AGRICULTURAL EXPERIMENT STATION

OF THE

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS

FIFTY-SIXTH ANNUAL REPORT

STATE COLLEGE, N. M.
1944—1945

DR. FABIAN GARCIA

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Director Emeritus of the Experiment Station and Professor Emeritus of Horticulture.

Fabian Garcia was a member of the first graduating class of New Mexico College of Agriculture and Mechanic Arts in 1894. Since that date, with the exception of one year during which he did graduate work in horticulture at Cornell University, he has served the institution in some capacity. Appointed Director of the Experiment Station in 1913, he continued in that position 32 years, devoting his time and effort to supervision of research on crops and livestock problems in New Mexico. The results obtained have gained wide recognition.

Dr. Garcia is recognized as an authority on horticulture. Besides having taught various phases of the subject, he is the author of 20 station bulletins on results of horticultural experimentation and co-author of other station bulletins. He is best known for his work with onions and chile.

The title of Director Emeritus of the Experiment Station and Professor Emeritus of Horticulture was conferred upon him by the Board of Regents at the time of his retirement, April 1, 1946. His is indeed a record of outstanding achievement and service to agriculture and to the people of New Mexico.

State College, New Mexico,
December 27, 1945.

To His Excellency, John J. Dempsey,
Governor of New Mexico.

Sir: It is a pleasure to present the fifty-sixth annual report of the Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts, for the fiscal year ended June 30, 1945. It contains reports of progress relative to various experimental activities and a financial statement of receipts and expenditures.

Respectfully submitted,
Albert S. Curry, Acting Director

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FIFTY-SIXTH ANNUAL REPORT

INTRODUCTION

This publication is a brief report of the experimental activities of the Agricultural Experiment Station for the fiscal year ending June 30, 1945. As compared with previous years, many of these activities were restricted because of the loss of staff members and the impossibility of obtaining qualified replacements, the general difficult labor situation, and the scarcity of items required in conducting field and laboratory research. Despite these handicaps staff members have diligently studied many agricultural problems and disseminated much information of particular value to the agricultural production program.

Although there was a reduction in the scope of research activities, the cost of the program was not proportionately decreased. Higher prices of materials and supplies, increased cost of labor, and the necessity of using a larger proportion of available funds for salaries than in prewar years indicate that research in future years will involve the expenditure of more dollars than it has in the past, if it keeps pace with other phases of our way of living. Excellent foresight, recognition of these conditions, and knowledge of the needs of New Mexico agriculture were exhibited by the State Legislature at its last session in its action to provide the station with additional funds for agricultural research.

NEW INVESTIGATIONS

Project Purnell No. 67, "Transportation Costs on Agricultural Products from New Mexico and Competing Areas," is a study to determine the relationship between transportation costs of New Mexico agricultural products and those from other areas and to appraise the relative importance of transportation as a factor in New Mexico agriculture.

Project Bankhead-Jones Research No. 8, "Storage, Dilution, and Seasonal Variation in Quality of Ram Semen," was planned to obtain information about the use of diluted ram semen for artificial insemination.

Project Purnell No. 66, "Weights of Range Sheep at Critical Periods During the Annual Cycle," is a study to determine weights, losses, and gains of range sheep in New Mexico at various times of the year.

Project Adams No. 3, "Improvement of the White Grano Onion by Inbreeding," has the objective of developing a strain of white onion that is superior to the present strain in the following char-

acteristics: 1, earliness; 2, uniform maturity; 3, broad obovate shape; 4, small neck; 5, yield; and 6, uniformity in size and color.

Project Adams No. 4 is "The Bionomics of the Mexican Bean Beetle (*Epilachna varivestis* Muls) in the Irrigated Valleys of Southern New Mexico with Particular Reference to the Proper Timing of Insecticide Schedules." Factors affecting the seasonal occurrence of Mexican bean beetles, as well as the effectiveness of various control measures, are being investigated.

Project Station Sales No. 3, "Irrigated Pastures for Dairy Cattle," is a study to determine the ability of permanent pastures to withstand grazing, the carrying capacity of irrigated pastures, and suitable pasture mixtures for dairy cattle.

Project Station Sales ID No. 5, is an investigation of the effect of irrigation practices and methods on yield of cotton and incidence of Verticillium wilt.

Project Station Sales PH No. 5 has been undertaken to determine the influence of date of hatch upon the annual egg production of hens kept in laying cages and on the floor.

INVESTIGATIONS COMPLETED

During the year the following research projects were completed:

Project Adams Z, "The Fiber and Saponins of Yuccas Growing in the Southwest."

Project Purnell 26, "Improvement of the White Grano Onion."

Project Purnell 38, "Determination of the Iron and Copper Content of Pinto Beans and the Effect of Pinto Beans on the Regeneration of Hemoglobin in the Nutritional Anemia of the Albino Rat."

Project Purnell 65, "Variety Tests and Disease and Insect Control on Irish Potatoes at High Altitudes."

Project Bankhead-Jones Research No. 7, "Experimental Induction of Ovulation and Artificial Impregnation of Ewes."

COOPERATIVE WORK

In order to obtain a larger amount of information on various agricultural and livestock problems in New Mexico, the Experiment Station cooperated with the following agencies and organizations during the past year:

Cotton and Fiber Branch, Office of Marketing Services.

Division of Dry Land Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering.

Division of Sugar Plant Investigations, Bureau of Plant Industry, Soils, and Agricultural Engineering.

Farmers and Manufacturers Beet Sugar Association.

Kennecott Copper Company.

Operations Division, Soil Conservation Service.

Research Division, Soil Conservation Service.

Southwestern Forest and Range Experiment Station, Forest Service.

Tennessee Valley Authority.

United States Cotton Field Station, Bureau of Plant Industry, Soils, and Agricultural Engineering.

Western Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry.

Western Regional Salinity Laboratory, Bureau of Plant Industry, Soils, and Agricultural Engineering.

Western States Sheep Breeding Laboratory, Bureau of Animal Industry.

ANIMAL HUSBANDRY

RANGE MANAGEMENT

Revegetation of Southwestern Ranges

(Project B1)

Natural Revegetation. In the fall of 1944, observations were made in a series of plots established in 1939 to determine the effect of grazing by rodents, rabbits, and livestock on well-preserved, open black grama grassland. Data obtained are presented in table 1.

TABLE 1.—STAND AND YIELD OF BLACK GRAMA GRASS UNDER RODENT, RABBIT, AND CATTLE EXCLUSION

Plot treatment	Stand per sq. ft. at ground level	Computed yield per acre
	Square inches	Pounds
Closed to rodents, rabbits, and cattle	.80	480
Open to rodents, closed to rabbits and cattle	.70	453
Open to rodents and rabbits, closed to cattle	.85	460
Open to rodents, rabbits, and cattle	1.02	307

The only significant difference in stand was between the plot "Open to rodents; closed to rabbits and cattle" and the plot "Open to rodents, rabbits, and cattle." Cottontail rabbits got into the first-mentioned plot and persisted there for some time, causing some rather heavy localized damage before they could be removed. This probably accounts for the light stand on that plot. The denser stand on the plot open to rodents, rabbits, and cattle is thought to have been caused by light to moderate grazing of domestic livestock.

A comparison of yields showed that only the differences between the plot "Open to rodents, rabbits, and cattle" and the other three plots were significant, and these highly so. Probably the differences are at least partly due to the fact that

the plot open to cattle had been lightly to moderately used, so that less material remained on this plot from previous years. These observations indicate that neither the rodents nor rabbits present in well preserved, open black grama grassland have an appreciable effect on the stand of vegetation or forage yield.

Artificial Revegetation. Reseeding trials were conducted at five sites in the 1944 growing season, two of these being extensive trials on a practical basis. Rainfall was good early in the growing season but was only fair from the time of seeding to the close of the season. Fair to good stands of the better-adapted species resulted on the species test plots, but only a poor to fair stand of seedlings could be observed in the extensive plantings at the end of the growing season.

Continued observation of the 1943 extensive reseeding site through the 1944 growing season failed to reveal more than a very few plants. Most of the plants were Lehmann lovegrass which germinated in 1943. Observations indicate that under conditions represented at the planting sites, seed of Lehmann and Boer lovegrass which fails to germinate or produce visible seedlings the year it is sown, cannot be expected to produce a stand in the following years.

About 7½ acres of mixed Lehmann and Boer lovegrass which were harvested for seed in the fall of 1944 yielded 6 pounds clean seed to the acre. This was only 15 percent of the yield obtained in the excellent growing season of 1941, but was probably much nearer the results that might be expected in average years.

Continued observations of the 1943 species tests and current results on the 1944 species tests conducted in the creosote bush (*Larrea tridentata*) vegetation type indicate that chamiza (*Atriplex canescens*) is one of the better species for reseeding creosote-bush areas. Black grama grass seedlings in this type of vegetation were severely damaged by small rodents.

Determining the Carrying Capacity of Ranges

(Project B1)

Forage utilization surveys were made at the end of the grazing season in late spring and early summer. From the resulting data and stocking records, the stocking capacity of the forage in the pastures was computed.

As a check, in November 1944 a forage survey by means of clip transects was also carried out in one 2,470-acre pasture representative of good black grama range. Results showed 465,200 pounds of grass vegetation to the section, air-dry weight to ground level. Of this amount 37.7 percent or 175,380 pounds to the section were considered usable as forage when consideration was given to the proper degree of use of the grasses and the necessary decreasing use that results as distance from water increases. Deduction

of a 10-percent weathering loss left 157,842 pounds of grass forage to the section available for the 1944-45 winter-spring season. With a forage requirement of 8,760 pounds to the animal unit year (24 pounds per day) the indicated stocking rate would be 18 animal units to the section. Consideration of weeds and yucca flower stalks not included in the forage crop survey would tend to increase this rate slightly. An animal unit as used in this work is a 1000-pound cow with a calf.

When the forage survey was made, much material remained from previous years. Analysis of the grass samples showed that not more than 53.6 percent of the total was current growth, which indicates that the stocking capacity of the current year's grass forage production was not over 9.6 animal units to the section.

In this same pasture the utilization survey made the first of June 1945 showed 28.1 percent of the grass forage to have been used by 27.65 animal unit years stocking. About half the animals were yearlings and half mature cows. These figures indicate that a stocking of 98.4 animal units, or 25.5 animal units per section, would have been necessary to make proper use of the grass forage in the pasture. This figure comprehends the use of all forage, current and holdover growth of the grasses, and weeds and yucca flower stalks. If one disregards the effect of weeds and yucca flower stalks and discounts for the value of holdover forage, a stocking rate of 13.7 animal units to the section would be indicated. This rate of stocking was determined in a year when summer rainfall was about one-quarter greater than the long-time average for the site, and hence is probably somewhat greater than the long-time average proper stocking rate.

SHEEP

Different Levels of Nutrition for Ewes

(Project B5)

Four lots of range ewes have been fed on different levels of nutrition for the past two years, and the effects on wool and lamb production have been noted. The rations are, in general, as follows:

Recommended ration. This is as close as possible to supplying all requirements.

Fattening ration. This ration supplies all requirements and enough more to keep the ewes in high condition.

Maintenance ration. This allows the ewes to gain enough to replace about one-third of the loss at lambing.

Submaintenance ration. This is a ration that keeps the ewes below normal weight.

Groups fed the recommended, fattening, and maintenance rations were equal in wool production the first year, but the

submaintenance ration resulted in close to one-half pound less clean wool per ewe. The second year nearly one-third pound less clean wool per ewe was produced on the maintenance ration than on the recommended and fattening rations, while almost 1 pound less wool was produced by the group fed the submaintenance ration.

The fineness of wool remained about the same in all groups. Length of wool fibers from the recommended, fattening, and maintenance rations was a little over $\frac{1}{8}$ inch longer the second year than the first year, while fibers from animals fed the submaintenance ration remained the same in length.

Lamb production was influenced to a greater extent than was the wool. The average production of pounds of lamb per ewe on each ration was: recommended, 62.74 pounds; fattening, 71.79 pounds; maintenance, 53.26 pounds; and submaintenance, 44.31 pounds. The ewes produced 10 to 15 pounds more lamb per ewe as three-year-olds than as two-year-olds.

Weights of Range Sheep at Critical Periods of the Year
(Project P66)

Range ewes on five ranches in widely different sections of the state were weighed about November 1, January 15, and April 1. Two herds weighed practically the same in the spring as in the fall. One herd lost 3 pounds per animal, and another had an average loss of 7 pounds. A gain of 2 pounds per ewe was found in the fifth herd.

Four herds of yearlings were weighed with one herd showing an average gain of 6 pounds, another an average loss of 6 pounds, and the other two weighing the same in the spring as in the fall.

Only one ranchman used supplemental feed. Both yearling and ewe herds were fed 20-percent protein alfalfa cubes at the rate of .12 pound a day per animal. This was the ranch on which the yearlings showed 6 pounds gain, while the ewes gained 2 pounds.

Feed and weather conditions were considered good during the winter. On most of the ranches spring feed was poor.

Rations for Fattening Lambs
(Project P63)

An experiment was begun two years ago to compare the feeding value of fine alfalfa hay with that of coarse hay; to find out the value of corn silage and of cottonseed hulls as replacement feeds for part of either fine or coarse alfalfa hay; and to determine the necessity of using cottonseed meal as a supplement for silage and alfalfa hay. (A table showing the rations used in this experiment is given in the 55th Annual Report.)

Fine leafy alfalfa hay and sorghum grain produced the fastest rate of gain and as cheap a gain as coarse hay in the second year's

trial, even though the ton cost of fine hay was $5 greater. Substituting silage at $8 a ton or cottonseed hulls at $14 a ton did not reduce the cost of 1 pound of gain when fine hay was $27 and coarse hay $22 a ton.

The chemical analysis showed the fine hay to be 16.25 percent protein and 24.19 percent crude fiber. The coarse hay analysis was 13.88 percent crude protein and 31.85 percent crude fiber.

A Comparison of the Physical Characteristics of Sheep and Their Offspring

(Project B6)

A comparison of one year's lamb crop with the dams indicates that rapid progress can be made in selecting breeding stock for the following characters: weaning weight of lamb, length of fiber, face covering, and skin folds. This is shown by high correlation coefficients and regression of lamb measurements on ewe measurements (see table 2). For these characters the lambs are on the average midway between the sire and the dam. Because of the high heritability of the above characters, the extent to which lambs will show the characters can be largely predetermined by selection of breeding stock.

Type (as measured by a score), or body form of lamb and parent, was not highly correlated, and lower progress is to be expected in changing this character by selection. One reason is lack of a definite measurement of type; moreover, type is a composite of a number of characters, such as length of leg, length, depth, and width of body, and the associated changes in internal organs. Since a change in a given character can be brought about more quickly by concentrating on that character rather than several at one time, improvement in type would be expected to be slower than in a single characteristic such as length of wool.

TABLE 2—CORRELATION COEFFICIENTS AND REGRESSION OF LAMB ON EWE FOR VARIOUS CHARACTERS WHICH WERE MEASURED OR SCORED

Characters compared	Correlation coefficient	Regression coefficient
Body weight of ewe, birth weight of lamb	.39*	.051
Body weight of ewe, weaning weight of lamb	.60*	.55
Length of fiber on ewe and lamb	.61*	.50
Skin folds on ewe and lamb	.56*	.50
Face covering on ewe and (a) lamb	.49*	.47
Type score of ewe and lamb	.17	.15

*Correlation highly significant.

Experimental Induction of Ovulation and Artificial Impregnation of Ewes

(Project B7)

The main objective of this project was to determine whether a satisfactory lamb crop could be obtained by inducing ovulation with gonadotropic hormones and inseminating the ewes at the proper time. A number of pregnancies were obtained by this

means but the percentage of the ewes lambing was too low to warrant its use in practical operations. The percent of ewes becoming pregnant was increased slightly after first conditioning the uterus to simulate natural estrus by injections of estrogen, but the increase was of doubtful significance.

The project was terminated June 30, 1945, after two years' data were collected. The results have been published as a scientific paper in *Endocrinology*.

BEEF CATTLE

Relation of the Carotene Content of Range Forage to the Vitamin A Requirement of Breeding Cows

(Project A1)

Under normal moisture conditions, range forage at the animal husbandry ranch seems to be supplying enough carotene for the successful reproduction of range cows. Conditions at the college ranch are fairly typical of most areas in the Southwest where black grama is the principal type of vegetation.

This project, which has been carried on two years, is planned to run three years or more. Two pastures are used, with 16 breeding cows in each. Every 28 days, the forage and the blood are sampled, and the cows are changed from one pasture to the other. The results for blood plasma carotene and vitamin A are at hand for 19 bleeding periods.

According to various investigators, approximately 150 milligrams of carotene per 100 milliliters of blood plasma are considered the minimum necessary for successful reproduction. There was only one time when the blood plasma carotene approached this minimum. This was during January and February of 1944 when the carotene content of the blood plasma ranged from 140 to 170 milligrams per 100 milliliters. The months from January to June in both 1944 and 1945 were favorable for the growth of early spring weeds and annuals. This was reflected in the high forage carotene and blood plasma carotene which were secured during March and April of 1944 and 1945. In these months, both years, the carotene content of the blood was over 1,000 micrograms per 100 milliliters of blood plasma. These were higher values than were secured during August, September, and October, the time of most active growth of the grasses. This emphasizes the nutritional importance of the early annuals and weeds on the ranges.

Seasonal Use of Phosphorus Supplements for Range Cattle

(Project B4)

Results of four years' work on the use of mineral supplements indicate that continuous rather than seasonal feeding is to be recommended. However, seasonal feeding may be advisable

when the supply of supplements is limited.

Special steamed bone meal was used for the first two years of the experiment, and spent bone black was used the remainder of the time. The supplement was fed mixed with an equal amount of salt. Sixteen cows were given supplemental feed continuously, while 16 were fed in winter and spring only.

No significant difference was noted in the average weight of calves. The average for four years was 431 pounds for the continuously fed lot and 430 pounds for the seasonally fed lot. However, of 61 calves born in the seasonal lot, seven died; whereas only two deaths occurred among the 63 calves (including one pair of twins) born in the continuously fed lot.

Low-Protein Roughage for Fattening Cattle

(Project BO3)

A second test was run comparing corn silage, ground hegari fodder, and cottonseed hulls in rations of ground kafir, cottonseed meal,and alfalfa hay. A ration containing corn silage and alfalfa hay was also compared with a ration containing corn silage as the only roughage.

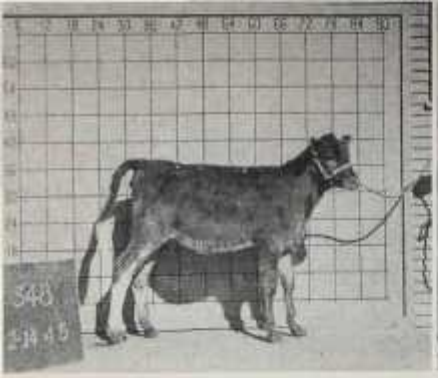
TABLE 3.—SECOND YEAR'S RESULTS FROM FEEDING FOUR KINDS OF ROUGHAGE

Kind of roughage	Cottonseed hulls and alfalfa hay	Hegari fodder and alfalfa hay	Corn silage and alfalfa hay	Corn silage
Average daily gain, lbs.	2.01	2.35	2.05	2.23
Feed required for 100 pounds of gain:				
Kafir, lbs.	306	257	305	280
Cottonseed meal, lbs.	85	72	83	117
Alfalfa hay, lbs.	393	322	377	—
Cottonseed hulls, lbs.	866	—	—	—
Hegari fodder, lbs.	—	330	—	—
Corn silage, lbs.	—	—	986	1813
Oyster shell, lbs.	—	—	—	4.3
Cost of feed for 100 pounds of gain	$16.87	$14.51	$18.73	$16.26
Profit per head	23.44	30.28	22.34	21.23

Feed prices:
Ground kafir, $42 a ton
Cottonseed meal, $54 a ton
Oyster shell powder, $20 a ton
Alfalfa hay, $22 a ton
Ground hegari fodder, $22 a ton
Cottonseed hulls, $14 a ton
Corn silage, $8 a ton

Probably because of a larger amount of grain contained in the fodder, the ration of hegari fodder, alfalfa hay, cottonseed meal, and grain gave better results than in the previous year. The cattle that received this ration gained faster at lower cost and returned more profit than those in the other lots. Although rather low gains were made by the cattle receiving the ration in which cottonseed hulls were used, the profit obtained was higher than in the lots receiving corn silage.

A comparison of the rations will be made for at least one more season to verify the results so far obtained.



Calf No. 348 in No Oil group of project 64. Age: 4 months. Weight, 192 pounds; 111.0 percent of normal weight. Fed home-mixed calf starter and alfalfa hay with whole milk for first 30 days only.

Calf No. 739 in No Oil group of project 64. Age: 4 months. Weight, 257.5 pounds; 106.0 percent of normal weight. Fed home-mixed calf starter and alfalfa hay with whole milk for first 30 days only.

DAIRY HUSBANDRY

DAIRY CATTLE

Vitamin A Supplement Tried with Calf Starter Containing No Animal Protein

(Project P64)

Only slight benefits seem to have been obtained from feeding vitamin A supplement with a calf starter containing no animal protein. The experiment was an effort to overcome digestive disturbances and pneumonia which had been observed during the development of a home-mixed calf starter which had no animal protein (project P61.)

Two groups of calves, 20 in all, were fed in the same manner except that one group received fish liver oil in capsules as a vitamin A supplement until the calves were consuming at least 2 pounds of alfalfa hay per day.

No pneumonia occurred in either group. In some cases of digestive disturbance the vitamin A supplement has appeared beneficial. Also, calves receiving the fish liver oil have shown smoother coats and sleeker appearance than those not receiving the oil.

The laboratory and field work of this project have been finished, but the data have not yet been completely analyzed. When this part of the work has been concluded, a bulletin will be published.

Irrigated Pastures for Dairy Cattle

(Project S3)

No evidence of bloat was found in dairy heifers from 15 to 24 months of age which were pastured on alfalfa and ladino clover fields for a total of 3,833 animal days during two pasture seasons.

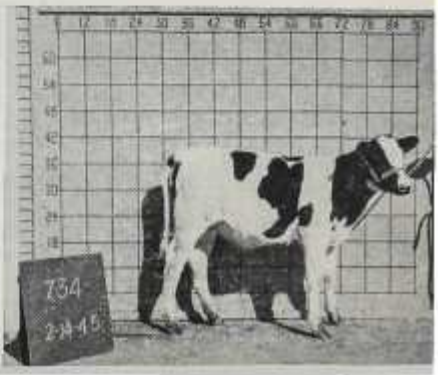
This may have been due to the "harvest method" of pasturing, in which the animals are turned into the field when the crop is about ready to be cut for hay. The crop is "harvested" in approximately a week, and then the animals are moved to "harvest" the next plot. However, 540 animal days of pasture on young, rapidly growing legumes (alfalfa and ladino clover) failed to produce bloat. When frozen legumes were used as pasture for 457 animal days, one animal bloated, but this animal also bloated occasionally in dry lot when fed dry alfalfa hay.

Four 1-acre plots having a medium-heavy adobe soil were used as permanent pastures. One was planted to alfalfa only; the second to ladino clover; the third to alfalfa and a grass mixture; and the fourth to ladino clover with the grass mixture. Ladino clover appears to afford pasture slightly earlier and later in the season than does alfalfa. Six grasses, African love, switch, orchard, Dallis, perennial ryegrass, and alta fescue, were used in the grass mixture with the legumes. Although a good stand of each grass was obtained from the seed ng in late October 1942, only two, perennial ryegrass and alta fescue, have persisted in significant quantities through two seasons of pasturing. Occasional plants of orchard and Dallis grass remain, but no switchgrass or African lovegrass is apparent. Dallis grass is a little more apparent than elsewhere in one end of the alfalfa and grass plot where there was some over-irrigating because of seepage from a ditch box. This indicates that the Dallis grass may need irrigation in this region more frequently than at two-week intervals, which was the average frequency practiced. Neither alfalfa nor ladino clover has seemed to influence the persistency of the grass.

The carrying capacity of permanent pastures is influenced by three factors: (1) amount of feed required by the animal, (2)

Calf No. 356 in Fish Oil group of project 64. Age: 4 months. Weight: 203.0 pounds; 117.3 percent of normal weight. Fed home-mixed calf starter and alfalfa hay with whole milk for first 30 days only.

Calf No. 734 in Fish Oil group of project 64. Age: 4 months. Weight: 358.0 pounds; 196.2 percent of normal weight. Fed home-mixed calf starter and alfalfa hay with whole milk for first 30 days only.



total yield of the pasture, and (3) rate of yield during the pasture season. Attempts to determine the pasture yield and rate of yield have been unsuccessful because of a lack of skilled labor; however, from the number of animal-days pastured, it seems that these plots would carry approximately two 1000-pound animals per acre throughout the normal five-month pasture season. The work is being continued with milking cows during the 1945-46 season.

Other Projects

A discussion of irrigated pastures for southern New Mexico will be found in the report of the Agronomy Department, page 25. Permanent irrigated pasture mixtures at the Conservancy District Substation are discussed on page 35.

MILK GOAT IMPROVEMENT

Testing for Johne's disease to determine if a non-reacting herd can be established by the test-and-slaughter method has been continued.

Of 22 animals tested in July 1944, six reactors were found. The reacting animals were slaughtered, and specimens from the intestines of five of them were sent to the Regional Animal Disease Laboratory at Auburn, Alabama. All samples were reported positive for *Mycobacterium paratuberculosis*, the causal organism of Johne's disease. The intestines of the sixth reactor were accidentally destroyed before a specimen was secured. Another animal that had been in poor condition but failed to react to johnin was slaughtered at the same time. A specimen from this animal was reported negative by the Regional Laboratory.

In May 1945 the 17 goats then in the herd were tested with johnin and three reactors were found. These animals were slaughtered and specimens from them were sent to the Regional Laboratory. Each of the three specimens was reported negative by the laboratory.

Newborn kids are removed immediately after birth to new lots that have not been frequented by mature goats, but they are fed milk from the general herd. Five animals that were segregated in this manner have reacted positively to johnin. Specimens of three were reported positive, while two were found negative in laboratory examination.

POULTRY HUSBANDRY

Dried Buttermilk in Rations for Laying Hens

(Project S4)

Feeding tests to determine the value of dried buttermilk in the ration of laying hens kept in cages have been conducted for three years. The general conclusion is that it makes little difference whether or not dried buttermilk is in the ration.

Two cages, each containing 96 hens, were used. The protein-rich supplements in the laying mash fed one cage were: 4.0 percent dried buttermilk, 11.0 percent meat scraps, 5.5 percent fish meal, and 4.0 percent soybean meal. In the second cage the dried buttermilk was omitted, but the soybean meal was increased to 8.0 percent.

Data are now being compiled for publication.

Effectiveness of Ferrous Sulphate in Preventing Egg-Yolk Discoloration Produced by Cottonseed Meal

(Project S5)

When New Mexico cottonseed meal is used in the laying ration the yolks of the eggs are apt to be discolored. The amount of discoloration depends on the percentage of cottonseed meal used. Usually a mash containing 10 or 15 percent of cottonseed meal does not produce any apparent discoloration in the fresh egg, but more than this amount usually causes a very noticeable mottled effect on many of the egg yolks. When eggs produced by flocks fed cottonseed meal are placed in cold storage a large percentage of them are so discolored that they cannot be used. Again the percentage of loss depends upon the percentage of cottonseed meal fed; only in this case even 5 percent of cottonseed meal causes a material loss. Therefore, it has not seemed wise to recommend the use of cottonseed meal in laying rations. This seemed to be especially true in New Mexico, as for some reason the local cottonseed meal causes more discoloration than the meal produced in other areas.

A number of stations have tried to find some way of overcoming this objectionable feature of cottonseed meal. One method which gives some promise of being successful is to mix with the cottonseed meal a small amount of either ferrous sulfate or ferrous chloride.

Since it might be desirable to use cottonseed meal during times of protein shortages, a test has been conducted to obtain data on the effectiveness of ferrous sulfate in preventing yolk discoloration in storage eggs. The test has been run for two years. The experience at this station was that ferrous sulfate decreased markedly the palatability of the mash. Thus, while the cotton-

seed meal discoloration was nearly eliminated, this effect could be due simply to the fact that the birds consumed only a small amount of the mash. One group of hens was fed mash with no ferrous sulphate but in quantities only as large as those consumed by the birds fed the mash with ferrous sulphate. When eaten in those limited amounts, the mash without the ferrous sulphate produced no more yolk discoloration than the mash with the ferrous sulphate. The conclusion to be drawn is that it is still best not to use cottonseed meal, as egg production will probably be better on a mash which is palatable though low in protein than it would be on a mash which contains more protein but is unpalatable because of the presence of ferrous sulfate.

Inheritance of the Condition of the Firm Egg Albumen

(Project P15)

In carrying out this project the objective has been to develop a strain of birds having a high percentage of thick albumen, and at the same time to develop another strain of birds having very little if any firm egg albumen. This latter condition, while not the desired one, is being developed as a check on the progress being made. Data collected thus far show that a strain which produces eggs with a small amount of firm egg albumen can be developed in rather a short time, simply by breeding from hens whose eggs are of this type. The hen apparently exerts a strong influence in transmitting this characteristic to her daughters. However, more difficulty has been encountered in developing a strain of birds which will produce eggs with a high percentage of firm egg albumen. Some progress has been made in this direction, but it has been slow up to this time.

IRRIGATION DEPARTMENT

Different Irrigation Treatments for Cotton

(Project P6 revised)

The study of how different irrigation treatments affect maturity, lint, and yield of Acala cotton was continued during the 1944 growing season. A description of the soil and a discussion of materials and methods are available in preceding annual reports.

Results were in line with those obtained in other years. Some of the data are presented in tables 4 and 5. Plots irrigated at such intervals that the plants did not suffer materially for moisture returned a higher yield than the other plots. This did not always happen in previous years. Plots receiving infrequent irrigations produced the lowest yields but returned the highest percentage of lint at the first picking. The other irrigation treatments had no particular effect on yield and maturity date. It appears from

TABLE 4.—IRRIGATION TREATMENTS AND YIELDS OF ACALA COTTON, STATE COLLEGE, 1944

Group numbers	Irrigation treatments	Date of first irrigation	Date of last irrigation	Total number of irrigations	Total water per acre[1]	Yield of lint cotton per acre			Percent of total	
						First picking	Second picking	Total	First picking	Second picking
					Acre inches	Pounds	Pounds	Pounds		
1	Frequent	April 26	Sept. 19	7	28.5	547	389	936	58.4	41.6
2	Infrequent	April 26	Aug. 29	3	13.4	507	179	686	73.9	26.1
3	Frequent and then infrequent	April 26	Aug. 29	5	20.5	585	310	895	65.4	34.6
4	Infrequent and then frequent	April 26	Sept. 19	5	21.7	443	349	792	55.9	44.1
5	General practice	April 26	Sept. 11	5	19.8	425	391	816	52.1	47.9

[1] This column refers only to irrigation water. The precipitation between the first irrigations and the average frost date in the fall amounted to 3.47 inches. This occurred on 25 days with the largest amount on any one day being 1.19 inches.

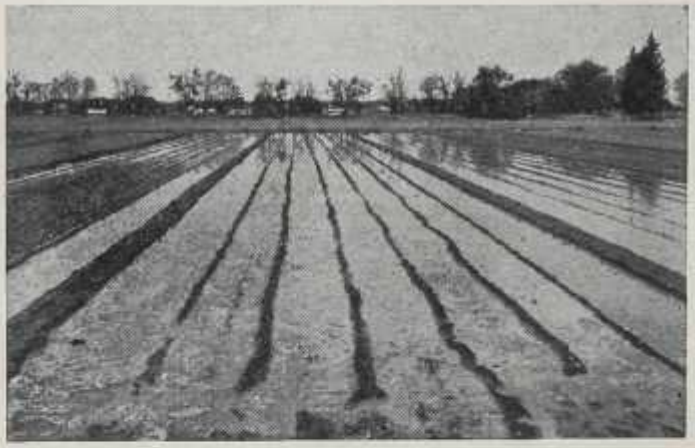
TABLE 5.—LINT GERMINATION, BLOOMS, SHEDS, AND OPEN BOLLS FROM MARKED PLANTS

Group numbers	Lint	Germination	Blooms per plant[1]	Percent shed	Bolls per plant	Weight per boll[2]	Lint index	Fibers at least 1 1-8 inches in length
	Percent	Percent				Grams		Milligrams
1	39.0	95.8	34.3	56.1	13.90	7.0	8.50	345.2
2	40.4	93.3	22.0	55.4	9.45	6.9	8.99	297.9
3	38.8	94.6	37.0	59.9	14.72	7.2	8.84	332.1
4	39.3	92.7	34.5	59.1	12.90	6.9	8.56	274.3
5	38.5	96.7	27.1	49.4	13.06	7.2	8.38	342.7

[1] The number of blooms, sheds, and open bolls were obtained by actual count.
[2] Average weight from eight 10-seed samples.

the data presented and from that obtained earlier that cotton should be irrigated in a manner which will result in good, as well as regular development of the plants.

Apparently the wilting of plants to some extent is not especially detrimental to crop yields, since plants in the last three groups wilted on several occasions before the middle of the day. A shortage of moisture in the latter part of the season hastens maturity and does not always decrease the yields. The effect depends on the length of the period of moisture shortage. During the experiment the irrigation treatments have not materially affected the percentage of small bolls shed, but they have affected the number of blooms per plant. Favorable moisture conditions resulted in the formation of the larger number of blooms. Reasonable variations in the irrigation procedures do not particularly affect yield, time of maturity, percentage of small bolls shed, and percentage of lint.



Condition of field and method of irrigation used in irrigation experiments with cotton.

AGRONOMY

COTTON

Cotton Varieties for New Mexico

(Project HS10)

That Acala strains and varieties of cotton are best adapted to southern New Mexico has been indicated by the 1944 spinning and variety tests, as well as by results obtained in previous years.

The tests are conducted in informal cooperation with the United States Field Station of the Division of Cotton and Other Fiber Crops and Diseases of the Department of Agriculture. In 1944, seven strains of Acala, Wilds 16, Stoneville 2B, and Deltapine 14 were included in the experiment. All Acala strains tested proved superior to the other varieties in lint index and spinning qualities.

In total yield of lint, Deltapine 14 was very significantly higher than any other strain or variety. However, only 21 percent of the crop was harvested at the first picking, as compared with slightly more than 46 percent of Acala 1517, which at the present time is most widely grown in New Mexico. Deltapine 14 is too late maturing to be adapted to this area. Furthermore, the fiber does not compare at all favorably with the Acala in quality. It is very doubtful if the variety can ever become profitable in New Mexico.

Acala 29 and Acala 29-1 showed higher total yields of lint than Acala 1517, probably because they have a higher degree of resistance to Verticillium wilt, which has been increasing rapidly in recent years.

Breeding Cotton of Uniform Quality for the Irrigated Areas of Southern New Mexico

(Project P15)

The 1944 progeny test consisted of 385 progeny rows, about half of which were grown on a wilt-infected field. From this planting approximately 1,200 individual plant selections and 53 entire row selections were made on the basis of superiority in yield and length of lint. A number of crosses were made between progenies for yield, length, strength, uniformity, and fineness of fiber. Also some back crosses were made involving interspecific hybrids by Acala. Laboratory tests of these strains and progenies were made for further study of length, uniformity of length, strength and fineness of fiber, and also seedling vigor.

As in several preceding years, two advanced strain tests were conducted, one at State College and one near Roswell, and there was also the usual preliminary strain test at State College.

Very satisfactory progress has been noted in developing strains for improvement of fiber length. A large number of progenies had a modal length of 1 1/8 inches with a relatively small percentage of fibers less than 3/4 inch in length. Various progenies also appeared to show resistance or tolerance to Verticillium wilt. Spinning tests of Acala 1517 and 2815, which are the strains now most widely grown in New Mexico, have shown that in spinning performance, these varieties are equal or superior to any commercial varieties grown in the United States.

Cotton Grade and Staple Estimates

(Project P24)

During the 1944 season practically all cotton gins in the state cooperated in the Smith-Doxey program which provides for free classification of cotton for members of the cotton improvement groups. More than 75,000 bales were classed in the El Paso office. Quality reports of both upland and American Egyptian cotton were issued regularly throughout the ginning season.

Average staple length of New Mexico cotton was slightly shorter in 1944 than in 1943 and the grade was slightly lower. In 1944 approximately 5 percent of the crop was 1 inch and shorter, and 11 percent was 1 1/8 inch or longer. In 1943, only 2 percent was 1 inch or shorter, and 23 percent was 1 1/8 inch or longer. About 17 percent of the 1944 ginnings were strict middling and higher, as compared with 35 percent in 1943. Five percent were in the gray category as compared with 1 percent last year.

This information on cotton quality has shown the advantages of growing superior strains of cotton and then having it ginned properly. More than 90 percent of New Mexico upland cotton is grown from stocks which originated at the Experiment Station. Practically all of this cotton is sold according to the official government classification. That ginners are taking special interest in these reports is indicated by statistics which show that only 0.7 percent of the cotton was reduced in grade because of rough preparation. In the United States as a whole in 1943, reports showed that 5.7 percent of the cotton ginned was reduced in grade because of rough preparation.

This project is being conducted in cooperation with the Cotton and Fiber Division, Production and Marketing Administration, U. S. Department of Agriculture.

The Effects of Alfalfa on Cotton

Project HS 10)

The effects of alfalfa were noticeable after four years of cropping to cotton, the yield of seed cotton to the acre being over 600 pounds greater than cotton yields following seven years of continuous cotton. Also, it was noted that no commercial fertili-

zer treatment increased cotton yields as much as alfalfa in a rotation. This again demonstrates the value of sound rotation practices.

It was also noted that cotton yields following alfalfa to which phosphate fertilizer had been applied were no greater than those following unfertilized alfalfa.

A test was conducted in 1944 to compare deep and shallow plowing as seedbed preparation for cotton on heavy soil. Land occupied by the test had been previously cropped to alfalfa which was utilized by grazing. As a result of grazing while wet, the surface soil was badly puddled and in poor physical condition. Deeply plowed plots produced good yields of cotton and absorbed irrigation water at a normal rate. Shallow-plowed plots produced very low yields of cotton and absorbed irrigation water very slowly. Forty-eight to 72 hours were required for complete absorption of a normal irrigation on these plots. This condition existed throughout the season.

Other Projects

In the report of the Irrigation Department, pages 18-20, may be found a discussion of the effect of different irrigation treatments on cotton.

ALFALFA

Variety Tests

(Project H11)

An alfalfa nursery consisting of 63 varieties and strains in its fifth year was noted principally for the percentage of stand and resistance to alfalfa wilt, a disease which has become increasingly serious in recent years. All stands have been reduced by 50 percent or more, primarily because of wilt, but strains of alfalfa from Virginia, Kansas, and Nebraska showed more wilt resistance than the average of all varieties. However, New Mexico Common compared rather favorably to the best in wilt resistance, and since it nearly always yields among the highest, it probably has excellent possibilities as foundation material in a program of breeding and selecting for high yield and wilt resistance. Such an alfalfa breeding program is now being planned, and it is hoped that the work will be in progress in the coming year.

Fertilizer Tests

(Project H12)

Phosphate fertilizers are very essential for maximum alfalfa production in New Mexico. Results of three years' experiments with various forms of superphosphate indicate that equally favorable results may be obtained with almost any form of phosphate fertilizer, providing equal amounts of available phosphoric acid are supplied.

Except for calcium metaphosphate, which gave significantly

Uniform alfalfa nursery at State College, photographed March 8, 1941, showing the difference in early spring growth of different strains. Center row is New Mexico Common.

The same nursery, photographed March 8, 1945, showing the decrease in stand and vigor due to alfalfa wilt.

lower yields in 1944 than the standard 0-44-0 superphosphate, no recent phosphate treatment has given results essentially different from those obtained with the previously recommended standard treatment of approximately 60 pounds of P_2O_5 to the acre. All phosphate treatments gave significantly higher yields than no phosphate.

Boron was applied to alfalfa the first two years of the experiment but not in 1944. There were no noticeable effects on alfalfa yields.

Other Projects

Alfalfa renovation and variety tests were conducted at the Conservancy District Substation and are reported briefly under that topic. Alfalfa is also discussed in the report on the Las Vegas Experimental Field and under the heading, "Irrigated Pastures for Southern New Mexico."

IRRIGATED PASTURES FOR SOUTHERN NEW MEXICO

(Project H14)

Because of widespread interest in irrigated pastures, a study was begun in 1942 of adaptability and yield of various grasses and legumes, both alone and in mixtures. Experiments were also conducted with barley-legume mixtures for winter pasture.

While alfalfa as a pasture has its objectionable features, particularly the danger of causing bloat, it is doubtful if any other crop will produce a greater total yield of herbage for pasture. Alfalfa alone yielded more than alfalfa-grass mixtures. As has been shown in previous work, the risk of loss from bloat is greatly reduced by proper handling of the crop, such as not permitting stock to graze on it until it is in the bloom stage.

Ladino clover has shown considerable promise on heavy soil but seems unadapted to light, sandy soils. Strawberry clover and red clover show relatively little promise, but alsike clover has possibilities in combination with ladino clover.

African lovegrass appears to be the most promising warm-season pasture grass. Of the cool-season pasture grasses, alta fescue is most promising, but perennial ryegrass gave favorable results when permitted to make sufficient growth to reseed itself.

In general, the various winter annual legumes that have been tested have not been satisfactory. A mixture of barley and sweet clover has yielded more than any barley-legume mixture.

GRAINS

Small-grain Varieties

(Project H2)

More livestock will probably be raised in the irrigated valleys of southern New Mexico during the postwar period than in previous years. Consequently, use of barley both as winter pasture

and as a grain is increasing. It has done as well as any crop planted for winter pasture at State College, and it also shows much promise as a grain crop.

Thirteen varieties were planted in the fall of 1944 and six in the following spring. Winter varieties were Trebi, O. A. C. 7-6, Finley, Texas Winter, New Mexico Winter, California Feed, Tennessee Winter, Tenkow, Oklahoma 108, New Mexico Winter northern grown, Reno, Purdue, and Oklahoma 82.

Winter killing greatly decreased the yields of the fall-planted varieties. Texas Winter, northern grown New Mexico Winter, and California Feed lodged very badly. While no significant differences in yield were noted, Trebi showed most promise for winter pasture.

Barley was the only small grain tested during the 1944 season at State College.

Grain Sorghums Under Irrigation

(Project HS17)

That combine-type sorghums will prove profitable for postwar livestock feeding was indicated by a test of eight varieties which was conducted in 1944. Plainsman, Double dwarf milo, Wheatland, Early hegari, Martin, Hegari, Manko, and Caprock were compared for yield, height, date of maturity, and bird damage.

All these varieties showed adaptability to combine harvesting. The grain was almost completely destroyed by birds, but indications are that when these sorghums are planted in larger areas the damage will be relatively light.

Corn Varieties and Hybrids

(Project H4)

The leading corn variety in southern New Mexico for many years has been Mexican June. Relatively late in maturing, it is excellent as both a grain and forage crop. For grain production its objectionable feature is the thick, heavy husk which makes it difficult and expensive to harvest; also, the extremely tall growth probably makes the crop almost impossible to harvest mechanically. However, the thick husk results in less damage to this variety from corn ear worms and birds than almost any other variety.

Because of the relatively higher value of other crops in this state, and because of the great diversity in climatic conditions in the various corn-growing areas of the state, a comprehensive program of corn breeding by the Experiment Station has not seemed justifiable. However, each year a number of tests have been conducted with important varieties and hybrids from the corn belt. Up to this time none of these introduced hybrids have shown

advantages of any consequence over the open-pollinated Mexican June.

Two open-pollinated varieties and six hybrid types from the corn belt were tested at State College in 1944. Mexican June, with a yield of 75.2 bushels to the acre, was significantly higher than any other variety.

Other Projects

Trials with different grains were made in northeastern New Mexico, at Clayton, Capulin, and Mosquero, at the Las Vegas Experimental Field, and at the Conservancy District and Curry County Substations. Results are included in the reports from these different areas.

SUGAR BEETS

Effect of the Preceding Crop on Sugar-beet Seed Yield

(Project AT, revised)

Significantly higher yields of sugar-beet seed were obtained in the 1944-45 season after summer fallowing of the land than after cantaloupes, barley, sweet clover for green manure, Sudan grass, or corn. Yields following the cantaloupe crop were significantly higher than those following sweet clover or corn, but no significant differences were noted between barley, sweet clover, Sudan grass, and corn as preceding crops.

The experiment verified results of previous years, which have shown that highest yields are almost always obtained when the beet field is fallowed through the season up to planting time. Probably yields of seed following the fallow treatment will ordinarily be high enough to more than offset the loss of any crop that might be grown earlier in the season. It is recommended that the beet field be cultivated and fallowed as long as possible during the season prior to planting.

Fertilizer Treatments for Sugar-Beet Seed

(Project AT, revised)

On soil of high natural productivity, commercial fertilizer applications, other than the usual spring applications of nitrate fertilizer, are of little if any economic value in the production of sugar-beet seed, according to results obtained in the 1944 experiment.

Ammonium sulfate and superphosphate were applied alone and in combination, both at planting time and in the spring at about the time the new growth started. Also, comparisons were made between 5 tons of manure and superphosphate and 10 tons of manure without the superphosphate.

All yields were relatively high, because of the natural productivity of the field. Production varied from 1,951 to 2,102 pounds of seed to the acre. The former yield was obtained after

application of 10 tons of manure in the fall and ammonium sulfate in the spring, while the latter resulted from applications of manure and superphosphate in the fall followed by ammonium sulfate in the spring. The relatively small difference was not significant.

Curly-top and Leaf-spot Resistance

(Project S9)

About 35 sugar-beet strains and varieties supplied by the Division of Sugar Plant Investigations were tested in 1944 for relative stands, curly-top and leaf-spot resistance, yield, and percentage of sugar. Also, 10 selections of beets varying from a few to 50 or more were planted in isolated locations for foundation seed production, and 10 increase blocks varying in size from one-half to one acre for seed production were planted in isolated locations, principally in the Middle Rio Grande area from Belen to Albuquerque.

S. L. 32 was one of the varieties most resistant to the curly-top disease, but it showed rather severe leaf-spot injury. This variety yielded 14.65 tons to the acre on a field which had not been heavily fertilized, as it would have been in commercial sugar-beet production. On the other hand, the variety 1-300, which showed no curly-top resistance, was a complete failure. Curly top is more virulent in New Mexico than in most of the sugar-beet areas of the United States. Results obtained with S. L. 32 indicate that, because of progress made in the development of disease-resistant varieties in the last two decades, satisfactory yields of sugar beets may be obtained even in areas where curly top is most prevalent.

(The sugar-beet investigations were conducted in cooperation with the Division of Sugar Plant Investigations, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture.)

Other Projects

In the report on the Conservancy District Substation will be found results of sugar-beet tests conducted there.

PINTO BEANS

(Project 36)

Experiments to develop greater uniformity of maturity and color, earliness, and rust resistance in pinto beans were continued in 1944. Tests were conducted under dry-farming conditions at Clayton, Capulin, and Las Vegas, and under irrigation at State College.

Of 20 progeny rows planted at Clayton, 10 represented promising strains from a similar test in 1943, while the other 10 were selections made at Clayton and from farmers' fields in that area.

Twenty rows of hybrids were planted at Clayton in 1944. These consisted of Pinto x California Pink, Pinto x Calico, Pinto x Great Northern, and Pinto x Strain 1334 crosses. Some of these crosses were in the third and fourth generations. From these hybrids it is hoped to develop a pinto-marked bean with better cooking qualities than the present pinto variety or pinto selections. In previous years, one white bean hybrid (1334) and one pinto-marked bean with a small white spot on it have shown superior cooking qualities.

Five improved pinto bean strains were planted in randomized plots at Clayton, Capulin, and Las Vegas, in advanced strain tests, while nine improved pinto bean strains, together with a white hybrid and Red Mexican were planted in preliminary tests at these same fields. Advanced tests of 11 strains and preliminary tests of 16 strains were made at State College.

At Clayton, pinto strain 247 yielded highest, with strain 641 ranking next. At Capulin, strains 295, 291, and 247 gave the best yields. At Las Vegas, pinto strain number 291 yielded highest, while number 295 was next.

Of the tests conducted with newer strains on these three fields, the following strains ranked highest in order named: numbers 1034, 1080, 1272, and 1241. A new strain, number 1388, was added to this test in 1944. This one is extremely early and is very promising in the Capulin and Las Vegas areas. Two selections, numbers 255 and 256, which appear to be resistant to bacterial blight, were made in 1942 and were tested and increased in 1944.

As a result of this work, two pinto bean strains, numbers 247 and 295, have been in commercial production for several years. These are superior to local seed stocks in yield, color markings, and market qualities. Strain 641 has averaged high in the advanced strain tests at all three fields in the past three years.

Resistance to bacterial blight, a serious bean disease in the dry-farming areas, is shown in some of these improved strains, especially 295 and 247. The new strain, number 1388, which has shown resistance, has been increased for field plot testing.

More detailed discussions of the work with pinto beans are included under "Dry-Farming Investigations in Northeastern New Mexico," "Las Vegas Experimental Field," and "Conservancy District Substation."

Dry Farming Investigations in Northeastern New Mexico

(Project P8)

The work for this project is conducted on three experimental fields near the towns of Clayton, Capulin, and Mosquero. Weather data consisting of daily temperatures, precipitation, and character of the day have been recorded during the 12-month period.

At the Clayton field, precipitation was considerably higher than the 17-year average, while at the Capulin and Mosquero fields it was about normal. The 1944 precipitation for the three fields was as follows: Clayton, 21.85 inches; Capulin, 16.20 inches; and Mosquero, 15.32 inches. Averages for the previous 17 years (1927-1943) were 14.37, 15.50, and 17.86 inches, respectively. Rainfall during the summer months was approximately the same as in previous years, except on the Clayton field. The percentage of seasonal rainfall was as follows: Clayton, 87; Capulin, 79; and Mosquero, 81. The mean temperature for the 12-month period was approximately the same as the 17-year average. Extreme temperatures for the year were: Clayton, maximum, 101°, minimum, 5°; Capulin, maximum, 95°, minimum—9°; Mosquero, maximum, 101°, minimum, 5°. On all three fields temperatures were less extreme than in previous years.

Clayton

Sorghums.—At the Clayton field, sorghum nurseries were maintained in order to observe the most recent developments in both grain and forage sorghums. Nurseries were also maintained on disease-resistant and nonresistant varieties of sorghums in order to detect any sign of the sorghum disease (Pythium root rot). Seed was furnished by sorghum breeders from Kansas, Oklahoma, Texas, and Colorado, who were interested in the adaptability of certain new varieties to high altitude conditions. Sweet Sudan Strains and Common Sudan were planted, and differences in habits of growth, adaptation, and yield were noted.

Weskan yielded highest of seven Kafir-type varieties of grain sorghum, while Sedan kafir, Early Kalo, and Greeley ranked next. Yields of these varieties were 14.1, 13.0, 12.9 and 11.7 bushels to the acre, respectively. For the eight years Weskan has averaged highest, with a yield of 14.7 bushels to the acre, while Greeley and Early Kalo have yielded 13.5 and 13.1 bushels to the acre, respectively. Sedan kafir, which has been in the test only five years, has averaged 17.3 bushels to the acre during that time. This

variety is well adapted to northeastern New Mexico and widely grown there.

Although Quadroon yielded highest of five milo-type grain sorghums in 1944, Dwarf Yellow milo had the highest eight-year average yield, 13.9 bushels to the acre. The 1944 yields were: Quadroon, 18.3; Dwarf Yellow milo, 16.1; Beaver, 15.3; Double Dwarf milo, 15.2.

Of four varieties of forage sorghums, Leoti Red was highest, both in 1944 yield (2.07 tons to the acre), and in average yield for the preceding 10 years (1.9 tons to the acre). Yields of other varieties in 1944 were: Early Sumac, 1.84; Sunrise, 1.49; and Fremont, 1.47.

Pinto Beans.—Improved pinto bean strains and hybrids were planted in nurseries to study yield, character of growth, and color markings. Of nine pinto strains in a preliminary test, numbers 1042, 1034, 1283 and 1080 averaged highest in 1944 with yields of 250, 225, 200 and 194 pounds to the acre, respectively. In the three-year averages (1942-1944), numbers 1042, 1283 and 1272, with average yields of 462, 433, and 427 pounds to the acre, have ranked highest of the new pinto strains. A local strain yielded an average of 326 pounds to the acre over this same period.

In the advanced bean strain test, which consisted of five pinto selections, a local strain of pinto and numbers 247, 641, 291, and 295 yielded highest with average yields of 516, 456, 453, 434, and 428 pounds to the acre, respectively. Ballo averaged 350 pounds to the acre; Calico, 353, and Great Northern, 269. The seven-year averages for Local and numbers 247, 295, and 291 have been 281, 271, 253, and 253 pounds to the acre, respectively. Strains 641 and 406, which have been in the test only three years (1942-44), have averaged 360 and 295 pounds to the acre, respectively, during that time. Number 641 has yielded high for the past three years and appears to be a superior strain.

Corn.—Of eight corn varieties, Hays Golden had the highest yield, 13.6 bushels to the acre. Union County White, with 13.0 bushels to the acre, was next in order, while Blue Squaw yielded 12.3, and Bloody Butcher, 11.9 bushels to the acre. For the eight years, 1937-44, Union County White and Hays Golden have averaged approximately the same, while Bloody Butcher, White Flint, Minnesota No. 13, Colorado No. 13, and Swadley have averaged next in order named.

Capulin

Sorghums.—Six early-maturing varieties of grain sorghums were planted but failed to mature sufficient seed to justify harvesting. The same thing has happened the past 18 years, partly because of extremely cool temperatures in the late spring and early fall.

Fremont, with a yield of 4.2 tons to the acre, was the highest of four varieties of forage sorghums. Leoti Red, Early Sumac, and Sudan grass ranked next in order named. For the eight years, 1937-1944, Early Sumac has had the highest average yield—2.56 tons to the acre.

Millet.—Of two varieties of millet, Siberian had the higher yield, .88 ton of hay to the acre. These varieties were seeded late, and unfavorable growing conditions during August caused low yields.

Corn.—Yellow Flint corn yielded 24.6 bushels to the acre; Swadley, 19.9; and White Flint, 17.5. These last two varieties were not mature when frost came on November 9. Altogether, four open-pollinated varieties were tested. In addition, five strains of hybrid corn which seemed early enough for this high altitude were planted, but failed to mature sound, marketable corn.

Pinto beans.—Pinto bean strains 295 and 291, each yielding 420 pounds to the acre, were highest of 10 strains of field beans. Great Northern, 1334 (White hybrid), 247, Calico, and 641 ranked next with yields of 406, 406, 401, 385, and 362 pounds to the acre, respectively. Strain 295 averaged 264 pounds per acre for the seven years, 1938-1944. This was the highest average yield. Strain 247 averaged 249 pounds. Numbers 641 and 406, which have been in the test only three years (1942-1944), averaged 489 and 424 pounds to the acre, respectively, for that period.

When compared with six new strains of pinto beans, the local strain had the highest yield, 590 pounds to the acre. Numbers 1034, 1080, and 1241 ranked next, with yields of 556, 518, and 511 pounds to the acre, respectively. Number 1388, a new strain in the area, is extremely early and offers considerable promise in this high altitude where the growing season is extremely short.

Barley.—Odessa has yielded highest of four varieties of spring barley, both in 1944 and as an average for the eight years, 1937-1944. The 1944 yield was 16.4 bushels to the acre, while the eight-year average was 10.6. Other varieties tested produced these yields in 1944: Conway, 15.0; Colsess, 15.0; and Club Mariout, 14.8.

Mosquero

Winter Wheat.—Cheyenne yielded 32.5 bushels to the acre in 1944. This was the highest yield obtained from five winter wheat varieties. Cheyenne also had the highest 1940-44 average yield—16.6 bushels to the acre. Yields of other varieties in 1944 were: Blackhull, 32.4; Kanred, 29.3; Tenmarq, 27.6; and Turkey, 26.1.

A winter wheat nursery of 15 promising varieties is maintained at Mosquero in order to observe their adaptability to this area. These varieties differ in hardiness, maturity, quality of

grain, and strength of straw. Blackhull 6251 has produced the highest yield, 23.6 bushels to the acre.

Corn.—Of five corn varieties, Hays Golden yielded highest in 1944 (15.2 bushels to the acre) with Blue Squaw, Minnesota 13, and Union County White ranking next. Hays Golden also had the highest six-year average yield, 18.6 bushels to the acre.

Sorghums.—Highest yield obtained from five forage sorghums in 1944 was 1.69 tons to the acre, which was produced by Sudan grass. Fremont, Early Sumac, Sunrise, and Leoti Red ranked next. Early Sumac had the highest average for the eight-year period—1.51 tons to the acre.

Sedan kafir appears to be well adapted to this area. It yielded highest of seven kafir-type grain sorghums, with Early Kalo and Greeley ranking next. Yields of these three varieties were 12.6, 11.5, and 11.4 bushels to the acre, respectively. Kalo did best over the seven-year period, 1938-1944; its average yield was 16.2 bushels to the acre.

Quadroon, with a yield of 14.6 bushels to the acre, was highest of five milo-type grain sorghums, while Dwarf Yellow milo and Sooner ranked next, with yields of 12.9 and 11.7 bushels to the acre, respectively. Dwarf Yellow milo had the highest average yield for the 10 years 1935-44—10.1 bushels to the acre.

Pinto Beans.—Pinto yielded 273 pounds to the acre, which was the highest yield obtained in a test of four field bean varieties. Yields of other varieties were: Calico, 233; Great Northern, 160; Ballo, 127.

Las Vegas Experimental Field

Conditions were very unfavorable for crop production at the Las Vegas field during the 1944 season. There was very little irrigation water in the Storrie Lake, and the annual precipitation was 14.33 inches, of which only 66 percent, or 9.44 inches, came during the summer months (April 1 to September 30). All crops except alfalfa were grown under dry-farming conditions.

Alfalfa.—Alfalfa received only one irrigation which was early in the spring. Because of the low water supply, it was necessary to depend on rainfall for the rest of the moisture. Cossack had the highest yield of five varieties—1.55 tons to the acre. This represents one cutting only. In the alfalfa fertilizer test, there were no differences in yield from the various commercial fertilizers.

Pinto Beans.—In an advanced test of five improved college strains of pinto beans, number 291 had the highest yield, 438 pounds to the acre. Numbers 295, 406, and 641 were next with yields of 407, 372, and 366 pounds to the acre, respectively. Strain

247 averaged 512 pounds to the acre for the seven years. This is the highest average produced by any of the strains. Of all bean strains in a preliminary test, number 1233 yielded highest—423 pounds to the acre.

Sorghums.—For the third successive year, Fremont, a comparatively new variety, has yielded highest of all forage sorghums. In 1944 the yield was 3.96 tons to the acre. Extremely early, this variety comes nearest to maturing in this high-altitude, short-season area. Of the grain sorghums, Early Kalo and Early hegari matured about 50 percent of their heads. No grain yields were secured. During the eight years, no grain sorghum variety has been found that will produce a satisfactory yield at this location. This may be attributed to the fact that temperatures are too low for abundant sorghum growth.

Corn.—Corn varieties did not produce grain yields, because of unfavorable weather at the flowering time. Yellow Flint produced some mature corn but not sufficient to warrant taking yields.

Work at this location was discontinued in the spring of 1945.

Conservancy District Substation

Horticulture and field-crop experiments included tests of potato varieties, potato fertilizers, lettuce varieties, tomato varieties, pinto bean dates of planting, permanent irrigated pasture mixtures, fertilizers for permanent irrigated pasture mixtures, alfalfa renovation, alfalfa varieties, sweet corn varieties and hybrid corn varieties.

Potatoes.—Of six varieties of potatoes, the Colorado Cobbler was highest, with a yield of 219.2 bags to the acre, followed by the Utah Cobbler, which yielded 205.5 bags to the acre. The Katahdin, White Rose, Pontiac, and Bluewater Cobbler produced yields of 117.8, 180.8, 186.3, and 172.6 bags to the acre, respectively. Psyllids were controlled with three dustings of sulfur at 10-day intervals.

No significant differences in yield of potatoes were obtained in the potato fertilizer test, which consisted of seven fertilizer treatments and no treatment after applying 12 tons of barnyard manure to the acre on the entire field. Fertilizers tried were nitrogen alone, phosphorus alone, potassium alone, and combinations of nitrogen-phosphorus, nitrogen-potassium, nitrogen-phosphorus-potassium, and phosphorus-potassium on a basis of 800 pounds of 4-12-4 to the acre, or 160 pounds of plant food to the acre supplied by the commercial fertilizers.

Lettuce.—Two lettuce varieties, Imperial 847 and Imperial 850, were planted in October 1943. Imperial 847 was discarded because of a poor stand, but Imperial 850 produced 227 crates of

good quality lettuce to the acre, with an estimated average of six dozen heads to the crate.

Tomatoes.—Of the tomato varieties Pearson, Pearson C, Pearson S, and Pan America, the Pearson produced the highest yield, which was 183.4 bushels to the acre, and also a slightly better quality tomato than any of the other varieties.

Sweet Corn.—In a test of varietal ear worm resistance in sweet corn, June Gold yielded highest with 41.8 percent of the ears undamaged by worms. Although very low in yield, the variety V20 Namograin produced 51.8 percent of the total yield of worm-free ears. The first varieties to mature were Early Bancross, Early Golden Bantam, and Marcross Northern.

Permanent Pastures.—Of the permanent irrigated pasture mixtures, those containing alfalfa as the legume produced the highest mean yields to the acre. However, the mean yield of 6.2 tons to the acre which was produced by Ladino clover, orchard grass, and meadow fescue (the recommended mixture for the Rio Grande Conservancy district) was not significantly lower than yields of mixtures containing alfalfa.

In the fertilizer test on permanent irrigated pastures, nitrogen alone and phosphate alone significantly increased the acre yield over the no-fertilizer check plots in the mixtures having alfalfa as the legume. However, nitrogen and phosphorus in combination produced no significant increase in yield. In the mixtures having Ladino clover as the legume, nitrogen alone did not increase the yield over the no-fertilizer check treatment. Nitrogen and phosphorus in combination increased the yield over the check treatment, but the increase was not significant.

In the strawberry clover mixtures, nitrogen or phosphorus alone did not increase the yield over that from the no-fertilizer treatment. Nitrogen and phosphorus in combination did increase the yield but not significantly.

Alfalfa.—Alfalfa renovation tests did not increase yields of old stands. Heavy spring disking and splitting of the alfalfa crowns reduced yields almost to the point of being significantly lower than the non-renovated plots.

For the first time since the alfalfa variety test was planted in 1939, there was no significant difference in yields between varieties, but for the second year in succession Pecos Valley common and Hardy Cimarron led the test in yields, thus confirming earlier statements that these two varieties are best suited to this locality.

Corn.—Some 27 varieties of hybrid corn were tested for yielding ability with B & B Yellow Dent as a check. Most of the hybrids yielded favorably and many outyielded Mexican June and B&B Yellow Dent, both of which produced 57 bushels to the acre. Reid National 122, Reid National 123, lowealth TXI, and Reid

National 118R yielded 84.1, 74.3, 72 and 71.4 bushels to the acre, respectively. The high-yielding hybrid corn varieties all matured well. Mexican June remained soft at harvest.

Sugar Beets.—Yields of sugar-beet seed following sweet clover as a green manure crop were not significantly higher than sugar-beet seed yields after small grains and sweet clover.

Results of a sugar beet variety test including both curly-top resistant and curly-top susceptible varieties, showed that significantly higher acre yields of roots were obtained from curly-top resistant varieties. This variety test was run in cooperation with the Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Sugar Plant Investigations, United States Department of Agriculture.

Curry County Substation

Wheat.—Moisture conditions during the fall of 1943 were extremely unfavorable with little surface moisture. As a result, winter wheat seedlings were withheld until late in January, and only one variety of winter wheat, Comanche, was seeded at that time. The remainder of the land which was to have been seeded to winter wheat was seeded to three varieties of spring wheat; Komar, Thatcher, and Ceres. Yields of the varieties were as follows:

Comanche winter wheat	11.4 bushels to the acre
Komar spring wheat	13.9 bushels to the acre
Thatcher spring wheat	18.1 bushels to the acre
Ceres spring wheat	13.3 bushels to the acre

Sorghums.—The planting of sorghum varieties on 45 acres of this field was withheld until July 4, because of extremely low surface moisture. The varieties Sedan kafir and Martin milo were seeded and made exceptionally good growth; however, these were bound the middle of October for bundle feed, since they were not fully matured. The remainder of the field was summer fallowed during the season of 1944 and seeded to winter wheat varieties on September 1. Exceptionally good fall and winter growth occurred.

Digging a field of Pontiac potatoes. This 1-acre field produced 290 sacks of potatoes 1⅞" and over.

HORTICULTURE

TRUCK CROPS

Potato Culture Investigations

(Project A1)

(In cooperation with the Department of Biology)

Fertilizer tests.—No significant differences occurred in yields of Irish potatoes given different fertilizer treatments in 1945. All plots produced high yields of marketable potatoes.

The same fertilizers were used as in 1944, but the experiment was conducted on a slightly heavier type of soil. Yields obtained from the different treatments are given in table 6.

It will be noted that all plots produced high yields of marketable potatoes with only slight differences between the various fertilizer treatments. These data when subjected to a statistical

TABLE 6.—YIELDS OF IRISH COBBLER POTATOES RESULTING FROM FERTILIZER APPLICATIONS

Treatment	Plot yields in pounds*			Computed acre yield in pounds			Percent No. 1
	No. 1	No. 2	Total	No. 1	No. 2	Total	
4-12-4	157.6	11.2	168.8	21,853	1,560	23,513	93.3
20-0-0	159.2	9.6	168.8	22,176	1,337	23,513	94.3
5-15-5	157.0	9.5	166.5	21,870	1,323	23,193	94.2
0-0-20	151.6	12.2	163.8	21,117	1,699	22,826	92.5
10-0-10	148.8	10.4	159.2	20,727	1,448	22,175	93.4
0-15-5	163.4	12.6	176.0	22,761	1,755	24,516	92.8
5-20-0	161.4	10.4	171.9	22,483	1,448	23,931	94.0
0-0-0	155.8	13.0	168.8	21,702	1,811	23,513	92.2

*Average of 5 replications

analysis failed to show any significant differences between the treatments used.

Variety tests.—Five varieties of Irish potatoes were compared with the Irish Cobbler, which is the standard variety for the state. Seed of all varieties was planted on February 26, 1945. Results are shown in table 7. The work on Irish potatoes as outlined in the project has been completed, and a bulletin is being prepared.

TABLE 7.—IRISH POTATO VARIETY TRIALS FOR 1945

Variety	Date of harvest	Plot yield in pounds*			Computed acre yields in pounds			Percent No. 1
		No. 1	No. 2	Total	No. 1	No. 2	Total	
Kaseta	7-17	858	130	988	22,994	3,484	26,478	86.8
White Rose	7-14	860	211	891	18,234	5,654	23,878	76.3
Pontiac	7-18	814	74	888	12,815	1,980	23,798	91.6
Irish Cobbler	7-12	752	79	831	20,153	2,117	22,270	90.4
Katahdin	7-19	725	75	800	19,430	2,010	21,440	90.6
Chippewa	7-14	548	113	661	14,686	3,028	17,714	82.9

*Each plot consisted of three rows 200 feet long.

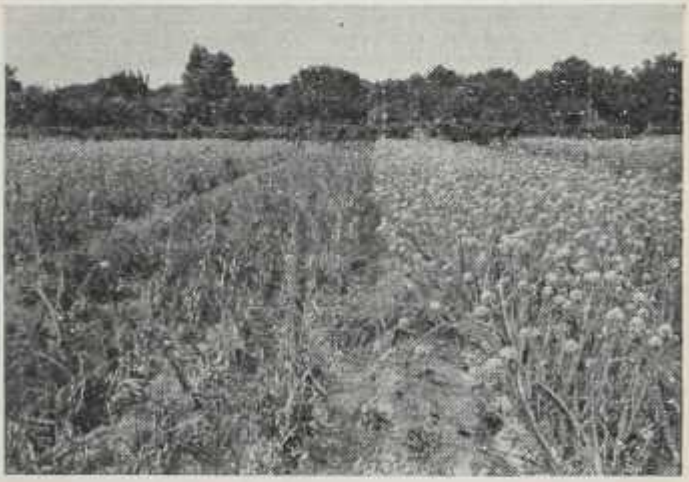
Tomato Investigations

(Project H13)

Pearson, Pan America, and Stokesdale tomato varieties were used in a 1944 experiment to determine the effect of close plantings on the incidence of western yellow blight. A comparison was made between plants 2 feet apart in a row and plants 4 feet apart. The experiment was laid out in a randomized block design with four replications for each treatment. The number and percent of plants having the disease were determined at various times during the growing season.

Data secured from this experiment were inconsistent and

General view of variety trial blocks of Irish potatoes. From left to right: Rose, Katahdin, Cobbler, Pontiac, Chippewa.



Top: Onion seed plots from bulb planting. Plot on left, ridge method; plot on right, level method.

Bottom: Onion seed to seed plots, 1945. Plot on right was seeded September 1, 1944; plot on left was seeded October 1, 1944. Photograph was taken in June 1945.

extremely variable, and when analyzed according to the variance method of Fisher, failed to show any significant differences between the treatments. Of the three varieties grown, the Pearson had the highest percentage of healthy plants.

The Improvement of the White Grano Onion

(Project P26)

This project has been closed and has been replaced by Adams project 3 (Improvement of the White Grano Onion by Inbreeding). During the 1944-45 season, those bulbs which most nearly approached the ideal were selected in the field and planted in an isolated plot. These plants will be used as material for inbreeding purposes under the new project Adams 3, which was begun July 1, 1945, and will be discussed in the next annual report.

Factors Affecting Seed Production in the White Grano Onion

(Project P34)

Seed from Bulbs.—A serious problem confronting growers of Grano onion seed is the amount of bulb rot which occurs both during storage and in the field after the bulbs are planted. The resulting poor stands very materially reduce onion seed yields. Experiments were conducted in 1944-45 to determine the effect of planting date and also method of culture on the amount of bulb rot. Two methods of culture were used on each of four planting dates. The amount of bulb rot was determined at various times during the growing period as well as at harvest. These data, together with the yields of seed obtained from the various treatments, are shown in table 8.

Statistical analysis of these data shows that the ridge method of culture is superior to the furrow method in reducing bulb rot and also in seed production. Best planting date appears to be between September 1 and September 15. Earlier or later planting dates result in more rotting with accompanying reductions in seed yields.

Seed from Seed.—In an effort to determine the most desirable time of planting seed for the purpose of securing maximum bolting and seed production, plantings were made on four dates. The percent of plants producing flowers and the seed yields obtained from each date are shown in table 9.

Other Projects

Experiments with truck crops were conducted under the direction of the Agronomy Department at the Conservancy District Substation and are reported on pages 34-36.

TABLE 8A.—EFFECT OF PLANTING DATE AND CULTURAL METHOD ON BULB ROT AND SEED PRODUCTION OF WHITE GRANO ONIONS, 1945

Date of planting	Method	Percent stand on			Average stands on 5-2-1945[1]	Plot yields in pounds	Acre yields in pounds	Average yields in pounds[2]
		12-19-44	3-14-45	5-2-45				
Aug. 15	Ridge	88.1	86.1	85.4	81.7	14.6	424	367
	Furrow	83.2	79.1	78.0		10.7	311	
Sept. 1	Ridge	95.8	95.8	95.6	84.3	16.5	479	383
	Furrow	78.5	74.5	73.1		9.9	287	
Sept. 15	Ridge	94.1	93.3	93.2	89.5	14.9	433	399
	Furrow	89.4	85.9	85.8		12.6	366	
Oct. 1	Ridge	94.8	79.1	78.5	71.0	9.7	282	216
	Furrow	82.8	66.9	65.6		5.2	151	

[1] Difference required for significance at 5-percent level, 6.1.
[2] Difference required for significance at 5-percent level, 66.7.

TABLE 8B.—AVERAGE RESULTS FROM RIDGE AND FURROW METHODS

Method	Average percent stand on 5-2-45	Average yield, pounds per acre
Ridge	88.1	464
Furrow	75.1	228

TABLE 9.—YIELDS OF ONION SEED FROM BOLTED PLANTS, 1945

Date of seeding	Date of harvest	Percent seeders[1]	Plot yield in pounds[2]	Computed yield, pounds per acre
Aug. 15, 1944	July 9, 1945	86.6	22.60	614.0
Sept. 1, 1944	July 9, 1945	85.1	22.00	598.0
Sept. 15, 1944	July 9, 1945	45.8	2.80	76.1
Oct. 1, 1944	July 9, 1945	9.4	.71	19.3

[1] Difference required for significance at 5-percent level, 10.0.
[2] Difference required for significance at 5-percent level, 3.7.

FRUITS

Pecans

(Project S19)

Growing conditions were favorable during the 1944 season, and an excellent crop of pecans was harvested from most varieties. The yields secured from each tree, together with the data secured from the cracking tests are shown in table 10.

TABLE 10—PECAN DATA FOR 1944

Variety	Age of tree (years)	Yield per tree (pounds)	Nuts per pound	Kernels per pound	Percent kernel	Filled	Cracking quality	Shell
Burkett	13	101	50	84	57.8	Med.	Good	Thin
Clark	13	41	89	152	56.5	Well	Good	Thin
Co'o ado	27	43	85	138	60.1	Med.	Good	Thin
Delmas	24	90	55	127	56.4	Med.	Med.	Thick
Halbert	27	24	98	169	61.2	Med.	Good	Thin
Harbin	13	83	101	224	41.7	V. Poor	Med.	Thick
Indiana	27	96	61	113	50.3	Well	Good	Thick
Kentucky	26	48	89	167	49.9	Well	Med.	Med.
Mahan	13	87	56	107	53.4	Poor	Med.	Thin
Moneymaker	27	140	64	126	49.7	Well	Med.	Thick
Niblack	27	7	96	195	48.9	Med.	Good	Thick
Oklahoma	13	85	67	142	46.8	Med.	Good	Thick
Odoacer	27	393	80	123	62.3	Med.	Good	Thin
Paisl	26	169	56	110	49.5	Well	Good	Thick
San Saba Imp.	13	33	72	108	62.9	Well	Med.	Thin
Schley	25	19	78	132	59.6	Med.	Good	Thin
Seedling No. 1	27	196	82	148	54.6	Poor	Med.	Med.
Seedling No. 2	27	118	90	152	57.1	Med.	Med.	Med.
Stuart	25	76	55	102	51.9	Med.	Med.	Thick
Success	28	102	63	116	53.3	Poor	Med.	Thick
Texas Prolific	27	97	78	136	54.3	Med.	Med.	Med.
Van Deman	24	47	60	127	45.7	Med.	Poor	Thick
Varrick	27	25	83	169	47.7	Well	Med.	Thick
Western Schley	13	146	79	129	57.7	Med.	Tear	Thin
Williamson	13	31	63	118	51.2	Med.	Med.	Thick

Phenological Investigations with Fruits

(Project H1)

Heavy frosts in the spring of 1945 destroyed the entire crop of stone fruits in the experimental orchard. On March 20, a minimum temperature of 17 degrees killed all fruits which were in bloom at that time. A minimum temperature of 22 degrees was recorded on March 29. At this time all the stone fruits were well past full bloom, and the late blooming varieties which had escaped the earlier freeze were destroyed. Pecans, apples, and grapes were not affected by these frosts and, consequently, bore good crops during 1945. Blooming data were recorded for all varieties of fruits being grown in the experimental orchards.

Variety Trials of Tree Fruits

(Project H4)

Since the spring frost of 1945 destroyed the entire crop of peaches, plums, apricots, nectarines, and cherries, no information could be secured. The several new varieties of peaches, plums, cherries, and pears which were planted in the spring of 1944 all made a satisfactory growth during 1945.

Biennial Bearing of Apples

(Project P41)

1944 *tests*.—The 1944 season was the "on" year for the biennial-bearing varieties of apples now being grown in the college orchard (Delicious, Gano, and Arkansas Black), and a heavy crop of fruit was harvested from these trees. However, an early spring freeze damaged many flowers of the Delicious and Gano varieties, making it necessary to confine the experimental work on this project to the Arkansas Black variety, which bloomed late enough to escape the freeze.

Scaffold limbs of Arkansas Black were used in tests comparing the effectiveness of the following materials in reducing the set of fruit: Reico, .08 percent; Hormex at two times the recommended strength for pre-harvest spray (.002 percent naphthalene acetic acid plus an activating agent); di-nitro-ortho-cyclo-hexylphenol, .25 percent; naphthalene acetic acid, .004 percent; and naphthalene acetamide, .008 percent. All materials except Hormex significantly reduced fruit set and the percentage of flowering points that matured fruit. Except for naphthalene acetamide, all materials which reduced set caused some injury to the leaves, but the damage was not severe, and the treated plant-parts recovered within a few weeks.

Small limbs instead of entire scaffolds were used in tests comparing different strengths of naphthalene acetic acid with and without a wetting agent. The following combinations were used: naphthalene acetic acid, .002 percent; naphthalene acetic acid, .002 percent, plus Vatsol K, 3 ounces to 100 gallons of spray; and naphthalene acetic acid, .001 percent, plus Vatsol K, 3 ounces to 100 gallons of spray. Limbs sprayed with .002 percent naphthalene acetic acid alone were not significantly affected, but limbs treated with the same concentration of naphthalene acetic acid and Vatsol K had a significantly lower set. When the wetting agent (Vatsol K) was used, a .001-percent spray reduced set although a .002-percent spray without the wetting agent did not. The sprays used in these tests did not cause any visible injury to the tree.

Boron in the form of a borax spray was applied to limbs of Arkansas Black. The concentrations used were—.05 percent, .5 percent, and 1.0 percent by weight. The two strongest concen-

trations caused a significant reduction in fruit set without any visible injury to the foliage or spurs of the tree.

1945 *tests.*—Records were taken of the amount of flowering which occurred on limbs and scaffolds treated in 1944. In general, all treated limbs on which the set of fruit was reduced in 1944 produced more flowers in 1945 than the untreated limbs. In most cases the difference in flowering was not great enough to be statistically significant.

Previous work has shown that strong concentrations (.03 percent) of naphthalene acetic acid not only prevented fruit set, but appeared to have a carry-over effect the following year. This suggested the possibility of applying sprays of strong concentrations during the "off" year as a means of reducing the amount of flowering during the "on" year. In the spring of 1945 (off year) several sprays of rather strong concentrations were applied to non-fruiting limbs and scaffolds of the Delicious and Arkansas Black varieties. Data on the amount of flowering and the extent of fruit set will be collected in the spring of 1946.

Other Projects

Experiments with codling moths conducted by the Horticulture and Biology Departments in cooperation are included in the following report by the Biology Department.

BIOLOGY

Codling Moth Investigations

(Project AG, in cooperation with the Department of Horticulture)

Life-history and ecological studies in San Juan County have been completed. Results of these experiments, as well as a two-year comparison of spraying schedules, will be reported in a bulletin now in preparation. The project has been replaced by Project 4, "The bionomics of the Mexican bean beetle (*Epilachna varivestis* Muls.) in the irrigated valleys of southern New Mexico with particular reference to the proper timing of insecticide schedules."

In addition to the investigations in San Juan County, a comparison of DDT (20 percent active ingredient) with two standard insecticide schedules was made in the college orchard. Results are given in table 11. The concentration used for the DDT insecticide was that recommended by the manufacturer. Although the control obtained was promising, it was slightly less than that of the standard schedules, and further tests of this insecticide are being made.

Potato Culture Investigations

(Project A1, in cooperation with the Department of Horticulture)

Because of the very light infestation of the potato psyllid

(*Paratrioza cockerelli* Sulc.) no insecticide comparisons were possible this season. However, all experimental fields were treated with dusting sulfur to assure freedom from infestation. Other phases of the project are reported by the Horticulture Department.

TABLE 11.—CODLING MOTH INSECTICIDE COMPARISONS, STATE COLLEGE, 1944

Material per 100 gallons water	Mean percentages of sound fruit		
	Arkansas Black	Stayman Winsap	Delicious
1. Calyx spray: lead arsenate, 3 lb., colloidal spreader, 4 oz. Cover sprays 1-6, Standard lead arsenate,[1] 3 lb., summer oil, ¾ gal.	97.4	Not represented	Not represented
2. Same as above but using crystal lead arsenate (S. W.)[2]	97.0	Not represented	96.0
3. Calyx spray and cover sprays 1-3: Standard lead arsenate 3 lb., with colloidal spreader or summer oil as in No. 1. Cover sprays 4-6: nicotine bentonite 3½ lb., summer oil ¾ gal.	93.6	82.5	94.9
4. Calyx spray as above. Cover sprays 1-6: DDT (50 per cent parachlorphenyltrichlorethane) 2 lb. per 100 gal. water.	92.1	80.9	Not represented

[1] "Acme" brand.
[2] Sherwin Williams brand.

Pink Root of Onions

(Project AV)

That pink root of onions can be reduced by treating the soil with chloropicrin has been indicated by field tests at the Horticulture Farm. From table 12 it can be seen that 3 cc of chloropicrin applied to holes 6 inches deep and 12 inches apart decreases the incidence of pink root and gives a greater yield of onions. Furthermore, onions from plots treated with chloropicrin do not break down with soft rot caused by *F. zonatum* as do those from untreated plots.

Results from the use of D. D. mixture will be available later in the season. Greenhouse tests indicate that D. D. is not so effective as chloropicrin in the control of pink root of onions.

The so-called false blight of onions is merely one of the symptoms associated with pink root and not a separate disease. *P. terrestris* is more active at lower temperatures while secondary infection by *F. zonatum* occurs at higher temperatures. Attempts are being made to develop a White Grano onion that is resistant to pink root.

TABLE 12.—RESULTS OF SOIL TREATMENT WITH CHLOROPICRIN FOR CONTROL OF PINK ROOT ROT OF ONIONS, 1944

Treatment	Number of healthy onions	Number of diseased onions	Weight (pounds)	
			Healthy	Diseased
Check	0	833	0	61.0
Chloropicrin, 2 cc. on 12" centers	674	412	89.0	65.5
Chloropicrin, 3 cc. on 12" centers	731	176	106.5	31.5

Insects Affecting Field, Garden, and Orchard Crops

(Project H7)

DDT in dust and liquid form was applied to two common vegetable pests which have been exceedingly difficult to control—the corn ear worm (*Heliothis armigera* Hbn.) and the western flower thrips (*Frankliniella occidentalis* Perg.).

In the corn ear worm experiments DDT was compared with several other insecticides reputed moderately effective in other sections of the country. Each treatment was replicated four times in a randomized series of hills of sweet corn, and the results were computed in number of worms per ear and percentage of ear (i. e., rows of kernels) destroyed when the corn was harvested. The insecticides were applied only once to the silk at the ends of the ears just at the beginning of the silking period. The pyrethrum oil mixture was applied with an oil can as is customary for this type of treatment, the DDT liquid with a small hand sprayer, and the dusts with a hand duster. No attempt was made to force the sprays or dusts into the silking end of the ear, but the silk itself was thoroughly covered. Results of these tests (table 13) showed that none of the applications of dust or liquid spray were so effective as the oiling with pyrethrum and mineral oil.

Experiments for controlling the western flower thrips were conducted during the early growing period of the onion seed crop, which suffers severe infestations in March and April. The test included three insecticides: DDT (50-percent water dispersible powder) applied as a spray at the rate of 2½ pounds per 100 gallons of water; a 3-percent DDT-pyrophyllite dust; and a 15-percent B-B'—dithiocyano diethyl ether dust ("Lethane B-71"). Each was replicated three times in a randomized series of small plots composed of approximately 75 onion plants. Counts of thrips infestation were made on 25 onion plants before and 72 hours after each application of insecticides, and the data are presented in terms of percent mortality and percent reduction in comparison with the undusted controls (table 14).

Yields of cleaned onion seed at harvest were obtained and the data analyzed for variance (table 15). This analysis indicated that all three treatments were significantly superior to the un-

treated control. Differences in yield between the two DDT treatments and the Lethane B-71 closely approached significance.

TABLE 13.—COMPARISONS OF INSECTICIDES FOR CORN EAR WORM CONTROL, STATE COLLEGE, 1945

Insecticides and concentrations	Total larvae	Average per ear	Average percentage ear area injured
White mineral oil 1 qt Extract of pyrethrum flowers ¼ oz	9	0.56	2.80
Dusting sulfur, 60 percent Cryolite, 20 percent Inert, 20 percent	30	1.88	8.13
3-percent DDT-pyrophyllite dust	18	1.13	9.00
Water-dispersible DDT, 1 lb (active) Summer oil emulsion, ½ gal Water, 100 gal	28	1.75	7.50
Untreated	30	1.88	9.38

TABLE 14.—COMPARISONS OF INSECTICIDES FOR THRIPS CONTROL, STATE COLLEGE, 1945

Treatment	Number living	Number dead	Percent mortality	Percent control[1]	Percent reduction over untreated
Series I.—Following first application, March 21:					
Untreated	228	24	9.5	——	——
3-percent DDT-pyrophyllite dust	55	51	48.1	42.6	42.0
DDT spray, 1 lb. active to 100 gal. of Water, Vatsol, 3 oz., Summer oil, ½ gal	96	82	46.0	40.3	29.3
Lethane B-71 dust (14 percent active)	148	50	25.6	17.6	23.4
Series II.—Following second application, March 30:					
Untreated	164	22	11.8	——	——
3-percent DDT-pyrophyllite dust	3	16	84.2	82.1	89.8
DDT spray	5	43	89.6	88.2	74.2
Lethane B-71 dust	111	26	19.0	8.2	26.3

[1] Corrected for percent mortality in the untreated series by Abbott's formula.

TABLE 15.—YIELDS OF ONION SEED AT HARVEST

Treatment	Pounds per replication				Estimated pounds of cleaned seed per acre
	1	2	3	Average	
Untreated	2.14	1.92	1.54	1.86[1]	308.6
3-percent DDT-pyrophyllite dust	2.69	2.35	2.78	2.61	431.5
DDT spray	2.94	2.55	2.56	2.62	519.2
Lethane 8-71 dust	2.39	2.56	2.18	2.37	393.2

[1] Difference required for significance at 5-percent level, 0.33 lb.

HOME ECONOMICS RESEARCH

The Carotene and Ascorbic Acid Content of Chile

(Project P51)

Both green and ripe peppers of several varieties were found to be rich in ascorbic acid. Of the two varieties of hot peppers which are of commercial importance in southern New Mexico, College No. 9 chile was found to be higher in ascorbic acid than the Anaheim variety whenever the two were compared under the same conditions. Similar varietal differences were observed in less well-known varieties.

In a study of the changes in ascorbic acid during two growing seasons, 1943 and 1944, the highest ascorbic acid values were found in partially ripe pods. The ascorbic acid values of the green pods fluctuated from day to day depending on the time of day, amount of sunshine, and probably other factors. Green pods gathered during the latter part of the growing season, in late September or October, contained more ascorbic acid than similar pods gathered earlier in the season.

The data secured in this study have been reported in Bulletins 306, "The Carotene and Ascorbic Acid Content of Peppers," and 324, "Some Factors Affecting the Ascorbic Acid Content of Chile." A third bulletin which is being prepared for publication deals with the effect of canning and drying on the carotene and ascorbic acid content of chile.

Carotene and Ascorbic Acid Content of Carrots

(Project P60)

The gradual increase in the carotene of carrots during growth which was found last year in Imperator and Red Cored Chantenay carrots was observed again in carrots of these two varieties which were planted in August 1944 and allowed to remain in the ground during the winter. However, the very high carotene values of the

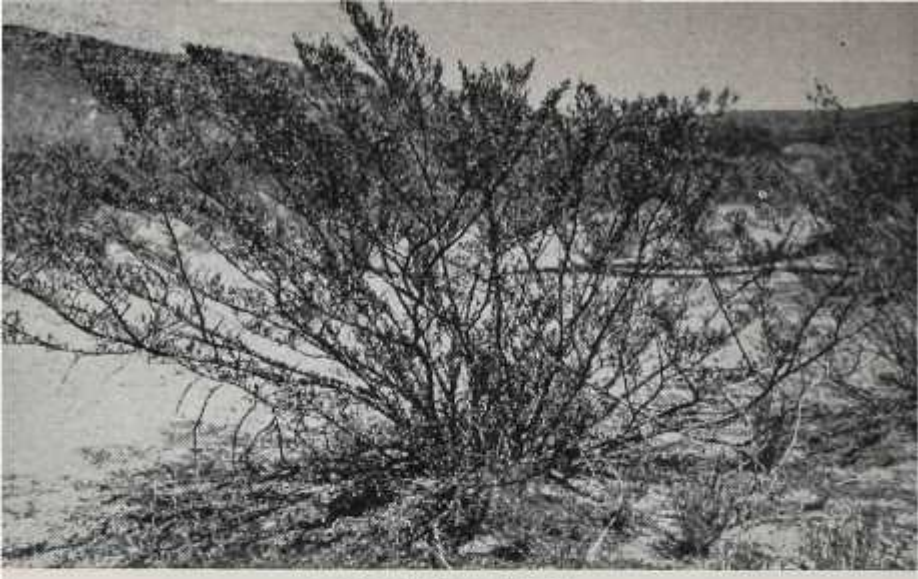
spring carrots were not reached by the slowly growing fall carrots.

A second lot of Imperator carrots was planted in the spring of 1945 by the Department of Horticulture and the carrots analyzed at intervals through the spring and summer. The results were much like those found in 1944. In all the lots studied the highest ascorbic acid values were found in the very young carrots. Day to day fluctuations in ascorbic acid values which were observed during the two years appear to be related to such environmental factors as irrigation and sunshine.

Ascorbic Acid in Cantaloupe

Five varieties of locally grown cantaloupe (Arizona 45, Arizona 13, Hales Best, Rocky Ford, and Pollock 10-25) were found to be rich in ascorbic acid. Freshly harvested melons picked at full-slip contained from 35 to 80 milligrams of ascorbic acid per 100 grams of edible material, with the highest values being found in cantaloupes of the Rocky Ford variety. Loss of the vitamin during storage was slow, considering the low acidity of the fruit.

These data have been reported in Press Bulletin 998 as progress notes on the National Cooperative Research Project on the Nutritive Values of foods.



Creosote bush (Larrea divaricata).

CHEMISTRY

Creosote Bush Analyzed for NDGA

(Project A2)

Nordihydroguaiaretic acid (referred to as NDGA for brevity) in concentrations of .01 percent has been found most effective as an antioxidant for retarding the rancidity of fats and oils. The present production of this compound has been assigned for use in the food supplies of the armed forces. The compound is obtained only from the leaves of creosote bush, *Larrea divaricata*, which is very abundant over wide areas in southern New Mexico. The NDGA content of the leaf is reported to vary between 3 and 7 percent, but no previous data have been published on this question.

A determination of this percentage and a study of the factors which contribute to the variation in concentration are the objectives of this project. Effects of the maturity of the foliage, of seasonal and climatic conditions, and of methods of harvesting and curing are being investigated. The analytical method used for determining the NDGA in lard and fat was found inapplicable to analysis of the leaf, and a new and apparently satisfactory method has been devised.

Samples from rather widely separated localities were obtained during the summer of 1944. Other samples were taken in October and December, and again in March 1945. These samples represent vigorous young growth, bloom and seed stages, and drought and winter conditions of the plant, and also include

a number of individual plant samples growing under the same conditions.

Data obtained on the samples of the first year are not sufficient to justify conclusions, and in some instances corrections may be necessary as a result of improvements in the accuracy of the analytical method. A few averages from these data are given, subject to correction. Twenty-six of the dry leaf samples averaged 6.6 percent of NDGA, the minimum being 5.2 and the maximum 7.7 percent. Sixteen samples of vigorous, green, younger growth averaged 6.2 percent of NDGA, while 10 samples representing extreme drought or fall and winter conditions averaged 7.2 percent. This would indicate that climatic variations are not large and that the NDGA appears to be highest when growing conditions are most difficult and there are fewest leaves on the plant.

AGRICULTURAL ECONOMICS

The Effect of Agricultural Adjustments on Farm Income

(Project P42, Revised)

For the fifth year, farm management data were obtained from farmers in cash crop areas of the state. The major cash crops are cotton, beans, wheat, and grain sorghums. These basic data have been obtained for the purpose of budgeting the incomes of various sizes and types of farms each year during the postwar adjustment period in order to show the economic effect of natural adjustments and of government programs. It is anticipated that the bugeting phase of the project will begin in 1946.

Costs of operating farms have increased markedly during the past five years, especially on types of farms requiring a large amount of hand labor. Cotton is a representative high cost crop, and a detailed enumeration of labor requirements and costs is shown in tables 16 and 17.

An average stand of creosote bush.

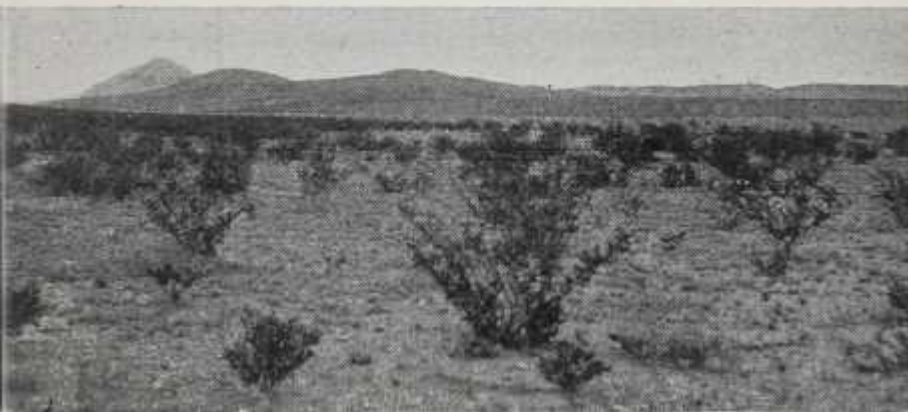


TABLE 16.—ESTIMATED LABOR AND TRACTOR COSTS INCURRED, PER ACRE, IN PRODUCING COTTON IN DONA ANA COUNTY, 1944

Operations	Man hours[1]	Tractor hours	Total tractor and labor costs
Leveling	1.20	1.2	$1.08
Cutting stalks	.26	.26	.23
Plowing	2.20	2.20	1.98
Cleaning ditches and rep. levees	2.00	.70	1.05
Disking	.56	.56	.50
Floating	.65	.65	.59
Bedding	.35	.35	.32
Bordering	.29	.29	.26
Irrigation	8.00	———	3.56
Harrowing	.48	.48	.43
Planting	1.19	.60	.78
Cultivating	2.60	.52	2.35
Chopping	7.47	———	2.99
Hoeing	13.86	———	5.54
Dusting	.40	.20	.26
Total	42.19	7.50	$23.72

[1] Man labor, 40 cents per hour, and tractor, 50 cents per hour.

TABLE 17.—SUMMARY OF COSTS PER ACRE OF PRODUCING COTTON IN DONA ANA COUNTY, 1944

Item	Cost
Man labor and tractor costs	$23.72
Seed	2.08
Calcium arsenate	3.00
Picking—2787 lbs. seed cotton at $2.00 per cwt.	35.74
Depreciation on buildings	1.12
Depreciation, interest, and repair on machinery (except tractor[1])	3.88
Interest on land and buildings ($250, at 5 percent)	12.50
Land tax	2.00
Weighing cotton at picking time	1.55
Hauling to gin	1.80
Ginning, bags, ties, and drayage	10.19
Irrigation water (construction, operation, and maintenance)	4.50
Cost per acre (lint—450 lbs.; seed, 1137 lbs.)	$98.08

[1] Depreciation of tractor covered in hourly cost rate.

Production Planning to Meet War Needs

(Project P58, Revised)

The principal objectives of this project are (1) to determine the shifts in production in response to war needs, in major farming areas, by sizes and types of farms; (2) to determine and analyze the principal difficulties encountered by producers in attempting to reach full production; and (3) to analyze the permanent effects of war upon the agriculture of the state.

Production Trends.—To attain the first objective, records of the organization of approximately 800 farms were secured from the Agricultural Adjustment Administration in the wheat, grain, sorghum, and cotton areas. These will be used with records

obtained in previous years to show shifts in production during the war period.

Dairy Costs—Adverse cost-price relationships have existed in the New Mexico dairy industry during the war period. To demonstrate these relationships in various parts of the state a study of 51 dairies was carried on in 1943-44. The results of this study were published during August 1944 in Bulletin 317, "Costs and Returns of Producing Milk in New Mexico."

Economics of Broomcorn Production—In response to war conditions in 1944 a large acreage of broomcorn was planted in New Mexico as in other producing states. A large yield provided more broomcorn than could move into the market in the usual time. In order to furnish information about economics of production, to be used as a basis for obtaining loans, a study was conducted, the data analyzed, and a manuscript prepared which will be published as Bulletin 326, "Economics of Broomcorn Production."

Broomcorn is an important cash crop in the eastern, central, and northeastern parts of New Mexico. For the five-year period 1940-1944, the acreage harvested averaged 60,800, and the average yearly production was 8,636 tons. New Mexico is the third ranking state in both acreage harvested and total production, but the long-time acre yield is next to the lowest of all important producing states.

The average farm price is lower than in any other important producing state, averaging $96 for the 26 years, 1929-1944. This low price is largely the result of the time of harvest, the New Mexico crop being the last crop to reach the market.

In 11 years the New Mexico farm price advanced over that of the previous year, and in nine of the following years the acreage increased. In 15 years the price went down, and in 12 of the following years, the acreage decreased. The amount of rainfall in April, May, and June is important in determining yields. In 17 years when the rainfall during these months was less than aver-

TABLE 18—NEW MEXICO BROOMCORN ACREAGE, PRODUCTION AND FARM PRICE, BY 5 YEAR PERIODS, 1929-1944 INCLUSIVE

Period	Broomcorn harvested	Total production	Production[1] per acre	Farm price per ton	Value per acre
	Acres	Tons	Pounds	Dollars	Dollars
1929-1934	27,800	4,015	289	101.95	14.73
1925-1929	30,000	4,380	275	93.40	12.84
1930-1934	42,800	4,680	221	55.60	6.16
1935-1939	50,000	5,750	230	64.25	7.36
1940-1944	60,800	8,636	281	132.85	18.66

[1] Weighted average of acre yield, price per ton, and value per acre.

age, the acre yield was below average 13 times.

Almost all the New Mexico broomcorn acreage is planted to the dwarf varieties, Scarborough No. 7 being the preferred variety. Production costs in 1944 were very high, largely because labor was scarce, its quality was poor, and wage rates were high. The cost per ton of the bulk of the crop ranged from $100 to $150.

Postwar Settlement of Veterans—In order that returning veterans and others who desire to go into farming or ranching in New Mexico may have information which is needed to help them in making their decisions, Bulletin 320, "New Mexico Dry-Farming Areas," was issued. The bulletin attempts to solve one of the postwar problems in the dry-farming area of the state: that of enabling veterans and others new to the area to make economic investments.

Ranch Organization and Management Practices in Southeastern New Mexico

(Project P47)

An analysis of a five-year study of sheep ranches has been prepared in Bulletin 325, "Sheep Ranching in Southeastern New Mexico." This bulletin shows the organization of ranches, cost of

TABLE 19.—ESTIMATED INCOME, EXPENSE AND CAPITALIZED VALUE OF LAND FOR A MINIMUM FAMILY-SIZED SHEEP RANCH UNIT IN SOUTHEASTERN NEW MEXICO

Items	Ranch Unit	Per Section
Area, sections	20.0	
Carrying capacity, number sheep	1,700.00	85
Investment, (Not including grazing land)	$30,326.00	$1,526.30
Improvements and equipment	17,360.00	878.00
Livestock	12,966.00	648.30
Cash Income—Total	9,253.90	462.69
Lambs, 801 head, 60,075 lbs. at 8¢	4,806.00	240.30
Ewes, 214 head, 21,400 lbs. at 4¢	856.00	42.80
Rams 8 head, 1,120 lbs. at 8¢	48.00	2.50
Wool 15,030 lbs. at 23 cents	3,456.90	172.84
Other livestock	87.00	4.35
Cash Expense—Total	3,778.57	188.93
Hired labor	985.00	49.25
Feed	569.80	28.04
Leases	203.14	10.16
Livestock expense	537.99	26.88
Repairs	255.00	12.75
Auto and truck expense	374.00	18.70
Taxes (not including income tax)	378.58	18.93
Interest (operation loans only)	141.40	7.07
Purchase of livestock	343.00	17.15
Net cash income	5,475.39	273.76
Non-cash expense		
Depreciation	1,530.00	76.50
Operator's labor (12 mo. at 86)	780.00	39.00
Wages of Management (3% on $30,326)	915.78	45.78
Interest on capital other than land (3% on 30,526)	915.78	45.78
Return on land	1,333.83	66.70
Capitalized value of land at 6%	22,230.50	1,111.52

production, physical production per head of stock and section of land, and the productive value of range land.

A discussion of the organization of a minimum-sized economic sheep ranch unit is also in the bulletin. It indicates that such a unit should provide returns sufficient for (1) expense of operation; (2) a reasonable standard of living for the operator, his family, and his hired labor; (3) payment for the land within the operator's productive life; (4) the earning of a reasonable return on invested capital; and (5) accomplishment of these objectives without the necessity of overgrazing and depleting the range resources.

In table 19 is shown an estimate of the organization and operating results of an economic unit, taken from data obtained in the study of eight sheep ranches over a five-year period.

PUBLICATIONS

Results of completed projects are presented in bulletins, which may be obtained by writing to the Department of Publications. Also available for free distribution are the shorter press bulletins, with timely information resulting from research at the station. Much of the material contained in these press bulletins is later incorporated into regular bulletins.

Following is a list of station publications for the fiscal year, 1944-1945:

ANNUAL REPORT FOR THE FISCAL YEAR ENDED JUNE 30, 1944

BULLETINS

316 TENSILE STRENGTH OF YUCCA FIBERS (*Technical*).—C. W. Botkin and L. B. Shires, August 1944.

Fiber strength of all the abundant species of yucca was measured. Y. *glauca* and Y. *elata* were found to be as strong as the usual commercial fibers, while Y. *baccata* and Y. *torreyi* were found equal in fiber strength to manila, which is the strongest rope fiber. Significant effects of the method of extraction or of the condition of the leaves on the strength of the fiber were also noted.

317 COSTS AND RETURNS OF PRODUCING MILK IN NEW MEXICO.—H. B. Pingrey and Morris Evans, August 1944.

Costs and prices for 51 dairies in the principal dairy areas in New Mexico were studied in 1943 and 1944. Milk was produced at a loss on 41 irrigated farms in the Pecos, Mesilla, and Middle Rio Grande Valleys, and at only a very small profit on 10 eastern New Mexico dry-land farms.

318 RAISING CALVES ON A LIMITED AMOUNT OF MILK.—O. C. Cunningham and D. H. Nelson, November 1944.

A home-mixed calf starter, of which the main ingredients were ground grain sorghums and cottonseed meal, was fed with alfalfa hay and also with hegari fodder. Calves on these rations were compared with animals fed an established commercial starter and also with calves raised by the whole milk-skim milk method. Calves fed the home-mixed starter and alfalfa hay compared favorably with the whole milk-skim milk group and developed in height and weight within the range given by Ragsdale for normal calves. Less favorable results were secured with hegari fodder as the roughage.

319 COTTON VARIETY TESTS IN THE RIO GRANDE VALLEY OF NEW MEXICO, 1940-1943.—A. R. Leding and L. R. Lytton, December 1944.

Strains of Acala cotton in large-scale commercial production in New Mexico, Acala strains from other irrigated sections of the Southwest, and a few varieties from the cotton belt were tested for adaptability to New Mexico conditions. Results indicate that Acala 1517 is best suited to conditions of the Rio Grande Valley in New Mexico.

320 NEW MEXICO DRY-FARMING AREAS.—Morris Evans, January 1945.

Veterans and others who are considering a move to the dry-farming areas of eastern New Mexico will find helpful information in this bulletin. Climate, topography, soils, vegetation, crop yields, range carrying capacity, transportation and hazards in dry-farm-

ing areas are discussed. Types and sizes of farms, farm organization, probable income, and investment requirements are other topics.

321 FIELD CROP EXPERIMENTS AT LAS VEGAS, NEW MEXICO, 1937-1944.—John Carter, Jr., June 1945.

Crops best adapted to Las Vegas and similar areas in northern New Mexico are discussed. All alfalfa varieties tested maintained good stands; Fremont yielded highest of the forage sorghums; and among the hay crops Siberian millet gave the greatest yield, while field peas and oats produced the best quality hay. Early-maturing dwarf varieties of corn proved adaptable to this region, and good yields of pinto beans were obtained. Of the range grasses, blue grama, crested wheatgrass, and weeping lovegrass maintained the best stands.

322 SOME POISONOUS PLANT PROBLEMS OF NEW MEXICO.—A. L. Hershey, June 1945.

Included in the bulletin are discussions of the causes and symptoms of hydrocyanic or prussic acid poisoning; bighead or photosensitization; oxalate and nitrate poisoning; selenium poisoning; and mustard poisoning. Also discussed are possible methods of prevention and treatment.

323 ALFALFA PRODUCTION INVESTIGATIONS IN NEW MEXICO.—Glen Staten, R. S. Stroud, and John Carter, Jr., June 1945.

Alfalfa is one of the most important crops in the irrigated areas of New Mexico. Results are given of variety tests, date-of-cutting tests, and experiments with fertilizers. Also discussed are the effect produced on the yield of cotton when alfalfa is in the rotation; renovation of old alfalfa stands; pasturing alfalfa; forage yields of alfalfa and alfalfa-grass mixtures; and rate, date, and method of planting.

PRESS BULLETINS

991 AGRICULTURAL ADJUSTMENTS IN NEW MEXICO FOR WARTIME PRODUCTION IN 1945.—P. W. Cockerill, July 17, 1944.

992 WARTIME ADJUSTMENTS IN THE AGRICULTURE OF EASTERN NEW MEXICO.—Morris Evans, August 7, 1944.

993 ESTIMATING WOOL LENGTH.—P. E. Neale, August 2, 1944.

994 THE SPINNING QUALITY OF ACALA 1517 COTTON AND FACTORS AFFECTING IT.—Glen Staten, Sept. 15, 1944.

995 A HOME-MIXED CALF STARTER FOR NEW MEXICO.—O. C. Cunningham and D. H. Nelson, Sept. 22, 1944.

996 FIRST-CUTTING AND THIRD-CUTTING ALFALFA HAY, CORN SILAGE, AND COTTONSEED MEAL FOR FATTENING LAMBS.—P. E. Neale and Marvin Koger, October 6, 1944.

997 THE VITAMIN VALUE OF COMMERCIALLY PREPARED CHILE PRODUCTS.—Edith M. Lantz, November 11, 1944.

998 THE ASCORBIC ACID VALUES OF CANTALOUPS.—Edith M. Lantz, November 24, 1944.

999 RESULTS OF FIVE YEARS OF SELECTIVE BREEDING OF NEW MEXICO RANGE SHEEP.—P. E. Neale, January 16, 1945.

1000 RECENT RESULTS OF RANGE RESEEDING TRIALS ON SEMIDESERT RANGELAND IN SOUTHERN NEW MEXICO.—K. A. Valentine, March 12, 1945.

1001 IRISH POTATO VARIETY TESTS.—J. V. Enzie, April 19, 1945.

1002 EXTERNAL PARASITES OF POULTRY AND THEIR CONTROL (906 *Revised.*)—L. N. Berry, April 19, 1945.

1003 BREEDING STUDIES IN RAMBOUILLET EWES AND RAMS.—T. D. Bell, June 8, 1945.

1004 EFFECT OF AGE ON THE WEIGHT AND PRODUCTION OF RANGE COWS.—J. H. Knox and Marvin Koger, June 28, 1945.

1005 AVOIDING BLOAT ON ALFALFA PASTURE.—D. H. Nelson, June 27, 1945.

1006 COTTONSEED MEAL AS A FERTILIZER FOR COTTON.—A. R. Leding, June 29, 1945.

JOURNAL ARTICLES

The following journal articles by members of the Experiment Station staff were published in 1944-45.

Schneider, G. W., and Enzie, J. V. Further Studies on the Effect of Certain Chemicals on the Fruit Set of the Apple. Proceedings Amer. Soc. for Hort. Science. Vol. 45, 1944.

Koger, Marvin. Artificial Breeding as a Tool in Livestock Improvement. Western Livestock. Sept. 29, 1944.

Watkins, W. E. Why Feed Mineral Supplements to Range Livestock in New Mexico. The Stockman. Nov. 1944.

Koger, Marvin, and Knox, J. H. The Effects of Sex on Weaning Weight of Range Calves. Journal Animal Science. Feb. 1945 (Vol. 4-No. 1)

Knox, J. H., and Koger, Marvin. Effect of Age on the Weight and Production of Range Cows. The Cattleman. June, 1945.

CHANGES IN EXPERIMENT STATION STAFF

Harbour D. Jones, Assistant Agronomist, resigned August 18, 1944, to accept a position with the Soil Conservation Service.

George W. Schneider, Assistant Horticulturist, was given a military leave beginning September 15, 1944.

Govan N. Stroman, Associate Agronomist, returned from the armed forces and resumed his duties on January 1, 1945.

Clarence P. Wilson, Experiment Station Editor, died January 19, 1945.

Margery Suhre, M. A., Bowling Green State University, Bowling Green, Ohio, was appointed Experiment Station Editor April 1, 1945.

Dr. Fabian Garcia, Director of the Agricultural Experiment Station, was retired April 1, 1945, and given the title of Director Emeritus of the Experiment Station and Professor Emeritus of Horticulture. Albert S. Curry was appointed Acting Director.

Rufus Stroud, Assistant Agronomist, resigned April 5, 1945, to accept a position as Superintendent of Los Poblanos Ranch at Albuquerque, New Mexico.

Harbour D. Jones, B. S. A., New Mexico College of Agriculture and Mechanic Arts, was appointed Assistant Agronomist April 5, 1945, to be in charge of the Conservancy District Substation at Albuquerque, New Mexico.

New Mexico Agricultural Experiment Station

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STATION STAFF, as of June 30, 1945

H. M. MILTON, B. M. E.*	President of the College
J. W. BRANSON, M. S.	Dean of the College and Acting President
FABIAN GARCIA, M. S. A., D. Agr., D. Sc.,	Director Emeritus and Horticulturist Emeritus
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J. R. EYER, Ph. D.	Associate Biologist
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GLEN STATEN, M. S. A.	Associate Agronomist
JOHN CARTER, JR.,[1] B. S. A.	Associate Agronomist
R. R. PINGREY, M. S.	Associate Agricultural Economist
J. W. BENNER, D. V. M.	Associate Animal Husbandman
J. V. ENZIE, M. S.	Associate Horticulturist
MORRIS EVANS, M. S.	Associate Agricultural Economist
H. D. JONES,[2] B. S. A.	Assistant Agronomist
K. A. VALENTINE, M. S.	Assistant Animal Husbandman
MARVIN KOGER, Ph. D.	Assistant Animal Husbandman
D. H. NELSON, Ph. D.	Assistant Dairy Husbandman
A. L. HERSHEY, Ph. D.	Assistant Biologist
D. R. BURNHAM,[3] B. S.	Associate Agronomist
A. R. LEDING[4]	Associate Agronomist
L. R. LYTTON[5]	Senior Agricultural Aid
D. S. HUBBELL,[6] Ph. D.	Senior Soil Conservationist
J. L. GARDNER,[6] Ph. D.	Associate Soil Conservationist
J. E. CHAPMAN,[6] M. S.	Assistant Soil Conservationist
A. J. ERICKSON,[7] B. S.	Assistant Soil Scientist
LILLIAN J. SWENSON, A. M. L. S.	Librarian
R. W. BONEY	Comptroller
N. ELLEN GIBBONS	Secretary

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[2]Post-office address, Route 1, Box 294-A, Albuquerque, N. M.

[3]Superintendent of the Tucumcari, N. M., Field Station, operated by the United States Department of Agriculture, in cooperation with the New Mexico Agricultural Experiment Station.

[4]Superintendent of the U. S. Cotton Field Station, operated by the United States Department of Agriculture, in cooperation with the New Mexico Agricultural Experiment Station.

[5]Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture.

[6]Soil Conservation Service, Research Division, United States Department of Agriculture.

[7]Soil Conservation Service, Operations Division, United States Department of Agriculture.

*On leave since September 16, 1941, for military duty.

FINANCIAL STATEMENT

	Hatch Fund	Adams Fund	Purnell Fund	Bankhead-Jones Research Fund	Non-Federal Funds
RECEIPTS					
Balance on hand July 1, 1944					$65,550.65
State appropriation					18,016.00
Receipts from sales					41,172.56
Receipts from U. S. Treasurer for fiscal year ended June 30, 1945	$15,000.00	$15,000.00	$60,000.00	$14,516.00	
	$15,000.00	$15,000.00	$60,000.00	$14,516.00	$124,739.21
EXPENDITURES					
Personal services	$12,822.8[illegible]	$12,079.70	$49,079.68	$11,678.26	$26,406.81
Travel	150.73	216.53	1,213.33		639.96
Transportation of things		57.26	57.00	117.52	377.07
Communication service	13.70	52.60	91.29	6.35	325.29
Rents and utility services	563.86	258.34	1,652.10	176.53	2,594.92
Printing and binding	567.35		533.29		576.43
Other contractual services	95.72	18.70	1,220.90	234.14	7,080.82
Supplies and materials	361.18	1,518.64	5,815.67	2,292.70	11,095.85
Equipment	424.62	798.23	336.65	10.50	1,618.68
Lands and structures					
Unexpended balance					74,023.38
	$15,000.00	$15,000.00	$60,000.00	$14,516.00	$124,739.81