PIMA COUNTY, ARIZONA

ANNUAL REPORT

G. E. BLACKLEDGE
COUNTY AGRICULTURAL AGENT

December 1, 1951
to
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I N D E X

G. E. Blackledge
Pima County
1952

I. County Situation

The two major agricultural enterprises in Pima County have always been cotton and beef cattle production. Beef cattle raising is practically all on range land. Cotton production in the county is all carried on by pump irrigation. There has been a steady increase in the number of wells during the past five years. The increase in the number of wells has been accompanied by a steady lowering of the water table in all irrigated areas.

During the past two years, there has been a sharp increase in the development of irrigated land. The high yields and favorable prices of cotton has been largely responsible for the new agricultural development.

Underground water authorities are of the opinion that the present rate of pumpage of irrigation water, if continued, will create a serious situation in a very few years. At the present time, it is probable that an increase in pumpage will take place in 1953. Several wells have been lowered during the past few years and the lowering of wells will continue as long as the following conditions exist: 1. Crop production remains as lucrative as it has been during the past three years. 2. An increased volume of water is produced by lowering the wells. 3. The increased water lift does not increase pumping costs beyond economic feasibility. 4. There are no provisions in the water code to prevent it.

There are many thousands of acres of land in the county that are feasible of irrigation, provided water is available. Attempts at further development of new land will continue if the present price of cotton is maintained and the favorable high yields of the past few years continue. New land development during the past two years has nearly doubled the irrigated acreage in the county. A large percentage of the new land has proved to be highly productive. This should have a favorable influence on future land development for irrigation.

Satisfactory prices and high yields of cotton have resulted in a one crop system of farming. Where cotton is grown year after year on the same land, there are certain problems that follow. Depletion of soil fertility results from the one crop system. Weed control has loomed up as a major problem on a great deal of the acreage being continuously farmed to cotton. Plant diseases, such as Texas Root Rot, is another serious problem in the one crop system that is being so largely followed in this county.

I. County Situation (continued)

Other crops that can be grown in the county are barley, grain sorghums, wheat, oats, alfalfa, peanuts, beans, potatoes, head lettuce, carrots, cauliflower and cabbage. The vegetable crops and potatoes are not grown on a commercial scale at the present time. There has been a steady increase in deciduous fruit plantings during the past six years.

Poultry production has steadily increased during the past few years. The poultry enterprise amounted to approximately 200,000 layers, 300,000 fryers and 25,000 turkeys last year.

Pima County is one of the great cattle breeding range sections of the Southwest. The ranges are well adapted to the production of livestock, of which there are normally about 70,000 head of beef cattle.

The dairy cattle numbers are very low in the county, but the quality is high.

The following table is an estimate of the 1951 Agricultural Production for the county

	Estimated Acres	Estimated Gross Return Per Acre	Estimated Gross Value
Cotton-(Short)	33,911	$ 323.00	$10,951,160
Cotton-(Long)	2,475	490.00	1,228,215
Alfalfa & other Hay	1,000	150.00	150,000
Barley & other small grains	1,200	90.00	108,000
Grain Sorghums	1,500	90.00	135,000
Corn	400	70.00	28,000
Beans	200	150.00	30,000
Truck Crops	200	400.00	80,000
*Irrigated Pastures and orchards	500		20,000
Poultry			2,065,000
Livestock			6,000,000
Total	41,386		$20,795,375

* Irrigated pastures credited to Livestock.

Further attempts to encourage the efficient use of water will be made again. Land levelling and the reduction of length of irrigation runs will be encouraged. Uniform water penetration will be stressed. Early irrigation of cotton compared to delayed irrigation will be stressed and if

I. County Situation (continued)

possible a result demonstration covering the two methods will be carried on.

The practice of growing and plowing under green manure crops will have special attention in our educational program again this year. The use of both legumes and cereal crops for green manure purposes will be recommended.

Crop rotation on all cotton farms will be encouraged. Where Texas Root Rot is a problem, a rotation with non-tap rooted crops will be recommended.

Weed control will be given added emphasis this year. A system of summer fallowing on land heavily infested with Johnson Grass will be recommended. Growing a barley crop on this type of land can well precede the summer fallowing.

Further work on cotton improvement will include both long and short staple variety tests. Some of the "Verticillium Wilt Resistant" varieties will be included in these tests. Texas Root Rot in cotton will be considered in our educational program this year.

Cotton fertilization demonstration work will be continued. Split applications of nitrogen will be included in these demonstrations.

Cotton spacing demonstrations are planned for this year.

The work in cooperation with the Dairy Herd Improvement Association and the Southern Arizona Poultry Association will be continued.

Deciduous fruit work will include management practices of established home orchards and commercial orchards and the practices necessary for establishing new home orchards.

II. Organization

The Pima County Farm Bureau was active this year carrying on projects of road improvement, rural mail service, hospital and medical insurance, and automobile and liability insurance. The two Farm Bureau locals at Marana and Sahuarita held meetings on a monthly schedule. These meetings took care of the business of their organization besides carrying educational and recreational programs. The county agent's office was active in planning and promoting the educational and recreational phase of these local meetings. Suggestions from these groups are valuable in the formulation of the county extension program.

The Pima-Pinal Dairy Herd Improvement Association maintained the full cooperation of the county agemt's office. Mr. Bernard Law, the associations' tester, makes his headquarters in the agents office, and all herd testing records are cleared through the agent. The county agent's office prepares a monthly newsletter for all dairymen, which includes a summary of the months herd testing and timely information on dairy management.

The Southern Arizona Poultry Association carries on an excellent educational program during their monthly meetings. The agent serves on the program committee. This organization affords a splendid opportunity for disseminating available information on poultry.

The Tucson Chamber of Commerce - The agent prepared the material for revising the Chamber's agricultural pamphlet. The agricultural part of the Chamber's publication on "Facts and Figures" was also prepared by the agent. These pamphlets are used by both the Chamber and the County Agent's office in answering many inquiries on local agriculture.

The Chamber of Commerce sponsors the County 4-H Club Fair and Livestock Sale.

The Pima County Fair cooperates with the County Extension office in the promotion and advancement of both 4-H club work and adult agricultural activities. The agent serves as a member of the Fair Commission.

III. Program Planning

There are no committees organized for the express purpose of Extension program planning. The regular commodity groups have been the guiding help in formulating programs. Individual leaders have been successful in carrying result demonstration work, and the opinion of these leaders on the need for certain programs are evaluated very highly. These leaders are among the top ten percent of productive farmers, and their thinking is considered sound. The three organizations mentioned under the heading of "Organization" in this report are splendid mediums for gaining information for program planning. However, there are only a few individual leaders who can, in the final analysis, give constructive assistance in formulating a worthwhile program.

IV. Information Program

A. Objective

Getting timely agricultural information to farm people and other interested people is the objective of an information program. This includes bulletins, letters, circular letters, telephone and office calls, farm visits, radio, newspapers, magazines and meetings. Information must be of the type that people want and near the season when it will be used.

B. Facilities and Utilization

1. Daily newspapers

The Arizona Daily Star and Tucson Citizen will be furnished timely information on agricultural subjects.

2. Magazines

The Arizona Farmer will be furnished articles on agricultural projects of interest to their readers.

3. Visual aids

Motion picture films and slides will be used to forward information of an agricultural nature to farmers and other interested groups. Posters and charts giving pertinent agricultural information will be used.

4. Circular letters, reports and bulletins

Progress reports on projects that develop valuable information will be used in circular letters. When new information that is of value to the farmers in the county is received, the information is sent out in bulletin form or by circular letter in the event that the information is not in a bulletin formavailable for distribution. A fair supply of bulletins on agricultural subjects covering a wide field of agricultural subjects is kept for distribution in the county agent's office.

V. Projects

3. Horticulture

A. Deciduous Fruits

Some encouraging progress in fruit growing in the county has been noted during the past five year. The local markets have, in most instances, sold fresh fruit at rather high prices. A great deal of this fruit is shipped from distant points, and lacks the freshness of locally grown fruit. The plantings of locally adapted varieties and better orchard management practices have given some fine results which has resulted in some excellent quality local fruit being sold in Tucson markets.

Many of the past failures in deciduous fruit growing were due to poor varieties, aimless pruning practices, indiscriminate irrigation, lack of nitrogen fertilization, lack of insect control and clean cultivation with no soil mulching. These were the conditions found by Mr. H. F.Tate, Extension Horticulturist, and the agent after surveying the situation about six years ago. The program has been designed to offer information which will correct these shortcomings in deciduous fruit growing.

A county extension pamphlet on Fruit Growing was prepared by Mr. H. F. Tate, Extension Horticulturist, Dr. R. B. Streets, Plant Pathologist, and the agent. The pamphlet is revised from time to time as new and better information becomes available. The orchard pamphlet has been freely distributed to all interested parties. Dr. J. N. Roney, Extension Entomologist, prepared a bulletin on control of insects in fruit orchards. This has been used extensively in the deciduous fruit growing project.

Mr. H. F. Tate put on another masterful pruning demonstration for the residents in the Tucson area. The demonstration was conducted in the orchard of Mr. W. T. Dudgeon where reports on varietal behavior, fertilization, irrigation, insect control and general orchard management practices were discussed and results inspected by the 118 interested residents who were in attendance.

Root Rot control work was continued in the I. A. Beal orchard at Sopori. Heavy losses from this fungus disease occurred in 1949, 1950 and 1951. Replacements went down with Root Rot in 1950. The replacements used in 1950 were on Elmyra root stock. None of the young trees planted on this root stock were lost in 1951, but this year found several of them showing the typical symptoms of Texas Root Rot.

V. Projects (continued)

3. Horticulture (continued)

B. Miscellaneous (continued)

Mr. Tate also cooperates with the agent in preparing a weekly newspaper article for the Sunday edition of the Arizona Daily Star. These articles contain timely information on many horticultural subjects.

V. Projects (continued)

3. Horticulture (continued)

A. Deciduous Fruits (continued)

The ammonium sulfate treatment had been previously used with little success, so it was not considered in this years root rot control work on deciduous fruit trees.

Reports on success with caclium poly-sulfide in root rot control were received by the agent. These reports were from some of our own extension service personnel and was given some credence by this agent. However, any report on positive control of Texas Root Rot is always taken with reservations. Mr. Beal was a most willing cooperator in setting up a test demonstration on the use of calcium poly-sulfide for root rot control of peach and apricot trees. Another product was reported as having promise in the control of root rot. This material is a by-product of fish canneries and is known as "Fert-O-Fish." Mr. Beal and the agent agreed to include this material in the test demonstrations.

Calcium poly-sulfide and "Fert-O-Fish" were applied at the time when acute root rot symptoms appeared or when the trees showed definite symptoms of root rot, such as thinning out and yellowing of the foliage with some die-back.

Dikes were thrown up around the trees so as to make a water basin. The calcium poly-sulfide solution was 1 part to 400 parts water while the "Fert-O-Fish" was (1-100). The amount of solution used was estimated to be equivalent to a light irrigation, which was approximately eight acre inches. All trees treated before the acute symptom or wilting stage appeared showed excellent recovery where the calcium poly-sulfide solution was used. Some trees made recoveries even though the first wilt stage had been reached. All trees that were treated showed some temporary recovery, but by September 18 six of the 24 treated trees were dead. Three of the trees lost were treated with "Fert-O-Fish". The recoveries obtained by the calcium poly-sulfide, at least, looks encouraging. "Fert-O-Fish" appeared to have a strong stimulating effect on the root system, and it is possible that this material may have a place in root rot control.

The root rot area in the Beal orchard had an original planting of 320 trees. The tree loss from root rot in this area in the five year old orchard amounted to 115 or about 36%. A survey of the area made in July of this year showed that 17 of the 205 remaining trees showed severe root rot symptoms, all in the acute or wilt stage. There were 83

V. Projects (continued)

3. Horticulture (continued)

A. Deciduous Fruits (continued)

other trees showing root rot symptoms which were not in the acute or wilt stage. Trees treated with "Fert-O-Fish" made a 50% recovery - only six were treated. Trees treated with calcium poly-sulfide made an 83% recovery. The fact that the trees had not been irrigated since late June may have a distinct bearing on the recoveries made, according to Dr. R. B. Streets, Plant Pathologist of the University of Arizona. Dr. Streets pointed out that an irrigation alone could have a beneficial effect on root rot trees. Trees receiving an irrigation with just plain water were not available as checks; therefore, this possibility leaves some real doubt as to the value of these new root rot control treatments.

The thrips control demonstration carried on by Mr. I. A. Beal in his orchard was carried on for the third year. The results have been very satisfactory, since almost complete control has been accomplished with D.D.T. This practice is taking root among many of the home orchardists.

Mr. W. T. Dudgeon and Mr. I. A. Beal increased their fertilization programs this year using larger amounts of nitrogen. This practice has increased among home orchard owners.

Irrigation of deciduous fruit trees is a real problem with most home orchardists. The tendency is to over-irrigate, and especially to apply too frequent irrigations to young trees. The agent has stressed the importance of irrigation practices among home orchardists this year.

B. Miscellaneous

A great deal of the agents time in the office is spent in answering calls from urban and city residents pertaining to horticultural problems. Problems with ornamental plantings, including trees, lawns, flowers and shrubs, are predominate.

Other calls received by the agent relate to problems on citrus fruits, pecans, grapes, vegetables and berries. Mr. H. F. Tate, Extension Horticulturist, has prepared very helpful literature for use in answering these calls. These publications include "A Flower Planting Outline," "Hardy Evergreen Shrubs and Trees", "Arizona Home Gardening".

Demonstration meeting on Deciduous Fruit growing taken when Mr. H. F. Tate, Extension Horticulturist, was demonstrating correct methods of pruning.

Photo by: G. E. Blackledge
W. T. Dudgeon Orchard, January, 1952

V. Projects (continued)

4. Livestock

A. Beef Cattle

(1) Range Management

Extensive project work on beef cattle production on range land as range management is limited by the necessary facilities. Cattlemen are always interested in any project that will improve the feed or grass. Range grass re-seeding is of interest to many cattlemen, but very few successful demonstrations have been carried on. Water spreading and erosion control are very popular projects with many cattlemen.

Imparting information on external parasite control, disease control, and control of grasshoppers and Harvester ants on range land are some of the practical work that can be carried by the Extension Service.

Some work on range grass re-seeding has been carried on with mediocre results. Demonstrations on parasite control have been carried on successfully. The latest information on disease control, parasite control and supplemental feeding have been made available to cattlemen during past years.

The activities on range management this year has consisted of disseminating information on supplemental feeding, parasite control, treatment and prevention of diseases and control of Harvester ants and grasshoppers. The information on these subjects have been furnished through bulletin distribution and personal contact.

Since grasshoppers have been a serious menace in past years, the agent was on the look-out for possible severe infestations this year as in the past several years. The use of aldrin emulsion spray with a regular cattle spraying rig has proved very effective for range grasshopper control work where the infestations have been confined to small areas, like hatching grounds, and where the terrain permitted, the use of ground equipment.

Reports on Smear 335 have been in the aggregate, rather successful for screw worm control. Many cattlemen are mixing this smear with Smear 62, mainly on account of adding color. The Smear 335 was introduced last year through the cooperation of Dr. J. N. Roney, Extension Entomologist, and two of the leading cattlemen, Mr. Henry Boice and Mr. Carlos Ronstadt.

V. Projects (continued)

4. Livestock (continued)

A. Beef Cattle (continued)

(1) Range Management (continued)

Both Dieldrin and Chlordane powders were used for Harvester ant control this year. No campaign on Harvester ant control was launched since the cost of material and labor still does not compare favorably with the results obtained. If Dieldrin would eliminate a colony with one application, then it is believed the expenditure would be justified.

V. Projects (continued)

5. Dairy

Pima County milk production doesn't supply half the demand for fluid milk in the county. Feed crops haven't been strong competitors of cotton for the irrigated land in the county. This is the principal reason that dairy farming doesn't expand in the county.

One of the main problems facing local dairymen is feed prices. The Extension Service has endeavored to point the way to greater and more economical feed production during the past eight years. The use of commercial nitrogen fertilizer on pastures and grain crops has been demonstrated during past years. Warble or Cattle Grub control demonstrations were conducted. Both of these practices have been in the campaign stage during the past five years. The county agent's office has cooperated with local Dairy Herd Improvement Association in carrying on their worthwhile program during the past thirty years.

The work with dairymen this year has consisted of an information program covering timely dairy management topics. The same cooperation with the Herd Improvement Association has been maintained this year as it has been in past years. Cutting and feeding green feed instead of pasturing has been recommended in some cases. Making grass ensilage under certain conditions has been suggested as an economical dairy feed production practice. The campaign on increased forage crops and pasture by the use of nitrogen fertilizer was continued this year. The importance of eradicating the Cattle Grub in dairy herd was again stressed this year.

The efficiency of herd management among local dairymen is well demonstrated by the annual report on Herd Averages.

V. Projects (continued)

5. Dairy (continued)

Year	Ave. # Of Herds On Test On Test Per Mo.	# Of Herds Reported	Ave. Milk	Percent Butterfat	Ave. Fat	# Cows Sold Or Culled
1952	21.0	20	9,175	3.65	335.2	384
1951	24.7	20	9,707	3.69	357.8	361
1950	26.7	24	9,439	3.70	348.9	360
1949	24.0	22	9,231	3.75	346.2	358
1948	20.5	17	9,349	3.70	345.9	448
1947	15.0	9	9,072	3.90	353.4	179
1946	11.0	10	9,558	3.99	390.4	151
1945	14.0	12	8,926	3.91	348.9	156

Five High Herds

Herd Owner	Years in D.H.I.A.	Cow Years On Test	Milk	Ave. Test	Butterfat
H. S. Raskob	4	34.98	8,879	4.57	405.8
J. W. Ewing, Jr.	18	115.21	8,434	4.64	391.7
W. T. McClelland	21	115.31	8,143	4.65	378.7
W. C. McAda	3	29.70	10,840	3.43	371.7
Stan Orton	1	27.80	10,886	3.37	366.5

Averages of Testing by Months

Year	Herds	Cows
1952	21.0	1,550
1951	24.7	1,485
1950	26.7	1,726
1949	24.0	1,635
1948	20.5	1,430
1947	15.0	888
1946	11.0	521
1945	14.0	622

Five High Cows

Owner	Name of Cow & H. B. #	Breed	Age Yr. Mo.	Days In Milk	Milk	Fat
J. W. Ewing, Jr.	Madge #9930639	R.G.	5-2	365	14,876	664.5
Shamrock Dairy	#2 #86-9433	R.H.	Unknown	327	16,701	646.9
Univ. of Ariz.	U. of A. Oneonta Koba Daisy #2657574	R.H.	5-2	348	17,509	643.0
H. S. Raskob	Carrie #987414	R.G.	4-6	307	13,170	639.8
Univ. of Ariz.	U. of A. Victor Posch Rosita	R.H.	3-6	360	15,362	635.6

* All of these cows were twice daily milkings.

V. Projects (continued)

5. Dairy (continued)

There are three reasons for the slight decrease in average milk and butterfat production this year. Herd replacements were mostly heifers. Feed prices were high and the period of hot weather was abnormally long.

V. Projects (continued)

6. Poultry

Like dairy products, the local demand for eggs greatly exceeds local production. Through the efforts of local poultrymen working in an association known as the "Southern Arizona Poultry Association", a premium on fresh local eggs is realized. It is believed that this premium on eggs offsets the disadvantage of the higher than average feed prices. Loss of production during the hot summer season is also somewhat offset by the favorable weather conditions during winter months. The disease problem is somewhat less serious in this dry climate than in areas with high humidity. The poultry industry in general has an "in and out" history. Many ill-adapted and under-financed poultrymen have come and gone. The county agent's office has a duty to perform in this respect, since each year many prospective poultrymen call for advice on starting in the poultry business. Many of these callers are discouraged when the facts are presented. In spite of the hazards in the poultry industry, it is growing steadily in Pima County.

Work on feeding, brooding, culling, housing, parasite control and disease control has been carried on during past years.

The Southern Arizona Poultry Association has done a splendid job in carrying on a consumers educational program this year. During the 1951 Pima County Fair, the Association was given a booth for an educational display. The committee delegated to set up the booth and run it found the public to be deeply interested in all the subjects demonstrated in the display booth. This encouraged the Association to spend more money on this type of advertisement. An advertising committee was appointed and money appropriated to run educational advertisements in local newspapers. The value of eggs in the diet, how to select eggs, and special virtues of Grade AA eggs were some of the features in the consumers educational campaign.

Professor Harry Embleton and Mr. R. W. VanSant of the University of Arizona Poultry Department headed up the campaign for improved poultry practices in Pima County. Their prepared literature, contributions at meetings and personal help was valuable again this year in promoting better selection of stock, improved brooding, pullet management and feeding and general flock management. Dr. W. J. Pistor's bulletins on "Newcastle Disease" and poultry diseases in Arizona were widely used in disseminating information on prevention and control of diseases and parasites of poultry.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization

The Agricultural Chemistry Department of the University of Arizona cooperated with your local county agent's office and two Marana growers in conducting cotton fertilization test plots in 1951. Mr. Dale Gladden and Mr. Earl Horton were the cooperating growers. This was Mr. Gladden's third year of cooperation in this work, and it was Mr. Horton's second year. Their excellent cooperation in growing and harvesting these plots is greatly appreciated since full cooperation is necessary for the successful completion of these tests.

Neither phosphates nor potash applications appeared to have any value in these plots when used with nitrogen when the yields are compared to the straight 100 lb. nitrogen application. While there was some root rot in the plots, it is believed that the results are not too far from being representative of the fertilizer response.

While small plots such as we used this year are subject to considerable experimental error, it is felt that the number of replications, and the systematic manner in which the replicated treatments were distributed throughout the field area greatly compensates for the smallness of the plots. This type of test is certainly more accurate and dependable than comparing one field with another, or comparing results of one year with another. We find quite a variation in fertilizer response in different fields during different years. You will note quite a variation between response in these different small (200 ft., 4 rows) plots. The yield of each plot with the location and the treatment used is included in plot outlines on following pages. These same plot outlines are prepared in mimeographed form each year and used for grower's field days when the plots are inspected.

The results from these 1951 demonstrations indicated that 100 pounds of nitrogen per acre, without phosphates or potash, was the best fertilizer program. Since the results from other years cotton fertilization demonstration work had shown a profit for the addition of phosphates to nitrogen, it did not appear to be feasible to recommend dropping phosphates from the countys' fertilization program. There was one factor especially to be considered in evaluating last years' phosphate response on cotton, and that was the long

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

growing season. December 1 was the first killing frost date at Marana which was about three weeks later than normal. Earlier maturity that is promoted by phosphate fertilization may be needed when first killing frost dates occur at an early date. Another factor to be considered in forming a fertilizer program is the carry-over of available phosphates from the previous years applications. The carry-over of phosphate was considered in the 1952 cotton fertilization recommendations.

The fertilization program was discussed with many of the growers individually and at meetings. Newspaper and farm magazine articles were prepared on the subject for dissemination of information to growers. A mimeographed report on cotton fertilization with the progress report on current demonstration results was given to all growers.

The results this year on cotton fertilization practices among county growers have been fairly satisfactory although it is again doubtful if phosphates paid off. In fact, there has been some evidence that where phosphates were used, the yield was reduced. The first picking on the 1952 cotton fertilization plots showed the straight nitrogen plots producing more cotton than the plots that also received phosphates. Second picking results may not bear this out, although the straight nitrogen treatments should give still greater differences on the second picking.

Growers in general, used more nitrogen fertilizer on their cotton crops this year. In some instances, where the nitrogen applied was less than 80 pounds, there has been regret expressed by the grower that he did not use the additional nitrogen.

The plots grown by Mr. Dale Gladden demonstrates the value of an additional forty or fifty pounds of nitrogen. This appears to be well demonstrated on the first picking of Mr. Gladden's 1952 plots.

This years demonstration plots were based on information gathered from many of the growers in the county. It was found that a majority of growers were planning to use an

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

initial application of 250 to 300 pounds of (14-6) or (14-7) to be followed in many cases by a nitrogen application amounting to 20 to 45 pounds of nitrogen per acre. Some growers were following a straight nitrogen program as the 1951 county demonstration plots had indicated to be the best. The treatment selected by the growers, in cooperation with the agent, were built around the practice being used by different growers. When looking at the plots or the printed results of the harvest from these plots, most any grower will see his 1952 fertilization practice being compared with six other different programs. The treatments used were all within budgetary limits of local growers and believed to have relative merit.

Mr. Dale Gladden and Mr. Earl Horton continued their excellent cooperation in carrying on demonstration work again this year. Mr. Patrick Tucker cooperated in a field size test demonstration and Mr. Weyman Gladden cooperated in carrying on one of the small plot demonstrations.

The plots were 200 feet long with four rows each again this year. Fertilizer applications were made night after chopping. The side dressing or band method of application was used. Placements of fertilizer were approximately ten inches to the side of the row (one side only) and six inches deep.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1951 Cotton Fertilization Plots

Dale Gladden - Marana - Cooperator

Fertilizer Treatment	Lb. Seed Cotton Y/A	Gain Over Check
50 N - 0P - 0K	3141	666
100 - 0 - 0	3708	1233
150 - 0 - 0	3542	1067
50 - 50 - 0	3283	808
100 - 50 - 0	3383	908
150 - 50 - 0	3091	616
100 - 150 - 0	3592	1117
Check	2475	

1952 Plant Food Price

	Cost per # N.
$72. per T. Ammonium Sulfate 21%	17.1¢
$156. per T. Uranon 44%	17.7¢

Using (14-6) mix at $80.36 per ton, and crediting the nitrogen in the mix at 17.1¢ per pound, the cost of the P_2O_5 would amount to 27 cents per pound. This set of plots indicates that the investment in phosphates may have been wasted when the 100 lb. nitrogen application is compared to the 100 N. 50 P. application. Where 50 pounds of P_2O_5 is added to 50 pounds of nitrogen, 142 pounds of seed cotton increase per acre is noted over the 50 N. application. This small increase in yield may be considered insignificant when the size of the plots and the number of replications are considered. The plots were two hundred feet long and four rows wide with four replications.

There is definite indication that 150 lbs. of nitrogen per acre was too heavy on this soil, since yields were reduced under the 100 nitrogen application yields.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1951 Cotton Fertilization Plots

Dale Gladden - Marana - Cooperating

Fertilizer Treatment Lb. Plant Food Per Acre	Estimated Net Value of Gain Over Check Per Acre	Cost of Fertilizer & Application Per Acre	Estimated Net Profit Per Acre For Practice
50 N - 0 P	$ 83.92	$ 8.50	$ 75.42
100 N - 0 P	155.36	17.00	138.36
150 N - 0 P	134.44	24.50	109.94
50 N - 50 P	101.80	14.00	87.80
100 N - 50 P	104.41	21.50	82.91
150 N - 50 P	77.62	29.00	48.62
100 N - 150 P	140.74	30.50	110.24

Note: Net value of gain is computed on basis of $12.60 net value for seed cotton. Picking, hauling and charges at gin are all included in harvest costs at current prices.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Soil Analyses with Yield Comparisons

1951 Dale Gladden Plots

Plot No.	Depth Feet	PO_4	N.	K.	Seed Cotton Lb. Per Acre
		Parts per Million			
8	1	12	15	35	2200
	2	15	20	39	
14	1	10	25	38	1667
	2	18	20	51	
23	1	12	20	47	2467
	2	32	25	39	
29	1	12	10	42	3567
	2	18	12	38	

Since the response to nitrogen was outstanding in Mr. Gladden's pet of plots, let us take a look at the nitrogen content of the first and second foot of these plots and compare it with the respective yields. The samples from plot 29 had 10 parts per million nitrate nitrogen in the first foot and 12 in the second foot, which is only about one-half the amount of nitrogen reported for the other plots, yet the highest yield was obtained from this plot. The lowest yield was from Plot 14, which showed the highest nitrogen content. This is just another example of soil analyses giving an unsatisfactory guide for formulating a fertilization program. Results from similar test plots during former years have given about the same indication, which in effect is, that field tests and observations on past cropping is the safest basis for planning your fertilization program.

V. Projects (continued)

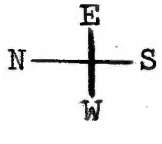
7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Dale Gladden 1951 Cotton Fertilization Plots

T - 1 P - 29 y/a 3567	T - 2 P - 30 y/a 3867	T - 3 P - 31 y/a 4100	T - 4 P - 32 y/a 4700
T - 8 P - 25 y/a 3600	T - 7 P - 26 y/a 3733	T - 6 P - 27 y/a 3167	T - 5 P - 28 y/a 3800
T - 3 P - 21 y/a 3533	T - 5 P - 22 y/a 3767	T - 1 P - 23 y/a 2467	T - 2 P - 24 y/a 3733
T - 4 P - 17 y/a 3533	T - 6 P - 18 y/a 3167	T - 7 P - 19 y/a 3667	T - 8 P - 20 y/a 3967
T - 5 P - 13 y/a 3733	T - 1 P - 14 y/a 1667	T - 4 P - 15 y/a 3667	T - 3 P - 16 y/a 3733
T - 7 P - 9 y/a 3633	T - 8 P - 10 y/a 3667	T - 2 P - 11 y/a 2533	T - 6 P - 12 y/a 3467
T - 6 P - 5 y/a 3733	T - 3 P - 6 y/a 3467	T - 8 P - 7 y/a 3133	T - 1 P - 8 y/a 2200
T - 2 P - 1 y/a 2433	T - 4 P - 2 y/a 2267	T - 5 P - 3 y/a 1833	T - 7 P - 4 y/a 2333



T - 1 = check
T - 2 = 50 N - 0P - 0K
T - 3 = 100 N - 0P - 0K
T - 4 = 150 N - 0P - 0K

T - 5 = 50 N - 50 P - 0K
T - 6 = 100N - 50 P - 0K
T - 7 = 150N - 50 P - 0K
T - 8 = 100N -150 P - 0K

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

The cotton fertilization demonstration plots grown by Mr. Earl Horton at Marana in 1951 were harvested on November 5 and December 27, 1951. First picking harvested the bulk of the crop.

Second picking results are recorded in the following table.

1951 - Cotton Fertilization Demonstration

Earl Horton, Marana, Grower

Treatment	Yield Per Acre Ave.	1st Series	2nd Series	3rd Series	4th Series
Check	292	200	333	467	167
100N-50P-0K	491	1,000	200	533	233
0N-50P-0K	333	100	667	100	467
100N-0P-100K	391	600	233	599	133
100N-50P-0K	533	700	200	467	767
150N-50P-100K	358	200	133	567	533
50N-50P-100K	616	733	800	533	400
100N-0P-0K	425	233	800	400	266

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Total Yield Per Acre

Treatment	Ave.	1st Series	2nd Series	3rd Series	4th Series
Check	2442	2652	2622	2233	2260
100N-50P-100K	2895	3681	2751	2430	2718
0N-50P-0K	2672	2651	3218	2389	2429
100N-0P-100K	2582	2954	2718	1770	2887
100N-50P-0K	3084	3283	2718	2821	3514
150N-50P-100K	2533	2554	2226	2725	2626
50N-50P-100K	3077	3087	3547	3018	2656
100N-0P-0K	3196	3372	3579	3016	2817

Ave. Gain Over Check Lb. Seed Cotton Per Acre

Treatment	1st Picking	2nd Picking	Total
100N-50P-100K	253	199	453
0N-50P-0K	188	41	230
100N-0P-100K	57	99	140
100N-50P-0K	400	241	642
150N-50P-100K	27	66	91
50N-50P-100K	310	324	635
100N-0P-0K	621	133	754

While there was considerable root rot in the field, it is believed that results of the various fertilizer treatments are indicative of certain principles of cotton fertilization. A balanced fertilizer program is considered essential for maximum yields. It is suspected that an unbalanced fertilizer program can give adverse results. The available phosphates as shown by the soil analyses were at a high level. This may account for the reduction in yield on those plots where phosphates were used.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(3) Cotton Fertilization

1951 COTTON FERTILIZER PLOTS

Carry-Over from '51 Plots

Earl Horton, Cooperator

Treatment Rate Per Acre N - P - K	# Seed Cotton Per Acre	Gain Over Check
100 - 50 - 100	2895	453
0 - 50 - 0	2672	230
100 - 0 - 100	2582	140
100 - 50 - 0	3084	642
150 - 50 - 100	2533	91
50 - 50 - 100	3077	635
100 - 0 - 0	3196	754
Check	2442	

Soil Analyses

Plot	Depth Feet	N	PO_4	Y/A Seed Cotton
8	1	10	15	2652
	2	10	18	
10	1	10	16	2622
	2	8	21	
20	1	6	15	2233
	2	6	9	
30	1	8	15	2260
	2	4	12	

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1951 Cotton Fertilization Demonstration

Earl Horton - Marana - Cooperator

Fertilizer Treatment	Lb. Seed Cotton Y/A	Gain Over Check
100 N - 50 P - 100 K	2895	453
0 - 50 - 0	2672	230
100 - 0 - 100	2582	140
150 - 50 - 0	3084	642
150 - 50 - 100	2533	91
50 - 50 - 100	3077	635
100 - 0 - 0	3196	754
Check	2442	

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Soil Analyses with Yield Comparisons

Earl Horton Plots

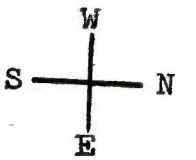
Plot No.	Depth Feet	PO_4 Parts per Million	N. Parts per Million	K. Parts per Million	Seed Cotton Lb. Per Acre
8	1	15		10	2652
	2	18		10	
10	1	16		10	2622
	2	21		8	
20	1	15		6	2233
	2	9		6	
30	1	15		8	2260
	2	12		4	

Earl Horton - 1951 Fertilization Plots

Y/A 3514 T - 5 P - 25	Y/A 2627 T - 6 P - 26	Y/A 2429 T - 3 P - 27	Y/A 2656 T - 7 P - 28	Y/A 2887 T - 4 P - 29	Y/A 2260 T - 1 P - 30	Y/A 2718 T - 2 P - 31	Y/A 2817 T - 8 P - 32
Y/A 2725 T - 6 P - 17	Y/A 1770 T - 4 P - 18	Y/A 2430 T - 2 P - 19	Y/A 2233 T - 1 P - 20	Y/A 3016 T - 8 P - 21	Y/A 2821 T - 5 P - 22	Y/A 3018 T - 7 P - 23	Y/A 2389 T - 3 P - 24
Y/A 3579 T - 8 P - 9	Y/A 2622 T - 1 P - 10	Y/A 3547 T - 7 P - 11	Y/A 3218 T - 3 P - 12	Y/A 2718 T - 5 P - 13	Y/A 2751 T - 2 P - 14	Y/A 2718 T - 4 P - 15	Y/A 2226 T - 6 P - 16
Y/A 2954 T - 4 P - 1	Y/A 3087 T - 7 P - 2	Y/A 3681 T - 2 P - 3	Y/A 3283 T - 5 P - 4	Y/A 2651 T - 3 P - 5	Y/A 2554 T - 6 P - 6	Y/A 3372 T - 8 P - 7	Y/A 2652 T - 1 P - 8

T - Treatment
P - Plot

Treatment 1 - Check
2 - 100 N - 50 P - 100 K
3 - 0 N - 50 P - 0 K
4 - 100 N - 0 P - 100 K
5 - 100 N - 50 P - 0 K
6 - 150 N - 50 P - 100 K
7 - 50 N - 50 P - 100 K
8 - 100 N - 0 P - 0 K



V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

The cotton fertilization demonstrations have been very interesting again this year. To date first pickings have been made on all of them except the set of plots being grown by Mr. Weyman Gladden. It has been tentatively planned by Mr. Gladden and the agent to defer this picking until all of the cotton has matured, thus making one picking suffice.

Some of the nitrogen results, if any are obtained, on the Earl Horton plots will be forthcoming on the second picking. It is believed that substantial results will show up on the second pickings of these plots. The harvest on the Dale Gladden plots showed a very fine response again for the nitrogen applications. There is no indication of a phosphate response on these plots. In fact, it is barely possible that the addition of phosphate has somewhat reduced the yields on the average. The results from demonstration plots established in 1951 also indicated that the addition of phosphate was detrimental to yield. This was true on all plots carried last year.

The plot outline for Mr. Weyman Gladden's project is included in this report. The harvest results will be included in the 1953 Annual Report. Mr. Gladden's land was placed in cultivation in 1951; this year being the second year in cultivation and the second year in cotton. No fertilizer applications were made in either year. The soil analyses from the plot area are as follows:

Plot	Feet Depth	pH	Parts Per Million T.S.S.	N	P	K
1	1	8.1	355	11	10	125
	2	8.1	460	10	5	125
2	1	8.0	390	50	25	150
	2	8.0	355	12	25	200
3	1	8.0	405	11	10	135
	2	7.9	390	T	6	150
4	1	8.0	415	14	25	200
	2	8.1	390	4	6	225

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Plot Outlines - 1952

Cotton Fertilization Demonstration

Weyman Gladden

Ditch 87'

4	2	3	1
3	1	4	2
2	4	1	3
1	3	2	4

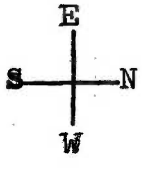
Treatments

1 - 300# (14-6)

2 - 100# Uramon

3 - 300# (14-7)

4 - Check



3rd Border
South 16 Rows

Lane 266'

Weyman Gladden - Supplemental Plots

9th Border - north side of border west end.

Row 2 and 3 - Plot 1 -- 300# (14-6) + 100# Am. Sul.
Rows 2 and 3- Plot 2 -- 300# (14-6) + 100# Uramon

Row 10 and 11 - Plot 2 -- 300# (14-6)
Row 10 and 11 - Plot 1 -- Check

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Cotton Fertilization Demonstration

Dale Gladden, Marana - Cooperator

1st Picking Results

Plot Outline

				N 10 P 18			
1928 T-6 P-49	2647 T-4 P-50	3366 T-7 P-51	2109 T-1 P-52	1634 T-8 P-53	2386 T-5 P-54	2353 T-3 P-55	2059 T-2 P-56
	N P Tr. 22						
2614 T-3 P-41	2288 T-8 P-42	3105 T-2 P-43	2876 T-6 P-44	3481 T-7 P-45	2582 T-1 P-46	2582 T-5 P-47	2810 T-4 P-48
					N P 15 17		
2744 T-2 P-33	2974 T-1 P-34	3137 T-5 P-35	2908 T-3 P-36	3824 T-6 P-37	1732 T-8 P-38	3399 T-4 P-39	3268 T-7 P-40
							N P 18 25
3268 T-4 P-25	2451 T-5 P-26	2810 T-1 P-27	2974 T-2 P-28	3105 T-3 P-29	3431 T-7 P-30	3595 T-6 P-31	1928 T-8 P-32
						N P 18 24	
2744 T-5 P-17	2613 T-3 P-18	2778 T-6 P-19	3007 T-7 P-20	3137 T-1 P-21	3105 T-2 P-22	2288 T-8 P-23	2810 T-6 P-24
N P 12 15							
2810 T-8 P-9	2353 T-7 P-10	2518 T-4 P-11	2255 T-5 P-12	2451 T-4 P-13	2026 T-3 P-14	2386 T-2 P-15	1895 T-1 P-16
		N P 9 12					
1863 T-1 P-1	2549 T-2 P-2	2518 T-8 P-3	3072 T-4 P-4	2353 T-5 P-5	2744 T-6 P-6	2843 T-7 P-7	2647 T-3 P-8

S
E W
N

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Cotton Fertilization Demonstration

Dale Gladden, Marana - Cooperator

Soil Analysis Data

Plot No.	pH	PPM T.S.S.	PPM PO_4	PPM N
3	8.1	250	12	9
9	7.8	535	15	12
23	8.1	475	24	18
32	8.2	345	25	18
38	8.1	310	17	15
42	8.0	210	22	Trace
53	8.1	260	18	10

These soil analyses data are included in this report for the purpose of demonstrating the importance of field tests or result demonstrations on the use of chemical fertilization of cotton. According to the only published information in Arizona, the above soil analyses indicates an adequate supply of nitrogen in five of the seven locations sampled. Results from the first picking on these plots indicates that the soil analyses report would be a very misleading guide for formulating a fertilization program. Samples from the check plots in each of the seven series were taken. Each series or replication represented 32 rows 200 feet long. Since nitrogen seems to be the one element that showed response, the following table is presented to show the inconsistency in results as compared to nitrogen content in soils reported in soil analyses.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Cotton Fertilization Demonstration

Dale Gladden, Marana - Cooperator

1st Picking Results

Series	Average of All Nitrogen Application Y/A				Soil Analyses P.P.M.	
	42 N	63 N	84 N	Check	N	P
1.	2353	3072	2793	2518		
Gain or Loss	-165	+554	+275		9	12
2.	2140	2451	2353	2810		
Gain or Loss	-670	-359	-457		12	15
3.	2900	2518	2865	2288		
Gain or Loss	+612	+230	+577		18	24
4.	2835	3268	3505	1928		
Gain or Loss	+907	+1340	+1577		18	25
5.	2941	3399	3596	1732		
Gain or Loss	+1209	+1667	+1864		15	17
6.	2751	2810	3178	2288		
Gain or Loss	+463	+522	+890		Trace	22
7.	2227	2647	2647	1634		
Gain or Loss	+593	+1013	+1013		10	18

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Cotton Fertilization Demonstration

Dale Gladden, Marana - Cooperator

1st Picking Results

Fertilizer Treatment Lb. Per Acre	Lb. Seed Cotton Yield Per Acre Average of 7 Plots	Gain Over Check
300 --(14-6) Mix	2481	310
300 --(14-7) Mix	2703	532
(42-18) Simples	2609	438
300 --(14-6) Mix + 21 N	2881	710
42 N	2558	387
300 --(14-6) Mix + 42 N	2936	765
84 N	3107	936
Check	2171	---

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Fertilization Demonstration

Pat Tucker, Avra Valley - Cooperator

1st Picking Results

Plot	Treatment # Per Plot	Yield Seed Cotton Lb. Per Plot	Gain Over Check
1	* 894 (14-7) Mix	5990	1390
2	580 Ammonium Sulfate (21%)	5810	1210
3	800 (14-6) Mix	5960	1360
4	Check	4600	
5	650 (14-7) Mix	6050	1450
6	800 (14-6) Mix + 40 lb. (NH_3)	6960	2360

Soil Analyses

Location	Depth Feet	N	PO_4	pH	T.S.S.
1	1	15	11	6.9	905
	2	18	21	6.7	1485
2	1	8	18	6.9	1025
	2	12	23	7.4	190
3	1	7	Trace	7.5	905
	2	11	Trace	7.9	195
4	1	12	Trace	7.4	905
	2	15	20	7.2	190

* There were several large skips in Plot #1 which is significant in yield results.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Cotton Progress Report

Cotton Fertilization Demonstration

Earl Horton, Marana, Cooperator

First Picking -- 10-10-52

Plot No.	Treatment No.	Lbs. Seed Cotton Y/A
1	8	1993
2	7	2124
3	1	2288
4	5	2386
5	2	2223
6	4	2157
7	3	2223
8	6	2453
9	1	2190
10	2	2124
11	3	2092
12	4	2059
13	7	1961
14	6	2190
15	5	2026
16	8	2353
17	4	2288
18	5	1961

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Plot No.	Treatment No.	Lbs. Seed Cotton Y/A
19	7	2124
20	6	2386
21	8	2256
22	2	2288
23	1	2223
24	3	2157
25	2	2190
26	6	1667
27	8	1961
28	1	2190
29	3	2353
30	5	2288
31	4	2026
32	7	1928

Treatment No.

1 -- 300 lb. (14-6) Mix
2 -- 300 Lb. (14-7) Mix
3 -- (42-18) Simples
4 -- 300 lb. (14-6) + 21 N
5 -- 42 N
6 -- 300 lb. (14-6) + 42 N
7 -- 84 N
8 -- Check

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Cotton Fertilization Demonstration

Earl Horton, Marana - Cooperator

First Picking -- 10-10-52

Average of Plots

Treatment and Rate Per Acre	Y/A Lb. Seed Cotton	Y/A * Lb. Lint	Y/A ** Lb. Seed
300 lb. (14-6) Mix	2223	825	1309
300 lb. (14-7) Mix	2206	816	1302
(24-18) Simples	2206	816	1302
300 Lb. (14-6) + 21 N	2132	789	1258
42 N	2165	800	1278
300 lb. (14-6) + 42 N	2173	803	1283
84 N	2034	753	1200
Check	2141	792	1263

* Ginning % -- 37%
** 4% dockage for trash

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

1952 Cotton Fertilizer Plots

Horton, 1st Picking

Treatment Rate Per Acre	Y/A Lb. S. C.	Gain or Loss Per Acre
300 - (14-6)	2223	82 Gain
300 - (14-7)	2206	65 Gain
(24-18) Simples	2206	65 Gain
300 (14-6) + 21 N	2132	10 Loss
42 N	2165	24 Gain
300 (14-6) + 42 N	2173	32 Gain
84 N	2034	107 Loss
Check	2141	

Soil Analyses

Plot	Depth Feet	N	PO_4	Y/A Seed Cotton
1	1	T	5	1993
	2	T	5	
27	1	T	4	1961
	2	T	4	
21	1	T	4	2256
	2	T	5	
16	1	T	5	2353
	2	T	4	

pH - 7.9 to 8.00
TSS - 470 to 740

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

Cotton Fertilization Demonstration

Earl Horton, Marana - Cooperator

First Picking -- 10-10-52

Gain and Loss Table

Treatment and Rate Per Acre	Gain or Loss Lb. Lint per Acre Gain	Loss	Lb. Seed per Acre Gain	Loss
300 lb. (14-6) Mix	33		46	
300 Lb. (14-7) Mix	24		39	
(42-18) Simples	24		39	
300 lb. (14-6) + 21 N		3		5
42 N	8		15	
300 lb. (14-6) + 42 N	20		11	
84 N		39		63

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(1) Cotton Fertilization (continued)

When harvest data are complete a progress report on this and past years work will be prepared and the information will be disseminated to the growers.

All growers were familiarized with last years demonstrations on cotton fertilization. An all-around improvement in this practice has been noted this year.

Result Demonstration plots on Cotton Fertilization showing non-fertilized cotton on the right with heavily fertilized cotton on the left.

Photo by: Professor W. E. Bryan
Dale Gladden Farm, January, 1951

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests

A definite improvement of Upland cotton grown in Pima County dates back to 1948. Growers in the county were the first to take advantage of an improved Acala strain developed by Mr. E. H. Pressley, cotton breeder for the University of Arizona. It was through the information gained from variety tests conducted by local growers in cooperation with the agent that it was possible for this county to pioneer the growing of the improved variety and to start the important function of pure seed production. The main variety was named Acala 44 and since its introduction here in Pima County in 1948, it has become the major variety in the state.

Local growers, working in cooperation with the University of Arizona Experiment Station and the county agent, carried on the preliminary work of satisfactorily introducing the new variety to the cotton mills. This work started out with samples from cooperative variety tests being sent to laboratories and mills. This was followed up by a bale identification program in 1949, 1950 and 1951. Dr. Scott Hathorn of the Agricultural Economics Department of the University of Arizona followed the bale identification work right into the mills during the first year of its inaugration. This personal contact with the mills gained favor for the identification work and brought home the welcome information the Acala 44 was well received by the cotton mill trade.

Long staple varieties have changed from the standpoint of size of plant and yield. Mr. R. H. Peebles of the Bureau of Plant Industry Field Station at Sacaton, Arizona, developed a long staple strain known as Pima 32. This variety is planted exclusively in the county at this time. Another long staple variety of cotton was developed by Professor W. E. Bryan, Plant Breeder at the University of Arizona. This new variety was tested out here in Pima County for the first time last year.

This is the sixth straight year that variety tests have been carried on here in Pima County. Pima County growers have reaped important benefits from these tests, since it has been the guiding factor in varietal choices which has given them better yields and a superior cotton.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

Verticillium Wilt has been present in the county for at least the past eight years, or since this agent has worked in Pima County. This disease has gradually increased in scope and severity until it has become a serious consideration for some growers. It is for this reason that wilt resistant varieties were included in the county's variety test work, during the past two years.

The information from all tests are included in the written reports to all growers in the county. Variety test results are discussed at meetings and with individual growers.

The following variety test results are recorded in this report as a matter of record.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

Mr. J. B. Bull grew a cotton variety test that adds materially to information on varieties for the Sahuarita-Continental district. While this variety test consisted of only one plot of four rows each, the land proved to be exceptionally uniform, which makes up a great deal for the lack of replications.

The variety test plots were harvested during the first half of January. Each variety was ginned separately, which affords the opportunity of obtaining ginning percentages, grade staple and other lint characteristics of each variety. Samples from bales of each variety were delivered to the cotton laboratory at the University of Arizona for breaking strength tests, uniformity of fiber, fineness of fiber, etc.

The following table represents the harvest data from Mr. Bull's variety test:

1951 Cotton Variety Test

Mr. J. B. Bull, Continental - Cooperator

Variety	Y/A Lb. Seed Cotton	Y/A Lb. Lint	Ginning %
W.R. 29-46	3532	1215	34.4
W.R. 29-1-6	3685	1259	34.2
Acala 44	3382	1238	36.6
D.P. L	3012	1103	36.6
Acala 33	2962	1006	34.0

The two wilt resistant varieties showed up very well in this test. This was rather expected since wilt in the district has been increasing for the past five or six years, and is now a factor in cotton production.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

1951 Cotton Variety Test

Lee Moor Ranch - O'Dell Massey, Mgr.

Seed Cotton Yields

Replications	W.R. 2946 Y/A Seed Cotton	W.R. 2916 Y/A Seed Cotton	W.R. 1517 Y/A Seed Cotton	Acala 44* Y/A Seed Cotton
1	2010	1920	2260	
2	1993	1983	2667	
3	2313	2047	2683	3102
4	2757	2227	2273	2779
5	2330	2083	2453	3303
Ave.	2281	2052	2467	3061

* Acala 44 was not in regular rotation with either varieties in the test.

1951 Cotton Variety Test

Lee Moor Ranch - O'Dell Massey, Mgr.

Lint Cotton Yields

Variety	Y/A Seed Cotton	% Ginning	Y/A Lb. Lint	Y/A Lb. Seed
W.R. 2946	2281	36.1	823	1415
W.R. 2916	2052	36.4	747	1266
W.R. 1517	2467	33.8	834	1784
Acala 44	3061	39.3	1203	1803

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

1951 Cotton Variety Test

Lee Moor Ranch - O'Dell Massey, Mgr.

Net Value Comparisons

Variety	Value of Lint	Value of Seed	Total Value	Cost of Harvest	Net Value
W.R. 2946	$329.20	$48.11	$377.31	$ 76.66	$300.65
W.R. 2916	298.80	43.04	341.84	69.03	272.81
W.R. 1517	333.60	60.66	394.26	82.35	311.91
Acala 44	481.20	61.30	542.50	103.86	438.64

Acala 44 was outstanding in this variety test. The field did not appear to be affected by wilt, so the wilt resistant varieties did not have that advantage. It has been noted that the wilt resistant varieties have produced comparatively better in wilt infected fields.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

The Long Staple Cotton variety test work proved to be very interesting in spite of inadequate records. Incomplete records on the tests conducted by Earl Horton, Buddy Britian and L. E. Anway indicated that Professor Bryan's Long Staple variety has a real advantage in several respects. These advantages are: 1st, a high ginning percentage; 2nd, comparatively small plants; and 3rd, large bolls that fluff out well, which should be an asset in mechanical harvesting.

The test run by Dale Gladden was completed this month, when the Bryan cotton was ginned. The results are as follows:

Dale Gladden
1951 Long Staple Test

Variety	Ginning %	Lb. Lint Per Acre
Pima 32	29.50	480
Bryan	36.85	888

Mr. W. I. Thomas produced 29 bales of the Bryan long staple cotton in the Sahuarita district. The average ginning percentage on the 29 bales was 35.0%.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(2) Cotton Variety Tests (continued)

The only variety tests planned this year in Pima County were used for observation purposes only. Due to the unforseen difficulties no harvest data was collected from these variety tests. The cooperator was Mr. Alvin Luckett. Through no fault of Mr. Luckett's the harvest data was not obtained. In the short staple variety test run by Mr. Luckett, two wilt resistant varieties were used which showed up very well although there was no apparent wilt in the field. From the indications of the growth of these wilt resistant varieties at Marana either 2946 or 2916 WR might well have a place in the cotton growing picture in the event of verticillium wilt becoming serious in the area.

The long staple variety test grown by Mr. Luckett appeared to have favored the Bryan or dwarf long staple cotton. This variety of cotton developed by Professor W. E. Bryan, plant breeder of the University of Arizona, appeared to have set more bolls and larger bolls which matured earlier than the Pima 32. The test last year showed a much higher ginning percentage for the Bryan long staple cotton. Spinning tests reported from the growth last year strongly indicated this is a superior long staple lint.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(3) Defoliation

With the adoption of mechanical harvesting of cotton, defoliation gains emphasis. Tests on materials and methods have been conducted to some extent in the past without any worthwhile results.

Growers have been applying defoliants to some fields for the past few years with results that were in the aggregate rather discouraging.

A cotton defoliation conference was held in Phoenix this year by the Cotton Council where the best information in the Southwest was brought together. The agent attended this conference and brought the information which he obtained back to local growers. Plant condition was claimed to be the key factor in successful defoliation. The agent dispensed this information at meetings and through individual contacts. There was an increased acreage of cotton on which defoliants were applied, amounting to approximately 20,000 acres. There were poor jobs of defoliation again this year, but an increased number of successful defoliation jobs were noted.

In cooperation with Mr. Lamar Brown of the Bureau of Plant Industry Field Station at Sacaton, the agent established four demonstrations on bottom defoliation of cotton. The defoliants were applied with the use of a highboy equipped with a spray. Four defoliants were used in fields belonging to Alvin Luckett, Earl Horton, Dale Gladden and Midvale Farms. Grower interest in this has only been passive in most cases but some growers are intensely interested. Fields that ordinarily grow very rank cotton are most likely to be benefitted by the practice of bottom defoliation. The prevention of boll rot alone should be worth the effort in those areas of heavy cotton plant growth.

The bottom defoliation in each of the four test demonstrations was observed to be successful. Comments from growers invariably included the statement that the spray could have well been placed higher on the plant so as to cover and defoliate at least half the leaves.

V. Projects (continued)

7. Agronomy (continued)

A. Cotton (continued)

(4) Insect Control

Cotton insect control measures is one of the major operations in cotton growing in Pima County. All growers have adopted some measure of insect control practice during the past several years.

Each year the Extension Service has carried on an educational program on cotton insect control for the past several years. The program has consisted of meetings, field demonstrations, distribution of bulletins and circulars, letters and individual contacts. Dr. J. N. Roney, Extension Entomologist, has headed up this work. He prepares a circular on current recommendations each year, assists in conducting meetings and demonstrations.

One of the problems this year that has been prominent in the county is the preservation of an unusually large population of beneficial insects. The educational program on cotton insect control work this year has stressed this phase of control. Many dustings were saved by the growers when the beneficial insect population was considered by them. Field demonstrations conducted by Dr. J. N. Roney, Mr. W. A. Stevenson and Mr. W. R. Kaufman of the Bureau of Entomology and the agent served a good purpose in starting and encouraging growers to recognize the beneficial as well as the damaging insects and to evaluate the effect of dust on both populations of insects. Circular letters, meetings and individual contacts were other methods used in promoting this work.

The balance between beneficial and damaging insects is an important consideration in determing when to apply insecticides. This point has been stressed in out educational program during past years, but it was most important this year with such a predominance of beneficial insects in the fields early in the season. This phase of the program made progress this year and satisfactory results were obtained by deferring dusting operations. The agent followed one field through the season with frequent inspections and the cooperator, Mr. Joe Carrasco, saved at least two dustings as compared to his next door neighbor who had a similar insect situation. His results appear to be very satisfactory. Yields on his farm, when dusting was limited on account of good insects, will be obtained at the end of the season.

V. Projects (continued)

7. Agronomy (continued)

B. Alfalfa

Pima County farmers have never planted a fair percentage of their acreage to alfalfa. This has been true, even when cotton acreages were controlled, and more than half the cultivated acreage had to be laid out or farmed to other crops. Most growers claim that alfalfa requires too much water and is not a profitable crop. The average grower fails to take into consideration the net returns over a five or ten year period. Information on the comparison between a cotton -- alfalfa rotation and a straight cotton system of farming is lacking for the county. The acreage of alfalfa on the few farms growing it is so small that it is impossible to make a fair comparison.

Bearing in mind the virtue of alfalfa for maintaining soil fertility, and the experience of other cotton growing districts in gaining substantial yield increases of cotton from an alfalfa -- cotton rotation, the Extension Service has encouraged growers to plant more alfalfa.

Fertilization with phosphates and variety tests have been the main demonstration projects carried on during past years. Two demonstrations on phosphating alfalfa was carried on, both of which showed an excellent profit for application of rather high rates. Liquid phosphoric acid and ammonium phosphate (11-48) showed best results. On the basis of these demonstrations, phosphate fertilization has been recommended for the past six years. The variety tests showed the extremely early or "Non-Hardy" varieties such as "India" and "Africian" to winter kill. Work on irrigation of alfalfa has consisted of water penetration problems. Ripping or deep renovation, slowing down the movement of water across an irrigation run by cutting down the head of water, and land levelling have been the recommended practices.

Activities on alfalfa growing during the past year has not differed to any degree from the past three years. Advice and information on seed bed preparation, varieties, rates of seeding, irrigation, fertilizing and harvesting have been general activities.

Mr. Charles Elwood, Extension Agronomist, prepared material this year for the purpose of selling growers on the practice of an alfalfa -- cotton rotation system. Mr. Elwood's material was collected from various sources over the state. The data were set up to show how this crop rotation system

V. Projects (continued)

7. Agronomy (continued)

B. Alfalfa (continued)

gives better net returns to the grower over a period than was realized by the one crop system with cotton. Mr. Elwood presented this material at two cotton growers meetings, in the county. While the reception to the idea by the growers was discouraging, it has given them something to think about, and perhaps to profit by in some future period.

One alfalfa fertilization demonstration was established and carried on this year. The applications were made to a new stand which was planted in the fall of 1951 with oats as a companion crop. The variety of the alfalfa is Africian. No preparation of soil was made and a surface application was made with a broadcasting machine. The following table represents harvest data on the first and second cuttings after fertilizer applications were made. This was the second and third cutting for the field. Negligible increases in hay yields from phosphate fertilization during July and August has been the rule in past demonstrations. The large gains for phosphates occur mostly in September, October, April, May and June. This demonstration isn't an exception to that rule. The September and October cuttings did not materialize due to the absence of irrigation.

V. Projects (continued)

7. Agronomy (continued)

B. Alfalfa (continued)

1952 Alfalfa Fertilization Demonstration

Weyman Gladden

Border No.	Treatment Rate Per Acre	No. Bales 1st Cutting	No. Bales 2nd Cutting	* Gain Or Loss
6	220# (0-33-0)	12	11	5 L
7	Check	18	10	
8	220# (0-33-0)	20	18	7 G
9	Check	22	12	
10	200# (13-39)	25	19	2 G
11	Check	31	19	
12	200# (13-39)	30	22	2½ G
13	Check	31	18	
14	200# (13-39)	36	22	9 G

* Gain or loss is figured by comparing Borders No. 6 vs. 7, 8 vs. 7 and 9, 10 vs. 9 and 11, 12 vs. 11 and 13, 14 vs. 13.

Starting in with Border No. 6 each successive border increases in area, acreage of each border will be measured at a later date.

According to Mr. Gladden, Mr. Oberly and the agents observations, the bales from the fertilized borders were approximately 25% heavier on cutting. Mr. Oberly, Assistant County Agent, is rendering valuable assistance in this work. The project is designed to cover at least a two year period.

V. Projects (continued)

7. Agronomy (continued)

C. Grain Sorghums

Hegari is the major grain sorghum grown in the county. It is an excellent silage crop, and gives high grain yields. Some double Dwarf Milo is grown for grain. Martin's Combine and Plainsman have been grown to a small extent for pure seed purposes. In the aggregate, grain sorghums are planted more or less as an emergency crop when for some reason the grower couldn't get the land planted to cotton. Planting of grain sorghums is not encouraged unless the grower has a cattle feeding enterprise or is in the dairy business. The crop is often planted after a grain crop by regular grain sorghums growers who have livestock to feed. The returns, when grown as a cash crop, are comparatively low.

One other recommended place for grain sorghums is on land heavily infected with Texas Root Rot. Non-tap rooted plants are not effected by this fungus disease, and the absence of tap rooted plants for two or three years materially reduces the incidence of root rot damage in tap rooted crops which follow.

D. Small Grains

Barley is the major small grain crop. The Arivat variety yields well in this district and is planted exclusively. A great deal of the barley acreage furnishes pasture for beef and dairy animals during the winter months and makes a fair grain crop if not pastured later than February 15.

The returns are comparatively low when barley is grown as a cash crop but the crop has an important place in a crop rotation system, on root rot infected land and on land heavily infested with Johnson Grass.

V. Projects (continued)

8. Irrigation

Since water resources limit farming activities in the county, irrigation problems are of first importance. It has been pointed out by geologists and irrigation engineers that the supply of underground water is being pumped out of the ground at a much greater rate than it is being replenished. At the same time there is new land being developed for irrigation purposes each year. There has been some of this irrigated land development that is questionable as to its feasibility, regardless of the water situation. There is a considerable acreage of unlevel land being irrigated in the county which defeats efficient use of irrigation water. While a great deal of land levelling and re-levelling has taken place during the past few years, and a considerable amount of ditch lining has been accomplished, there still remains a lot of this work to be done.

The Extension Service in the past has worked on land levelling, ditch locations and maintainance, and irrigation methods and schedules for individual crops. The Soil Conservation Service now takes care of all the land levelling lay-outs.

The work on irrigation during the past year has consisted mostly of advice on irrigation methods for individual crops, and need for re-levelling. There are cases that come up frequently, where water penetration problems appear, and the trouble is in the make-up of the soil, such as imperious layers, and "slick" soils or it may be just plain black alkali soils. A majority of water penetration problems are, however, the result of unlevel land or land having too much fall. These steep irrigation runs are conspicuous by the appearance of a four-fifth zone, which has vigorous plant growth on the upper and lower ends of the field, and mediocre growth on the middle four-fifths. Spreading the head of water, which slows down the velocity of flow, greatly overcomes this problem. Growers have been advised on this subject on all applicable occasions. Farmers in the county have been advised on the advantages of properly levelled land both by word of mouth and written material. The agent has worked closely with the Soil Conservation Work Group on irrigation problems, encouraging farmers in general to utilize their services.

Work this year has consisted of stressing the point to growers that pre-irrigation with adequate and uniform penetration is of paramount importance in growing a successful

V. Projects (continued)

8. Irrigation (continued)

crop. Shortening of irrigation runs, reducing heads, levelling, pre-irrigating when land is in the rough were the main recommendations on gaining penetration and uniformity. Mr. James Miccleton, Extension Specialist in Irrigation, stressed these points in his talks before groups of growers at meetings and in the cotton growing recommendations issued from the State Office.

The practice of delayed irrigation on cotton was discussed on one of the field tours. The example shown to the group was on the farm of Mr. Dale Gladden who applied his first irrigation to this particular field, which was being visited, during the last week in June. The soil in general in this field would be classed as one of the lighter soils in the area and yet it was pointed out that at no time did this cotton show water stress and the yield is in the upper bracket of the area. Mr. Gladden pointed out to the group that this practice was helpful in controlling Johnson grass since it enabled the operator to keep the Johnson grass growth chopped down or cultivated out well into the fruiting season whereas the grower who applied two or even one irrigation between late June and pre-irrigation could not accomplish this nearly so well since the excess amount of water in the surface soil kept the hoe hands or cultivators out of the field and at the same time stimulated Johnson grass growth. It was also pointed out that the delayed irrigation was conducive to the development of a much deeper and stronger root system which not only made it easier to carry the crop without water stress during the heavy growing and fruiting season, but was a real feature in Texas Root Rot control. There is a lot of merit in this method of cotton irrigation. A demonstration comparing early and delayed irrigation of cotton is needed, but difficult to establish. It should be considered on yield per acre foot of water.

V. Projects (continued)

10. Entomology

The organized insect control work was reported under the heading of "Crops and Livestock Projects."

Each year there are many insect control problems which arise in the county. There are certain insects of economic importance to farmers, ranchers and home owners that show up every year in season. Then there are the periodic economic infestations, such as grasshoppers. The county agent's office answers many calls each year relating to these miscellaneous insect problems. These calls include household insects, animal parasites, insects damaging trees, shrubs, flowers, lawns, vegetable gardens, citrus and deciduous fruits and farm crops.

The county agent's office has always endeavored to assist Pima County residents with their many insect problems to the best of their ability. Many times these calls are over the telephone, and it is necessary for the caller to furnish a specimen of the insects that are giving the trouble, while in other case the trouble is easily diagnosed, since the trouble is in season, on the common host, and the verbal description is sufficient. Home owners are usually very co-operative in these matters.

Dr. J. N. Roney, Extension Entomologist, does an excellent job in keeping up to date literature on all types of insect control available for distribution. The Entomology Department at the University of Arizona performs a valuable service in this work by giving assistance in identification and control measures.

This years activities in general insect control work has been highlighted with an increased number of calls on lawn insects (mainly grubs), thrips, subterranean termites and the tough cloth devouring insect, Buffalo Bug. These last two mentioned insects are very destructive and cost Pima County residents an untold amount of money from ruined clothing, rugs and upholstery. While this office gives publicity on helpful suggestions for the control of these insects and gives many individuals assistance, it is felt that a real campaign on the subject would be well worthwhile. Most calls on termite control and Buffalo Bug control falls about in the same category as "locking the barn door after the horse has been stolen." About all these unfortunate callers can do is to start all over and fortify against future troubles.

V. Projects (continued)

11. Soils

Irrigated land in the county is located mostly in rather narrow valleys. Soil types range from sandy loams to clay loams. The lighter textured soils are generally deficient in plant food, especially nitrogen. The heavy or fine textured soils are more fertile, but most often offer problems of poor water penetration. The coarser textured soils are easier of tillage, but normally require more water, while the heavier soils require more care in tillage so as to prevent compaction, but generally require less water.

Agricultural soils in general in Pima County are low in organic material. The Extension Service has recommended green manure crops, plowing under all crop residue and manure applications for the building up of organic matter in soils. The importance of returning organic matter to the soil is called to the attention of growers at every opportunity. Gypsum has been used successfully on some of the tight soils showing high alkalinity. The agent carried on demonstrations during past years to show the benefits of gypsum where conditions were right for its successful use. These demonstrations were on high pH soils where water penetration and tillage problems confronted the grower. Thorough leaching was one of the essential steps in these demonstrations.

While green manure cropping has been stressed this year, there has been very little of it carried on. It takes water, and generally some irrigation water to grow these soil building crops, and growers are not prone to use their well water for any other crop than cotton. The places where gypsum might help some tight soils falls in the same category.

One interesting soil problem this year was on the farm of Mr. Patrick Tucker in the Avra Valley. The soil "slicked" over badly when water was applied, and it was very difficult to gain any penetration or subbing up from the lister rows. Soil samples from the field showed a very low pH, some samples being 6.8 or slightly on the acid side. Mr. Tucker had planned somewhat on using gypsum as a corrective measure but since neither the soil or water analyses indicated the beneficial use of gypsum, that idea was dropped. Mr. Tucker did apply some "Fert-O-Fish" in the irrigation water and his "slicking-over" problem disappeared. Magic, it would seem, when looking at the analysis of "Fert-O-Fish."

V. Projects (continued)

11. Soils (continued)

Total Solids, Minimum	30.00%
Ash, Minimum	4.8 %
Protein	20.4 %
Alpha Free Amino Nitrogen	1.0 %
Cude Protein Nitrogen	2.0 %

IN PERCENT BY WEIGHT

Minimum Guaranteed Analysis:

Nitrogen, Organic	3.0 %
Phosphoric Acid, Available	3.0 %
Potash, Water Soluble	1.0 %

MINERALS

Aluminum	0.3 %
Magnesium	0.3 %
Iron	0.06%
Vanadium	0.03%
Copper	0.03%
Chromium	0.03%
Silicon	0.03%
Strontinum	0.003%
Nickel	0.0006%
Barium	0.0006%
Potassium	0.80%
Calcium	0.52%
Phosphorus	1.0 %

Vitamins

Biotin	0.16
Riboflavin	5.10
Thiamin	1.08
Nicotinic Acid	90.0
Pyridoxin	3.0
Pantothenic Acid	10.8
Choline	1080.0
Vitamin B_{12}	0.15

IN MILLIGRAMS PER LB.

V. Projects (continued)

11. Soils (continued)

Several growers used this material during the past season and report similar success. Mr. W. L. McGeorge, head of the Agricultural Chemistry Department of the University of Arizona, expressed an opinion that the product (Fert-O-Fish) was heavily loaded with bacteria, which may be the key to its success. The material is a by-product from fish canneries.

Other new soil corrective materials used this year were calcium poly-sulfide and reports on results from these products are variable. Certainly, those new products of this nature that have any real promise should receive careful attention.

The Agricultural Chemistry Department of the University of Arizona made chemical analyses on 150 soil samples and 114 water samples. There were 131 soil samples from agricultural land and 19 from home grounds. There were many requests for soil analyses from city residents which were deferred, since the problems offered did not necessitate such proceedure. Most of these problems were plainly nitrogen defecienceis, lack of organic matter and over-irrigation.

V. Projects (continued)

12. Rural Sociology

The farm population in the county is comparatively small. Farm operators have large acreages as do cattlemen. Farm laborers are largely migratory. The usual rural community life has been more or less lacking in past years, but has improved somewhat during the past four years. Liquidation of the Cortaro Farm Co., formerly the major land owner in the Marana district, has changed the complexion of rural life somewhat in that community. Growers who were tenants are now owner-operators. They are a great deal more important part of the community. The farmers in the Marana district have an active Farm Bureau, and carry on many worthy community projects. The farmers in the Sahuarita-Continental district have improved their rural life activities during the past three years. They organized a local farm bureau and have been carrying on several community projects. New homes have been built in the farming areas and living conditions for farm families and farm laborers have been improved.

Most of the work carried on under the heading of Rural Sociology has been in cooperation with the countys' farm organizations in assisting with their programs and projects. One rural area was surveyed for the purpose of evaluating part time farming.

During the past year there was the usual work carried on with farm organizations in planning and carrying on their programs. Circular letters on fire prevention and accident prevention have been prepared and sent to rural residents. These subjects have been discussed at meetings by the agent. Cooperating organizations included two Farm Bureau Locals, one dairy association, one poultry association, the Pima County Fair Commission and the Tucson Chamber of Commerce.

V. Projects (continued)

13. Agricultural Economics

Market reports on the principal agricultural commodities produced in the county are readily available to farmers and ranchers. Outlook information is also made available. Local farm credit for farmers comes almost entirely from cotton finance companies. These finance companies are represented by the owners or operators of the cotton gins, who in turn buy the seed and some of the lint. Inquiries for sources of government finance for land purchases and poultry keeping are common in this office. This class of credit is difficult. Many inquiries on the value of land are received each year.

Cotton growers have received free government classing of their cotton during the past several years through the administration of the Smith-Doxey Act. The county agent's office has been responsible for the organization of a Cotton Improvement Association among the growers which qualifies all growers for receiving free cotton classing service. The work also makes available the cotton market news service to all growers. It has been attempted to give pertinent information on judging land values to all interested parties. The office callers inquiring about land credit and production credit are always directed to the source of the type of credit desired. The functions of the different credit agencies are explained.

During the past year, the work on agricultural economics has followed about the same pattern as in past years, with possibly more emphasis on cotton marketing. The Marana district has adopted the practice of bale identification for all of their cotton. The growers have a "One Variety Community" which lends itself well to bale identification. The lint produced from the adopted variety is of superior quality, and is well accepted by the cotton textile mills. Bale identification insures the cotton merchant, and in turn the cotton textile mills, of receiving the cotton with desirable spinning qualities as represented by this variety. The growers at Marana had two years of trial run on bale identification and were convinced that the marketing of their cotton was greatly improved.

The bale identification program adopted by growers in the county did an excellent job in establishing the new superior strain of cotton being grown in the area. Arizona cotton had an adverse reputation to correct among the mill trade, and with a new strain that was very acceptable to the mills being first grown in Pima County, the countys bale identification program did a great deal to pave the way for correcting the situation which was a discrimination against Arizona cotton. The estimated difference between

V. Projects (continued)

13. Agricultural Economics (continued)

the value of the countys crops in the 1950-51 season and the value it would have had with the old variety was $1,000,000. With a larger crop for the 1951-52 season, the difference in value is still greater. The Extension Service worked with the University Experiment Station workers, ginners and growers in this marketing phase of Pima Countys cotton crop.

Summary

Organization

Work was carried on in cooperation with seven organized groups consisting of two local Farm Bureaus, Santa Cruz Valley Cotton Improvement Association, Southern Arizona Poultry Association, Pima-Pinal Dairy Herd Improvement Association, Pima County Fair Commission and the Tucson Chamber of Commerce.

Cotton

Five cotton variety tests were carried over from last year and completed this year. Two variety tests were established this year and used for observations on wilt resistant strains. There were two cotton fertilization demonstrations carried over from last year and completed this year. Four fertilization demonstrations were established and carried to partial completion this year. The cotton progress report for 1952 was prepared, mimeographed and furnished to all growers. Field meetings and other meetings were held to review results of these demonstrations. Insect control recommendations for 1953 were furnished to all growers. Field meetings to study cotton insects and control measures were held. Cotton insect control problems and control measures were topics of discussion at other meetings. The fertilization recommendations, varietal recommendations and insect control recommendations were adopted in some measure, by better than 80% of the growers in the county.

Horticulture

Result demonstration work on thrips control and Texas Root Rot were carried this year, with progress made in both. Several hundred rural and urban and city residents were assisted with horticultural problems this year.

Soils

Increased organic matter in the soil was stressed this year. Information on soil correctives was given to growers with special soil problems involving water penetration. One hundred and fifty soil samples were taken for analyses in connection with this work.

Irrigation

Pre-irrigation for all crops was stressed this year.

Summary (continued

Irrigation (continued)

Uniform water penetration was set up as a goal and some progress was noted.

Dairy

The county agent's office cooperated with the Dairy Herd Improvement Association in carrying on another successful year of their program. Information letters were prepared in connection with their monthly letter containing herd testing results.

Poultry

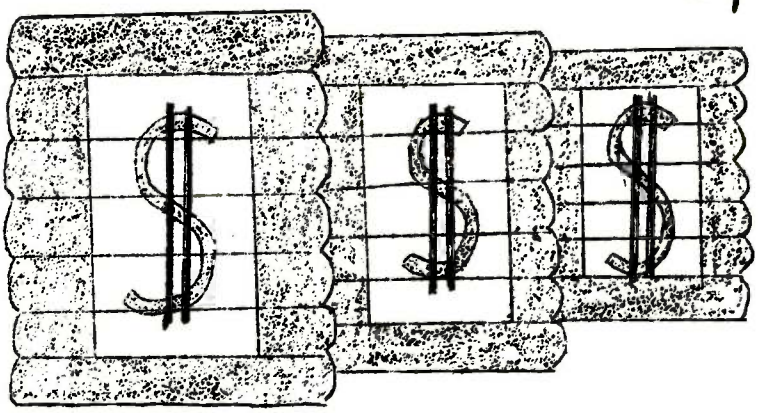
An educational program was carried on in cooperation with the Southern Arizona Poultry Association. All available literature was furnished to poultrymen.

Small Grains, Sorghums and Forage Crops.

Information on establishing pasture crops, small grain plantings and grain sorghums was furnished to all interested parties.

MORE PROFIT

by



PROPER FERTILIZATION, VARIETIES, and CULTURAL METHODS

COTTON FERTILIZATION DEMONSTRATIONS

by

G. E. Blackledge
Agricultural Agent

Pima County - 1951

The Agricultural Chemistry Department of the University of Arizona cooperated with your local county agent's office and two Marana growers in conducting cotton fertilization test plots in 1951. Mr. Dale Gladden and Mr. Earl Horton were the cooperating growers. This was Mr. Horton's second year. Their excellent cooperation in growing and harvesting these plots is greatly appreciated since full cooperation is necessary for the successful completion of these tests.

While small plots such as we used this year are subject to considerable experimental error, it is felt that the number of replications, and the systematic manner in which the replicated treatments were distributed throughout the field area greatly compensates for the smallness of the plots. This type of test is certainly more accurate and dependable than comparing one field with another, or comparing results of one year with another. We find quite a variation in fertilizer response in different fields during different years. You will note quite a variation between response in these different small (200 ft., 4 rows) plots. The yield of each plot with the location and the treatment used is represented in the tables which follow:

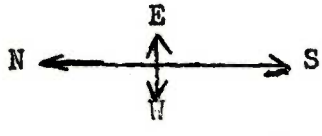
G. E. Blackledge

1-52-Pima

Cotton Progress Report

Dale Gladden 1951 Cotton Fertilization Plots

T - 1 P - 29 y/a 3567	T - 2 P - 30 y/a 3867	T - 3 P - 31 y/a 4100	T - 4 P - 32 y/a 4700
T - 8 P - 25 y/a 3600	T - 7 P - 26 y/a 3733	T - 6 P - 27 y/a 3167	T - 5 P - 28 y/a 3800
T - 3 P - 21 y/a 3533	T - 5 P - 22 y/a 3767	T - 1 P - 23 y/a 2467	T - 2 P - 24 y/a 3733
T - 4 P - 17 y/a 3533	T - 6 P - 18 y/a 3167	T - 7 P - 19 y/a 3667	T - 8 P - 20 y/a 3967
T - 5 P - 13 y/a 3733	T - 1 P - 14 y/a 1667	T - 4 P - 15 y/a 3667	T - 3 P - 16 y/a 3733
T - 7 P - 9 y/a 3633	T - 8 P - 10 y/a 3667	T - 2 P - 11 y/a 2533	T - 6 P - 12 y/a 3467
T - 6 P - 5 y/a 3733	T - 3 P - 6 y/a 3467	T - 8 P - 7 y/a 3133	T - 1 P - 8 y/a 2200
T - 2 P - 1 y/a 2433	T - 4 P - 2 y/a 2267	T - 5 P - 3 y/a 1833	T - 7 P - 4 y/a 2333



T - 1 = check
T - 2 = 50 N - OP - OK
T - 3 = 100 N - OP - OK
T - 4 = 150 N - OP - OK

T - 5 = 50 N - 50 P - OK
T - 6 =100 N - 50 P - OK
T - 7 =150 N - 50 P - OK
T - 8 =100 N -150 P - OK

1951 Cotton Fertilization Plots
Dale Gladden - Marana - Cooperator

Fertilizer Treatment Lb. Plant Food per acre	Estimated Net Value of Gain over Check per acre	Cost of Fertilizer Per Acre Application	Estimated Net Profit Per Acre For Practice
50 N - 0 - P	$ 83.92	$ 8.50	$ 75.42
100 N- 0P	155.36	17.00	138.36
150 N- 0P	134.44	24.50	109.94
50 N - 50 P	101.80	14.00	87.80
100 N - 50P	104.41	21.50	82.91
150 N - 50P	77.62	29.00	48.62
100 N - 150P	140.74	30.50	110.24

Note: Net value of gain is computed on basis of $12.60 cost for seed cotton. Picking, hauling and charges at gin are current prices and include all charges.

1951 - Cotton Fertilization plots
Dale Gladden - Marana - Cooperator

Fertilizer Treatment	Lb. Seed Cotton Y/A	Gain Over Check
50 N - 0 P - 0 K	3141	666
100 N - 0 P - 0 K	3708	1233
150 N - 0 P - 0 K	3542	1067
50 N - 50 P - 0 K	3283	808
100 N - 50 P - 0 K	3091	616
100 N - 150 P - 0 K	3592	1117

Soil Analyses with Yield Comparisons

Dale Gladden Plots

Plot No.	Depth Feet	PO_4 Parts per million	N.	K.	Seed Cotton lb. Per Acre
8	1	12	15	35	2200
	2	15	20	39	
14	1	10	25	38	1667
	2	18	20	51	
23	1	12	20	47	2467
	2	32	25	39	
29	1	12	10	42	3567
	2	18	12	38	

Since the response to nitrogen was outstanding in Mr. Gladden's set of plots, let us take a look at the nitrogen content of the first and second foot of these plots and compare it with the respective yields. The samples from plot 29 had 10 parts per million nitrate nitrogen in the first foot and 12 in the second foot, which is only about one-half the amount of nitrogen reported for the other plots, yet the highest yield was obtained from this plot. The lowest yield was from Plot 14, which showed the highest nitrogen content. This is just another example of soil analyses giving an unsatisfactory guide for formulating a fertilization program. Results from similar test plots during former years have given about the same indication, which in effect is, that field tests and observations on past cropping is the safest basis for planning your fertilization program.

Soil Analyses with Yield Comparisons

Earl Horton plots

Plot No.	Depth Feet	PO_4 Parts per million	N.	K.	Seed Cotton lb. Per Acre
8	1	15		10	2652
	2	18		10	
10	1	16		10	2622
	2	21		8	
20	1	15		6	2233
	2	9		6	
30	1	15		8	2260
	2	12		4	

1951 Cotton Fertilization Demonstration

Earl Horton, Marana, Cooperator

Fertilizer Treatment Lb. Per Acre	Lb. Seed Cotton y/a	Gain over Check per acre
100 N-50P-0K	2859	417
0 N-50P- 0K	2672	230
100 N-0P-100K	2582	140
150 N- 50P-0K	3084	642
150 N-50P-100K	2533	91
50 N-50P-100K	3077	635
100 N-0-P-0K	3196	754
Check	2442	

1951 Cotton Fertilization Demonstration

Earl Horton- Marana - Cooperator

Fertilizer Treatment	Net Value of Increase over Check Per acre	Cost of Fertilizer Application Per acre	Net Profit Per Acre Credited to Fertilization
100 N-50P-100K	$ 52.54	$ 24.80	$ 27.74
0 - 50-0	28.98	6.50	22.48
100 - 0 - 100	17.64	20.30	2.66 loss
150 - 50 - 0	80.89	29.00	51.89
150 - 50 - 100	11.47	32.30	20.83 loss
50 - 50 - 100	80.01	17.30	62.71
100 - 0 - 0	95.00	17.00	78.00

These results follow about the same pattern as Mr. Gladden's demonstration. 100 pounds of nitrogen was the most profitable, and where other plant food was added to the 100 pound nitrogen application, yields were reduced. There is some indication that a balanced nitrogen and phosphate application such as 100 - 50 - 0 would have given best results. That combination of nitrogen and phosphate has given top results in previous years' tests.

1951 - Cotton Variety Test - Santa Cruz County

W. B. Allen - Cooperator - Baca Float Ranch

Harvest Results, 11-27-51
Pounds Seed Cotton Per Acre

Variety	1st Replication	2nd Replication	Average
Delta Pineland	2208	2696	2452
Acala 33	2232	2672	2452
Coker Wilde	1788	1732	1760
2946 W. R.	2612	2688	2650
2916 W. R.	2044	2300	2172
Acala 44	2264	2284	2274

Ginning Percentages and Yield Per Acre Lint and Seed

	% Lint	Pounds Lint Cotton	Pounds Cotton Seed
Delta Pineland	40.2	985.7	1412
Acala 33	37.4	817.0	1586
Coker Wilde	30.9	543.8	1180
2946 W. R.	35.9	951.3	1648
2916 W. R.	34.6	751.5	1378
Acala 44	37.5	852.7	1378

3% Dockage for trash was deducted

W. B. Allen 1951 Cotton Variety Tests

Per Acre Net Values

Variety	Gross Value of Lint Seed	* Harvesting and Ginning Costs	Net Value
Delta Pineland	$ 443.03	$ 105.38	$ 337.65
Acala 33	389.53	91.87	298.66
Coker Wilde	263.62	74.43	189.19
2946 W. R.	446.63	99.79	346.84
2916 W. R.	349.32	81.58	267.74
Acala 44	397.17	85.90	311.27

* Net value is value of production from variety after all harvesting and ginning costs are deducted. Ginning costs include bagging and ties, insurance and yardage and ginning. 50 cents per cut extra was charged on Delta Pineland and Coker Wilde varieties. This was based on a limited amount of past experience with these two varieties.

W. B. Allen 1951 Cotton Variety Test

Results Laboratory Data

Variety	Weight per 50 bolls Grams	Staple Length Inches	Strength of Fiber Pressley Index	Coarseness of fiber Micronaires
Delta Pineland	303	29/32	790	470
Acala 33	355	1 1/16	797	440
Coker Wilde	333	1 1/16	874	395
2946 W.R.	421	1 1/16	974	480
2916 W.R.	421	1	820	475
Acala 44	414	1 1/16	857	487

* Gross Value of Lint & Seed Per Acre

Variety	Value of Lint Cotton	Value of Seed	Total Gross Value of Crop
Delta Pineland	$ 394.60	$ 48.43	$443.03
Acala 33	335.13	54.40	389.53
Coker Wilde	223.15	40.47	263.62
2946 W. R.	390.10	56.53	446.63
2916 W.R.	302.05	47.27	349.32
Acala 44	349.90	47.27	397.17

* Values are set up on the current market and prices for strict middling cotton on basis of staple length reported by the University of Arizona cotton laboratory. Premiums that can be obtained from other characteristics are not considered since the mills' reaction on most of the varieties is unknown.

1951 Cotton Variety Test
Lee Moor Ranch - O'Dell Massey, mgr.

Seed Cotton Yields

Replication	W.R. 29446 y/a Seed Cotton	W.R. 2916 y/a Seed Cotton	W.R. 1517 y/a Seed Cotton	Acala 44* y/a Seed Cotton
1	2010	1920	2260	
2	1993	1983	2667	
3	2313	2047	2683	3102
4	2757	2227	2273	2779
5	2330	2083	2453	3303
ave.	2281	2052	2467	3061

* Acala 44 was not in regular rotation with other varieties in the test.

1951 Cotton Variety Test
Lee Moor Ranch - O'Dell Massey, mgr.

Lint Cotton Yields

Variety	y/a Seed Cotton	Ginning %	y/a Lb. Lint	y/a Lb. Seed
W.R. 2946	2281	36.1	823	1415
W.R. 2916	2052	36.4	747	1266
W.R. 1517	2467	33.8	834	1784
Acala 44	3061	39.3	1203	1803

1951 Cotton Variety Test
Lee Moor Ranch - O'Dell Massey, mgr.

Net Value Comparisons

Variety	Value of Lint	Value of Seed	Total Value	Cost of Harvest	Net Value
W.R.2946	$ 329.20	$ 48.11	$ 377.31	$ 76.66	$ 300.65
W.R.2916	298.80	43.04	341.84	69.03	272.81
W.R.1517	333.60	60.66	394.26	82.35	311.91
Acala 44	481.20	61.30	542.50	103.86	438.64

Acala 44 was outstanding in this variety test. The field did not appear to be affected by wilt, so the wilt resistant varieties did not have that advantage. It has been noted that the wilt resistant varieties have produced comparatively better in wilt infected fields.

1951 Cotton Variety Test

Mr. J. B. Bull - Continental - Cooperator

Variety	y/a Lb. Seed Cotton	y/a Lb. Lint	Ginning %
W.R. 29-4-6	3532	1215	34.4
W.R. 29-1-6	3685	1259	34.2
Acala 44	3382	1238	36.6
D.P. L	3012	1103	36.6
Acala 33	2962	1006	34.0

The two wilt resistant varieties showed up very well in this test. This was rather expected since wilt in the district has been increasing for the past five or six years, and is now a factor in cotton production.

1952 PRACTICES

Varieties

Acala 44 continues to be the leading short staple variety in the variety tests conducted this year. Two Wilt Resistant strains were included in the tests, and show promise, where Verticilium Wilt is present. It is encouraging to know that these Wilt Resistant strains have been developed, and that they produce an excellent quality of lint under wilt conditions. In the event that Verticilium Wilt becomes a serious problem in Pima and Santa Cruz Counties, the Cotton Breeders have the situation well in hand with the development of W.R. 2916 and W.R. 2946.

Six plantings of a new long staple variety of cotton were planted to make comparisons with Pima 32. The Cortaro Management Co., Mr. L. E. Amway, Mr. Buddy Britian, Mr. Alvin Luckett, Mr. Earl Horton, and Mr. Dale Gladden grew the long staple tests. The new variety was developed by Mr. W. E. Bryan, head of the Plant Breeding Department of the University of Arizona. The Bryan long-staple variety created a great deal of interest among the growers who inspected these test plantings. The Bryan variety is a smaller plant, has larger bolls, and gives a higher ginning percentage. Yields were about even in some of the tests, but on the average it was conceded that the Bryan variety gave highest yields. It has been reported that spinning qualities have been favorable in the few tests made to date. Further field tests of this promising long staple variety are planned.

Fertilization

Field tests indicate that about 100 pounds of nitrogen per acre is the first consideration for the most efficient fertilizer application. The addition of 20 to 50 pounds of phosphoric acid is also indicated to be a profitable investment, when the results of all tests conducted over the past several years are considered. It is believed that the addition of phosphates to the nitrogen applications will be most profitable during years when an early killing frost occurs. Since the field tests have included mostly rates of 50 lb., 100 lb. and 150 lb. of nitrogen per acre, and the 100 lb. rate has been the most productive application, there is still a range between the 50 lb. and 100. lb. rate that may fit the requirements of some fields better than either of the rates used in test work. Likewise, there may be a rate between the 100 lb. and 150 lb. applications that may be better fitted to the needs of other fields. This same reasoning may be applied to phosphate applications. 50 lb. of phosphoric acid per acre has rather consistently been superior to 100 lb. applications when used with 100 lb. of nitrogen per acre.

Split applications of fertilizer have been made by different growers in Pima County with success. Some of the 1950 test demonstration plots included two applications, one at chopping time and the other in mid-July. Results from some plots favored the split applications, while others favored the single application. Reports

from tests made in another irrigated district show a distinct advantage for the split applications over the single application. Two-thirds of the fertilizer was applied at chopping time and the remaining one-third was applied about five weeks later. This appears to be a feasible fertilizer program.that will give the cotton plants an additional supply of available nitrogen during the last part of the fruiting period, and at the same time will not be late enough to carry the plants into an early frost with heavy vegetative growth, and immature bolls.

Spacing

Several spacing tests have been conducted during the past four years, and there has been a trend toward closer spacing. Approximately an eight-inch spacing or a hoe width has been adopted by most local growers. There is no attempt to have single plants in each spacing. In fact, most growers prefer two or three plants in each spacing. Some of the spacing tests have favored two or three inch spacings or no thinning where from 5 to 10 pounds of acid delinted seed per acre is planted. The thick stand resulting from no thinning appears to be most satisfactory on light or sandy soils, but doesn't appear to produce well on heavy soils. Growers who have experience with mechanized harvesting claim that the thicker stands pick better by machine.

A report on one thinning test conducted this year is worth mentioning since the method which gave the highest yield is different. The "Blocking" method gave best yields. It consists of chopping out 8 inches in the row and skipping 8 inches, which leaves 8 inches of solid stand alternating with 8 inches of blank space in the row. This method of thinning should be tested in this area, since the results were outstanding in the test conducted this past year.

Irrigation

Pre-irrigation of the land so as to obtain a 6 ft. penetration of water is one of the old standard practices that is fundamental. There is somewhat of a controversy concerning the first irrigation after the cotton stand is established. One practice is to delay the first irrigation as long as possible without water stressing the plants. This will, in most cases, carry the crop until after chopping without an irrigation. The other practice is to irrigate at least one time before chopping. The first method has been very successful for some of the local growers, but a majority of growers follow the second method. Cotton irrigation experiments carried on at the Mesa, University of Arizona Experiment Station, showed the extra irrigation before chopping time to give materially higher yields in most years that the tests were conducted. In any event, it is a poor practice to let your cotton become water stressed after fruiting starts.

INSECT FIELD STUDY FOR ALL COTTON GROWERS IN PIMA and SANTA CRUZ COUNTIES

TUESDAY, JULY 15

MARANA - START FROM PRODUCERS GIN OFFICE 9:00 A.M.

SAHUARITA - START FROM GIN OFFICE 2:30 P.M.

Dear Cotton Growers:-

The main objective of these scheduled meetings is to become acquainted with the many beneficial insects that are to be found in most of your fields at this time.

Beneficial insects have often been mistaken for injurious insects. The application of insecticide will aften kill off these good insects, which can easily result in a net loss to the grower, when the balance of insect population is in favor of the good insects at the present time, there are many fields where the good insects greatly out-number the injurious insects. The application of insecticides in such fields at this time would be like, "killing the Goose that laid the Golden Egg".

We will have three top men in the cotton insect field to give us the low-down on these beneficial insects as well as the injurious ones and latest control measures. We expect to have Dr. J. Roney, our Extension Entomologist, and Mr. W. A. Stevenson, and William Kaufman of the Bureau of Entomology. Bill and Steve will be with us for sure.

I know that many of you need this information and I hope you turn out for one of the field meetings.

Very truly yours,

G. E. Blackledge

G. E. Blackledge
County Agricultural Agent

GEB/j
200 c.