since the production of turkeys is well suited to Nevada conditions, it is the plan of this office to devote 15% of itstime to this project. The turkey industry has suffered the same handicaps as have poultry and eggs, and other livestock industries, where grains and prepared feeds are used. In many cases profits could have been expected, had not the prospect of continued high feed prices discouraged the operators.

It is generally felt that the 1949 production year will show reasonable profits for the turkey grower.

The cooperating agencies in this project have been the county agents of Lyon and Churchill counties, the Nevada Turkey Growers Association, the Norbest Turkey Growers Association, U. S. Bureau of Agricultural Economics and the representative of this office.

Because of the more favorable outlook for turkey feed prices next year, it is anticipated that more turkey growers will resume operations.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

NAME OF PROJECT VI — Agricultural Economics and Marketing.

SUB-PROJECT PHASE — Extension News Stories

The development of current news stories has been one of the important activities of this office since the service was established. It has been the purpose of this office to review U. S. Department of Agriculture releases and other sources of material, and prepare news articles covering the subject matter.

It has been the intention in the past to use these news stories for the purpose of reporting subject matter of a news nature as well as of a propoganda nature for promoting programs, that are calculated to influence production and consumption of commodities, principally of an agricultural nature.

In preparing such news stories for local or state publication, it is necessary to review and keep in mind a large amount of information found in government circulars and trade papers. These news stories are first prepared by this office and then submitted to the Extension Editor for review, after which they are referred to this office for final review before they are submitted by the Extension Editor to the newspapers for publication.

During the year 1948 Extension News Stories were prepared on the following subjects:

Sheep and Wool Production in Nevada and U.S.

Turkeys in Short Supply for Nevada and U.S.

Nevada Exports 187 cars of vegetables.

Nevada Grain Crop Abundant.

More Feed for Fewer Livestock.

Nevada Grain Crop Shows Steady Gain.

Farmers Purchasing Power Declining.

The Grain-Livestock Feed Ratio Favorable to Livestock.

Grain-Livestock Price Favorable to Nevada Livestock Men.

Nevada Hog Prices in Good Position.

Livestock Supplies Reduced in Nevada.

Nevada Livestock Numbers Down but Values Up.

Nevada Farm Crop Acreage Stationary.

Economic Position of Nevada Poultry Good.

Nevada Rabbit Grower has Profitable Industry.

Advan tages in Marketing Livestock while Young.

Churchill County has a Climate well Adapted to Rabbit Industry.

The cooperators in this project were the U.S. Bureau of Agricultural Economics, the Extension News Editor, Newspapers of the state and the representative of this office.

Ten Percent of the time of this office has been allotted to News Story writing.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948.

L. E. CLINE

NAME OF PROJECT VI — Agricultural Economics and Marketing.

SUB-PROJECT PHASE — Marketing Hay

The formation of cooperative hay marketing associations in western Nevada is not an uncommon experience. Most of the irrigated valleys in western Nevada grow alfalfa as a major crop, and on most farms there is a surplus of alfalfa, which must find a market outside of the area in which it is grown.

During the month, September, a study was made by the county and state extension service to determine if the ranches in Lyon county were holding more hay on the farms than might find a market either at home or in California. It seemed very probable from this survey that a surplus would exist by the next hay making time. This surplus would not only mean that some of the hay would not find a market, but that the unsold hay would serve to depress the market for all sales made.

The hay growers in Lyon county began to see that some activity must be put into a hay marketing project in order to move this hay before the new crop came on or the price would be depressed for all hay seeking a market. Due to the immediate situation, the County Agent of Lyon county called a meeting of all Lyon County haygrowers with a surplus on hand to discuss the possibility of forming a hay marketing association.

This office was invited to participate in the meeting and present a tentative set of Articles of Incorporation and By-laws. The meeting was well attended, and after examining and discussing the need of a marketing organization for hay, and examining the set of papers set up by this office, it was decided to organize a marketing association to be known as The Lyon County Hay Growers' Association.

A tentative Board of Directors was selected to serve until the next meeting, when the organization papers were to be presented by this office and memberships into the association accepted. In due time all the preliminary work of the organization was completed, and negotiations entered into to make a sample shipment by truck to the San Fernando valley. This was a very satisfactory experience for the association and resulted in stimulating other sales in the valley, as well as increasing the local price for alfalfa hay.

In a very short time all surplus hay in the valley was sold either through the local association or to buyers, who had been maneuvering to get the hay at a sacrifice price.

Next year the situation will be changed. The association plans to offer hay for sale as soon as the first crop is ready, and continue marketing efforts through out the year, and avoid having distressed hay in the community.

This office has cooperated in the establishment of this hay organization. It has rendered service in expediting the corporation papers without charge except for filing fees and otherwise giving council in the operation of the cooperative association.

This office devoted about 5% of its time to this project.

The cooperating agencies were the Lyon County Farm Bureau, County Extension Agent of Lyon County, the Lyon County H ay Growers and the representative of this office.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

NAME OF PROJECT VI — Agricultural Economics and Marketing.

SUB-PROJECT PHASE — Farm Supply Purchasing.

Among the more important farm cooperatives is the organization known as the Fallon Farmers Cooperative, Inc. The purpose of this organization is to provide a cooperative agency through which its members may market their farm products and also purchase supplies and equipment at less than retail prices.

This organization has been in operation two years and has made a rapid growth in membership and in the amount of supplies and equipment handled. Among the supplies handled are included a full line of Associated Oil Company's products. This line of products includes batteries, tires, tubes, oil and gasoline and is available to members at considerable discount under the regular retail price.

Formerly the dividends were paid at regular intervals to the number participating, but at the present time these dividends are being exchanged for certificates of interest and are credited to the member doing the business. By this means the Association is enabled to enlarge its capital and expand the business at a faster rate than formerly.

Recently this organization has begun the enlargement of its facilities in order to expand its business and carry a larger stock.

This office provided the organization papers for t his cooperative and supervised the details of organization and has made frequent visits to the cooperative to assist in any management problems that may be presented.

Approximately 5 % of the time of this office is devoted to this project.

NEVADA AGRICULTURAL EXTENSION SERVICE EXTENSION WORK IN
AGRICULTURAL ECONOMICS
Report January 1, 1948 to December 31, 1948

L. E. CLINE

PROJECT VI — Agricultural Economics and Marketing

SUB-PROJECT PHASE — Miscellaneous Activities

CIVIL SERVICE RETIREMENT PROGRAM

Early in 1945 this office was designated as Retirement Officer of the Civil Service Retirement Program and was supplied with blank forms and material with which to serve the office. Ten civilian employees in State and County immediately made application for Civil Service rating under the regulations of the Civil Service Commission as amended in 1942. In due time after this office computed the amounts due from each applicant to cover the mandatory payments, these mandatory payments were sent into Washington, and were approved, and each applicant received his formal notification of being inducted into the Civil Service Retirement Program.

Since the induction of Extension employees into the Civil Service Retirement Program, the individual inducted transmits the monthly deduction of 6% from his salary without any further act on the part of the retirement officer.

NEVADA AND COUNTY FARM BUREAUS

In December 1946, the Nevada State Farm Bureau and the various County Farm Bureaus decided to discontinue their affiliation with the State and County governments after the end of the fiscal year on July 1st 1947. From that time forward they have been self supporting.

The close affiliation of the farm bureau organization with the State and County Extension Service is expected to continue indefinitely in a cooperative manner. The Nevada Extension Service and the farm bureau organization have closely interlocked in promoting their respective programs. The Extension Service will continue in its educational program with the Farm Bureau functioning in a legislative capacity. This will relieve the Extension Service of any need for serving in any political capacity when promoting agricultural or business projects.

GRAIN CONSERVATION PROGRAM

During the early part of this calendar year, the U. S. Department of Agriculture launched a drive to save bread grains, so that the amount of bread grains pledged by the United States Government for export needs of Europe would be available. This grain conservation program took numerous forms, and the U. S. Department of Agriculture through its many branches was given the job of supervising this grain conserving program, and saving for this purpose an extra 100,000 tons of wheat.

Among the conservation measures was the promotion of feeding animals to a smaller size, thus reducing the amount of feed required to finish the animal for market. Such smaller animals would also require less feed for maintenance.

Another practice advocated was the widespread rat extermination program, which was promoted for the purpose of saving grain on a national scale.

Another conservation measure provided for adequate storage, weather proofed bins, and careful handling from the harvesting machinery to the place of consumption.

Another conservation measure was the protection of livestock and poultry from external and internal parasites, so that such animals would make cheaper gains.

This office gave considerable attention to these various conservation measures by dispensing the literature sent out by the U. S. Department of Agriculture through the various county agents.

CORRESPONDENCE

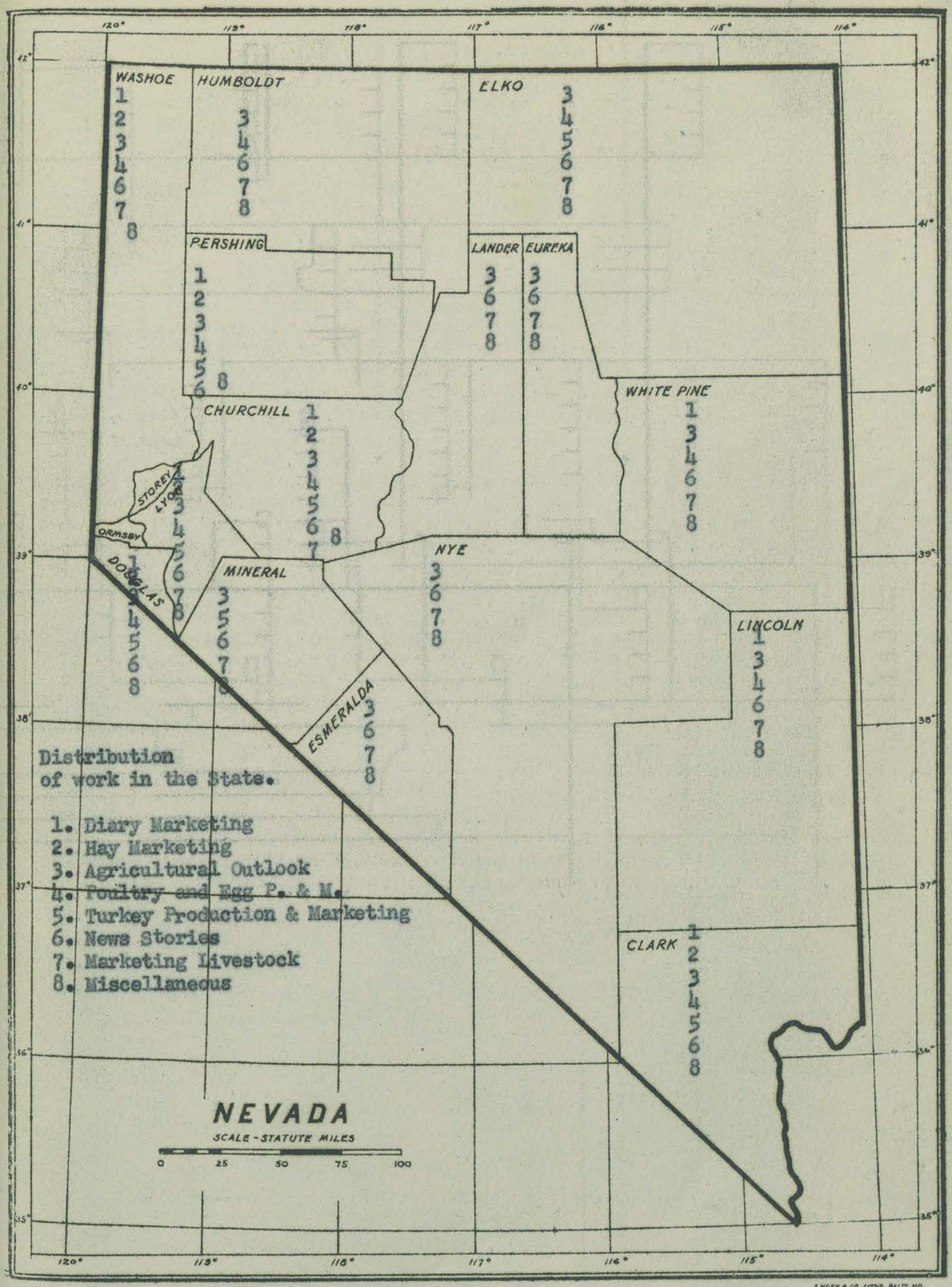
The representative of this office is given the duty of taking care of much of the correspondence that comes to the Extension Office relative to agricultural matters, especially those of a technical nature asking for information on breeding, feeding, marketing and general care of livestock, turkeys and poultry. These inquiries call for a lot of preparation in order to supply the technical details included in the questions, especially those concerned with the compounding of proper feed rations for the various localities interested.

In addition to such inquiries, out of town visitors as well as local visitors call at the office for such information or request bulletins covering the subjects in which they are interested.

It is estimated that 10% of the time of this office is devoted to miscellaneous activities.

The following is a numerical summary of the activities carried on by this office in connection with Nevada Extension Project No. VI:

Number of days in office	-- 211
Number of days in field	-- 40
Total number of miles traveled	-- 6,020
By train - 1,400	
By auto - 4,620	
Number of visits to Extension agents	-- 33
Number of leaders interviewed	-- 226
Number of result demonstrations visited	-- 20
Number of leader training meetings attended	-- 25
Number in attendance	-- 190
Number of meetings at result demonstrations	-- 11
Number in attendance	-- 85
Number of other meetings attended	-- 18
Number in attendance	-- 850
Number of news articles prepared	-- 17
Number of conferences by telephone	-- 52
Number of days devoted to project planning	-- 31
Number of days devoted to cooperative agencies	-- 75
Number of days spent in keeping agents posted on subject matter	-- 23
Number of days spent in direct teaching of rural people	-- 33
Number of days devoted to determining project accomplishments	-- 14
Number of days devoted to miscellaneous	-- 13
Number of days devoted to reports	-- 15
Number of days devoted to preparation of Extension Material	-- 47
Total days devoted to adult work	-- 251



A. HOEN & CO. LITHO. BALTO. MD.

UNIVERSITY OF NEVADA

Agricultural Extension Division

Cecil W. Creel,
Director

Annual Report of Agricultural Extension Work

(Project V)

Extension Forestry Work

for

1 9 4 8

By
Don M. Drummond
Extension Forester

ANNUAL REPORT OF THE EXTENSION FORESTER
STATE OF NEVADA
1948

A. RURAL FIRE PROTECTION (by Counties)

1. Washoe. Although the rural fire district contemplated in Washoe Valley did not materialize, interest is still high. Interest in rural fire districts was aroused in the Verdi area, and in the Mount Rose vicinity.

2. Storey. Storey County is well equipped to combat the rural structural, brush and grass fires that occur.

3. Lyon. The Smith Valley Rural Fire District purchased a new piece of fire fighting equipment in the Fall of 1948. The County Agent of Lyon County is doing a nice job in the encouragement of the Fire District in Lyon County.

4. Churchill. The rural areas are given fire protection from the County Seat. The County purchased during 1948 another piece of fine modern fire fighting equipment with which to combat rural fires.

5. Pershing. Through the efforts of the Extension Forester and the County Agent of Pershing County, interest has been revived in the formation of a rural fire protection district to take in the rural areas around Lovelock. Action will begin with a public meeting, officials from the Board of Fire Underwriters, and the Extension Forester on March 1.

6. Humboldt. The organization of the Paradise Valley unit was completed in 1948. The Extension Forester has the responsibility of instruction and assisting in fire prevention work in this area.

The Grazing Service and the Indian Service assisted through the fire season by placing fire fighting equipment at McDermitt. More work to arouse the proper amount of interest for the formation of a rural district is necessary in the McDermitt area.

7. Elko. Elko County purchased during the year 1948 one high pressure fog unit and mounted it on a 4 x 4 Dodge Power Wagon for fighting rural and range fires. A "slip-on" unit was purchased for use in the vicinity of Wells.

8. Lander - Eureka. Interest is quite high in the vicinity of Beowawee for the formation of a rural fire district. However, there is hardly enough taxable property within the area to support a rural fire district. Plans are being followed to determine whether or not a Clarke-McNary fire district can be formed to assist in financing the district.

9. White Pine. The City of Ely Fire Department is relied on by those outside the limits for fire protection. Probably no rural fire district will ever be formed, but the Extension Service should continue to work with the City Fire Department to better their performance.

10. Lincoln. Because of the new extension forester employed in July has not had an opportunity as yet to become acquainted with the problems in the Ursine area, interest has not been pushed. Low tax valuation is a problem in this area. Considerable on-the-ground fire prevention work will be done in this area.

11. Clark. Further work on rural fire districts will be done in Moapa, Mesquite, and the Overton areas. Work was begun in the Fall of 1948 on the formation of a Clarke-McNary Fire Protection District in the vicintiy of Charleston Mountain which is the watershed area for the Las Vegas area and vicinity.

12. Mineral, Nye, Esmeralda, Ormsby. No rural fire work was done in these four counties. However, rural fire protection was stressed, and will continue to be pushed by the Extension Forester.

13. Douglas. The rural fires in this county are handled by County-owned equipment. The County purchased, on recommendation of the Extension Forester, a fire fighting unit that has given them many times the protection their old equipment offered.

Douglas County also supports a rural fire protection district around Lake Tahoe.

General. Fire prevention work was done on a state-wide basis through the schools, civic clubs, and community meetings. Demonstrations, visual aids, lectures, and newspapers were used.

B. CLARKE-McNARY SECTION 4 TREE PLANTING

1. All rural areas in all counties need windbreaks on ranches for crop and building protection and feed lot protection. Shade is needed in many pastures for protection of livestock from summer heat. During 1948 more trees for windbreaks purposes were planted than in any previous year.

2. Experimental work was begun in a small way on the use of Arizona Cypress for windbreak plantings in the Las Vegas area. Seed was procured last winter from Arizona by the Extension Forester. The seedlings are now growing in the Clarke-McNary Nursery in Logan, Utah. They will be planted in demonstration windbreaks in Clark County next year.

C. LUMBERING

There are several small sawmills in Nevada - Clark County, White Pine County, Lyon County, and Churchill County - that are cutting some timber, both pine and cottonwood, from privately owned areas. Some work on technical operation and economical cutting practices have been provided these operators, but more work is necessary along these lines in the future.

D. WOOD PRESERVATION

The use of the latest satisfactory, easy, and economical means for preserving fence posts and other farm timbers was stressed by the Extension Forester. Two satisfactory demonstrations were held during the first part of December. A pamphlet prepared by the Extension Forester was distributed. Two demonstrations have been set up -- one in Douglas County and one in Ormsby County. Arrangements are being made for more of this type of work during the coming year.

E. 4-H CLUB WORK

The Extension Forester took part in the annual 4-H Club Camp by bringing a fire prevention lesson to the group. A field trip was undertaken by the Recreation Leader, assisted by the Extension Forester.

F. MISCELLANEOUS

Many of the older windbreak trees in Nevada, and ornamental trees throughout the State, suffer from disease. The Extension Forester has answered many inquiries. Material for a bulletin along these lines has been brought together and it is hoped it can be printed for distribution this year.

STATE OF NEVADA

Distribution of Forest Trees from Clarke-McNary Nursery
Logan, Utah
Through Cooperation with Utah Extension Service

By Counties and Years

COUNTY	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	TOTAL
Churchill	-	529	900	770	1350	1425	225	-	125	650	650	-	-	450	2275	4075	13,424
Clark	250	-	-	100	960	625	750	1470	700	-	200	-	1750	-	700	1790	9,295
Douglas	-	550	750	575	425	2650	1765	1450	975	150	-	585	525	-	425	-	10,825
Elko	100	350	545	1640	551	3725	3356	2975	1480	1055	-	600	550	2750	125	1675	21,477
Esmeralda	-	-	-	200	200	200	200	-	-	-	-	925	700	400	-	-	2,825
Eureka	-	33	200	200	150	700	143	445	200	1795	-	4500	25	-	-	-	8,391
Humboldt	100	150	580	380	180	14225	985	1035	1150	875	475	400	-	625	50	1175	22,385
Lander	45	10	500	-	25	100	100	-	-	100	-	200	-	75	-	450	1,605
Lincoln	-	200	-	100	625	-	590	850	400	150	50	-	500	525	-	-	3,990
Lyon	830	795	1240	1160	2198	1733	796	1672	681	500	325	700	2075	2825	550	950	19,030
Mineral	100	850	110	100	100	-	125	-	-	-	-	-	-	-	9500	-	10,885
Nye	-	12	105	-	-	200	-	75	-	-	-	300	-	225	100	400	1,417
Ormsby	-	-	-	505	135	350	375	500	910	225	1250		150	1025	400	1895	7,720
Pershing	200	883	1175	1485	825	1050	1600	1550	1125	625	250	125	-	-	100	455	11,448
Washoe	520	2372	925	7280	2130	3893	2261	1525	1600	1525	125	985	4900	8096	3050	8800	49,987
White Pine	915	100	1042	1390	140	1615	650	295	625	425	250	400	100	-	-	150	8,097
TOTAL	3060	6834	8072	15885	9994	32491	13921	13842	9971	8075	3575	9720	11275	16996	17275	21815	202.801

Don M. Drummond
Extension Forester
December 15, 1948

UNIVERSITY OF NEVADA

Agricultural Extension Division

Cecil W. Creel

Director

Annual Report of Agricultural Extension Work

(Project 2-B)

Extension Work in Home Economics

for

1948

By
Margaret M. Griffin

Assistant Director
for
Home Demonstration Work

UNIVERSITY OF NEVADA
AGRICULTURAL EXTENSION SERVICE
AND

U. S. DEPARTMENT OF AGRICULTURE COOPERATING
STATE OF NEVADA
1948

Name of Project: 2-B Extension Work in Home Economics by means of County and District Extension Agents.

Leader: Margaret M. Griffin, Assistant Director for Home Demonstration Work.

I. SUPERVISORY ACTIVITIES

A. Supervisory Situation

The Assistant Director for Home Demonstration Work had charge of the Home Economics Extension work in the state and directly supervised all women agents and a part-time nutrition specialist. She assisted in the formulating of state, district, county and community programs of work in the home economics field; suggested and approved changes made in programs; prepared and approved subject-matter materials used and published by the State office and agents; coordinated work with other agencies; provided for suitable and adequate publicity for the Home Economics Division of the State Extension Service; proposed and provided for needed and approved expansion of programs; assisted agents in acquiring suitable work centers, working materials, equipment and supplies.

Working with the Assistant Director for Junior Extension Work, the Assistant Director for Home Demonstration Work supervised 4-H and older youth work in the field of Home Economics. She supervised leadership training for leaders of 4-H home economics projects and subject-matter material used for these projects. She assisted the Assistant Director for Junior Extension Work with county, district, and state-wide 4-H programs such as county and state achievement programs and state club camp.

The Assistant Director for Home Demonstration Work cooperatively worked with the Assistant Director for County Agent work in the following: personnel relationships of county and district agents, including office procedure, joint reports, etc. In the development of programs concerning home gardens, farm homes and buildings, and frozen foods, the Assistant Director for County Agent Work provided some supervisory assistance to the women extension agents especially in those phases of the work that come more directly under the field of Agriculture, rather than Home Economics.

B. PERSONNEL PROBLEMS

1. Staff

During the fiscal year, November 1, 1947 to October 31, 1948, the staff of the Home Demonstration Division of the Extension Service underwent no changes. As of October 31, 1948, the staff consists of the following:

Miss Margaret M. Griffin	Assistant Director for Home Demonstration Work
Dr. Penelope B. Rice	Nutrition Consultant (1/5 time)

Women Extension Agents	County
Miss M. Gertrude Hayes	Washoe
Mrs. Lena Mauke Berry	Churchill
Mrs. Olive C. McCracken	Douglas, Ormsby, Storey
Mrs. Rose Spezia	Elko
Miss Madge Elder	Lyon and Mineral
Miss J. Hazel Zimmerman	Clark and Lincoln

Thus, six agents and one assistant agent served directly ten of the seventeen counties in the State, and the Assistant Director for Home Demonstration Work served as agent-at-large to the other counties. Additional personnel is necessary in order to adequately meet the needs of all of the counties in the State. Agents-at-large cannot do the work satisfactorily. The extensive area of counties, isolated homes and travel conditions, do not allow for enough follow-up work with all groups when agents are assigned to more than two counties.

Existing budgets made no allowance for an expanded home demonstration program. It was not possible to replace the vacancy existing in Humboldt and Pershing Counties due to lack of funds. The entire salaries of Agents McCracken and Zimmerman and a percentage of the salaries of the other women agents come from Federal funds. Travel and other expenses were met by some Federal and some State funds. Further needed expansion of the program will require more funds -- State and Federal.

It is very advisable that a home demonstration agent be assigned to Pershing, Humboldt and Northern Lander Counties in order to carry on the program that was organized there by Mrs. Spezia, during the period 1945 - 1947.

Additional specialists are needed on the State staff, especially one in the fields of housing and home improvement. The system of assigning specialist duties to agents is not satisfactory especially because of the expansion of their regular programs which curtails the amount of time that might be devoted to specialist duties. Furthermore, "specialists" should be qualified in their individual fields. It would be advisable to have both a specialist in nutrition and one in housing and home improvement, or at least a part-time person attached to the staff in each field.

2. Training

a. Agents

Because of the difficulty that exists in finding trained and experienced personnel for home demonstration positions, it has been necessary to provide pre-service and in-service training particularly adapted to the type of personnel that we can employ.

No specialists from the National Office visited Nevada during the year, which was regretable as the training and inspriation that they could have provided to the personnel would have been of great value. Although training progrems were held, it was not possible to hold workshops attended by all agents every two months as planned. This was due to the heavy schedules of the agents and also because of travel expense.

In-service training was provided the various agents in the counties by means of conferences and demonstrations conducted by the Assistant Director of Home Demonstration Work. Subject-matter materials, visual and other teaching aids were prepared, selected and disseminated to the agents by the State staff.

In December, 1947, a workshop in Home Management was conducted. Dr. Jean Warren, Head, College of Home Economics, California Agricultural College, led this conference.

Exchange visits by agents between counties was done in the line of training. Agents acted as judges at the Elko County Fair and at the Nevada State Fair held at Fallon during the summer.

Agents were provided training offered by various public agencies such as the Red Cross, Cancer Control Programs, Tuberculosis Association, and Health Clinics, to the extent that they were able to give their cooperation in bringing a knowledge of these programs and their provisions to the women in their groups. They also brought cases needing care to the attention of health authorities.

Agents were influenced to make a continuous evaluation of their work accomplishments and of current trends in order to adjust their programs to best meet present and changing conditions.

In addition, training conferences were held with the agents when they were in Reno for such state-wide activities as the State Achievement Day Program, Junior Livestock Show, and during 4-H Camp.

There is a great need for agents to take continuous additional training. Provision of training courses in the Extension field, both graduate and under-graduate, should be provided at the University of Nevada. Opportunities for the professional advancement of agents must become more available, and they must be given an opportunity to have time to take this work.

b. Leadership Training

The expansion of the 4-H program in homemaking projects necessitated training of new leaders and the agents spent much time in working with the leaders both individually and in groups.

Leadership training conferences were conducted by the agents and the Assistant Director for Home Demonstration Work throughout the year. In Churchill County the program functions well through a Leaders' Council. In Washoe County, the leaders meet several times a year not only for training, but to organize and carry on various community programs, and contests among their groups. These include gardening programs, health drives, safety campaigns, hobby-shows and others.

There is a need for more leadership training. State-wide programs would be of value, but district or county programs seem to be most effective. There was an apparent improvement in the standardization of the work throughout the State, during the past year, both in 4-H and adult work done under lay leaders.

c. Training for State Staff Members

The Assistant Director for Home Demonstration Work did not attend any conferences or training programs held out of the state during the past year, due mainly to lack of funds.

3. Improvement of Working Conditions to Retain Agents

Opportunities and facilities for studying the Federal Retirement System were made available to the agents. Mr. L. E. Cline, a specialist in the State Office was put in charge of this service, and some of the agents made arrangements to avail themselves of this opportunity.

Salary increases were made for all Home Demonstration Agents.

Additional equipment and educational supplies were provided for the women agents during the year. Agents purchased as much equipment as possible from county funds - although funds were limited. Slides, movies, visual aid materials, subject-matter materials were continually supplied. Since the time of the agents is being taken more and more with group and individual contacts in their attempts to work with more people, a larger part of the demonstration and illustrative materials were prepared at a central point for distribution to the agents.

Work centers were established during the previous year in Gardnerville and Carson, and during the past year a workshop was completed in Reno for the use of Washoe County homemakers. The centers serve as a means of reaching more people as well as a means of publicizing what the Home Demonstration Program has to offer.

The Assistant Director for Home Demonstration Work has assisted the agents with their schedules so that more efficiency has resulted. This can be further stressed, and such efficiency will have to be worked out if the home demonstration field will appeal to young women now preparing for their careers.

Subject-matter materials have been revised both for adult and 4-H work. Timely subject matter has been published and given to agents and others requesting it.

C. PROGRAM

1. Program Determination

During the past year, all Home Economics work both for adults and rural young people was centered on programs contributing to their needs and interests as homemakers and members of their family groups and communities. Agents worked closely with Councils, executive committees and with entire homemaking clubs in determining the program that was to be carried on and also in regard to its execution.

It was continually apparent that homemakers were needing and requesting help with their many new problems in the rapidly expanding field of family and community life. Every effort was made by the agents to give the homemakers a broadened program of homemaking. Economic problems and public policies; social relationships, adjustments and cultural values; health and medical care; housing; farm and home financial planning; consumer education; parent education and family life were programs in which increased assistance was given to rural people in helping them to solve their problems of community welfare, and their responsibilities as citizens in regard to both national and international situations.

Members of Homemakers Clubs were encouraged to develop their own programs for the year with the assistance of the agents. In almost all instances part of the program time was given to the women themselves for the consideration of economic problems, current topics of national and international significance; cultural pursuits. A definite indication of the recognition, on the part of the homemakers of the responsibilities, needs and demands of people living together was continually evidenced during the year, as well as their increased appreciation of the cultural values, and of current economic trends and forces.

The labor situation was improved. In addition to more farm laborers being available, more women were available for cooking jobs which allowed the farm homemaker to have more time for other activities. The increased interest in work simplification methods was an outgrowth, in many instances, of the experiences of the homemaker during the war years.

Food production and conservation; clothing conservation; repair and care of furnishings were programs which still were of major consideration. Home and farm management, home and yard improvement, gardens, family and community relationships were of concern to all groups.

Home demonstration agents continued to work with the women on fat salvage, clothing collection, Red Cross drives and sewing, bond committees, price control boards, USO, health clinics, tuberculosis and cancer control programs.

The Assistant Director for Home Demonstration Work assisted the new agents in the organization of new homemakers' clubs, and in those communities that did not have a regular agent, gave demonstrations and met with the clubs.

The expansion of the home demonstration program to reach more families in areas of the State not hitherto given assistance, both in adult and 4-H fields, was the major supervisory problem of the Assistant Director for Home Demonstration Work during the past year. Newly assigned agents needed assistance in many ways, and in addition it was necessary to create on the part of the people themselves an appreciation of what the Extension Program had to offer to them.

Agents were encouraged and assisted in obtaining and analyzing local factual data. Individual contacts were maintained as much as possible, and the agents not only contacted but became active members of various local groups and organizations. For instance, the agent in Washoe County is a member of the State Board of Directors for the Nevada Tuberculosis Association; the district agent for Ormsby, Douglas and Storey Counties was a

member of the P. T. A. School Lunch Committee; the Elko County agent has served for a number of years as County Nutrition Chairman. Community contacts such as these have been an invaluable means of determining needs of the individual and the community.

Planning and advisory groups were used more extensively during the past year, and included 4-H councils as well as executive and advisory groups for homemakers' clubs. In one county an executive homemakers' committee, composed of the presidents of each homemakers' club, meets monthly for the purpose of program determination, community relationships, 4-H sponsorship and other problems that are of interest to the various clubs. As a result of the cooperation between these councils and the agents, closer integration of all programs designed for the farm family, i.e., home demonstration, agriculture and junior work has resulted. Monthly and annual Farm Center and Farm Bureau meetings were planned to include something of interest from each program, goals as well as accomplishments.

2. Fields of Major Emphasis

Foods and Nutrition

Food production and preservation continued to receive special emphasis throughout the year. Garden projects were greatly stressed and many rural families continued not only to supply food for themselves but, in addition, for the market. Many rural families also produced meat, eggs and poultry for their home use for the first time as a result of the scarcity and high prices of these foods. There is a need for a specialist in truck gardening and the growing of small fruits.

A greater interest in meal planning, consumer education, sugarless recipes, meat substitutes, etc. was also evidenced by urban as well as rural homemakers.

Food preservation, particularly freezing, continued to be a program of great interest to the homemakers. There are now commercial freezing plants in five communities in the State: Las Vegas, Reno, Elko, Sparks, and Fallon. Many farm families installed deep freeze units. Assistance was given in the selection and use of home freezing equipment to many more people this year than ever before.

The nutritional consultant (who works 1/8 time) supervised publicity, and publication of subject matter. The Assistant Director for Home Demonstration Work is a member of the Executive Committee of the Nevada Food and Health Coordinating Committee, (now the Nevada Citizens' Food Committee) which is an outgrowth of the Nevada State Nutrition Council. She became chairman of the Committee November 1, 1948.

The Assistant Director and agents continued throughout the year to lend all possible assistance with school lunch projects. In some communities, homemakers' clubs actively sponsored the programs.

Home Management and Housing

The home management program continued to assist homemakers to utilize more efficiently their finances, time and labor. Housing improvement, and work simplification methods received much attention, as well as consumer education as to the selection of furnishings, equipment, etc. Kitchen improvement and refinishing and upholstering of furnishings were of interest to all groups. Workshops in upholstery ranging from one-week to four-week periods were conducted by all agents and also by the Assistant Director for Home Demonstration Work.

It is hoped that, during the coming year, more work can be done in housing. Agents are in need of additional training in this field, and surveys need to be made before any effective program may be carried out. Research in this field, especially the Regional Research Project, will be of unlimited assistance to the Extension workers.

Budgets and accounting studies carried on cooperatively by the Extension Service and the Experiment Station were of immeasurable help to farmers. Farm and family outlook material formed a basis of discussion at meetings. Definite types of record books were shown and explained to the end that more families were keeping farm and home accounts than ever before. In one county, Washoe, more than 200 families were assisted in making food budgets by the woman agent.

Money management and family relationship discussions were held at homemakers' and 4-H Club meetings. Families have more money to spend. Children are working and in some cases the mother. Guidance is needed in the spending of money.

Motion-studies on the preparation of various foods, meal preparation, use of equipment were carried on. Also, discussions were held on the choice, use and care of new equipment available.

Yard improvement and home ground beautification was approached from both the point of safety and appearance. In one county, Churchill, approximately 90% of homes in the County carried on some phase of yard improvement work. This program was very popular in Washoe and Elko Counties due to large number of newly constructed home and housing units. Safety measures were an aid in building up community morale as well as improving the appearance of the farm home.

In those counties that did not have the services of a regular agent, the agent-at-large met a great demand for assistance with all phases of home improvement. In order that the program would be continued when the agent was not present, leaders were trained to carry on the work.

Clothing

Clothing selection, remodeling and conservation, and care and repair of sewing equipment formed the basis for the work done in the counties in this field. Clothing clinics were conducted throughout the State. Good grooming, clothing suited to the individual, remodeling of hats and furs and knitted garments, glove making, consumer education were all stressed. The clever and resourceful use of substitute materials such as feed sacks formed one of the interesting demonstrations throughout the year, and this was one of the entries at the Nevada State Fair.

Family Life and Parent Education

As a result of the War and the many consequent adjustments of family life, many new requests for assistance were made of the agents. These included problems in parent education, family relationships, community relationships, child development and guidance. Some phase of this work was included in every homemakers' meeting. Special programs were designed to assist young homemakers, GI wives. This program can and will be given further impetus.

Health

In addition to the work that is done in health education such as sanitation, nutrition, production and proper utilization of adequate home food supplies, emphasis was directed, during the year, to assisting rural people to organize for group medical services. The agents assisted the women and 4-H youth to analyze their own health problems and to avail themselves of more adequate health facilities and services, such as Blue Cross Hospitalization Insurance.

Continued cooperation with the State Department of Public Health was maintained, especially in the furtherance of good growth and development programs in rural schools.

Health and safety projects were conducted. In one county, each family was asked to make a check of fire and safety hazards in their home. 4-H members made a similar check in their homes. If there was more than one 4-H member in a family, one of the boys or girls would check a neighbor's home.

4-H Club Work

The Assistant Director for Home Demonstration Work worked under the direction of the Assistant Director of Junior Extension Work and to some extent supervised 4-H Home Economics projects, supervised leadership training of leaders for these same clubs, and assisted the Assistant Director for Junior Extension Work in all joint undertakings that involved problems in the Home Economics field such as club camps and 4-H achievement days and contests.

4-H County Achievement programs were given more publicity and prestige, and again this year a State Achievement Day Program was conducted at the University of Nevada at which county winners competed for State honors. Entries in Style Dress Revue, Kerr Canning, Meal Preparation, Girls' Record, Clothing Achievement, Knitting were judged in the morning of October 16, by the following judges: Mrs. Chester Elliott; Miss Mildred Huber, State Supervisor of Home Economics Education; and Mrs. Haidee Moore, Teacher of Home Economics, Stewart Indian School.

The following girls were named State winners:

Canning	First - Theo Ann Smitten	Churchill
	Second - Lucille Cordes	Douglas
Clothing Achievement		
	First - Lorraine Bassman	Douglas
	Second - Velma Sheen	Washoe
Food Preparation		
	First - Elaine Teel	Churchill
	Second - Dorothy Harmon	Douglas
Frozen Foods	First - Alice Melendy	Washoe
	Second - Alta Tietje	Douglas
Girls Record	First - Lauretta Corkill	Churchill
	Second - Loretta Bassman	Douglas
Knitting and Crocheting		
	Janelle Glock	Douglas
Style Dress Revue		
	First - Joyce Hoover	Washoe
Tie	(Second - Ruth Fitz	Churchill
	(Second - Bonnie Faye Wilson	Lyon

The State winners attended the National 4-H Congress in Chicago. They were accompanied by Paul L. Maloney, Assistant Director for Junior Extension Work, and Miss Madge Elder, District Home Demonstration Agent, Lyon and Mineral Counties.

Efforts are being made to organize 4-H homemaking projects on a yearly basis, enrolling new members during February, March and April. Women agents have been successful in expanding the 4-H program in both the Home Economics and Agricultural fields. The annual Junior Livestock Show, county and state achievement programs, exhibits at county and the State Fair have served as an impetus to the program. Also the close sponsorship of the 4-H program by the homemakers' clubs have been of great assistance in developing the junior work.

II. COOPERATION WITH OTHER AGENCIES

Close cooperative relations were maintained with all organizations and agencies that had to do with the problems of rural and urban people. Included among these are the Nevada Food and Health Coordinating Committee, State Department of Education, Department of Public Health, Red Cross, Child Welfare and Old Age Assistance Divisions, Tuberculosis Association, Agricultural Adjustment Agency, Soil Conservation Service, Office of Price Administration, U. S. Employment Service, County Commissioners, Farm Credit Administration, Federal Land Bank, Indian Service, schools, churches, fraternal organizations, Maternal and Infant Care Program, and others.

Planning and guiding efforts in the solution of local and State problems constituted the major contribution of such cooperative relationships, as well as the avoidance of duplication and promotion of services. The small population of communities in Nevada has always made for a high degree of cooperation among agencies, and the fact that staffs of programs are limited in number has been a factor in this.

Throughout the history of home demonstration work in Nevada, the closest working relationships have been maintained with the Department of Public Health. The nutritional studies conducted by the Nevada Health and Food Coordinating Committee were actively carried on by public health nurses and women extension agents in cooperation with school officials. The chairmanship of the Nevada Citizens' Food Committee, formerly the Nevada Health and Food Coordinating Committee, rotates among representatives of the State Department of Public Instruction. State Department of Public Health and the Extension Service, the vice-chairmanship is held by one of the agencies, and that of past-chairman being the assignment of the other group.

The Assistant Director for Home Demonstration Work served as State Chairman for the Friendship Train Activities, and will act as State Chairman of the French "Thank You Train" program. Members of the Nevada State Farm Bureau and Extension agents lent enthusiastic and effective assistance in successfully accomplishing the goals of this program. The quota set for Nevada was one car load of food; two cars were filled.

The homemakers' clubs are continually becoming more active in community affairs. Many new activities originated during the War, have continued, and the assistance given to the Red Cross, Tuberculosis and Cancer Control Program is particularly noteworthy. The women have become more active in promoting the services of these agencies, and in creating an awareness among rural people of the advantages of the services which are provided. Similarly, throughout the State, the Extension Service continued to work with all interested groups and organizations in bringing assistance needed to make for a more correctly informed rural

citizenry in regard to their social, economic, national, state and community affairs.

III. MAJOR DEVELOPMENTS CONTEMPLATED FOR 1949

1. Further expansion of the homemaking program to areas in State not now provided with this service.

   Need for one full-time agent in Pershing and Humboldt Counties and one agent, preferably full-time, in White Pine County.

2. Improved and increased leadership for adult and 4-H groups.

   Leadership training on an improved scale is essential. Agents need assistance in the selection of better leaders. It is hoped that more workshops, training conferences, and more opportunities for professional advancement may be provided during the coming year.

3. An effective sound program in homemaking education that will adequately meet the needs of homemakers and 4-H girls.

4. A more correctly informed rural citizenry in regard to their social, economic, national, state and community affairs.

5. The increased efficiency of homemaking methods in use by all homemakers within the State.

6. Further development of the neighborhood leadership technique.

7. Improvements in 4-H Home Economics Club work as follows:
   Increased club enrollment
   Increased project completion
   More and better trained leaders
   Increased participation on the local, county, and state levels in 4-H content. Further development of the truly educational values of "contests."

8. The development and accomplishment of a sound and effective health program that will result in improved nutritional and all other health promotional activities on the part of both young people and adults.

9. Revision of subject-matter materials previously published by Nevada Extension Service, especially 4-H Home Economics Project subject matter.

10. A more adequate program of pre-service and in-service training for home demonstration agents.

11. To develop improved working relationships between staff members and cooperating groups and agencies.

12. To develop and expand programs with all cooperating groups that are concerned with solving community, state, national, and international problems.

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

ANNUAL REPORT OF AGRICULTURAL EXTENSION NEWS SERVICE

FOR

1948

BY

A. L. HIGGINBOTHAM, EXTENSION EDITOR

REPORT OF THE EXTENSION EDITOR
AGRICULTURAL EXTENSION DIVISION
UNIVERSITY OF NEVADA

For the Year 1948
By
A. L. Higginbotham

Food will win the war....and assure the peace.

The war is over. Food had much to do with winning it.

But peace is not yet assured. And food will have much to do with achieving it.

That was the theme of the news service of the University of Nevada agricultural extension service during 1948.

Abundant production, careful conservation, efficient operation, sound use by consumers.....these highlighted the news which went to the farmers and homemakers, through their newspapers, farm magazines, and radio stations from the state office of the extension service during the year.

News Service Ready for Emergency

Into this food emergency situation, the news service of the University of Nevada agricultural extension service continues to fit efficiently, as it did during the war years.

During 1948, the news service has brought to every farmer and homemaker in the state who reads or listens, the importance of the peace, food efforts and facts related to it which lead toward achievement of the goals which result from victory.

Service is Prepared

The problem of conveying information to the people of the state as quickly and effectively as possible is one for which the news service was prepared with a background of twenty years of practice.

It swung into the job as "natural" one for the news service, since post war information, dynamic and of the moment, is particularly adapted to handling as news. Food, food production, and food use continue, in this emergency, to be big news.

THE NEWS SERVICE

In terms of practices adopted, which is the goal of extension work, the news story is, by all odds, the cheapest and most effective extension technique. This principle is not only well recognized, but it has been proven time and again by surveys of unquestioned accuracy.

The press and radio, in matters related to farming as well as in other fields, form the chief mass medium in passing on information and in keeping up effort on behalf of the nation in its post-war crisis.

News Selects Post-War Effort

During 1948, the need for reaching rural people quickly with information which was news of the highest value was great. Through the press of the state, this goal could be realized.

The result was a steady flow of current, newsworthy, vital information to farmers and farm homemakers definitely related to their part in the national food effort.

News is Dynamic and of the Moment

A great deal of this effectiveness may be attributed to the fact that extension information in the form of news is far more dynamic than in the form of technical information.

Displayed in a local, thoroughly read newspaper with stories bright with the dynamic of the contemporary, extension news catches the urge to immediate action which stimulates activity on the farm or anywhere.

Extension news, moreover, is not read as one studies a textbook, but naturally, casually, as a farmer each day or each week takes times out to get acquainted with the changing nature of his cultural environment.

Read in Receptive Spirit

As such, it is accepted in a more receptive spirit than is the reading or studying of information which the farmer knows he ought to understand, but which is pretty hard work after a day following the plow or pitching hay. Extension news brings the information in homeopathic doses assimilated easily and without pain. In fact, it is even pleasantly taken.

News Story Chief Medium

This past year, as during the war years which preceded it, found the old-line medium of the news story bearing the brunt of the burden. Not only is it the key to public opinion in Nevada at all times, and, therefore should be stressed above all, it is especially vital in post-war times because it is the primary medium of post-war news.

Radio also, as one of the speedier methods, was stressed during the year, and Nevada radio stations carried more farm news than ever before. As the year ended, eight radio stations were operating in the state, all in the two largest cities.

One new bulletin was issued by the extension service during the year. Bulletins, in general, however, are less fitted than other commonly used media to the speed needed in emergencies.

With agents relieved of some of the wartime rush of their jobs, and with many new agents in the service, stress was given them in the use of mass media in extension work. And, under this stimulus, their news story production showed a sharp increase.

PMA and SCS News Covered

The extension editor also is prepared to handle the information work of the Nevada Production and Marketing Administration office, which is of considerable volume and the Nevada final preparation and distribution of Soil Conservation news originating in the regional office, as well as stories from the Nevada office.

In accordance with the request of the federal extension office, the Nevada editor continued with an arrangement with Pacific region office of the Production and Marketing Administration for the handling in Nevada of Nevada PMA news originating in the regional offices.

Specialist Number Limited

Chief handicap of the news service during the year has been the limited number of specialists as sources of news.

If news is to be handled so as to have a personal appeal, it must be localized. Specialists for this function are not available in many important fields. Those available have worked with a will and done a good job. But much, if not most, of the copy used by the news service is stimulated by suggestions of the extension editor, who has even acted as an unofficial garden story source, although everything has been checked by quotable extension workers.

Moreover, specialists are not anywhere near equal in their cooperation with the news service in stories. During the 1946 report year, for example, various specialists in the state office (some of them with administrative duties) varied in news story representation from 2 to 14. And some of the lowest ranking specialists are in contact more frequently with material of news value than those ranking high. It's really a matter of interest and willingness to work.

I.Q. and Education are Index

The method of presenting farm and home information to any group of persons must depend to a very large degree upon their intelligence and ability to understand.

If these factors are of a low grade, material must be adapted to that kind of reader and listener. If, on the contrary, there is a high I.Q. and an extensive educational background, the appeal can be made at a much higher level.

The rural people of Nevada, to whom the extension service directs its information through various channels, are very much above the average in intelligence and in education.

Nevada Farmers Rate High

According to the 1940 census, the median number of school years of Nevada rural people, 25 years and older, was 8.4, a figure exceeded in only seven other states.

This figure includes Nevada's Indians, who have their own extension service. The major contact of the extension news service, however, is with native whites. Among these, the median number of school years completed is nine, a standing exceeded only by Utah and Massachusetts.

Many College Graduates

While most rural people are not college graduates, the percentage of this group among the farm population is a significant index of the general intelligence and background. Only two states in the union exceed Nevada in the number of rural farm people, 25 years and older, who have completed four or more years of college. In Nevada the percentage is 9.5 again exceeded only by that of Utah and Massachusetts.

In brief, therefore, the appeal to Nevada farm people can be pitched at near the top level for farm people anywhere in the United States. Many Nevada news stories are more educational, therefore, than is possible in other states.

Map Shows Isolation

A map issued by the national highway users conference during World War II, indicates dramatically how dependent are Nevada rural people upon secondary contacts for their information and stimulus.

According to the map, there are three enormous areas in the United States which are 25 miles or more from any railroad line. Of these areas, two include large parts of Nevada. The third includes parts of New Mexico, Arizona, Utah, and Colorado.

Secondary Contacts Important

With so many of Nevada's rural people living in such an isolated area, the effectiveness of such secondary contact agencies as the newspaper, the magazine, the bulletin, the radio, and similar mass community methods is evident.

People living in the cities and towns of Nevada likewise are readersof the news stories issued by the University of Nevada agricultural extension service. Those with special interests, such as gardeners and homemakers, of course read copy related to their activities, but, the public also is concerned with agriculture, one of the basic industries of the state, the welfare of which affects one and all.

Now, like the farm people, these townspeople are of a high level intellectually and culturally.

Rate High in Education

Both farm and town people, taken together, in Nevada rate, among the states, third highest in completion of one to four years of college, exceeded only by California and Utah.

Except for Utah and Washington, Nevada has a greater percentage of its youth enrolled in school than any other state, this including, of course, both those living in rural and in urban communities.

In circulation of 18 nationally advertised magazines, an index of ability to read and of interest in contemporary affairs, the people of Nevada rank highest in the nation. Of each one thousand residents in 1940, including both farm and town, 509 subscribe to one or more of these magazines, compared with a national average of 284.

Above Average Intelligence

In short, then, the people of Nevada, whether living in town or in country, are way above the average in intelligence, in schooling, in reading, and in interest in contemporary affairs. Naturally enough, they read agricultural and homemaking news in their local papers with interest and understanding. Mass media methods are suited to them.

It is with such factors as these in mind, that the University agricultural extension news service is operating.

Development Is Reviewed

In 1947, the news service was conducted by the extension editor, A. L. Higginbotham, who also is professor of journalism in the University of Nevada. During the University year, about four-fifths of his time is devoted to resident teaching, but, during the summer recess, with the exception of a month's vacation, he devotes his entire time to extension editorial duties.

Thus, the news service to newspapers and the radio service, which require regular attention, are maintained the year around.

The news service of the University of Nevada agricultural extension service was inaugurated by Higginbotham in 1927, on a very small scale, and during the years since, has been developed to its present status, which in general, is ample to carry the load of news and editorial work during the normal years. In time of emergency, additional, part-time help is needed, and it has not been available in 1948.

News is Concrete

Extension news, in contrast to general scientific information, is related intimately to the physical and social environment with which the farmer and farm housewife deal nearly every day.

It has, therefore, a reality, a concreteness, which is appealing to the practical man or woman.

Wholesome competition between neighbors arises and practices are adopted for social reasons which bear fruit in economic and general cultural terms.

Because of additional social and psychological factors, the news story is superior as a means of conveying extension information to the rural people of a state.

News is Cheap

But, practices are adopted through news stories not only efficiently, but cheaply, as well.

And the reason for that lies in the fact that the newspapers, in serving the interests of their readers, bear the major portion of the expense of the dissemination of this information in the form of news stories.

The average news story issued by the agricultural extension service of the University of Nevada reaches the people of the state in nearly eighty-thousand copies of printed newspapers, and through several radio stations.

Many of these people are not farmers, but they often are gardeners, homemakers, or persons deeply interested for patriotic, social and economic reasons in the rural life of the state. And, nearly all of them are both federal and state taxpayers and are the rightful recipients of the services of the agricultural extension service.

Mass Communication Effective

Reports from Nevada and other states continued toverify the judgment that the mass communication media, and especially the newspapers, are relied upon by rural people as the primary source of their information from extension sources.

A survey of homemakers in Richmond, Virginia, in June of 1947, revealed an appalling lack of information about human nutrition.

The homemakers indicated that they wanted to learn about this important subject, although the information sought was less along the lines of nutrition than of new dishes and recipes.

"The homemakers themselves...considered newspapers and magazines the most helpful (media), and more homemakers were reached by these media than by any other."

In keeping with the challenge, the University of Nevada agricultural extension service is regularly carrying to the newspapers and radio stations of Nevada stories about human nutrition, in a form which homemakers can use.

Alabama Study Favors Printed Page

In a study of how Alabama farmers get agricultural information, Robert Leigh found that 38 percent of the ideas came to them in print.

"The printed page is the most authentic and most permanent form by which ideas may be given," he concluded.

A survey by an Iowa newspaper revealed that Iowa farm people rely more heavily on newspapers than any other mass communication medium for information on which to make up their minds about public questions. Included, of course, are agricultural questions.

In a survey of extension work in a Texas county last year, it was determined that "more people read extension articles in the newspapers and listened to extension radio programs than participating in any other way. A majority of men and women were reached through these media."

Papers and Stations Vie for Copy

Agricultural and home economics news issued by an extension news service should, of course, be newsworthy.

When, however, stories are so newsworthy that newspapers and radio stations compete among themselves to get the break on them, that is, indeed news!

Yet, during recent years, that very thing has happened in Nevada. Some time ago, during the days when release dates were used, an editor of an important Nevada daily on a holiday decided he had to have one of the Nevada extension news stories, so he jumped the release date.

He then called up the extension editor and told him that he had done it, but that he knew the extension editor didn't mind.

Well, the extension editor did mind, but more important, three editors in the state did and burned up the mail protesting that they had been "scooped" and that they didn't like it at all.

Want "Break" on Stories

Farm editors of Nevada radio stations have persistently over the years cajoled and urged and tried to get a special early release on all of the stories so that they can beat the newspapers. This appeal has been resisted successfully.

The city editor of one of the dailies in the state has discovered a way of beating the release-by-mail system.

Nearly all Nevada weekly newspapers are published at the week-end, coming out on Thursday, Friday, or Saturday. All extension news stories, therefore, are released for publication at the end of the week.

The city editor in question has learned that the papers published on Thursday sometimes reached his desk before the stories mailed from the state office, so he "scoops" the state office now and then by simply clipping the stories from the weekly paper.

Now what this all amounts to is that Nevada papers and radio stations really want extension news stories and are competing among themselves to get the first break on them.

Mailing List Important

Keeping the news story mailing list up to date is one of the important duties of the extension editor.

It has long been the conviction of the extension editor that news stories should always be addressed personally to the individual who has the authority to use or reject the story, whether it be on newspaper, magazine, radio station, news service, or any other agency.

This involves a constant checking of changes in personnel and remaking of addressograph plates.

Stories Individually Addressed

One of the reasons for the success of the extension news service, the editor believes, is this care given to seeing that it reaches the right person.

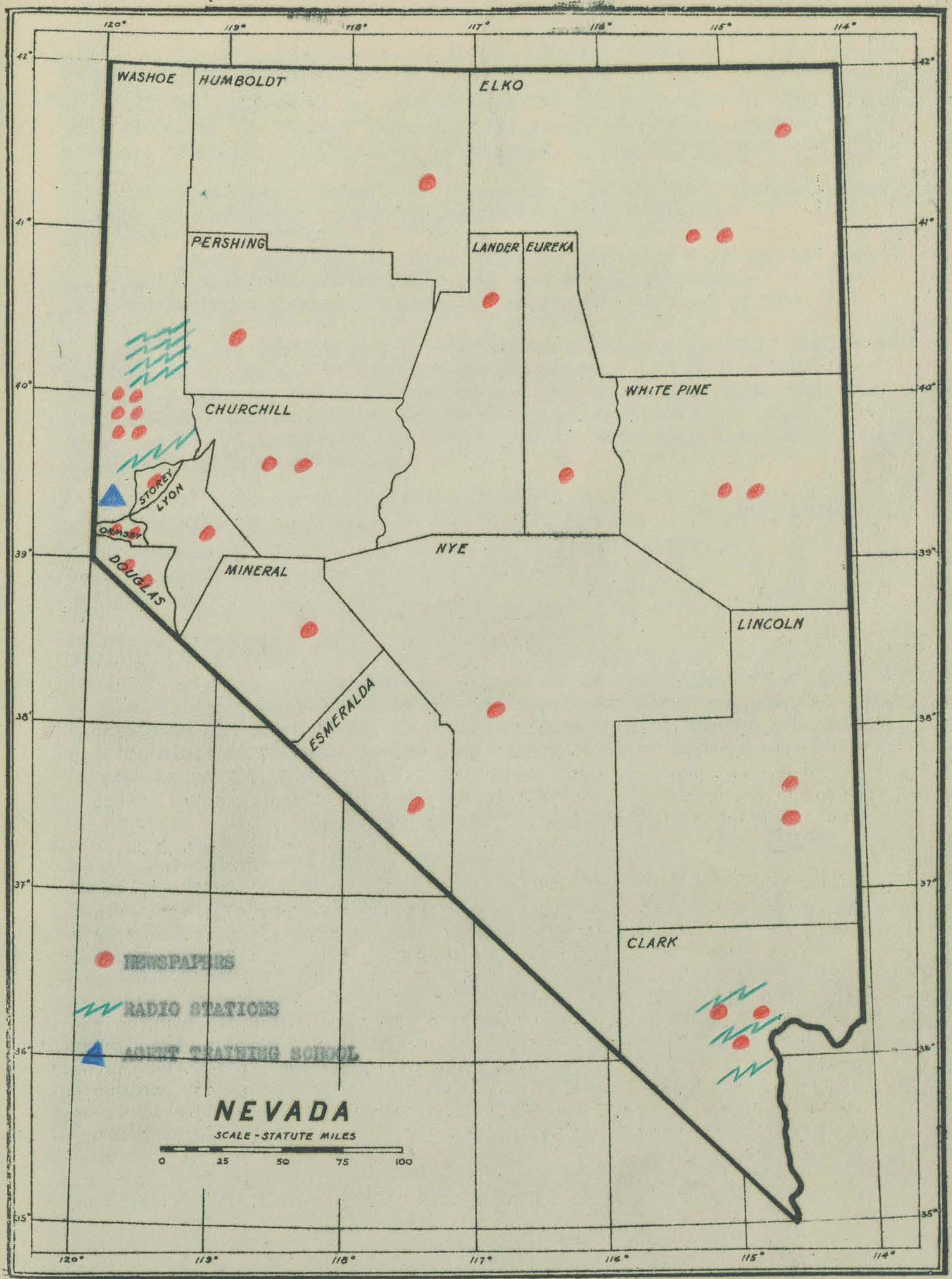
Some years ago, the extension editor heard a story about how lack of attention to mailing lists results in lack of confidence in stories on the part of newspaper editors.

An editor in California at one time was receiving four separate copies of all releases from a Washington agricultural agency. One was addressed to every editor of the paper since its founding and all four were arriving in the same mail. Naturally, he had very little respect for the people who were sending him the news.

State Stories News Service Backbone

State-wide stories, the backbone of the news service, go to the entire state list and to Nevada radio stations, as well as to newspapers and farm journals, the press association, and feature services outside the state; in addition, is the speical news service to five or fewer publications and radio stations.

In a normal year, the number of state-wide stories should run between 100 to 150, the latter being about the top amount of copy which Nevada newspapers can wisely use in peace time.



A. HOEN & CO. LITHO BALTO. MD.

One of Greatest Volumes

An analysis of the news service for the year, reveals that it has reached one of the highest figures in its peacetime history, running to 179 stories, totalling 62,000 words, an increase of about 25 percent over 1947.

News always reflects the current situation. And, of course, was so with subject matter of the 1948 state-wide news service.

During the year, as in the previous year, the color of the entire news story output was shifted to relate everything, if possible, to the farmers' and farm homemakers' part in the national post-war effort.

In the table below, is a breakdown of state-wide story numbers in relation to source and to the post-war emergency. Many more stories than indicated, however, are in support of the work of the Production and Marketing Administration, since, from a policy point of view, it often is desirable to originate copy along the lines of their objectives with extension specialists as educators.

	No. Stories
Regular Extension Activities	105
Nevada Office of the PMA	5
Soil Conservation Service	1
Miscellaneous	68

No Pattern Followed

The idea throughout the year was to do everything in the news service to carry post-war vital information. No attempt was made, as might be the case in normal times, to follow any set pattern related to a desirable emphasis in relation to the improvement of farming, ranching, and homemaking in the state.

Chief Subject Matter Categories

	No. Stories
Food Preservation	3
Gardening	6
Nutrition	13
Production	17
Salvage	1
Utilization of Food	6
Manpower	3
Loans and Insurance	9
Homemaking	10
Horticulture and Forestry	14
Personnel	1
Outlook	4
Engineering	5
General	87

Analysis of the state-wide news stories further shows that the great emphasis has been on agriculture, rather than on homemaking or on 4-H Club work.

This probably is a sound emphasis. Although homemaking stories run to only about one-fourth of the number of stories concerning agriculture, it is probable that that is a natural division in terms of news value. And, on account of the wartime emphasis on food and clothing, the number of home economics stories has increased in recent years.

Undoubtedly, there is room for many more 4-H club stories, news copy of a high caliber.

	No. Stories
Agriculture	124
Homemaking	34
4-H Club Work	21

Specialists Determine Pattern

While the extension editor exerts every effort to keep the emphasis on the most important projects and to produce a balanced service with variety and interest, much of the nature of stories in the news service is determined by the activitiesof the specialists in the state office.

The activities of each state specialist determine, to a very large extent, the nature of the information from which news service stories can be written. If for some reason, a specialist emphasizes a certain phase of his work for a long period of time, that emphasis is inevitably reflected in the news service. No matter how many suggestions are made by the extension editor, if the specialist doesnot have time to work on them, they do not produce information which can be used as news for papers or radio.

State Policy is Factor

In like manner, emphasis throughout the state determines, to a very large part, the nature of the emphasis in the state-wide news service. If a certain goal is being sought by the entire service, which requires an unusual amount of effort on the part of every member of the staff, whether in the counties or in the state office, it is obvious that some other things must be neglected.

With Nevada's small staff, it has been impossible for us to take on all of the obligations and to do all of them as thoroughly as we would like. The result has been that we have often devoted a major protion of our time to the things of the moment, rather than those which might be more important from the long point of view.

News Activity Varies

Great variation occurs in the number of stories originating from various members of the Nevada extension staff.

An analysis of the year 1946, reveals that one specialist was responsible for material for 14 state-wide stories, while another was authority for but two.

Of course, the kind of material handled by various specialists and agents is a determining factor in news value, but it does seem as though there should be less of a gap between the various workers in their news activities.

Cooperate With PMA and SCS

Every effort was made during the year to cooperate fully with the Nevada office of the Production and Marketing Administration and Soil Conservation Service in their Nevada activities.

Soil conservation news concerning Nevada's agriculture is supposed, by agreement, to be handled by the extension editor through cooperation by the Nevada state office of the Soil Conservation Service.

The extension editor continued during the year to handle news from the Nevada office of the Production and Marketing Administration and Nevada news originating in the PMA regional office in San Francisco.

A considerable protion of the total stories in the state-wide news service for the year dealt with PMA activities.

Special Stories Written

Since approximately the same time is required to prepare a story for the papers of the state, as for one or only a few publications, the state-wide story is and should be stressed.

Nonetheless, at certain times, one strong publication or group of smaller publications need and desire some special writing for them, and speical stories are then prepared. In 1948, such stories were written in a total of several thousand words.

4-H Camp Special News Event

In 1946, the Nevada 4-H club camp resumed its annual sessions, and an entirely new program, with the chief emphasis on recreation, was developed. Activities of the camp were covered daily in 1948, by the extension editor, but since the state-wide contests were no longer on the program, the volume of copy was much smaller than previous years, running however, to about six thousand words.

Newspaper Circulation Grows

The circulation of the papers as a whole continued to grow during 1948, in view of a sharp increase in state population--in percentage, second greatest in the United States--despite the shortage of newsprint.

As a result of these factors, a greater number of Nevada citizens joined the newspaper audience and are among the readers of Extension Service news stories. Total circulation in 1947, was about 80,000 for a population of about 150,000.

The number of newspapers published in the state was maintained through the year. Several papers, however, changed hands, with subsequent need for education in extension news values.

As a result, the chief agency of publication open in the state, came through another year, although plagued by post-war problems.

Most Stories Used by All

The play of Extension Service stories by the papers in the state remained at a high point during the year.

Over the year, the state's editors have continued to recognize that while mining is regarded as the state's primary industry, agriculture and stock raising is the industrial backbone of Nevada.

No definite survey of the percentage of the Extension News Service stories used by the papersof the state was made during 1948, but it probably about equalled the percentage determined in previous surveys--about 80 percent of the average for all the papers of the state, although the volume increased greatly.

In comparison with Nevada's 80 percent, in some states a batting average of 20 percent is considered good.

Nevada Rates High

Another far western state reported during the year on a check of the use by daily and weekly newspapers in its state of extension news stories. Maximum use of any of twenty stories during the period ran to about 30 percent.

While no recent check has been made of the use of Nevada stories by the papersof Nevada, there is every reason to believe that it is as high as it was a number of years ago when the average was about 75 percent.

By comparison, therefore, with another far western state with a good extension news service, Nevada is batting high.

One Story Brings Responses

There is no question, of course, of the reaching power of the news story as a medium of extension education.

It is pleasant, nonetheless, to have that fact verified. That happened recently in Nevada.

A story about a recipe involving the saving of sugar drew requests from 39 different communities, including 25 in Nevada scattered throughout the entire state, 10 in California, 1 in Colorado, 1 in West Virginia, and 2 in Kansas.

The story undoubtedly was carried not only by Nevada newspapers, but by those in neighboring states, by farm journals, and possibly by one of the national press associations.

Cordial Relationships Continue

As in previous years, the extension editor maintained cordial relationships with the newspapermen of the state. Through contacts over the years, both as Professor of Journalism in the University of Nevada and as extension editor, he is now acquainted personally with nearly all of the publishers, editors, and other newspapermen in the state.

This friendly acquaintanceship continued through 1948, through visits to many editors of the state in their own newspaper offices.

Re-elected NSPA Officer

Early in the fall of 1943, the secretary-treasurer of the Nevada State Press Association joined the army, and the extension editor was asked to serve as secretary-treasurer until a successor is chosen, a post to which he was reelected in 1948.

In this capacity, the extension editor is in a position to work more closely than usual with the newspapermen of the state, and to ascertain their needs and develop their cooperation.

Many Journalism Graduates on State Papers

A large number of additional journalism graduates of the University joined the staffs of papers in the state, increasing the total of University of Nevada journalism graduates, trained by the extension editor as professor of journalism, at work in Nevada. Known personally through the years of teacher-student contact, these young men and women are a vital factor in the success of the News Service.

Papers Read Regularly

One of the most important parts of the extension editor's work in connection with the News Service, has been the regular reading of practically every newspaper published in the state. All but a few of the Nevada newspapers are sent direct to the extension editor as a gracious compliment in return for the agricultural news stories. From one-sixth to one-fifth of the total time of the extension editor, is spent reading and scanning these papers in an effort to keep him informed as to:

1. The use of Nevada agricultural extension service copy.
2. News stories originating with the various extension agents.
3. Agricultural news stories originating with the staff of the paper itself.
4. Editorial comment concerning Nevada's agriculture.
5. Changes in journalistic technique and the personnel of the papers.
6. Other matters involving a sound conduct of an agricultural news service in this state.

THE COUNTY AGENT SERVICE

News with a local angle is the most avidly sought by newspapermen everywhere.

Especially, however, is this true of the community newspaper, which is mostly read by farmers and farm homemakers. And much news which is of great importance in one small community has little or no value in another. These principles apply to news of farming, ranching, and the farm home, as well as to other kinds of local news.

AGENTS ARE REPORTERS

Realizing the importance of these laws in the dissemination of news of interest to farmers and farm homemakers, the extension editor through the years has encouraged and helped the agents in the various counties and districts of the state to serve as reporters of such news for the newspapers in their communities.

Beginning with some of the agents antagonistic to the idea, others lukewarm, and only a few convinced, the extension editor has, by repitition of the principles and by aid and suggestion, stuck with the idea, until in recent years and until the load of detail incident to the war effort bogged them down, most of the agents had been active and efficient in disseminating, through their local journals, news of agricultural and home activities in their own communities.

In 1946, for the first time in seven years, the average number of stories produced by the typical Nevada agent showed an appreciable increase, an important straw in the wind. And, in 1947, the upward trend continued, with a really big gain by the agents in the use of the news story as a medium of extension education. And, in 1948, the upward trend continued although it slowed down a bit.

FIGURES REVEAL ACCOMPLISHMENT

The figures tell the story of the development of this idea over the years.

In 1927, when the extension editor began the missionary work, the average production of each of the agents in the service during the year was 31.5 stories annually. Without interruption, the annual production of news stories by the average agent rose steadily for five years, being, in 1932, an average per agent of 76.3, well over twice the figure at the beginning.

During the emergency years, with each agent striving to learn the intricacies of much new work of a national nature, the production slumped, falling, at its lowest, to an annual average of 50.7 in 1936.

In 1937, however, the agents began to grasp the details of the emergency programs and to find in them a new source of news, with the result that the rise continued, and it was carried even higher in 1938, when a new high of 85 stories on the average was reached, approximately three times the production current when stimulation of this activity began about a decade before.

DECLINE SETS IN

In 1939, a decline started in the number of stories produced by the agents, which reached its low point in 1941, with an annual average production of 71.2.

In 1942, a very slight rise occurred, reaching a peak of 71.5 news stories average annual agent production.

In 1943, however, the agents' news story production began a sharp drop which continued through 1944.

In 1943, the figure for the state was 58.9 stories and in 1944 the number plunged to 43.1, a figure as low as the production of any year except three in the history of the Extension News Service.

FIGURE RISES IN 1945 and 1946

In 1945, for the first time in eight years, an increase in the average agent's annual production of news stories occurred, the figure rising from 43.1 in 1944 to 44.5. "So slight an increase may be meaningless," the editor said in his 1945 report. "It may indicate a reversal of the downward trend. It may mean only a pause. It may also reflect an increased effort on the part of the extension editor to interest the agents in extension work through news stories. The 1946 report will tell which."

And 1946 did tell something: for a second year, the trend reversed and moved upward. The typical agent news story production rose to 48.8, an increase of almost 10 percent.

1947 SHOWS BIG GAIN

But, 1947 was the real test. If the increase continued, it would be the third year in a row. Three certainly makes a trend. Moreover, during 1947, the extension editor made a strong effort, through a series of circular letters running about one a week for three months, to stimulate production. By individual letter, by personal interview, and by other means, the editor also sought to stimulate production, however lacking in skill.

And, in 1947, the agents did pass the test magnificently. The trend was definitely upward, and, as the years go, it gained acceleration.

For during the 1947 report year, average per agent news story production jumped from 48.8 to 58.4, an increase of almost one-fifth.

This was accomplished, moreover, during a period which saw many new

agents join the extension service force, some of whom did not stay long enough to get into news story production.

GAIN CONTINUES IN 1948

And, during 1948, the current report year, the upward trend continued, but it slowed down. During 1948, the average agent in the state was responsible for 61 news stories. That is about a 5-percent jump from the 1947 figure. It is a good increase, but it isn't as good as the previous year.

Why is this so?

Well, news story production in Nevada has certainly not hit a limit. In 1938 the agents were producing at the average rate of 85 stories a year.

It isn't more lack of skill. Personnel changes during 1948 were fewer then during 1947.

It isn't lack of opportunity. Newspaper numbers in the state are unchanged. If anything, opportunity is greater because many papers are running more pages.

The fundamental reason, it appears, is less stimulus from the state office. During 1947, a heavy campaign was put on by the extension editor. During 1948, he kept at it but let up somewhat. The result was not any backsliding, because the trend remained upward, but a little less steam.

It is unfortunate that this program, like so many others, needs constant stimulus from the state office. Learning once is not enough, apparently.

AGENTS HAVE LITTLE TIME FOR NEWS WORK

Why this marked decline since the beginning of the war?

The answer, the extension editor believes, is not difficult to discover. It lies not in lack of know-how, not in lack of initiative or energy, not in lack of news, but, on the contrary, in lack of time. This is the judgment not only of the extension editor, but of the agents themselves.

The multiplicity of additional duties which have fallen on the shoulders of the extension agents throughout the state on account of the war effort has left them little or no time to devote to news story production. Even though news story production rose appreciably in 1947, this difficulty still plagues the agents.

That this analysis is a true reflection of the situation was borne out at a meeting recently when the extension editor asked the assembled agents to explain why the production volume had declined. Without exception, the agents stated that the reason was lack of time and that other factors were negligible.

HOME ECONOMICS VOLUME DECLINES

That this is the case is found borne out also by the fact that, in 1943, for the first time in a number of years, the production of the women agents also showed a marked decline. Throughout the history of the Extension News Service, the women agents in the counties have been steady, regular, and effective producers of news copy. The drop continued in 1944 and 1945. In 1946, slight gain was registered - but it was very slight. In 1947 and 1948, however, the ladies approached their all-time highs.

NUMBER OF NEWS STORIES WRITTEN BY MEN AND WOMEN AGENTS
1927 1948

Date	Agents	Total Agents	No. News Stories	Average No. Stories By Men & Women	Total No. News Stories	Ave. No. Per Agent
1927	8 men	11	309	38.5	347	31.5
	3 women		39	13.0		
1928	8 men	11	384	40.8	463	42.0
	3 women		79	20.6		
1929	11 men	16	309	28.0	660	41.2
	5 women		351	70.2		
1930	11 men	16	556	50.5	806	50.3
	5 women		250	50.0		
1931	12 men	17	633	50.2	1125	66.1
	5 women		492	98.8		
1932	12 men	17	763	60.3	1300	76.3
	5 women		537	107.0		
1933	12 men	17	707	58.8	1242	73.0
	5 women		535	107.0		
1935	14 men	18	707*	50.1	1038*	57.6*
	4 women		336*	80.4		
1936	13 men	18	556	40.2	913	50.7
	5 women		557	111.2		
1937	11 men	16	842	70.6	1153	69.8
	5 women		294	50.8		
1938	13 men	18	1060	81.5	1531	85.0
	5 women		471	94.0		
1939	13 men	18	950	73.8	1368	76.0
	5 women		418	83.6		
1940	14 men	19	914	65.3	1382	72.7
	5 women		468	93.6		
1941	14 men	18	891	63.6	1282	71.2
	4 women		391	97.8		
1942	14 men	18	845	60.4	1287	71.5
	4 women		442	110.5		
1943	12 men	16	619	51.6	943	58.9
	4 women		324	81.0		

NUMBER OF NEWS STORIES WRITTEN BY MEN AND WOMEN AGENTS (CONT.)

1927 1948

Date	Agents	Total Agents	No. News Stories	Average No. Stories by Men & Women	Total No. News Stories	Ave. No. Per Agent
1944	13 men	17	419	32.2	733	43.1
	4 women		314	78.5		
1945	12 men	17	403	33.6	757	44.5
	5 women		354	71.0		
1946	17 men	25	637	37.4	1221	48.8
	8 women		584	73.0		
1947	15 men	21	609	40.6	1229	58.4
	6 women		620	103.3		
1948	16 men	22	707	44.0	1343	61.0
	6 women		636	106		

*Figures for 11 months only (December 1934-Oct. 1935, inclusive). Adjusted to 12 month basis for comparison.

Ratio to State News not Explanation

The Extension Editor at first thought that possibly the great volume of state-wide news stories had had a tendency to reduce the production of the agents for their local newspapers.

A study of the figures during the last dozen years, however, indicates that this is not the cause.

Although it is true that agent production reached a low figure of 43.1 in 1944 when the state story total reached its maximum of 245 stories, a high figure in both state and local stories occurred in several years simultaneously.

Table Reveals Relationship

The following table gives the figures for the last ten years in both locally produced and state-produced stories:

	No. Produced Per Agent 10 years	No. State-Wide Stories Issued 10 years
1936-	50.7	112
1937-	69.8	152
1938-	85.0	134
1939-	76.0	108
1940-	72.7	134
1941-	71.2	131
1942-	71.5	193
1943-	58.9	194
1944-	43.1	245
1945-	44.5	192
1946-	48.8	156
1947-	58.4	155
1948-	61.0	179

The extension editor plans, however, to put more emphasis upon the training of the newer agents during the next year, as he did last, together with stimulus for the older agents. Plans have already been made to talk periodically at the regular monthly meetings of the women agents, and preparations have already been made for a news writing school at the 1948 state-wide extension conference. A state-wide competition among the agents may be adopted.

Agent Production Varies

During 1948, one of the home demonstration agents wrote, or was responsible for 182 stories. Another home demonstration agent was responsible for 19. Opportunities for publication were almost identical.

This represents the variation in the use of news as an extension method between one agent and another.

The variation among the man agents was about as great and it also illustrates the same principle—that news story production depends, to a very large extent upon the desire to use this proven and sound medium. One of the men agents was responsible for 105 stories, another for only 11.

Women Agents Beat Men

Again, in 1948, as for many years, the home demonstration agents outstripped the men agents almost two to one in news story production. Six women produced nearly as many stories as 16 men. This is in view of the fact that agricultural news is very much more easily handled than news of home economics.

Agent Experience Reveals Time Lack

An illustration of the time required to produce good news stories on the local level occurred in 1944, on the part of one of the agents.

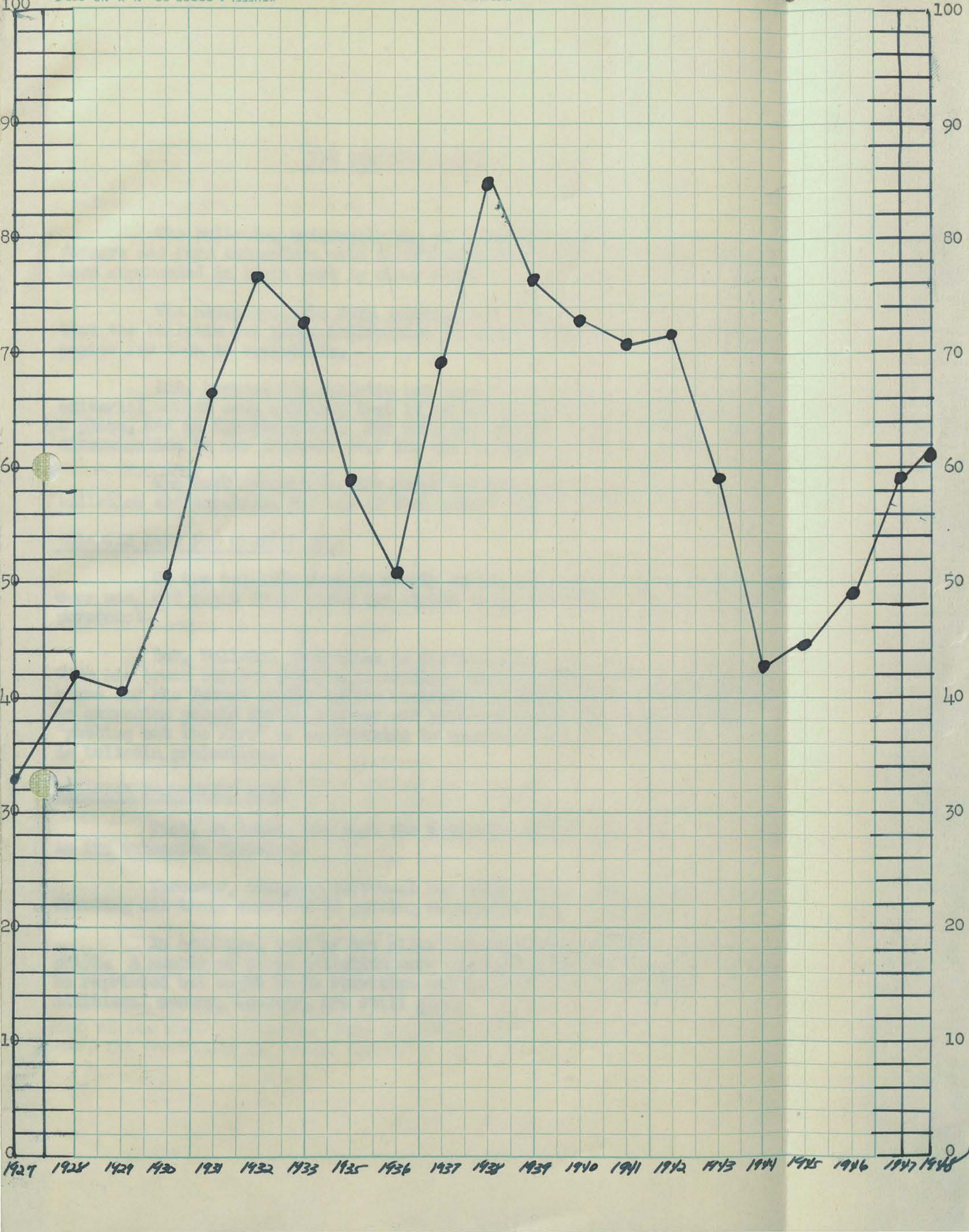
In a talk with the extension editor, the agent explained that he had determined to produce one story for each of the two strong papers in his territory each week.

He started out to do this job magnificently, producing in the early states a number of pieces of copy so good that, with some changes, they were suitable for rewriting for the state news service. They took, he found, however, a considerable amount of time, often consuming as much as a total day in the gathering and preparation of the material for one story.

An inevitable result was that he could not keep it up without neglecting phases of his extension job, until now, several months after his beginning, stories appear only very sporadically.

A similar occurrence in the summer of 1944, in another county in the state resulted in the starting of a weekly garden column which lasted about seven weeks, until the agent lost interest in it, or found the pressure of other duties so great that he could no longer continue his job as columnist.

When the confusion of the post-war period is over, with a stable personnel again in the field, it is likely, especially under stimulus by the extension editor, that news story production by Nevada agents will rise to its pre-war heights and what is admittedly the cheapest extension method will again come into its own. It is on its way up, but there is a long path to travel yet.



THE BULLETIN SERVICE

The bulletin, originally one of the major means of reaching farmers and farm homemakers with information about improved practices, has been superseded in large part by other means of mass communication.

The newspaper, the farm journal, and radio now are much faster than the bulletin and bring information to rural people in a form which is easier for them to assimilate.

But, because the bulletin has lost first place as an extension editorial method does not mean that it is out of the picture. It still has a place, and an important one. For much information which is not suited to dissemination in the pressand over the air is just right for bulletins.

The best function of the press and radio is to call attention to bulletins and encourage the use of them rather than to take their place.

BULLETIN BEST FOR CERTAIN JOBS

So the bulletin remains nearly as important for certain jobs as it ever was, and ought to be given due stress by an extension service and its personnel.

But, bulletin production is difficult in these days of emergency. With his house burning down, a householder does not sit on the curb drawing plans for his future abode; on the contrary, he tries to put out the fire. So extension people during the war and post-war years have been too busy "putting out the fire" of emergencies to undertake the long-range job which is bulletin production.

BULLETIN PRODUCTION DOWN

That, at least, has been the situation at the University of Nevada in its extension division.

Moreover, changing personnel has meant so many new workers who are devoting all their energies to getting acquainted with their jobs.

In addition, some of the older bulletins were rapidly going out of print. A number of these bulleting were so dated that they could not wisely be reprinted but ought to be rewritten and brought up to the times. An additional number, however, are still good.

A further slowing-down factor has been the increased cost of printing. To produce a bulletin these days costs from two to four times as much as it did before the war. More money, as well as more writing of bulletins, is needed, if the volume is to be stepped up.

The result has been a gradually declining number of bulletins.

BULLETIN PROGRAM LAUNCHED

The extension editor called attention to this situation in the summer of 1947, and a program of bulletin production, including new bulletins, revision of bulletins, and reprinting of good old bulletins was launched.

The program is under way. It has to date, however, produced no new bulletins, but has resulted in the rewriting of one good Nevada bulletin and the reprinting, with revisions, of several.

Not many new bulletins will be produced until the specialists and the agents have more time or until the importance of the bulletin over other activities is stressed more.

TWO BULLETINS ISSUED

During this report year, the total volume consisted of the reprinting of one bulletin and the purchase of another, marked as a Nevada bulletin, from an extension service in another state.

The revised and reprinted bulletin is Nevada Bulletin No. 80 - first published in 1936. A 4-H clothing handbook, it is designed for second-year members and is called "The Summer Outfit". It runs to 80 pages and was issued in a volume of 3,000 copies.

The second bulletin was published by Cornell University Extension Service. It was printed in Ithaca through generous arrangement by the Cornell people. The name of the publisher was changed from Cornell to Nevada and the bulletin given a Nevada number, making it a regular Nevada bulletin. The publication is "Guiding the 4-H Club", a manual for club leaders and parents. The Nevada number is 99. The volume was 500.

BULLETIN PRODUCED CO-OPERATIVELY

This is the first step by Nevada in the cooperative production of bulletins, which was outlined and launched by the Western States Extension Conference during the summer of 1947.

Nevada, as a state, cannot, of course, produce many bulletins, on account of its small resources. Many bulletins published in other states, however, fit conditions in Nevada equally as well or almost so. It is, there-

fore, wise, both in economy of effort and resources, to join in as many of these cooperative ventures as possible. Plans are now under way for a similar project in a 4-H Club baby beef feeding bulletin with the University of Idaho.

This year, as last, all new bulletins of the Extension Service, as all bulletins by any division of the University of Nevada, not of a routine nature, must be approved by the committee on publications to insure high quality and consistency with the policy of the University. The Extension Editor is chairman of this committee.

BULLETIN DISTRIBUTION DROPS

Nearly all bulletins which reach Nevada farmers and farm homemakers go out through district and county extension offices. During the war, the number of bulletins distributed dropped heavily. Rural people were just too busy to read bulletins. Following the war, the demand for bulletins increased, reaching 63, 184 in 1947. During 1948, however, something happened. The total distributed dropped to 19, 948. Either the demand for bulletins, unsatisfied during the war, shot up in 1947 to a peak, or agents are not pushing bulletin distribution as much as they were last year.

Or, and this is the opinion of many in the state office, Nevada bulletins, to fit Nevada conditions, are not available in even the basic fields of agriculture and homemaking in the state.

THE RADIO SERVICE

Newest established medium of mass communication is radio.

In part because of its novelty, radio has become one of the most popular means of dissemination of information.

Important everywhere, it is especially so in a sparsely populated area like Nevada. And it is a ready-made outlet for certain types of extension information.

There are jobs it cannot do as well as other media--especially the newspaper and the bulletin--but there are some it does better.

NEVADA FARMERS LEAD NATION IN RADIOS

Among the most avid readers in the nation, Nevada farmers and homemakers are also among the most avid radio listeners.

This fact has been made evident in many surveys. The recent survey of the Joint Committee on Radio Research shows that, in percentage of radio sets in rural homes, Nevada, along with Oregon, leads the entire nation, with 97 percent of the state's farms having radios.

But, until recently, there were few radio stations in Nevada. For years, there was only one--in Reno. Then, there was another--in Las Vegas. Both had very limited power. Most Nevada farmers, therefore, got their agricultural information via air from stations in other states.

EARLY CO-OPERATION IN RADIO

All during this period, the Nevada Extension Service was active in providing these outlets with information for radio news and feature programs.

For years it prepared copy for the old Western Farm and Home Hour, much of which reached Nevada from out-of-state stations. It gave constant help to the two Nevada stations and helped develop the farm programs of each.

MORE STATIONS LICENSED

Then, following World War II, the federal Communication Commission decided to grant licenses in great numbers. Applications from all over Nevada poured in. Of these, six were granted, all for additional stations in the two most populous cities in the state and all with low power, many not reaching far into the agricultural area.

Undoubtedly farmers, when they could, listened to all these stations. One of the original stations was granted increased power. It now reached into many rural areas.

EIGHT STATIONS IN NEVADA

The result was that in 1948 there were eight radio stations in the state. In Reno alone were five. They were KATO, 250 watts; KOH, 5,000 watts;

KOLO, 1,000 watts; KWRN, 250 watts; and KXXL, 250 watts. The other three were in Las Vegas. They were KENO, 250 watts; KLAS, 250 watts; and KRAM, 250 watts. In comparison, there were 35 newspapers.

Here was a new problem in extension information.

PROBLEM MET PRACTICALLY

And it has been met, not ideally, but practically, by the extension editorial office. With its marked limitations of time, the office served those stations which wished it with the regular state-wide news service. That is three stations. The others, with limited power, do not reach many farmers, and some have no interest in reaching farmers, since their audience is chiefly in their city.

Now, the news story designed for newspapers is not quite suited to radio broadcast. It does, however, do the job. In fact, some stations prefer newspaper style to radio style.

The ideal way of reaching farmers by radio probably is not through news. It is the personal appearance on the air by farmers themselves. Next best is some farm authority, either from the extension service or some other agency.

The extension agents have been encouraged by the extension editor, therefore, not only to send material to radio stations in their vicinity but to appear before the "mike" as often as possible.

But, the location of the stations, distance, and personal inclination, have prevented this.

AGENT ACTIVITY LIMITED

Of 22 agents in the state during the 1948 report year, nearly half neither sent any information to a radio station for its use or appeared personally on the air. A few got in an item or two or spoke from a station a few times.

Only three, all in Reno and chiefly over the station with the farm program, did any appreciable amount of radio work. But they did it, and it was good. The leader among them was the only extension agent in Nevada who has had a course in journalism.

OPPORTUNITY NOT ANSWER

But opportunity itself is not the answer. There must also be inclination. In Las Vegas, for example, the three agents were responsible during the year, with three stations at their disposal, for exactly two radio items.

A number of the specialists in the state office, too, have provided items and made personal appearances, but usually only with a station or two.

GOOD START MADE

A start has been made, however. That beginning will gather momentum during the years, and, eventually, radio will be more and more used as a medium

of extension information, as it should be.

Any development along this line, however, will have to be within the limitations of the staff of the service. Nevada cannot be compared with any other state in this respect. It will always be in a position where it cannot do everything desirable, but will have to give its efforts to the most effective things, whatever they be.

MISCELLANEOUS

While the News Service, the radio service, the bulletin service, and the county agent service are the extension editor's main responsibility, there is another on which only a general report can be given.

That is the position of one of the persons of the service who has had extensive experience in a variety of things closely related to many of the other activities in the extension service.

And, rarely a day goes by during which the extension editor is not called upon for an expression of opinion, for information, or for help in connection with the public presentation of information or visual education.

Printing Is Handled

All of the printing of any kind used by the state office during the year was cleared through the extension editor. Arrangement, styling, paper stock, typography, estimates when done by private concerns, proofing, volume, etc., all were handled by the extension editor.

As a result of this plan, the style and typography of much of the printed matter was improved and made more appealing, as well as being done by the least expensive and most efficient method.

He's Franking Privilege "Lawyer"

Over the years, the extension editor has been delegated the function of what might be called the services' "Franking privilege lawyer".

Normally, the duties in connection with this function are not arduous but, during the last report year, many changes were made in the federal penalty privilege regulation concerning the extension services of the various states.

A great deal of detailed work in understanding and helping others understand and apply these regulations fell on the shoulders of the extension editor.

It is unfortunate that so much time by so many persons has to be devoted to these detailed matters, but, of course, the extension service must be governed by law.

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

II-C 4-H CLUB WORK

ANNUAL REPORT
FOR
CALENDAR YEAR
1948

BY

PAUL L. MALONEY, 4-H CLUB WORK

FOR THE PERIOD FROM

NOVEMBER 1, 1947 to OCTOBER 31, 1948

11. Objectives, methods, and results related to

A. Personnel problems

2. Induction training and apprenticeship of new agents.

Believing that the start a newly appointed agent gets in the work will do a great deal toward saving that agent a large amount of time in orienting himself to the educational possibilities of the program, considerable follow-up visits and letters were directed toward the newly appointed agents.

One-day district meetings were held in the three districts of Nevada. Attending the meetings were county agents and club leaders. These meetings were called for the purpose of assisting the agents and leaders in their general club programs. Through discussion and work committees definite methods of approaching the problems relating to definite club work were presented and accepted.

These meetings brought out the idea that leaders and agents were placing too much emphasis on the work elements of the club program and that more thought should be given to general educational development in club meetings. Three primary objectives were given and recommended for club work as follows:

1. Finding leadership among our young people, by giving them the opportunity to realize the abilities each one might have, and help develop those abilities.

2. Character building. With a definite outline for regular and special club meetings.

3. Teaching better methods through the club project with special emphasis to be placed on the educational demonstration, with home improvement as the theme for 1948.

These discussions brought out under number 1 above, that leaders are not made, but that leaders are discovered and developed. Many of our juniors have natural leadership abilities if they would only realize this, and it is believed that a program designed to bring out these abilities and to give certain young people the confidence of their abilities would be a step in the right direction.

One method of bringing out the abilities of those young people, who have those abilities, yet are reluctant to take responsibilities, due to backwardness or due to the fact that the person does not realize those abilities until they are given the opportunity and the encouragement to put themselves before the group, was to use the method of group discussion as recommended by Dr. J. C. Schmidt.

By dividing the membership into small groups a better chance is given to find the ones who are willing and capable to assume the top role of this small group and through council and encouragement these members can be developed into positions of responsibility.

This procedure is carried into the district meetings where the newly appointed county agents as well as the older club members and club leaders participate for the reason that it is an actual demonstration to the new agent showing what can be done through organizing the group for a special purpose. It also gives the new agent, as well as the older agents, the idea that extension is an educational program and not one based entirely on personal service at the ranch or farm.

Under No. 2 above, Character Building, the district meetings brought out that definite plans should be made to make a certain number of club meetings available for emphasis to be placed on citizenship responsibilities with the members discussing in their small groups questions relating to citizenship and formulating plans for meetings on character building, such as working with ministers of the church in the various towns and communities to permit the club members to take active part in one or more services designated for the purpose and advertised before the service meetings. Good speakers were secured for club meetings and the members were asked to make notes on the speech and discuss the notes at a future meeting.

The idea behind such a procedure was to cause the club members to think for themselves and to thoroughly analyze the things they read or hear.

No. 3 of the objectives, Teaching better methods through the club project with special emphasis to be placed on the educational demonstration, and with home improvement to be taken as the theme for 1948. This was intended to familiarize the newly appointed agent and club leaders the importance of the demonstration as a teaching tool. It was brought out that the demonstration can do more to spread the results of an improved practice than any other method of teaching. While farm income is high it was believed that special emphasis should be placed on improving the comforts of farm and ranch homes.

While this accomplishment could be discussed under leader training, yet the newly appointed county worker must catch the vision of his responsibilities and duties as an educational leader early in his career.

The most difficult problem faced with many agents is to get them to see that there is more to the club program than having the club member take a project and make a few dollars profit on the undertaking. It is difficult to get the newly appointed, and older agent as far as that goes, to be able to see the vision of the broad objectives of the junior program, with its longtime values that the club member can derive from a properly thought out objective.

The other objective that was held out to the agents and leaders was to work out meetings and plans sufficient to give the club member inspiration and hold his club work up as a challenge so that he will remain in club work for a longer period of time. The county agent must see this picture and possibilities himself otherwise the results will not be satisfactory for the members. It is not a question of knowing what to teach but a problem of getting the county agents to realize the problems and strive to make plans to carry out the ideals of the club programs.

Every county agent has been visited more than one time during the year, while the newly appointed agents have been visited many times for the purpose of assisting them with the broad objectives of the program and to help them with such questions and details as might arise.

The idea secured from the Pullman Work Shop in 1947 to establish a "Trainer County" is still being recommended to the director as a good practice to consider for newly appointed agents. This procedure would have a trained agent who had worked as assistant to one or more agents for three months or more, available for any vacancy or emergency that might occur.

3. Professional improvement of agents in service.

While no agents took advantage of the Sabatic Leave features of their employment, yet the supervisor believes that this is a vitally important part of their extension education. County workers are encouraged to work out plans with the Director for taking advantage of their leave.

4. Improvement of county staff relationships.

It is most important that proper relationships between county workers as well as county worker to administrators be maintained. This is emphasized by the supervisor by being fair to all connected with the service, showing no partiality of one county over another one.

In order to improve the county staff relationships the county agents were assigned subjects to develop and present at the state and district meetings. This assured the democratic procedure of conducting the meeting with no one individual dominating the discussion and permitted each agent to get a mental picture of the problems and methods the other agents used in settling those problems.

B. Assistance supervisors give agents in the development of agriculture, home making, and youth segments of the Extension program in the counties.

1. Obtaining and analyzing local data.

At the time the agent is getting established, and after he has become established in his county, the supervisor believes that it is one of his important duties to assist the agent to secure all of the local factual data that is available and assist in analyzing the data secured. The agent must quickly secure sufficient background information regarding the local situation to be able to intelligently formulate a long-time program based on the needs within the county or locality. This permits the agent to advise with club leaders and members regarding projects which should be emphasized for the area and gives the agent an idea of the educational demonstrations to develop which would spread the information most needed for the various communities.

One of the first things that is done when a newly appointed agent is assigned to a territory is to call meetings of leading farmers and ranchers in the district and invite the heads of cooperating organizations and talk over the needs for a long-time well-planned program of work relating to the juniors of the area. From this meeting the agent will secure a challenge of the needs for expanding the club program and he will get the assured backing of those present.

The agent must know, quickly, the number of club members who have taken advantage of the program and the potential number available for membership, so that goals can be established for reaching the maximum.

A thorough analysis of what has been done, what is being done and what can be done is vitally important to a newly appointed agent. This information must include a broad view of all the factors relating to the entire needs of the adults as well as the juniors, as these needs will be closely related and the junior program based on the entire needs, and must include such facts as total number of

livestock of the various classes; marketing procedures followed; amount of summer and winter feeds available; is a definite closely supervised program of selecting replacements of breeding stock followed; where do stockmen secure their breeding bulls, dairy and beef, and a knowledge of the quality secured; feeding practices followed for both range, purebred and dairy stock and a knowledge of the general management practices, such as time stock are turned out, time they are gathered, is controlled breeding followed or desirable, number of calves raised per 100 breeding cows, number of breeding bulls ranged per 100 breeding cows, are calves weaned on small amount of grain and sold at the best ages for the area.

A thorough analysis of this information will open up avenues of constructive club projects to help correct any practices which should be improved. And the quicker this information can be secured the quicker the agent will be able to serve the community to its fullest advantage.

2. Setting Objectives.

The supervisor realizes that objectives must be established and efforts must be made to reach the objectives and after they are reached, new and larger objectives must be set. While the supervisor sets objectives and works toward their completion, it is also realized that club leaders and county agents must also establish goals. The real pleasure and value of any program is in setting goals and then striving to reach those objectives; the satisfaction seems to be in working toward a goal, not in reaching it.

Goals established by the supervisor in 1948:	Results
1. Assist agents and leaders to establish goals and objectives for their club program	secured
2. Secure a higher number of completions from a larger enrollment	secured
3. Where there is a boy or girl of club age eligible for club work, they will be given an opportunity to come under the benefits of the program.	recommended to all agents, not secured 100%
4. Establish a higher degree of coordination between junior and adult work	secured in 60% of the counties

5.	Teach club members through their leaders and agents the value of planning their projects and club meetings in advance of actual work done.	recommended to all agents
6.	Make supervision more effective in 1948.	secured
7.	Hold three district leaders meetings and one state meeting in 1948	3 district meetings held
8.	Hold a larger percentage of club member in the upper teen age group	Recommended to all agents methods of doing so. Data unavailable.
9.	Make the State 4-H Club camp more valuable to the members in 1948	secured - two camps were held
10.	Secure adequate publicity for the county and state programs	More publicity secured in 1948 from both newspaper and radio

The 10 objectives outlined for 1948 are still the jobs to be done in 1949. Added to this list for 1949 will be to:

11. Place more emphasis upon leadership, especially in locating and helping juniors to assume leadership.

12. Get more public understanding and support of the club programs.

3. Part committeemen, local leaders, club members, and other people play in determining county extension program.

With Service Clubs, business organizations as well as farm groups such as the Farm Bureau, taking a greater interest in the 4-H Club program, it becomes more and more important that these groups be given a chance to assist in formulating plans for the work on a county and state basis.

Older club members are called together before the club year is started and the proposed years work is discussed with them for the purpose of getting their whole hearted support in goals for increasing the membership and completions.

The Rotary Clubs of Nevada have taken the assistance to juniors as part of their objective and are working with county agents in formulating plans for sponsoring livestock projects. As an

example the Reno Rotary Club is sponsoring the county clubs in dairy and poultry, they will purchase a purebred dairy heifer for the deserving club member who is interested in dairying with the understanding that the member will grow the heifer out well, breed her to a proved sire and return to the club the first heifer calf dropped.

The Sears-Roebuck Foundation are doing the same project in dairying.

4. Cooperation of specialists, county extension workers, state supervisors, and leaders in planning and carrying out county Extension programs.

It must be realized that the specialist and supervisors are not working at cross purposes in getting the county agents and leaders to emphasize their individual projects to the exclusion of other important work. If the entire extension program is to function properly there must be a close cooperation between all groups who have the welfare of the farm, farm home and community at heart.

In making farm plans these plans must be over-all plans including the farm, farm home, the farm boy and girl with consideration for the community as a whole.

It is imperative that all workers concerned with the extension program have confidence in each other and, with one aim in view; work for the very best interest of the whole department.

The necessity for reaching the young people with vital issues and questions seems more important today than before the recent war, young people must be taught to think for themselves and plan for the entire community. These plans must be attainable, yet of sufficient scope to give permanence and be practical in their application, and all extension workers must realize that our program must keep abreast of the broadening requirements of the times.

5. Integration of agriculture, home demonstration, young adult, and 4-H Club programs from the standpoint of the farm family as a unit.

It is the belief of the supervisor that county agents sometimes get so busy and involved in rendering personal services that they miss the main objectives and possibilities of Extension work. That is, ranchers and club members are often more willing to advance or take constructive projects than we are to give them.

The county programs are discussed with the county agricultural agent and the home demonstration agent together, with emphasis being placed on a complete farm and home plan, including the 4-H members with a long-time plan of projects based on progressive standards each year. That this goal is being accomplished can be realized with the increased number of club members who purchase livestock of their own each year.

Club members are being encouraged to actually own all of the units involved in their club demonstrations. Agents can see the value of this type of projects over the ones where the members merely "claim" the animal or crop for a short time and the proceeds or animals going back to the parent.

It has been found that meeting with the parents and club members together, and formulating a long-time plan for the club member either for home improvement or livestock ownership creates good feelings between the parents and the county agents. It is then easier for the agent to make plans for adult work on the individual farms and homes.

These joint meetings also cause the club members to take their work more seriously and to realize that they are now getting old enough to plan for the future. Club members like this planning period, they enjoy the goals held out to them and it makes the parents realize the value of planning as a necessary part of their own successful farm life.

Good club meetings, effective projects, valuable demonstrations, assistance to the community as a whole, do not just happen to be good THEY MUST BE PLANNED TO BE GOOD. It is difficult to over emphasize adequate planning. To refuse to make plans is to merely mark time and hope that things turn out right, when plans can be made to make certain that they turn out as desired.

It has been found desirable to make plans for at least five years in advance with progression shown for each year. This permits the club members and parents to visualize the end results. It is impossible to put into effect a planned program on every farm, for the reason that many parents and club members do not have the capacity to visualize ahead, they make no plans, but accept the results as they come to them. Then there is the difficulty of getting the agents to see the value of plans, especially to put the required time to these kind of farmers who do not see the value of planning, to sell them on the procedure.

The agents and club leaders are encouraged to summarize each 4-H Club program in the presence of the parents, pointing

out the mistakes as well as suggestions for strengthening the project for the coming year. Most parents enter such a summary in a wholehearted way. It is in these summaries where the alert agent can integrate the agriculture, home demonstration and junior programs to the advantage of the entire family unit.

The supervisor realizes that the farm, farm home and children should be considered as a unit in making plans and that the entire family, which includes the children should participate. This type of plan takes time to properly present and work out in detail, and with the county agent busy on so many programs it is difficult to get them to agree to put on the individual planning program, therefore, the agent is encouraged by the supervisor to select a few families each year and formulate plans with these families, with special emphasis on the 4-H Club programs.

6. Development of urban work.

While some work has been done with urban youth, such as victory gardens and rabbit clubs to meet the demands for additional food during the war, there is a demand and a need for work to be carried on with urban youth, the lack of adequate personnel makes it impossible to develop a long-time program.

The Boy Scouts are very active in Nevada and are carrying out a fine program, yet most boys and girls should be given more responsibilities along practical lines of work.

There is an increasing demand from urban parents and children for work along the lines of 4-H Clubs, and more and more work is being done with urban children but the demand cannot be met due to the lack of adequate personnel. As an example of how the demand is increasing, a request came for assistance with juniors from Carson City people and parents. An experimental 4-H Club was organized early in 1948 with 75 members; a large delegation attended both the senior and junior State Camps. The girls carried cooking and sewing as their projects and did splendid work. About 92 per cent completed their work, which is larger than the state average.

Urban boys and girls need the 4-H Club program of responsibility as badly as do rural youth. If the urban young people can be caused to assume responsibility early in life and to have objectives and set goals to reach, and kept busy at constructive work they will be able to make adjustments later in life and will be better equipped for any type of work they may follow.

C. Assistance supervisors give agents in carrying out extension programs.

2. In selection, training, and use of local leaders.

It has been found that older club members make excellent leaders. The club leaders are encouraged to make use of certain likely club members by giving them responsibility before they finish their club work as this will give them the experience to equip them for taking the leadership of a club of their own.

These club members offer the largest and most satisfactory supply of leadership and this source should not be overlooked in the long-time training program.

The success of a junior program depends to a great extent upon the type of local leaders heading the undertaking. Proper training for these leaders is a most important task. More leaders could be secured if the leaders believed themselves capable of successfully leading a club group. Many leaders have expressed themselves as being afraid they could not meet the requirements and they do not know how to keep the interest of the club members in regular meetings. Many leaders are afraid that if their club members do not win a state or national contest that the members will blame the leader for not having done a good job.

In order to assist leaders with these and other questions and problems a series of district meetings were held with county agents, club leaders and older club members present. Emphasis was placed on the question of how to make the club meetings educational and interesting. Following the suggestions made by Dr. Schmidt group discussions were held to demonstrate the effectiveness of the procedure.

Young people are naturally enthusiastic and if the attitude of enthusiasm can be maintained toward their club projects it is believed they will remain in the work longer and receive more benefit from the work.

Club leaders and county agents were encouraged at the leaders meetings to hold club planning meetings and make plans as far in advance as possible. This planning will cause the members to have objectives and carry out planned meetings and to use their imagination and individuality in conducting their work.

In preparing junior leaders for responsibility, the supervisor suggests that the adult leaders assign the prospective junior leader certain jobs and that they be given progressively more and

more responsibility and more important jobs as the member portrays the ability to carry the additional responsibility. It cannot be expected that a junior leader could be started out with full leader responsibilities which might discourage a potential leader and cause them to refuse to act.

For the purpose of strengthening the volunteer leaders knowledge and giving them confidence and assistance the following points have been emphasized:

1. A manual was published for the local leader "Guiding the 4-H Club". This publication emphasizes the value of understanding the club members and treats youth reactions at various ages; the club member and the leader; club members working together; and the club member and the parents. The bulletin was written by Wilma Beyer Heinzelman of Cornell University and designated as "Nevada 4-H Club Bulletin 98".

2. Each adult leader to appoint assistant leaders to carry definite phases of the responsibility. This assistant to be an older club member.

3. Outline plans and suggestions for making club meetings interesting and educational have been printed and distributed to club leaders.

4. The state has been divided into three regional areas for the convenience of holding district leaders meetings.

5. The county agents are assisted in preparing programs to give adequate recognition to leaders for the work they are doing. This meeting includes the presentation of leader certificates, pins and etc.

3. In methods of evaluating and checking results:

(b) Checking results against goals selected.

Goals selected for 1948 and results secured

1. Assist agents and leaders to establish goals and objectives for their club programs	Secured
2. Secure a higher number of completions from a larger enrollment.	Secured

3.	Where there is a boy or girl of club age who are eligible for club work, they will be given an opportunity to come under the benefits of the program.	Recommended to all agents. Not secured.
4.	Establish a higher degree of coordination between junior and adult work	Recommended to all agents.
5.	Teach club members through their leaders and agents the value of planning their projects and club meetings in advance of actual work done.	Recommended to all agents. Not fully followed.
6.	Make supervision more effective in 1948	Secured
7.	Hold three district leaders meetings and one state meeting in 1948	3 district meetings held
8.	Hold a larger percentage of club members in the upper age group.	Methods of doing so recommended. Data unavailable.
9.	Make the State 4-H Club Camp more valuable to the members in 1948	Secured. Two camps were held.
10.	Secure more adequate publicity for county and state programs	Secured, both newspaper and radio.

While some of the objectives or goals established were of a general nature and along the line of policy, yet they are believed to be important factors to keep before the county agents and leaders.

County agents, leaders and club members are encouraged to set goals in formulating plans for the club year. It is believed that no undertaking can be a success if plans are not made before the undertaking is launched. There must be a plan, there must be goals established if club work is to reach the desired heights to which it is entitled.

After plans and goals are made they must be referred to throughout the year to determine what can be done to meet any unfilled portions and at the end of the club year, these goals must be studied and compared with the original plans to find out if any portions have not been met.

It is only after a thorough study of the plans and goals that have been established for the previous year that an intelligent set of plans and goals can be made for another year, as the weaknesses can be strengthened and the work made more effective.

(c) Evaluation of results obtained including preparation and use of rating sheets.

While no rating sheet is being used in Nevada at present, it is being seriously considered to place a rating sheet in the hands of each agent for their own rating. This would be as much of a reminder of the features of the extension program that they are not doing, as well as a chance for the agents to analyze the things that are being done. It would be one way of getting the agent to evaluate his own work.

Due to the small number of county agents in Nevada, the evaluation procedure has been to make the determination from personal conferences with each agent before the next years goals are established and in analyzing the past years work. It is believed, however, that a more definite and systematic way of arriving at opinions can be worked out, for the benefit of the agent as well as for the supervisor.

Projects and their adaptability to the long-time plans for the county must be made as well as the number of completions or increases in enrollment, for the former might be more valuable to the district. As an example, too many projects are carried which do not have a definite bearing on the agriculture of the area, such as feeding steers in districts where feeding is not a practical undertaking; and boys with dairy projects are permitted to feed steers just for the purpose of getting a sympathy bid for a junior project to make money on the deal and is not based on what the member can learn or contribute to the district from his records.

(d) Local studies to determine more effective methods.

Local studies must be made if effective methods and results are to be secured. Agentsand leaders are constantly reminded that club work must effectively reach more people than the individual member carrying the project. It must be a demonstration to the entire community or county in better methods, or to more completely verify the methods being used by the adults, either as a negative or a positive result must be demonstrated to all concerned.

Local studies and long-time planning are closely related to the successful club program and until those principles are made a part of the club projects, the work will not be fulfilling its entire aim. This was one subject that was discussed in every meeting of club leaders and county agents.

5. In methods of creating favorable sentiment toward Extension.

It is realized that favorable sentiment toward Extension work must come from the urban as well as the rural people. One method used by the supervisor to secure favorable sentiment from urban groups is to make talks to organizations such as service clubs. Talks explaining the objectives and results of Extension have been made to Rotary and Lions Clubs throughout Nevada.

The supervisor also cooperates with other Government agencies as well as serving as committeeman for Boy Scouts and other groups.

Full use of the radio programs and newspapers for the purpose of bringing the junior work before all of the people in the state is a very important way of creating favorable sentiment toward Extension and agents are encouraged and helped in making these avenues effective. A good achievement story is a very fine way to bring the work to the public.

The agents are encouraged to invite all rural people, adults as well as juniors to county wide achievement meetings, and to advertise that these meetings are open to the public and encourage urban people to attend through honoring certain urban, civic minded individuals who are sponsoring the junior work.

The supervisor places the greatest emphasis upon building a firm program based on the needs of the district and then giving adequate publicity to the program objectives and results achieved, as the method that will create the most favorable sentiment toward Extension.

Special events in 4-H Club circles are emphasized, such as securing the Governor to proclaim State 4-H Club Week by proclamation, and securing the Mayor and local banker to participate in achievement meetings, and notables such as the Governor to appear and speak at our annual 4-H Club Camp. Boys and girls give radio talks and appear at luncheons given by service clubs for special program on 4-H Club work.

As an example: Newspapers published pictures and feature articles of the accomplishments of the boys and girls who won the state awards in their years work. Radio stations featured personal interviews with club members on their accomplishments. Delegates to the National Club Congress appeared on radio station KOH at Reno and each delegate gave a brief history of their club work. Newspapers also featured this special event. A transcription was made by the delegates in Chicago giving their impressions of the Congress as well as telling the fine experiences they were having.

This disc was air mailed to radio station KOH at Reno, permitting the station to run the broadcast while the delegates were still in Chicago.

III. Brief evaluation of your accomplishments as a supervisor or state leader in terms of major responsibilities. Outlook and recommendations.

Goals established for 1948 and the results secured from those goals are given under item C. 3. (b) page of this report.

A 10% increase in enrollment was established for 1948, together with a goal to secure a larger percentage of completions.

The increase in enrollment has been secured and more counties have reported 100% completionsthan ever before. As an example, Churchill County with the largest enrollment of club members has reported 100% completions. In 1947 this county reported 91%. Nye County with a small enrollment reported 100% in 1947 and again in 1948. Elko County and Washoe County also report 100% completions. While two counties have not made final reports, it is expected that completions will average more than 90% for the State.

Eight delegates attended the National Club Congress. Two of those attending were awarded National Scholarships; one National award was in Canning and the other a Sectional Award in dairy production and at Chicago the dairy production winner was awarded a $200 National Scholarship.

It is believed that agents and leaders are realizing more than ever the advantages of having the club members make long-time plans for their individual and club programs. These plansto include the home and community as well as individual projects.

The supervisor judged livestock at eight county, state and one California district Fair in 1948. These judging events are used as a means of reaching the livestock men and club members with suggestions for improving their stock and how their exhibits could be made of greatest value to the community as well as to the individual grower.

The State 4-H Club Camp held each year at Lake Tahoe 4-H Camp grounds is attracting more and more attention among the juniors of the entire state. The facilities at the camp will accommodate about 350 campers, and as 500 applied for permission to attend, it was decided to hold two camps in 1948. The ages of the senior camp was from 14 years and over and the junior camp for those members under 14 years of age.

It is difficult to get one agent who is responsible for both the adult and junior programs to satisfactorily carry out the junior work. It seems that the easiest one to slight is the junior projects, consequently more time is given to the adult work. Few of the counties have assistant agents who are devoting their main efforts to the junior programs, and until this is done the 4-H Club work will not be conducted to its full possibilities.

NEVADA AGRICULTURAL EXTENSION SERVICE

IV. - EXTENSION WORK IN DAIRYING

ANNUAL REPORT

FOR

CALENDAR YEAR

1948

A. J. REED

Extension Dairyman

RECAPITULATION

		Meetings Attended
Farm Bureau meetings		20
Method Demonstration meetings		21
Attendance at Method Demonstrations		2,000
Result Demonstration meetings		16
Attendance at Result demonstrations		500
Days in field		180
Days in office		100
Bulletins distributed		100
Miles traveled		20,000
No. of Farm or Home Visits made		50
No. of different farm or home visits made		40
No. of calls relating to extension work	Office	75
	Telephone	105
No. of news articles or stories published		24
No. of radio talks broadcast		5
States visited in line with activities:		5

California, Oregon, Utah, and Idaho

REPORT OF EXTENSION DAIRYMAN
A. J. Reed
1948

1. Assisted in the formation of The Associated Nevada Dairymen Inc. It encompasses four western Nevada Counties and 64 of the 80 Grade A producers.
    a. Progress includes: 1) An increase in price of milk which means an increased annual income to dairymen of $65,000 a year and $81,000 more to distributors.

2. A stabilizing of the present milk supply.

3. An increase in production of Grade A measured by interest in new Grade A barns. Sixteen new barns built in Churchill County. Six new barns built in Lyon County, or 22 new barns in 1948. 22 new barns times $5500 the cost per barn or $121,000 of new construction.

4. An interest throughout the State in more dairy cattle. A trip was made to and dairy cows in numbers were found in Idaho at Caldwell. The trip was made in order to find cows for Washoe, Lincoln, Lyon and Pershing Counties. Arrangements were made for the purchase of said cows.

5. The sale of Nevada dairy cattle for export has largely been stopped. Work on County level. Lyon County Agent, Louie A. Gardella, called on the newly appointed extension dairyman and held a series of meetings on educational phases of the Southern Lyon County dairy business.

Such items as Grade A barns, Bangs control in dairy and beef herds. Organization and marketing.

The Lyon County program resulted in the building of six new barns, the sign-up of most of the dairy and beef herds owners in a calfhood vaccination program.

An increase in price per pound of butterfat in Grade A milk from 33 cents per gallon to 40.7 cents per gallon.

The Churchill County Agent, Charles York, states in a monthly report that a differential of 60¢ per lb. of fat now exists between Grade A and Grade B fat prices.

Existing markets such as Tonopah now furnished fluid milk by Lyon County producers has been saved. The State Board of Health ruled that other than Grade A milk could not be sold. The six new barns which have now been built in southern Lyon County will furnish Grade A milk for Tonopah.

The State dairymen were about to lose several markets in the State, Tonopah is an example. Winnemucca was nearly lost as a market to Utah distributors.

From Battle Mountain north the dairy market has largely been lost to Utah and Idaho producers.

The State of Nevada dairy market is on a deficit basis.

Here is a ready market for feed, the production of cows and in turn a cash market right at home. The production of dairy products must be increased and can be without fear of overproduction.

Dean Creel brings word back from Chicago that Mr. Kraft of Kraft Cheese Company, will enter the Nevada field whenever sufficient production warrants it. The Kraft Cheese Company manufactures cheese of both fancy and standard brands. Other products are made by Krafts such as candies.

The important point here is in the development of future markets for dairy products. The terminal markets at nearby California points will serve as a ready market for surplus California points.

A meeting was held with A. B. Nystrom, National Extension Dairyman for the West.

At the time of his visit a plan for a Western Nevada Artificial Insemination Association was worked out.

Plans for Western Nevada Artificial Insemination Ass'n.

Areas served		Cow population
Churchill	1	2,000
Douglas	1	1,500
Washoe	1	3,000
Total	3	6,500
Estimate. No. available		2,750
Cost per cow $7.00 or		19,750
Subsidies		6,000
Lab. $2,000		
Research 1,300		
Teacher 1,700		
Sires No. 6 cost	$6,000	
Corrals	$1,000	
Feed	$ 720	

Personnel:
- Technician
- Bull man
- University of Nevada
  - V.C.S. Research & Teaching - one Veterinary
  - College of Agriculture, Head of Dairy Department, Part-time Graduate Student, part-time and a project

Extension Service: Ext. dairyman
Ass'n. : Inseminator
Secretary-treasurer
Organization

Another meeting on artificial insemination was held with Prof. V. E. Scott, F. B. Headley, L. E. Cline, Dr. Edward Records, Dr. Lyman Vawter and myself. The above topic was again fully discussed and the Nevada Extension Dairyman was advised to survey present factors and determine interest in the new plan. Time for this survey has not been found up to the present time.

County visits have been made to Churchill, Clark, Douglas, Lincoln, Lyon, Pershing, and Washoe Counties.

Dairy cattle were judged in Lincoln and Clark Counties. Crops were also judged at Lincoln with Mr. Maloney at the two shows mentioned above.

Sheep were judged at the Nevada State Fair and the Modoc Company (California) district fair by me.

At the California State Fair Sheep Show, a Grand Champion Suffolk ram was purchased for Fred Saunders of Fallon, Nevada.

I also attended Grand National Livestock Show at San Francisco.*

Miscellaneous information was given out such as costs of using overhead sprinkling systems in Nevada. The inquiry was made by Dr. Clark, eye specialist. He was given the cost study made at Lovelock at which time the Spreckles Sugar Company of Sacramento, California, used that system. The overhead sprinkling cost study was taken from my 1940 Annual Pershing County Agent report.

It would be a serious oversight if I did not pay tribute to my predecessor, Professor V. E. Scott. He was helpful at all times and left a world of information in the form of mimeographed material. It has been passed out at meetings and is just as applicable now as it was when written.

Bulletins, pamphlets, etc. distributed 100.

The Lyon County program developed a need for technical assistance.

The Grade A requirements brought the Nevada State Board of Health into the picture and instead of quarreling with Grade A requirements, we developed a working agreement with Sanitary Engineer, W. W. White, and Mr. Maistrioanni, Dairy Inspector. The dairymen were told and many agreed that these men were earnestly endeavoring to build up the quality of dairy products in Nevada. We all know that a market can be maintained or increased to better advantage if the product under consideration is A No. 1. The two men have been most cooperative.

The Bangs program brought to our assistance Dr. Klaich of the Nevada State Department of Agriculture and Drs. Maas and Fischer of B. A. I.

An interesting point here is that beef men were interested in the Bangs program as well as dairymen. County Agent Louie A. Gardella, a master salesman after he had received the technical assistance is continuing to sign-up owners of both dairy and beef herds.

L. E. Cline drew up the organization papers and was helpful in the interpretation of the Articles of Incorporation and the By-Laws. The results of his varied experience has always been available and helpful.

The discussion above proves that in Nevada we do have technical assistance available from U.S.D.A., from Nevada State Department of Agriculture, from the College of Agriculture, and from the Extension Service. All we need do on County levels is to start using some of it by outlining programs designed to solve the problems of Nevada's Agriculture.

*Contact was made here with the heads of the A. H. division at Oklahoma, Idaho and Professor Robert Miller of the University of California in regard to uses made of and the amount of money secured by these states under Hope-Flannagan for the genetic improvement of beef cattle.

It appears that Oklahoma had not as yet found the right project.

Dr. Hickman of Idaho said the amount of money available was too meager.

Mr. Miller said that $2500 had been made available which was being used to employ a clerk who was making calculations of statistical data available at University of California. The A. H. division there has been breeding for more milk and a prepotent strain of Herefords which would pass on red markings about the eyes. The red markings prevent a cancerous eye condition especially upon western ranges.

The meetings of the western branches of the A.D.S.A. and the Society for the Advancement of Animal Science were attended at Corvallis. Many valuable contacts were made and good material obtained there.

A better feeling has developed toward the Nevada State Health Inspectors who cover sanitation in the production of milk. The sanitrary engineer and the chief inspector have been invited to producer meetings with good results. Sanitation is now receiving the attention due it by all especially producers.

The same is true for the veterinarians attached to NSD of Agriculture and those from B. A. I.

It was determined in meetings with the Dairy Department of Nevada State Farm Bureau Associated Nevada Dairymen, Inc. and the A.N.D. Inc. that animal health should be controlled by veterinarians employed within the State for that purpose and sanitation should be considered as in the field of work in charge of the Nevada State Board of Health.**

So we find that such headings as (1) Sanitation, (2) Marketing and (3) Production problems are in the process of being solved.

**The work to secure closer cooperation between all State Agencies and the producer is being used on the State level and in at least two counties i.e. Clark and Lyon.

**A plan to establish a State operated milk testing service has been devised similar to the one in operation in Churchill County in 1922. The tester is to be employed by the University Weights and Measures Division. A tester will be employed to take samples and test the milk of each producer once each week. The cost to be distributed among the producers and distributors. It is hoped that a Dairy Herd Improvement Association can be started in Washoe County and the work be done by the State tester.

October 27, 1948

Dr. A. J. Hood
First National Bank Building
Reno, Nevada

Dear Dr. Hood:

Mr. Paul Maloney transmitted your request to have someone, from the University of Nevada, make a survey of the dairy herd at the Nevada State Hospital at Sparks.

I have made the survey and found the paid help cooperative in their desire to help me in every way.

The herd itself is below average generally showing a lack of the continued use of good sires.

The present sire, a Milking Shorthorn, is thought to be sterile.

An individual examination of the cows as to present state of pregnancy, calving records and signs of sterility should be made by a veterinarian.

Then, a bred for production Holstein sire of known ancestry should be purchased replacing the present sire.

The Hospital uses large quantities of milk and butter and well-bred Holstein cattle will provide it. Meat from properly fattened Holstein cattle will be made available of good quality and in optimum amounts for the herd numbers involved. Few people realize that 40% of all meat consumed by the trade is obtained from dairy cattle. The patients will then, have good meat, if the animals slaughtered, at the Hospital, are properly fattened.

Problems will arise from time to time and I believe a committee of three from our College of Agriculture and Extension Service should be appointed to work with your board and the paid help.

A committee composed of Professor Scott, L.E. Cline, and myself would be willing to serve as an advisory committee.

A committee of this kind can advise regarding budget needs, agriculture and livestock programs, purchase of the disposal of livestock and other problems arising from time to time.

Sincerely,

Al Reed
Extension Dairyman

A. J. (BART) HOOD, M.D.
Reno, Nevada

November 18, 1948

Mr. Al. Reed,
Extension Dairyman,
Extension Administration Office,
University of Nevada,
Reno, Nevada.

Dear Mr. Reed:

Please accept my personal thanks to you and Dr. Creel and Mr. Paul Maloney for your fine cooperation in the matter of the dairy herd at the Nevada State Hospital. Yesterday at a meeting of the Board of Commissioners for the State Hospital, I read your splendid report. The members of the Board concurred and decided to accept your kind offer as you suggested, to form a committee of Professor Scott, L. E. Cline and yourself for the purpose of meeting with a representative of the Board for the furtherance of our program to build up the herd for the meat supply and dairy products so necessary to augment the food supply to the hospital.

Mr. Epperson is at present compiling the data for the next Biennial Operations Budget to be presented to the next session of the Legislature. We feel as Board members that the problem of building up the herd and milk production is a definite priority.

With this thought in mind we are instructing Mr. Epperson to contact you with the purpose of organizing your committee, and confer with you for your valuable counsel. We trust that this can be a permanent arrangement. I will be glad to give any of my own time on this matter because I recognize its importance.

Again many thanks,

Sincerely yours,

/s/ A. J. Hood

A. J. (Bart) Hood, M. D.

AJH:N
c.c. to Mrs. Hawkins, Secy. of the Board.
Mr. D. E. Epperson

December 11, 1948

Dr. A. J. Hood
657 Ridge Street
Reno, Nevada

Dear Dr. Hood:

Pursuant to our telephone conversations, we are submitting in writing the following report in regard to the management of the farm, including the livestock thereon, as well as the management.

It is recommended that ten cows in the present herd be butchered for use at the hospital as needed.

In order to supply the necessary dairy products, fifty cows should be purchased; additional feed will be needed and two more paid milkers.

The hospital now uses or needs 225 gallons of milk per day. 80 or 90 cows will be needed in order to furnish this amount of milk.

The care, management, and milking work will need three employees, namely, the dairyman, and two paid milkers.

The fiscal break-down is as follows:

Dairyman----------$160 per month plus board, room and laundry			
Two paid milkers at $125 a month plus br. and l. $250.00 a month			
50 cows at $365------$18,250			$18,250
3 paid employees----$ 4920			4,920
180 tons of hay-------$5,400			5,400
24 tons of grain-----$1,512	$64		1,512
2 reg. Holstein bulls $680			680
1 reg. boar---------- $10			10
	$30,772		$30,772

It should be remembered that in the year 1950 it will not be necessary to purchase 50 additional cows so that the additional expense in 1950 will be $11,832.

The equivalent of 50 acres of pasture by way of feed will be necessary which at $7.00 per month for a five-month period will amount to $1,750.00.

It is also proposed that the present cultivated area not including the gardens, if possible, be used as pasture.

It is further suggested that the possibility of securing that land now included in the race track at the Nevada State Agricultural Societies holdings, known as the race track be obtained and used for pasturing purposes.

The figures submitted above are to be considered supplementary to the present cost items needed for the present dairy set-up.

It is further proposed that the present herd sire now in use be sold as beef and replaced by two registered Holstein sires.

The present herd sire should weigh around 1600 pounds and at 20¢ a pound should return $320.00.

Two new sires costing $500 each or $1,000 minus the $320 salvage would entail an additional expense of $680.

The herd boar should be disposed of and should bring $40.00 and we believe that a registered Duroc-Jersey Boar can be obtained at $50.00 or an additional expense here of $10.00.

We believe it is imperative that 225 gallons of milk be furnished per day for the hospital, patients and staff.

The figures hereby submitted may seem large at first glance but there is at present a shortage of milk in western Nevada and the 225 gallons if purchased would cost 64¢ a gallon. The purchase of 225 gallons per day on a yearly basis at 64¢ a gallon would amount to $52,560.00.

By following the plan outlined above instead of purchasing the necessary milk for the hospital the State would save about $20,000 the first year and around $40,000 the second year or in 1950.

Very truly yours,

Al Reed
Extension Dairyman

V. E. Scott
Director of Residence Teaching
in Agriculture

cc - Mr. J. O. Epperson

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

CECIL W. CREEL

DIRECTOR

Annual Report of Extension Work in Soil Conservation

For the Period
November 1, 1947 to October 31, 1948

Otto R. Schulz
Extension Soil Conservationist

TABLE OF CONTENTS

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF NEVADA AGRICULTURAL EXTENSION DIVISION
AND UNITED STATES DEPARTMENT OF AGRICULTURE
COOPERATING

I. NAME OF PROJECT — III Extension Work in Soil Conservation

II. PERIOD COVERED — November 1, 1947 to October 31, 1948

INTRODUCTION:

In accordance with a Memorandum of Understanding formulated between the Agricultural Extension Service and the Soil Conservation Service, an Extension Soil Conservationist was appointed on July 1, 1937. This Memorandum of Understanding provides for educational work through the State Extension Service in furtherance of soil conservation, on such areas and to such extent as may be mutually agreed upon by the state director of Extension and the state coordinator of the Soil Conservation Service; and, the encouragement of legally constituted soil conservation associations or districts so constituted by law to provide for general, effective, and permanent erosion control. It further provides through the office of the state coordinator for furthering unity for purpose among state agencies in all development of plans, cooperative arrangements, soil conservation legislation, and policies of soil conservation, to the end that a coordinated soil conservation program for the state may be effected.

The Soil Conservation Program, as formulated by the State Soil Conservation Advisory Committee and approved by the Soil Conservation Service, provides for project demonstration areas, CCC camps, soil conservation associations or districts, and general land-use and soil conservation practices to be followed in the development of the work in the state. The object of this program is to bring about a realization of the seriousness of losses due to erosion and to demonstrate the various practical measures of erosion control and practices for conserving soil and moisture through proper land utilization.

ORGANIZATION:

The Soil Conservation Service in this state functions under the supervision of J. H. Christ, Regional Conservator of Region Number 7, which includes the states of California, Nevada, Oregon, Washington, Idaho, and Alaska and Hawaii, with the Regional office located at Portland, Oregon. The administration of all soil conservation service activities in Nevada centers in the state office located in Reno, with Mr. George Hardman as State Conservationist.

Within the state, the activities are centered in five district offices located at Yerington, Ely, Caliente, Moapa and Elko, out of which supplemental technical services are supplied through the work units.

The major activities of the service were carried on through the twelve organization soil conservation districts located in Lyon, Douglas, White Pine, Lincoln, Clark, Humboldt, and Elko counties. During the year four additional districts have been petitioned for.

In other areas of the state, the activities center around off-area demonstration farms, under cooperative arrangements between the Soil Conservation Service, and the Nevada Agricultural Extension Division of the University of Nevada.

OBJECTIVES:

The duties of the Extension Soil Conservationist, as outlined in the Plan of Work approved by the Extension Service and the Soil Conservation Service, are as follows:

1. It shall be the duty of this specialist to coordinate the activities of the Soil Conservation Service and the Agricultural Extension Service in the educational phases of the State Soil Conservation program.

2. The state soil conservationist, working through special agents or directly with county agents, will:

   a. Assist county agents in:

      (1) Conducting soil conservation demonstrations with individual farmers.

      (2) Selecting soil conservation committees.

      (3) Organizing soil conservation associations.

      (4) Developing county or association soil conservation programs based on the State Soil Conservation Program.

   b. Prepare subject matter information for 4-H Club members and vocational classes.

   c. Set up exhibits for use at state and county fairs and such occasions in cooperation with the regional information office and state extension editor.

   d. Conduct farm tours in cooperation with county agents for inspection of soil conservation demonstrations.

   e. Address farmers meetings and other groups on need for the appropriate measures of erosion control and practices for conserving soil and moisture.

f. Secure services of subject-matter specialists of the Extension Service, Soil Conservation Service, and Experiment Station for assistance in the program as need arises.

g. Distribute information through method demonstrations, the press, film strips, and radio, in cooperation with the regional information office and state extension editor.

3. The state soil conservationist, working through the county extension agents, the Soil Conservation Service, or directly with the parties concerned, will:

a. Inform the state extension workers of the provisions of the State Soil Conservation Districts Law.

b. Conduct educational programs on provisions of the Act in areas selected by the State Soil Conservation Committee in which the first educational work should be started.

c. Assist the State Soil Conservation Committee in determining the need, economic advisability, and the correct size for administrative purposes of proposed districts, assist in preparing boundaries and legal descriptions of districts selection of supervisors, and otherwise assist in organizing districts.

d. Cooperate with the state coordinator and the district supervisors in formulating plans of operations for legally organized districts.

e. Assist in informing people of the districts of the plans formulated for the districts.

GOALS:

The specific goals as submitted in the Plan of Work for the year are as follows:

1. The State Soil Conservationist assists the State Soil Conservation Committee in the organization of Soil Conservation Districts, under the State Soil Conservation Districts Law.

2. Encourage and assist county agents and farmers to establish 10 additional off-area individual farm plans in cooperation with the Soil Conservation Service.

3. Cooperate with Nevada Experiment Station in conducting tests to determine the possibilities of use of commercial fertilizers with various crops on different soil types in Nevada.

4. Cooperate with the PMA by attending meetings of the State Technical Committee and formulating and encouraging the use of practices that will promote the conservation program in Nevada.

5. Stress the importance of using latest irrigation methods and practices to secure maximum benefits from use of irrigation water.

6. Meet with county agents, SCS Technicians and district supervisors to develop and forward the Soil Conservation Program.

METHODS AND ACCOMPLISHMENTS:

Soil Conservation programs have been stressed throughout the state and many conservation measures have been effectively carried out by farmers cooperating with federal agencies. Of the vast area of federal owned lands within the state, a major portion is now included either within national forests and administered by the Forest Service or is in grazing districts and administered by the Grazing Service.

On the privately owned lands, the Agricultural Adjustment Administration, the Soil Conservation Service, the Extension Service and other federal and state agencies are cooperating with farmers in promoting soil and water conservation practices and programs.

The work of the Soil Conservation Service has continued to extend from demonstration projects and areas within the districts to all sections of the state by conducting off-area demonstration farms in cooperation with the Nevada Extension Service. However, the most intensive work of the Soil Conservation Service was carried on in the areas included within the organized soil conservation districts.

The accomplishments on the specific goals as set out in the program of work for this year, are as follows:

1. District Organization.

Ruby Soil Conservation District.

The organization of the Ruby Soil Conservation district in Elko county was completed during the year. The appointed supervisors and the State Soil Conservation Committee petitioned the secretary of state for a certificate of organization which was issued on December 12, 1947. Nominating petitions were received by the State Committee for supervisors of the district. The State Committee advertised and arranged for the election of supervisors on March 12, 1948.

Northeast Elko Soil Conservation District.

A petition was received by the State Soil Conservation Committee for the organization of the Northeast Elko Soil Conservation district. Hearing on the petition was held on March 6, 1948.

On March 27, 1948 a referendum was held with 19 voting for and none against the creation of the district. On March 31, 1948 the State Soil Conservation Committee declared the Organization practical and feasible. Supervisors were appointed to complete the organization of the district. The State Committee and the appointed supervisors petitioned the Secretary of State for Certificate of organization which was issued on May 10, 1948. Nominating petitions for supervisors were received by the State Committee, and the election was held June 19, 1948.

Lamoille Soil Conservation District.

A petition was received by the State Committee for the organization of the Lamoille Soil Conservation district. Hearings were held on March 29, 1948. On April 15, 1948 a referendum was held with 12 for and 6 opposed to the organization of the district. The State Committee determined that the organization was practical and feasible on April 17, 1948. Two supervisors were appointed to complete the organization of the district. The State Committee and appointed supervisors petitioned the Secretary of State for a Certificate of organization which was issued June 3, 1948. Nominating petitions were received by the State Committee and election of supervisors held on October 15, 1948.

Tonopah Soil Conservation District.

The State Committee received a petition for the creation of the Tonopah Soil Conservation district and hearings on the petition were held in the area on March 26th and 27th, 1948. The State Committee considered the results of the hearings and arranged for the holding of a referendum on the creation of the district. The referendum was held on April 21, 1948. Thirty two votes were cast in favor and none opposed. The State Committee considered the results and declared the operation of the district practicable and feasible on May 1, 1948. Two supervisors were appointed to complete the organization of the district. The State Committee and the appointed supervisors petitioned the Secretary of State for a certificate of organization which was issued on June 11, 1948. Nominating petitions for supervisors were received by the State Soil Conservation Committee. The State Committee arranged for the election which was held on August 23, 1948 at which five supervisors were elected

Stillwater Soil Conservation District.

A petition for the organization of the Stillwater Soil Conservation district was received by the State Soil Conservation Committee. Hearings were held by the State Committee on March 13, 1948. After considering the results of the hearing due notice was given and a referendum held on April 18, 1948 ten votes were cast in favor and four against the organization of the district. On June 16, 1948 the State Soil Conservation Committee decided the organization of the district practical and feasible.

Two supervisors were appointed to complete the organization of the district. The State Committee and the appointed supervisors petitioned the Secretary of State for a certificate of organization which was issued on July 26, 1948. Nominating petitions for supervisors have not been completed by those within the district to date.

North Truckee Soil Conservation District.

A petition for the organization of the North Truckee Soil Conservation District was received by the State Soil Conservation Committee. A hearing on the petition was held on May 10, 1948. On June 11, 1948 a referendum was held with a vote of 62 for and 8 against the creation of the district. The eligibility of some of the voters were questioned and therefore the practicability and feasibility of the district has not been determined to date.

Additional territory has been added to several of the previously organized districts by petition of the individuals desiring to be included within the districts.

Educational activities were carried on in these areas by the County Extension Agents through use of off-area demonstration farms, farm center meetings, personal visits etc. George Hardman, State Conservationist and other soil conservation service personnel also actively participated in forwarding and explaining the organization procedure of these districts.

2. Off-Area Farm Plans:

Owing to the curtailment of funds by the Soil Conservation Service for technicians in charge of planning off-area demonstration farms, this program was not stressed during the year. One application presented was turned down for the above reason. Therefore, no demonstrations were conducted during the year.

The following table gives the statistical data on the number of plans requested and completed to date. This summary is analyzed by counties and shows the demonstrations are located in all the important agricultural counties of the state. These off-area demonstration farms have been a main factor in the increased interest in soil conservation districts according to reports from county extension agents. As new districts are organized in areas where the off-area plans are located, they are transferred to district plans.

Total of Farm Plans As Of
November 1, 1948

County	Requested	Acreage	Completed	Acreage
Churchill	14	2202	14	2202
Clark	15	2107	15	2107
Eureka	3	5640	3	5640
Humboldt	10	58133	10	58133
Ormsby	4	2962	4	2962
Pershing	1	3000	1	3000
Washoe	20	10473	18	8853
TOTAL	67	84517	65	82897

3. Fertilizer Tests:

The cooperative field test program with the Soils Department of the Nevada Experiment Station was considerably expanded during the year, as requested by farmers through the Nevada State Farm Bureau. At the Annual Extension Agents conference a full day was devoted to discussing fertilizer elements, soil amendments, methods of soil testing and the cooperative program of establishing fertilizer test plots. The County Agents all showed great interest in the program and desired plots to be located in their respective counties. However owing to the number of plots, work involved and available facilities it was impossible to enter all counties during the year, however it is planned that additional areas will be included as present facilities of the Soils Department permit.

The procedure followed in developing the program consisted of the agents discussing the plans with leading farmers in their communities and securing plots of ground that they thought was fairly representative of large areas in the county. When a number of locations were secured, Mr. V. E. Spencer, Head of the Soils Department and the writer went to the county and visited the areas, tested the soils, and in consultation with the agent and interested farmers approved the areas which were considered most desirable. A program of soil treatment and crops to be planted was then prepared for the plot areas, and put into operation which included preparing the land, applying fertilizer and soil amendments, seeding, irrigation, and harvesting.

The long time objective of this program is to determine the most economical methods of increasing and maintaining the productive capacity of the various soil types. Therefore the setup of necessity has been rather elaborate and the plots are contemplated to be conducted over a long period of time so that the desired results can be achieved.

The soil treatments carried out during the past year included Nitrogen, Phosphorous, Potash, Gypsum, Sulpher, Sulphuric Acid, Lime, Barnyard Mamure, and Green manure using sweet clover and third crop alfalfa. The crops grown included wheat, barley, oats, alfalfa, potatoes, tomato plants, and mixed grasses and clover.

A total of 537 plots 12' x 50' in size were conducted during the year in the following counties:

Churchill	---	100
Clark	---	160
Douglas	---	63
Elko	---	20
Lyon	---	36
Pershing	---	140
White Pine	---	18
Total		537

During the year field tours were conducted by County Extension agents in most of the counties where the plots were located. Large numbers of farmers attended the tours and inspected the plots at which time the various treatments were pointed out and discussed. Considerable interest was manifested by those viewing the plots and entire groups expressed their desires to cooperate in any way possible to continue this type of work.

The results of this years plots are now being compiled by the Soils Department of the Nevada Experiment Station and when completed will be available for presentation to farm groups.

The problem of securing new stands of alfalfa on farms in the Hayborne track of Carson Valley was further pursued during the year. From information gathered on plots established last year no definite conclusions could be drawn but indications pointed to several things that may cause the losses. New seeding made by farmers in the area were closely checked during the year in an endeavor to determine the exact reason for the losses. Three new plots were established and seeded to alfalfa during the fall, two different fertilizer treatments were made on these plots, and a change in irrigation methods, to determine how effective this would be in preventing losses.

While conclusions can not yet be made it can be noted that no losses were sustained in the new seedlings up to eight weeks of age. How the plants carry through the winter and perform next year will give considerable more information on the problem.

The use of DD as a soil treatment for the control of nematode in potatoes was again checked on several farms cooperating with County extension agents in Lyon and Washoe counties. From these studies it appears that in several cases very good results have been secured but in some cases control has not been effective. It has been difficult to account for this condition and further study is required on the problem.

State-wide news stories were prepared by the writer and distributed through the Extension News Service emphasizing to farmers the need of securing fertilizer early and suggestions on proper storage of fertilizer on the farm. The proper use of fertilizer in areas where results are known and types of crops responding to fertilizer treatments were also stressed.

4. PMA Cooperation:

Meetings of the State Technical Committee of the Production and Marketing Administration were attended, at which the different practices of the program were discussed and suggestions made for changes, and consideration given to new practices to be added to the program.

The conservation practices of this program have been of assistance to farmers in meeting the expense of carrying out the work. Such practices as land leveling and construction of irrigation structures have been emphasized to the greatest extent.

5. Irrigation Practices:

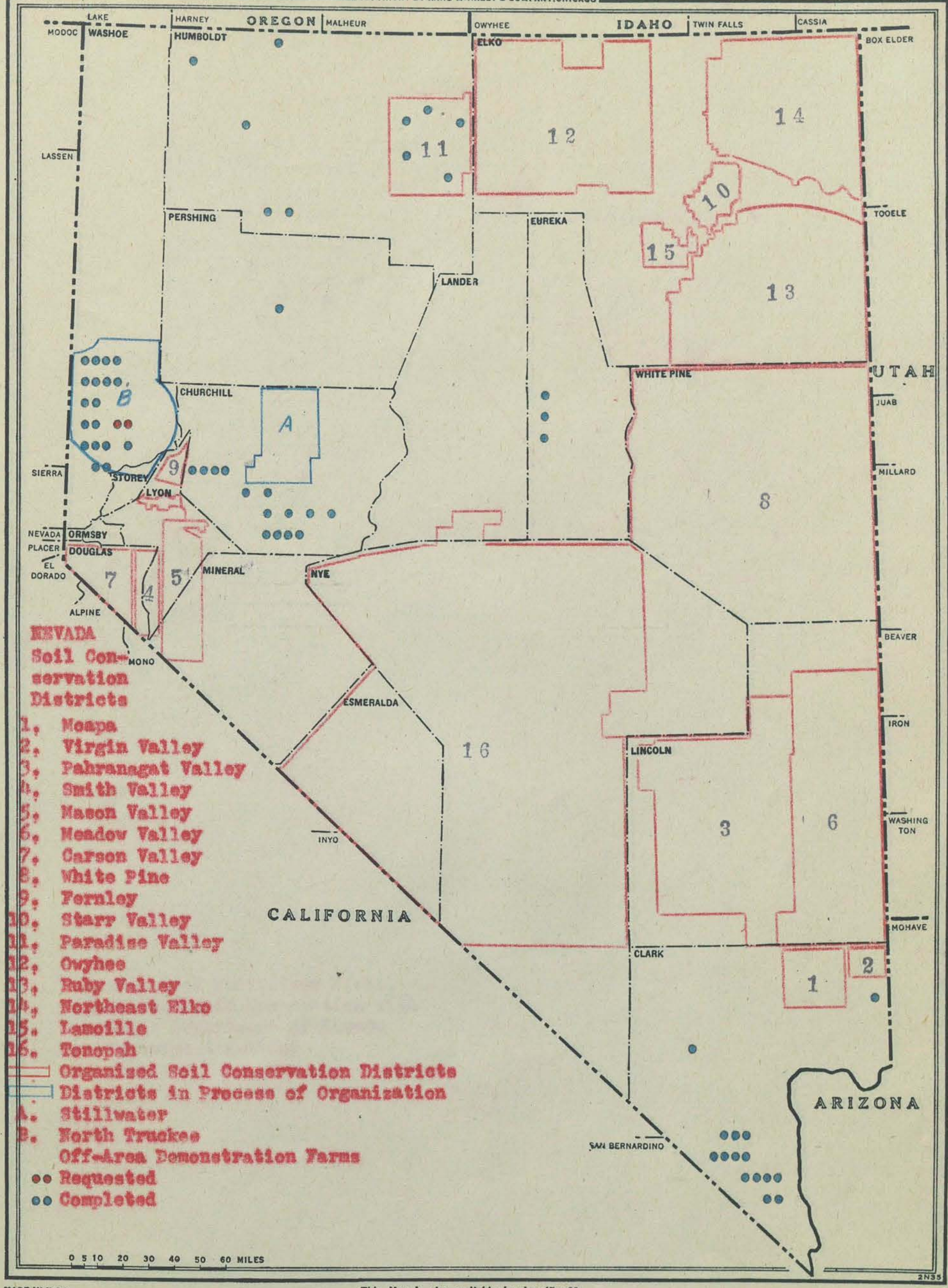
The importance of irrigation practices were stressed during the year through the regular extension programs, Soil Conservation Service farm plans, and the PMA program. Payments made by the PMA for such practices as construction of check dams and drops, and reorganization of farm irrigation systems and land leveling, assisted the farmer in carrying out these improvement programs, which materially assisted in forwarding the program. In organized soil conservation districts, loan of equipment has been made available to assist farmers in leveling land in accordance with a complete farm plan. Engineering assistance provided by the Soil Conservation Service has assisted farmers in organized districts in carrying out this program.

6. Meetings With County Agents, SCS Technicians etc.

Conferences were held with County Extension Agents and Soil Conservation Service Technicians at which time various phases of soil and water conservation practices were discussed also agency relationships and methods of improving programs. Meetings of the State Soil

Conservation Committee were attended and conferences held with George Hardman, State Conservationist at which various phases of the conservation program were discussed.

Mr. E. C. Hollinger, Extension Soil Conservationist for the Western States visited during the year, and reviewed the activities of our various programs. He has made suggestions for improving our program and furnished considerable material during the year.



NEVADA
Soil Conservation Districts

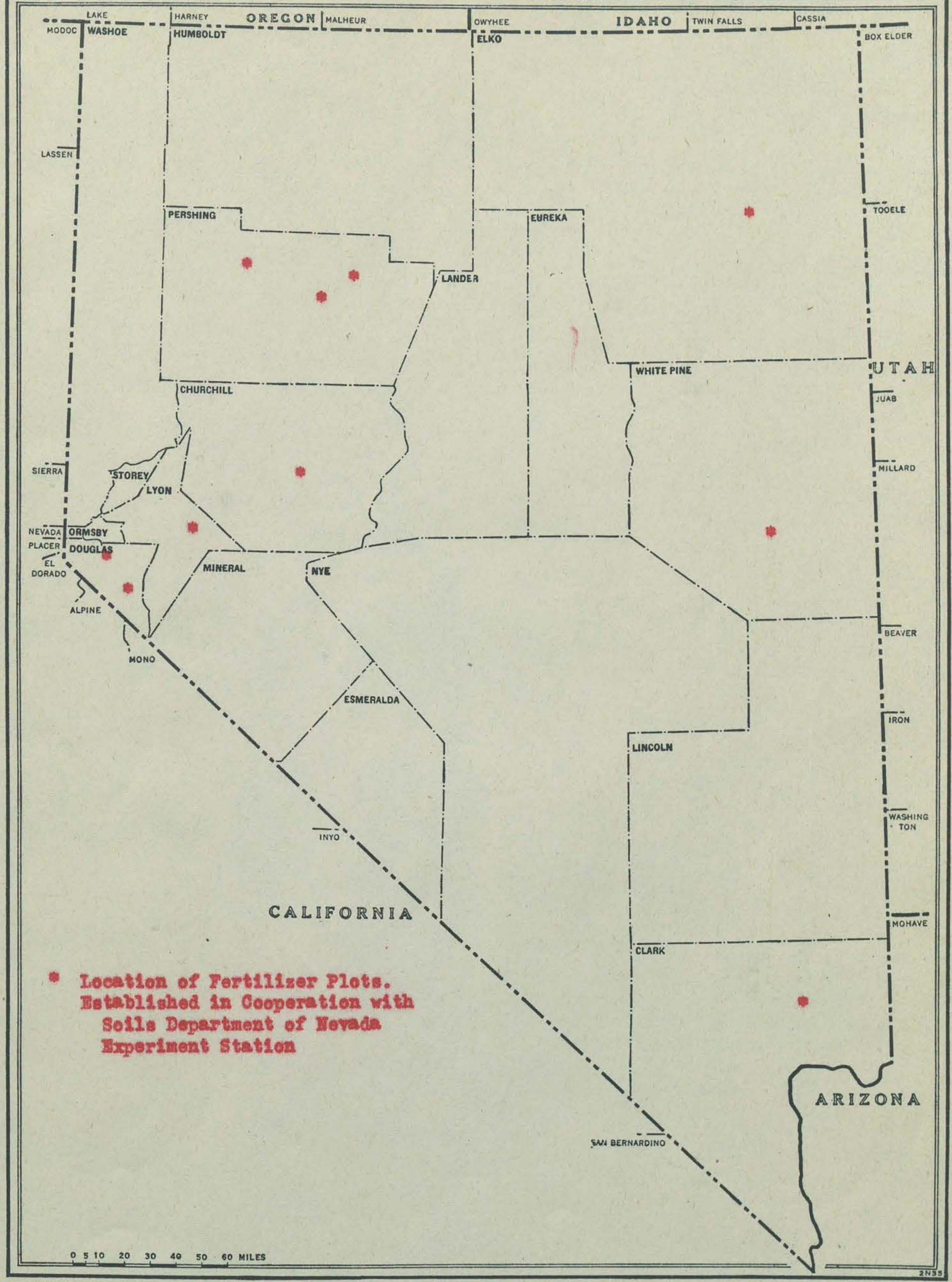
1. Moapa
2. Virgin Valley
3. Pahranagat Valley
4. Smith Valley
5. Mason Valley
6. Meadow Valley
7. Carson Valley
8. White Pine
9. Fernley
10. Starr Valley
11. Paradise Valley
12. Owyhee
13. Ruby Valley
14. Northeast Elko
15. Lamoille
16. Tonopah

Organized Soil Conservation Districts
Districts in Process of Organization

A. Stillwater
B. North Truckee

Off-Area Demonstration Farms

●● Requested
●● Completed



* Location of Fertilizer Plots. Established in Cooperation with Soils Department of Nevada Experiment Station

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

CECIL W. CREEL

DIRECTOR

ANNUAL REPORT OF EXTENSION WORK IN AGRICULTURAL ECONOMICS

(Project No. 6)

for

1948

Verner E. Scott

Extension Agricultural Economist

ANNUAL REPORT OF EXTENSION AGRICULTURAL ECONOMIST

V. E. Scott

For the period November 1, 1947 to June 30, 1948, apportionment of time; 90% Administration and Teaching, 10% Extension.

According to Plan of Work, the time devoted to Extension work was spent on the farm account project, closing out the project June 30, 1948.

PROJECT VI Extension Work in Agricultural Economics

SUB-PROJECTS D - Farm Management

I. Names of Specialists and Division of Work

A. Name - V. E. Scott

B. Division of Work - 1/10 Extension

II. Activities

1. Auditing 1947 farm accounts

2. Assisting individuals in problems associated with the 1947 income tax returns.

3. Assisting Vocational Agriculture Teachers in the use of the Nevada Farm and Home Account book.

III. Procedure

In November, December and January, farm account books were partially audited and farmer's income tax estimates made out.

In January, February and March, audits were completed and final income tax reports prepared.

As reported in 1947, the closing of this project had been under way for a year. Assistance was given to professional auditors to make them acquainted with the Nevada Farm Account book in order

to simplify the shifting from an Extension project to commercial auditors.

Thirty-seven accounts were audited and income tax reports based on those accounts made out.

Farmers who wished to have them were given account books, with which to continue their farm bookkeeping.

During the months, April, May and June, conferences were held with 6 Vocational Agriculture teachers, acquainting them with the farm account book and donating to the schools 94 books for use in Veteran's Training courses. Three meetings were held with veterans for the purpose of teaching them how to use the books and how to analyze the farm business.

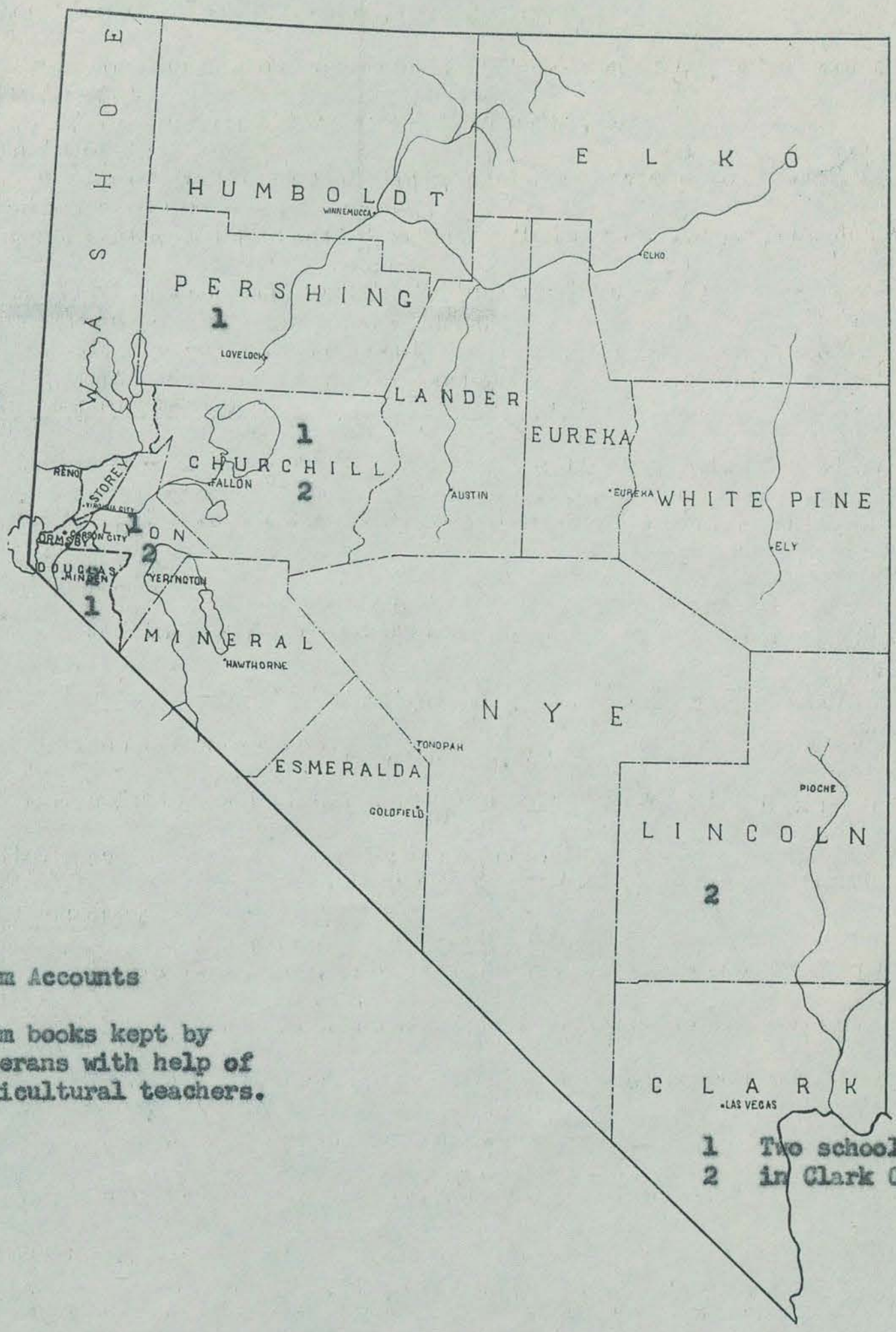
Statistical Report

Allocation of time to Project, 10% (30 days)

Days in field	3
Days in office	40
Meetings attended - Farm Accounts	3
Attendance	70
Farm Bureau meetings attended - State	2
County	2

Sub-project D - Farm Accounts

(1) closing out old project
(2) assisting Vocational Agriculture Teachers



1. Farm Accounts

2. Farm books kept by veterans with help of agricultural teachers.

1 Two schools
2 in Clark County

UNIVERSITY OF NEVADA

AGRICULTURAL EXTENSION DIVISION

CECIL W. CREEL

ANNUAL REPORT OF EXTENSION WORK IN AGRICULTURAL ECONOMICS

Project 6 - Extension Work in Agricultural Economics

1948

Economic Information and Miscellaneous Correspondence

Economic Survey of Dairy Industry in Nevada

Planning for Extension Program in Agricultural Economics

Eldon E. Wittwer

Extension Agricultural Economist

ANNUAL REPORT OF EXTENSION AGRICULTURAL ECONOMIST

Eldon E. Wittwer

1948

PROJECT VI -- Extension Work in Agricultural Economics

SUB-PROJECT PHASES -- Economic Information and Miscellaneous Correspondence

Economic Survey of Dairy Industry in Nevada

Planning for Extension Program in Agricultural Economics

During the period covered by this report my time has been divided between Extension work and resident instruction, according to the following plan. For nine months of the school year, 16% of my time was devoted to Extension work and 84% to resident instruction, then for two months during the summer, full time was given to Extension work. I have tried to follow through on this basis.

Three projects were planned at the beginning of the year and have received the major part of my time and attention except for the answering of letters received from farmers, county agents, and other sources, asking for various types of information in the fields of marketing, finance, farm management and other subjects in the general field of Agricultural Economics.

Projects

We have one project in Economic and Outlook information. Under this project I have prepared two Agricultural Economic situation and outlook reports. One was prepared in February, 1948, and another in May, 1948. These reports or digests were mailed to all county agricultural agents, vocational agriculture teachers and many farmers throughout the state. I am at the present time (December, 1948) working on another economic report which will likely be sent out in January, 1949.

In connection with this project I have also given seven different addresses on the economic situation and agricultural outlook. Three were to veteran groups in Fallon, Smith Valley and Reno. One before a meeting of county committeemen of the Nevada State Production Marketing Administration, and three before county farm groups.

Many letters from individual farmers, county agricultural agents, and others asking for various types of economic information were received and answered during the time covered by this report.

Economic information and statistics were also supplied to the Nevada Agricultural Extension News Service. This information formed the basis for several articles, on various farm economic problems, which were distributed through the Agricultural Extension News Service to all parts of the state.

Economic Survey of The Dairy Industry in Reno and Las Vegas Areas.

This project required the major part of my time from July 15, until September 15, except for one week which I took off on annual leave. In making this economic study of the dairy industry and market milk situation in the Reno area, three meetings were held with the Western Nevada Dairymens Association, in which the economic and marketing problems of the milk producers were discussed. Considerable study was given to the milk price problem in the Reno area. The milk producers in this area maintained that they needed and should have a higher price for their milk. After a careful study of costs of production and distribution of milk in this area, and after comparing prices in Reno with other somewhat comparable areas it was decided that an increase of two cents a quart in the retail price of milk was justified. The price increase went into effect in October, 1948, and the benefits of the increase were shared by both producers and distributors.

To collect data and other information in connection with this project a personal visit was made to each distributor in the Reno area, and one meeting was held with the Reno distributors. The purpose of these visits and this meeting was to discuss with distributors their distribution and price problems and collect information as to the amount of milk and fresh cream produced and consumed in the Reno milkshed area.

About 25 of the leading dairymen in the Reno milkshed area were visited to discuss with them their economic and marketing problems.

The Nevada State Board of Health and the City of Reno Health Department were contacted to learn of the sanitation and inspection requirements as they apply to the dairy and milk marketing industry.

In making the economic survey of the dairy and milk distribution industry in the Las Vegas area, all distributors (5 in number) were visited and the problems of milk distribution in the area were discussed. A meeting was then held in which all distributors in the area were represented. At this meeting milk distribution and price problems of the Las Vegas area were discussed.

Personal visits were made to about 20 of the leading milk producers in the Las Vegas milkshed area, for the purpose of discussing with them the economic and milk marketing problems of the producers in that area.

This dairy study was made in close cooperation with the County Agricultural Extension Agent in all the counties covered by the survey. The county agents cooperated wholeheartedly and offered many helpful suggestions and supplied some useful information.

A trip was also made to Sacramento, California, for the purpose of studying the California plan for establishing milk prices. Mr. W. B. Woodburn, Chief of the California Bureau of Milk Control, was very cooperative and helpful in explaining the California plan and supplying such information as might be of help in working out our milk marketing and pricing problems in Nevada.

Considerable statistics and other types of information have been collected which will be useful in working out the milk production and distribution problems in the areas studied.

With the opening of the Fall Semester at the University, my time was taken up very largely with resident instruction. As a result the final report of this survey has not as yet been completed. However, an effort is being made to complete the report and have it mimeographed and distributed to county agents, milk producers and distributors by December 31, of this year.

Program Planning for Extension Work in Agricultural Economics

Considerable thought and study has been given to this project, but not much has been accomplished in the way of tangible results. For three weeks, from June 21 to July 9, I attended the summer school for Extension workers, at Colorado A & M College. While at this school a special effort was made to obtain as much information on the problem of program planning as possible. Considerable attention was given to program planning in a course which I took in Extension Methods. I also obtained much helpful information on this problem from Mr. T. Guy Stewart, State Supervisor of Extension Program Planning for the State of Colorado.

Considerable information has been collected and studied on the subject of Program Planning. I have discussed the subject with Mr. Thomas Buckman, Assistant Director in Charge of County Agents, and with several of our county agents, but as yet no tangible results have been obtained in the line of working out a definite course of action, the formulation of long-time objectives, the collection of facts as a basis for program planning, or the appointment of county or community planning committees.

We hope to obtain more definite action along these lines during the next year.

Course Given in Extension Methods

During the spring semester, from February 1, to June 5, I taught a three-hour course in Extension Methods. This course was taken by Senior Agricultural students who were planning to enter the field of Agricultural Extension work upon graduation from the University.

From June 21 to July 9, I attended the Summer School for Extension Workers, at Colorado A & M College, where I took courses in Extension Philosophy and Methods, Marketing for Extension Workers, and Psychology for Extension Workers. The chief purposes for attending this school was to better prepare myself for teaching the course in Extension Methods here at the University of Nevada, and to become more familiar with practices in extension program planning. Much very helpful information was obtained at the School and I now feel much better prepared to carry on with this work.