

ANNUAL REPORT

G. E. Blackledge
County Agricultural Agent

December 1, 1946, to December 1, 1947

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ORGANIZATION

The quasi-official organization sponsoring county Agricultural Extension work in Pima County was the Pima County Farm Bureau. Mr. E. M. Furrey of the Flowing Wells district again acted as president. An attempt was made to start a new membership campaign this year, but was given up at the initial meeting. It appears that the commodity group type of organization is more successful in this county at the present time.

Pima County Cotton Improvement Association

All cotton growers in the county were members of this group and received free cotton classing service under the Smith-Doxey Cotton Classing Act. There were six meetings of the county's cotton growers held during the year for consideration of all the different phases and problems common to growing cotton in Pima county.

Southern Arizona Poultry Association

The agent was a paid member of this organization and cooperated in the discussions at the association meetings. This organization meets regularly, is well attended with over 200 members, and affords a splendid opportunity for disseminating information on Poultry Husbandry. Members of the University of Arizona Agricultural Experiment Station Staff take important parts on the association's monthly programs.

Southern Arizona Rabbit Breeders Association

The agent cooperates with this organization in assisting with many of their functions.

Tucson Chamber of Commerce

Water and Irrigation Committee

The agent served on this committee during the past year. Mr. Carlos Ronstadt was chairman this year. Consideration of a new State Underground water code was the most important activity of this committee.

Livestock Committee

Mr. Albert Lent headed up this committee. The "Foot and Mouth" cattle disease outbreak in Mexico was the outstanding problem considered by the Livestock Committee.

ORGANIZATION (continued)

Tucson Chamber of Commerce (continued)

Agricultural Pamphlet

The agent cooperated again this year with Mr. Don Bell of the Chamber in revising some of the literature on Pima County's agriculture.

Livestock Show Committee

This is the first year that the agent has served on this committee. The conduct of the Tucson Livestock Show is the entire function of this committee. The agent served on the sub-committee for the Junior Division of the show.

Pima County Agricultural Conservation Association

The agent attended the regular meetings of the county AAA Committee and contributed information on technical points in agriculture whenever possible. Mr. Howard Baker, Extension Economist, and the agent appeared on the program of this organization's annual meeting and election.

Pima County Fair Commission

The agent was elected chairman of this group, but resigned due to Extension policy. Mr. John F. Dayton consented to serve. Plans for a fair in February, 1948, are being carried forward. The agent assisted the secretary, Mr. Norman Cobb, in preparing the agricultural part of the premium list. Assistance in selecting, assembling, and preparing material for a county booth at the 1947 Arizona State Fair was given by this office.

Emergency Farm Labor Program

The farm labor supply situation eased up considerably during the past year. While farm labor was not considered normal when judged from a pre-war angle, there appeared to be a sufficient number of workers to carry on normal farm operations. Mr. James C. Armer, Mr. William B. Schwalen, Mr. Fred L. Ginter, Jr., and Mr. Harold E. Jacha were farm labor assistants at different times during the year. It is believed that the work that was to be done was carried on efficiently by these four men. There were a total of 190 orders placed for farm laborers. Three hundred sixty farm labor placements were made on 98 different farms. There were 52 applicants referred to other counties in Arizona.

ALFALFA

Alfalfa Fertilization

Pima County farmers had not been following the practice of fertilizing their alfalfa crops prior to 1945. This was unusual in lieu of the fact that Mr. W. F. McGeorge, head of the Agricultural Chemistry Department of the University of Arizona, published a bulletin on the favorable results obtained from phosphate fertilization of alfalfa on the University Experimental Farm near Tucson in 1936. Some of the growers in the county informed the agent that the practice had been given a trial, and that it had failed to produce results. It was noted that the broadcast method of application had been made, and that no soil preparation had been made for penetration of the phosphate fertilizer material.

It was for the above reasons that some result demonstration work on fertilization of alfalfa with phosphates was initiated in 1945 and carried on during the past three years. The agent was successful in keeping records on these result demonstrations. One demonstration was carried on during the entire three-year period, while another demonstration had records for 1946 only. The results obtained were very favorable for the practice on both demonstrations. Other farmers following the practices as outlined in the demonstrations are obtaining similar results.

There are some points in question regarding alfalfa fertilization which need clarification. One of these points is the most efficient method of application. Another mooted question is the amount and frequency of applications. Then, there is the question of whether or not the practice is successful when it cannot be ascertained by casual observations. The demonstrations were carried on so as to meet these questions as far as possible, with the available equipment and cooperators' cooperation.

The first demonstration set up was in the Flowing Wells District in cooperation with Messrs. W. F. Dudgeon and J. J. McAllister. While this demonstration was not carried on entirely as it was planned, most of the essential features were eventually included. Different amounts of phosphates were used. Different methods of applications were used, and different forms of materials were used. The frequency of applications were not well covered, but results give some indications on this point.

ALFALFA (continued)

Alfalfa Fertilization (continued)

When studying the data compiled over the three-year period - 1945, 1946, and 1947, it is well to note that Borders 10 and 11 on the J. J. McAllister plots had the fertilizer drilled in with a grain drill in April, 1945, after the soil had been renovated with a spring tooth harrow. Then it should be kept in mind that the application in April, 1947, made on Border Number 10 was broadcast without any soil preparation to aid in the penetration of the phosphates. Then, the method of application on Border Number 16 was somewhat different than the ones made on Borders 10 and 11, in that no renovation was made prior to drilling in the ammonium phosphate. This means that the placement of phosphate material was more shallow on Border Number 16 than on Borders 11 and 12. The liquid phosphoric acid application made on border number 14, June 30, 1945, was made without any soil preparation; and according to results obtained, this material does have some advantage in penetrating qualities as compared to the other phosphate materials used in the demonstrations.

The soil on the Lee Moor Ranch demonstration plots was a great deal heavier than the soils on the McAllister plots. The moisture equivalent on the Lee Moor soil was about 30%, while it ran only 13.5% on the McAllister soil. Due to the very heavy textured soil to a depth of about three feet on the Lee Moor Ranch plots, subsoiling preceded the drilling of the fertilizer material for the purpose of insuring some penetration of the phosphate fertilizer. In this case, all plots, including the checks, were subsoiled, so that increased hay yields resulting from the subsoiling could not be credited to the fertilizer applications. It was noted that the subsoiling alone greatly improved the growth of alfalfa, when comparing the checks with the adjacent borders which were not subsoiled.

Mr. Massey and Mr. McAllister were excellent cooperators in these projects, and a great deal of credit is due them in pioneering this profitable practice in Pima County. Yield data on these result demonstrations are presented in this report so that these records may be preserved and used for future reference. A discussion on the results will follow the tabular report.

ALFALFA (continued)

Alfalfa Fertilization (continued)

Soil Analyses data on the two Alfalfa Fertilization Demonstrations - made by University of Arizona Agricultural Chemistry Department:

| Grower- Cooperator | Description | Ave. | | % | T.S.S. |
|-----------------------|---|---------------------------|------|------|--------|
| | | PO ₄ P.P.M. | pH | | |
| Lee Moor Ranch | *Poor alfalfa area. Heavy top soil extended down about 3 feet. Poor penetration | 7.0 | 7.82 | 30 | 330 |
| Lee Moor Ranch | Better alfalfa area. Heavy top soil about 1 foot deep. Fair penetration | 12.0 | 7.75 | 36 | 400 |
| J. J. McAllister | Composite from area where demonstration was carried on. | 6.0 | 8.0 | 13.5 | 300 |

Note: *The area described as poor alfalfa area was from the area where the Lee Moor Ranch demonstration was carried on. The alfalfa growth before treatment was much better on the area designated good alfalfa area, which area started about adjacent to Border Number 4.

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

1st Cutting, April 15, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|------------|--|--------------------|
| 9 | Check | 2240 |
| 10 | 200# Treble superphosphate, April 7, 1945, & 100# Treble superphosphate plus 125# ammonium phosphate (11-48), April 19, 1947 | 2240 |
| 11 | 400# Single superphosphate, April 7, 1945 | 2400 |
| 12 | 5 Tons barnyard manure, March, 1945 | 2240 |
| 13 | Check | 2080 |
| 14 | 50 Gallons liquid phosphoric acid, June 30, 1945 | 2640 |
| 15 | Check | 1920 |
| 16 | 200# Ammonium phosphate (11-48), April 19, 1946 | 2640 |
| 17 | Check | 1920 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

2nd Cutting, May 24, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|---------------|--|-----------------------|
| 9 | Check | 3280 |
| 10 | 200# Treble Superphosphate, April, 1945, & repeated in April, 1947, with broad- cast of 100# Treble Superphosphate plus 100# ammonium phosphate 11-48 | 3200 |
| 11 | 400# Single superphosphate drilled in April, 1945 | 3040 |
| 12 | 5 Tons manure, March, 1945 | 3040 |
| 13 | Check | 2640 |
| 14 | 20 Gallons liquid P ₂ O ₅ applied June 30, 1945 | 2880 |
| 15 | Check | 2560 |
| 16 | 200# Ammonium phosphate (11-48) drilled in April, 1946 | 3040 |
| 17 | Check | 2560 |
| 18 | Check | 2480 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

3rd Cutting, June 25, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|---------------|---|-----------------------|
| 9 | Check | 2800 |
| 10 | 200# Treble superphosphate, April, 1945, 100# treble superphosphate plus 100# ammonium phosphate (11-48), April, 1947 | 3120 |
| 11 | 400# Single superphosphate, April, 1945 | 2960 |
| 12 | 5 Tons manure, March, 1945 | 2800 |
| 13 | Check | 2560 |
| 14 | 20 Gallons liquid P ₂ O ₅ June 30, 1945 | 2960 |
| 15 | Check | 2320 |
| 16 | 200# Ammonium phosphate (11-48), April, 1946 | 2720 |
| 17 | Check | 2400 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

4th Cutting, July 25, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|---------------|---|-----------------------|
| 9 | Check | 2000 |
| 10 | 200# Treble superphosphate applied April, 1945, plus 100# Treble & 100# ammonium phosphate, April, 1947 | 2320 |
| 11 | 400# Single superphosphate applied April, 1945 | 2000 |
| 12 | 5 Tons manure applied March, 1945 | 2080 |
| 13 | Check | 2160 |
| 14 | 20 Gallons liquid phosphate applied June 30, 1945 | 2240 |
| 15 | Check | 1840 |
| 16 | 200# Ammonium phosphate (11-48) applied April, 1946 | 2080 |
| 17 | Check | 1840 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

5th Cutting, September 2, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|---------------|--|-----------------------|
| 9 | Check | 2000 |
| 10 | 200# Treble superphosphate, April, 1945, & repeated in April, 1947, with broad- cast of 100# treble superphosphate plus 100# ammonium phosphate (11-48) | 2320 |
| 11 | 400# Single superphosphate applied April, 1945 | 1920 |
| 12 | 5 Tons manure applied March, 1945 | 2080 |
| 13 | Check | 2640 |
| 14 | 20 Gallons liquid phosphate applied June 30, 1945 | 2480 |
| 15 | Check | 1680 |
| 16 | 200# Ammonium phosphate (11-48) applied April, 1946 | 2160 |
| 17 | Check | 2000 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

J. J. McAllister Alfalfa Fertilization Demonstration

6th Cutting, October 23, 1947

| Border No. | Treatment | Yield Per Acre Lb. |
|------------|---|--------------------|
| 9 | Check | 1040 |
| 10 | 200# Treble superphosphate, April, 1945, & repeated in April, 1947, with broadcast of 100# treble superphosphate plus 100# ammonium phosphate (11-48) | 960 |
| 11 | 400# Single superphosphate applied April, 1945 | 1120 |
| 12 | 5 Tons manure applied March, 1945 | 1040 |
| 13 | Check | 1120 |
| 14 | 20 Gallons liquid phosphate applied June 30, 1945 | 1200 |
| 15 | Check | 960 |
| 16 | 200# Ammonium phosphate (11-48) applied April, 1946 | 1120 |
| 17 | Check | 880 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

1947 Summary

Alfalfa Fertilization Demonstration in
Cooperation with Mr. J. J. McAllister

| Border No. | Treatment & Date | Total Six Cuttings Lb. per acre | % Increase over Check | Increase Over Check Lb. Hay Per Acre |
|------------|--|---------------------------------|-----------------------|--------------------------------------|
| 9 | Check | 13,360 | | |
| 10 | 200# Treble superphosphate per acre April, 1945, 100# ammonium phosphate (11-48) plus 100# treble superphosphate (44%) April, 1947 | 14,160 | 5.9 | 800 |
| 11 | 400# Single superphosphate, April, 1945 | 13,440 | 1.2 | 160 |
| 12 | 5 Tons manure, March, 1945 | 13,280 | 0 | 0 |
| 13 | Check | 13,200 | | |
| 14 | 20 Gallons liquid P ₂ O ₅ , June 30, 1945 | 14,400 | 17.6 | 2160 |
| 15 | Check | 11,280 | | |
| 16 | 200# Ammonium phosphate 11-48, April, 1946 | 13,760 | 20.3 | 2360 |
| 17 | Check | 11,600 | | |

ALFALFA (continued)

Alfalfa Fertilization (continued)

1947 Summary (continued)

Alfalfa Fertilization Demonstration in
Cooperation with Mr. J. J. McAllister

| Border No. | Treatment & Date | Increased Yield over Check, Lbs. Per Acre | Value of increased Yield Per A. | This Year's Cost Material | Profit Per Acre |
|---------------|---|--|---------------------------------------|------------------------------------|-----------------------|
| 9 | Check | | | | |
| 10 | 200# Treble superphosphate per acre April, 1945, 100# ammonium phosphate (11-48) plus 100# treble superphosphate, April, 1947 | 800 | \$10.00 | \$7.00 | \$ 3.00 |
| 11 | 400# Single superphosphate, April, 1945 | 160 | \$ 2.00 | | \$ 2.00 |
| 12 | 5 Tons manure, March, 1945, per A. | 0 | | | |
| 13 | Check | | | | |
| 14 | 20 Gallons Liquid P ₂ O ₅ , June 30, 1945 | 2160 | \$27.00 | | \$27.00 |
| 15 | Check | | | | |
| 16 | 200# Ammonium phosphate (11-48), April, 1946 | 2360 | \$29.50 | | \$29.50 |

Hay figured at \$25 per Ton loose application of fertilizer made in April, 1947, was broadcast on top of the ground. No preparation to gain penetration was made.
(11-48) Ammonium Phosphate @ \$75.00 per Ton
Treble Superphosphate @ \$65.00 per Ton

ALFALFA (continued)

Alfalfa Fertilization (continued)

Alfalfa Fertilization Demonstration in
Cooperation with Mr. J. J. McAllister

1945-1947 - Summary - Income from Practice

| Border No. | Treatment | 1945 | | 1946 | | 1947 | | Total Increase Over Check | |
|------------|---|---------------------|----------|---------------------|----------|---------------------|----------|---------------------------|-------|
| | | Increase Over Check | # Hay | Increase Over Check | # Hay | Increase Over Check | # Hay | | |
| | | \$ Value | \$ Value | \$ Value | \$ Value | \$ Value | \$ Value | \$ Value | |
| 10 | 200# Treble superphosphate, April, 1945, 100# ammonium phosphate (11-48) plus 100# treble superphosphate, April, 1947 | 2320 | 29.00 | 480 | 6.00 | 800 | 10.00 | 3600 | 45.00 |
| 11 | 400# Single superphosphate, April, 1945 | 2080 | 26.00 | 1120 | 14.00 | 160 | 2.00 | 3360 | 42.00 |
| 12 | 5 T. manure, March, 1945 | 960 | | 400 | | 0 | | 1360 | 17.00 |
| 14 | 20 Gallons Liquid P ₂ O ₅ , June 30, 1945 | 800 | | 2440 | | 2160 | | 5400 | 67.50 |
| 16 | 200# Ammonium phosphate (11-48), April, 1946 | | | 1680 | | 2360 | | 4040 | 50.50 |

Note: \$25.00 per Ton is used in evaluating the hay for all three years included in this demonstration.

ALFALFA (continued)

Alfalfa Fertilization (continued)

Alfalfa Fertilization Demonstration in
Cooperation with Mr. J. J. McAllister

1945-1947 Summary - Net Income from Practice

| Border No. | Treatment | Total Increase Over Check # Hay Per Acre | Total Value Increased Hay Per Acre | Cost of Material Per Acre | Net Profit Per Acre For Practice |
|---------------|--|--|--|---------------------------------|---|
| 10 | 200# Treble super-phosphate, April, 1945, 100# ammonium phosphate (11-48) plus 100# treble superphosphate, April, 1947 | 3600 | \$45.00 | \$14.00 | \$31.00 |
| 11 | 400# Single superphosphate, April, 1945 | 3360 | 42.00 | 8.50 | 33.50 |
| 12 | 5 T. manure, March, 1945 | 1360 | 17.00 | | |
| 14 | 20 Gallons Liquid P ₂ O ₅ , June 30, 1945 | 5400 | 67.50 | 15.84 | 51.66 |
| 16 | 200# Ammonium Phosphate (11-48), April, 1946 | 4040 | 50.50 | 7.50 | 43.00 |

ALFALFA (continued)

Alfalfa Fertilization (continued)

Alfalfa Fertilization Demonstration in Cooperation
with O'Dell Massey, Manager, Lee Moor Ranch

| Border No. | Treatment # Per Acre | Yield 4 hay Cuttings # Per A. | Increased Yield Over Check # Per A. | Value Increased Yield Per Acre \$ | Cost Material Per Acre \$ | Net Profit Per Acre \$ |
|------------|---------------------------------|-------------------------------|-------------------------------------|-----------------------------------|---------------------------|------------------------|
| 1 | 200# Ammonium phosphate (11-48) | 8080 | 1600 | 20.00 | 7.50 | 12.50 |
| 2 | Check | 6480 | | | | |
| 3 | 200# Ammonium phosphate (11-48) | 7760 | 880 | 11.00 | 7.50 | 3.50 |
| 4 | Check | 6880 | | | | |
| Ave. | Ammonium phosphate (11-48) | 7920 | 1240 | | | 15.50 |
| Ave. | Check | 6680 | | | | |

Note: The four hay cuttings represented in this table are the last four hay cuttings.

ALFALFA PRODUCTION (continued)

Alfalfa Fertilization (continued)

Each year's results of the three-year alfalfa fertilization demonstration carried on in cooperation with Mr. J. J. McAllister have been tabulated, analyzed, and given out as pertinent information to farmers in Pima County. This informative material has been released to the press, presented over the radio, at meetings, and through office and telephone calls. The practice of alfalfa fertilization with phosphates is gradually taking root in Pima County.

The three years' results from the J. J. McAllister demonstration, coupled with the one-year results on the Lee Moor Ranch, which was completed this fall, will offer even better educational material on the subject. It is believed that these demonstrations point out several pertinent factors regarding alfalfa production.

An investment in phosphate fertilizer, properly applied, may make the difference in the feasibility of using alfalfa in the crop rotation. An application of 80 to 100 lbs. of P_2O_5 applied so that it will have some penetration has given good results for a two-year period. The 20 gallons of liquid phosphoric acid applied June 30, 1945, gave the best results over a 2½-year period. An increase of 5,400 lbs. of hay over the corresponding checks was realized from this application, which amounted to 127 lbs. P_2O_5 . The 200 lb. ammonium phosphate (11-48) application made in April, 1946, showed an increase of 4,040 lbs. of hay over the corresponding checks during the two-year period. This application amounted to 96 lbs. P_2O_5 and 22 lbs. of nitrogen. The 400 lbs. of single superphosphate and 200 lb. of treble superphosphate applications made in April, 1945, both showed excellent gains during the first two years, but did practically nothing during the third year, although Border No. 10, which received the 200 lbs. of treble superphosphate, received an application of 100# ammonium phosphate (11-48) plus 100# treble superphosphate in April, 1947. The point in this connection is that the April, 1947, application on Border No. 10 was broadcast, and no preparation of the soil was made to insure penetration of the phosphate material. The other borders receiving phosphate fertilizers were renovated and the material drilled in, with the exception of the liquid phosphoric acid.

ALFALFA PRODUCTION (continued)

Alfalfa Fertilization (continued)

The demonstration on the Lee Moor Ranch was on a fairly heavy soil, having a moisture equivalent of 30% in the first three feet. It was for that reason that all borders used in the test were chiseled prior to drilling in the fertilizer. While there were only four hay cuttings made after fertilization, and these were the last four cuttings, an average increase of 1,240 lbs. of hay per acre was realized from the phosphated borders. It is believed that with this type of phosphate application, at least eight more cuttings would have similar results.

It appears that many of the failures with the practice of applying phosphate fertilizer to alfalfa in the past is primarily due to faulty methods of application. So far as the writer has been able to determine, the failures have been from surface applications without any preparation for penetration. This point is being stressed to all growers.

It would appear from the McAllister demonstration that for each dollar invested in phosphate fertilization, when properly applied to alfalfa, that five dollars was returned in the form of increased hay production. Even a faulty broadcast application paid back two for one. Maybe a better way to express the profit angle is on the basis of number of pounds of increased hay production per pound of P_2O_5 properly applied. The average lb. of P_2O_5 properly applied to alfalfa in the McAllister demonstration gave an increase of 40 lbs. of hay over the corresponding checks or non-fertilized borders. The present price relationship between alfalfa hay and phosphate fertilizer makes the practice of phosphate fertilization very attractive. The price relationship would have to change drastically before the practice would become unprofitable. We will say that hay standing in the field recedes to a value of only \$10.00 per ton, and that phosphate fertilizer is still comparatively high in price - say treble superphosphate is about \$80.00 per ton and is 44% P_2O_5 . This would mean that nine cents would be invested for each 40 lbs. of increased hay production. With hay valued at \$10.00 per ton before it is cut, the forty pounds would only be worth 20 cents. With such a very unfavorable hay-fertilizer price relationship, the grower would still be getting back approximately \$2.00 for each \$1.00 invested in phosphate fertilization of alfalfa.

ALFALFA PRODUCTION (continued)

Alfalfa Fertilization (continued)

Should soil analyses be used in formulating recommendations on fertilization of alfalfa? The Pima County Agent's Office takes advantage of this splendid service offered by the University of Arizona's Agricultural Chemistry Department. Over a period of fifteen years, the writer has found a direct relationship between soil analyses data and alfalfa growth. Field tests are recommended to growers where the soil analyses reports are near the borderline on available phosphates. Growers are warned that observation tests are not too reliable, and that yield records should be the measurement used for judging the success of the practice.

There is some evidence that phosphate response on alfalfa is greatly reduced during the warmer months. The following table gives some support to this; however, it may be possibly due to water penetration rather than directly due to higher temperatures. It will be noted that the average percentage increase is lowest during the July and August cuttings, which are the 4th and 5th cuttings. There is also some evidence that phosphates become more available with increased temperatures:

ALFALFA PRODUCTION (continued)

Alfalfa Fertilization (continued)

Alfalfa Fertilization Demonstration
J. J. McAllister Cooperating
Percentage Increase by Cuttings

| Border No. | 1st Cutting | 2nd Cutting | 3rd Cutting | 4th Cutting | 5th Cutting | 6th Cutting |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 10 | 1945 - 92.3 | 9.0 | 5.4 | 17.9 | 6.7 | 21.4 |
| | 1946 - 0 | 7.7 | 20.9 | 0 | 2.8 | 0 |
| | 1947 - 0 | -2.4 loss | 11.4 | 16.0 | 16.0 | -7.7 minus |
| 11 | 1945 -100.0 | 25.0 | 39.4 | -2.3 minus | 14.3 | 36.4 |
| | 1946 - 11.5 | 18.2 | 7.0 | 12.0 | -2.8 minus | 11.0 |
| | 1947 - 11.1 | 2.7 | 10.4 | -3.8 minus | -17.3 loss | 3.7 |
| 12* | 1945 - 30.0 | 8.3 | 20.0 | 9.1 | 14.3 | 45.5 |
| | 1946 - 11.5 | 9.1 | 7.0 | 4.0 | 2.8 | -7.3 minus |
| | 1947 - 3.7 | 2.7 | 4.3 | 0 | 13.5 loss | -3.7 minus |
| 14 | 1945 - x | x | 14.0 | 2.3 | 0 | 42.9 |
| | 1946 - 33.3 | 53.8 | 30.0 | 21.7 | 2.8 | -5.3 minus |
| | 1947 - 32.0 | 10.8 | 21.3 | 12.0 | 14.8 | 15.4 |
| 16 | 1945 - x | x | x | x | x | x |
| | 1946 - x | 39.5 | 25.0 | 34.2 | 2.8 | -10.5 minus |
| | 1947 - 37.5 | 18.7 | 15.3 | 13.0 | 17.4 | 15.4 |
| Average for first 12 cuttings | 45.8 | 22.8 | 18.4 | 12.3 | 5.2 | 13.9 |

*Manure applied to Border No. 12.

ALFALFA PRODUCTION (continued)

Alfalfa Varieties

A keen interest in the feasibility of growing one of the less hardy, faster maturing varieties of alfalfa has been manifested by growers in Pima County. There has been a rather popular opinion that it is unprofitable to grow alfalfa in this county on account of the high water costs. Any change in practices of growing alfalfa which will increase yields is very desirable, since alfalfa is the most important soil-building crop in our crop rotation systems.

Indian and African varieties of alfalfa were found to be more profitable in the Yuma Valley. Growers in Pima County took stock of this information and were determined to use that variety in their plantings. Since temperatures go considerably lower in this county than in the areas where the two non-hardy varieties appear to be adapted, it was deemed feasible to carry on some test demonstrations with alfalfa in this county to ascertain the adaptability of Indian and African varieties of alfalfa, before adopting them for general planting.

The late Mr. I. F. Nichols made a test planting of Indian alfalfa in the fall of 1945. The planting was made without any other varieties with which to compare its productive qualities. An outstanding growth of alfalfa was obtained from the Indian variety, the best that the grower had ever seen. During the following spring, Mr. G. F. Woods made a variety test planting which included both African and Indian varieties, along with Hairy Peruvian, the adopted variety in this county. Like so many spring plantings of alfalfa, the weeds were the dominating plants during the first growing season. Another planting which included Indian and Hairy Peruvian varieties, was planted by Mr. R. A. Anderson in the Flowing Wells District. This planting was somewhat jeopardized by a heavy nurse crop of oats which continued to grow well into the middle of the summer.

It was attempted to keep production records on both the R. A. Anderson and G. F. Woods alfalfa variety tests. However, records are not complete for all of the hay cuttings on the test conducted by Mr. Woods. Another factor which makes the data on Mr. Woods test incomplete is that considerable pasturing was carried on. Still another factor which detracts from the value of the results on both tests is the timing of the hay cuttings. The Indian and African varieties were always ready to be harvested fully one week ahead of the Hairy Peruvian variety, but cuttings were delayed until the Hairy Peruvian variety was matured. The data obtained from these test demonstrations are presented in the following table:

ALFALFA PRODUCTION (continued)

Alfalfa Varieties (continued)

Alfalfa Variety Test Demonstration
G. F. Woods Cooperating

| Border No. | Variety | Yield Lbs. Per Acre - Cuttings | | | | |
|---------------|----------------|--------------------------------|------|------|------|--------|
| | | 1st | 2nd | 3rd | 4th | Total |
| 6 | Hairy Peruvian | 4320 | 3840 | 1920 | 1920 | 12,000 |
| 7 | African | 4320 | 3840 | 1920 | 1920 | 12,000 |
| 8 | African | 5280 | 3840 | 1920 | 1920 | 12,960 |
| 9 | African | 4800 | 3360 | 1920 | 1920 | 12,000 |
| 10 | African | 4800 | 4320 | 2400 | 2400 | 13,920 |
| 11 | Hairy Peruvian | 4320 | 2880 | 1920 | 1920 | 11,040 |
| 12 | Hairy Peruvian | 4320 | 3360 | 1440 | 1440 | 10,560 |
| 13 | Indian | 3840 | 3360 | 1920 | 1440 | 10,560 |
| 14 | Indian | 4320 | 3360 | 1440 | 1440 | 11,520 |
| 15 | Indian | 4800 | 3360 | 1920 | 1920 | 12,000 |
| 16 | Indian | 4320 | 2880 | 1440 | 1440 | 10,080 |
| 17 | Hairy Peruvian | 3840 | 3360 | 2400 | 2400 | 12,000 |
| 18 | Hairy Peruvian | 4320 | 2880 | 2400 | 2400 | 12,000 |
| 19 | Hairy Peruvian | 4800 | 2880 | 2400 | 2400 | 12,480 |
| 20 | Hairy Peruvian | 2880 | 3360 | 1440 | 1440 | 9,120 |
| Ave. | Hairy Peruvian | | | | | 11,314 |
| Ave. | African | | | | | 12,720 |
| Ave. | Indian | | | | | 11,040 |

ALFALFA PRODUCTION (continued)

Alfalfa Varieties (continued)

Alfalfa Variety Test Demonstration (continued)
G. F. Woods Cooperating

| Border No. | Variety | Yield Lbs. Per Acre - Cuttings | | | | |
|--|---------|--------------------------------|-----|-----|-----|-------|
| | | 1st | 2nd | 3rd | 4th | Total |
| Average Increase or decrease over Hairy Peruvian | African | | | | | +1406 |
| Average Increase or decrease over Hairy Peruvian | Indian | | | | | -274 |
| Eliminating Border No. 10 Average increase over Hairy Peruvian | African | | | | | +1009 |
| Average increase or decrease over Hairy Peruvian adjacent border | African | | | | | +1120 |
| Average increase or decrease over Hairy Peruvian adjacent border | Indian | | | | | -160 |

ALFALFA PRODUCTION (continued)

Alfalfa Varieties (continued)

Alfalfa Variety Test Demonstration
R. A. Anderson Cooperating

| Border No. | Variety | <u>Yield per Border, Bales</u> | | | | |
|---------------|--|--------------------------------|------------|------------|------------|--------------|
| | | <u>Cuttings</u> | | | | <u>Total</u> |
| | | <u>1st</u> | <u>2nd</u> | <u>3rd</u> | <u>4th</u> | |
| 1 | Hairy Peruvian | 9 | 8 | 9 | 8 | 34 |
| 2 | Indian | 9 | 8 | 11 | 8 | 36 |
| 3 | Mixed Indian & Hairy Peruvian | 6 | 10 | 10 | 10 | 36 |
| 4 | Hairy Peruvian | 8 | 9 | 12 | 9 | 38 |
| 5 | Hairy Peruvian | 8 | 9 | 10 | 9 | 36 |
| Ave. | Hairy Peruvian | | | | | 36 |
| Ave. | Indian | | | | | 36 |
| Ave. | Increase or de- crease Indian variety over Hairy Peruvian variety | | | | | 0 |

ALFALFA PRODUCTION (continued)

Alfalfa Varieties (continued)

The data obtained from the variety test demonstration carried on in cooperation with Mr. G. F. Woods showed an advantage of a little over one-half ton of hay for the African variety, while the Indian variety showed a net loss of 160 lbs. Border Number Ten was eliminated in computing the data for varietal comparisons since an application of treble superphosphate was made prior to planting on that particular border. It will be noted that Border Number Ten which is African Alfalfa, produced nearly one ton more hay per acre than Border Number Nine, the adjacent border of African Alfalfa, and approximately $1\frac{1}{2}$ tons more hay than the other adjacent Border Number 11, which is in Hairy Peruvian.

The conclusion from the G. F. Woods demonstration might lead one to believe that the planting of the African variety in Pima County is feasible and advisable. At the same time, the Indian variety did hardly break even with the Hairy Peruvian alfalfa. The same results with Indian alfalfa were obtained in the R. A. Anderson demonstration, where the data shows no advantage for either Hairy Peruvian or Indian. In both of these test demonstrations, it was noted that about one week or more before each hay cutting, both the Indian and African varieties were ready to cut, whereas the Hairy Peruvian was about a week off from being ready to cut. It is believed that one more cutting of hay could have been made from both these varieties had the hay been cut each time in accordance with their early maturing qualities instead of waiting for the slower maturing Hairy Peruvian variety.

Comparing the three varieties used in these two demonstrations, it should be noted that some cold weather injury was noted on both of the non-hardy varieties, Indian and African, but that the most severe damage appeared to be on the Indian variety. In lieu of the favorable results obtained by the Indian variety, it appears to be feasible for the County Agent's Office to conduct further demonstration work with it, and any other varieties or strains of alfalfa which have promise for this area. Recommendations for the adoption of the Indian variety of alfalfa will be given with reservations. The data obtained from the demonstrations are being given to interested farmers along with a discussion on the results. Newspaper articles, office calls, meetings, and circular letters are being used to acquaint the public with this work.

SMALL GRAINS

Small Grain Varieties

The agent has made it a point to inform all farmers who plant small grains for winter pasture about the advantages of Markton Oats. A steady increase in the use of Markton Oats is taking place in Pima County. Arivat barley remains the most popular variety for the production of grain.

Due to the mediocre grain yields from Markton Oats, it has been rather difficult to keep up the supply of seed stock. Mr. Dan Clarke, manager of Midvale Farms, was persuaded to produce a small acreage of Registered Markton Oats again this year for that purpose.

Small Grains Fertilization

The practice of using commercial fertilizer on small grains was demonstrated last year on the E. L. Rogers farm. In that particular demonstration where the nitrogen and phosphate levels were extremely low, a 200 lb. per acre application of ammonium phosphate (16-20) trebled the yield of barley. The field in which the demonstration was conducted was not pastured. This year two demonstrations on small grains fertilization were conducted where extensive pasturing was carried on. The following is an outline of these two demonstrations:

SMALL GRAINS (continued)

Small Grains Fertilization (continued)

Small Grains Fertilization Demonstration

Bruce Knapp - Sunset Dairy

Location: Barley field south of driveway leading to dairy plant, starting east of Mr. A. O. Knapp's residence. Applications in middle of borders. Plots 80' long, 10' wide.

Dates of Applications: February 4 & 5, 1947

| <u>Border No.</u> | <u>Treatment</u> |
|-------------------|---|
| 3 | 4 lbs. Ammonium sulphate |
| 4 | 8 lbs. Ammonium sulphate |
| 5 | 4 lbs. Chilean nitrate |
| 6 | 8 lbs. Chilean nitrate |
| 7 | 8 lbs. Chilean nitrate & ammonium sulphate mixed forming letter K |

Adjoining Field of Oats

Location: Starting on west side of field

| <u>Border No.</u> | <u>Treatment</u> |
|------------------------------|--------------------------|
| 2 | 4 lbs. Chilean nitrate |
| 2 after skip- ping 80 ft. | 8 lbs. Chilean nitrate |
| 3 | 4 lbs. Chilean nitrate |
| 3 after skip- ping 80 ft. | 2 lbs. Chilean nitrate |
| 4 | 8 lbs. Ammonium sulphate |
| 4 Adjoining above | 4 lbs. Ammonium sulphate |
| 5 | 4 lbs. Ammonium sulphate |
| 5 Adjoining above | 2 lbs. Ammonium sulphate |
| 6 | 4 lbs. mix forming S-S |
| 7 | Mix forming ! |

SMALL GRAINS (continued)

Small Grains Fertilization (continued)

The small grains fertilization demonstration on the Bruce Knapp farm was outstanding from the standpoint of increased pasturage from nitrogen response. This was true both on barley and oats. Three pasturings were made after the fertilizers were applied, and each pasturing showed a marked increase of forage on the 17 fertilized plots. The 400# applications of both ammonium sulphate and sodium nitrate were outstanding.

It was intended to secure grain yield data from the demonstration plots, but the grain was combined before the sample yields could be taken. However, the appearance of the plots indicated that at least a 50% increase in grain yields could have been expected from the plots receiving the 400# applications of nitrogen fertilizer. The 400# applications of a mixture of 50% ammonium sulphate and 50% sodium nitrate appeared to have the heaviest grain. The practice of using nitrogen fertilizer on small grains for pasture and grain production has been adopted by several of the growers this year.

Discussions at meetings, radio broadcasts, circular letters, and individual contacts were methods used in promoting this practice. Enlarged pictures of the check plots and fertilized plots were valuable assets in explaining results. Samples of plants cut from check plots and fertilized plots were mounted and displayed.

COTTON PRODUCTION

Cotton Fertilization

The principal crop in Pima County has been cotton for the past three decades. With excellent yields and the present fair prices, the growing of cotton in this county is an attractive enterprise. Growing costs run high, and favorable yields must be maintained in order to show profits at average or normal prices. Believing that the price relationship between commercial fertilizer and cotton was in a favorable enough ratio to make the fertilization of cotton a profitable practice, the agent established result demonstrations on the practice in 1946. Complete records were kept on two of these demonstrations, one of which was recorded in last year's annual report.

Rather outstanding results were obtained from side dressings of nitrogen fertilizer made after chopping. Increases ranging from 217 lbs. of seed cotton per acre to 700 lbs. per acre were gained on the different plots with ammonium sulphate, with an average increase of 463 lbs. of seed cotton per acre chalked up for an average application of 220 lbs. of ammonium sulphate per acre. Chilean nitrate applications averaging 175 lbs. per acre gave an average increase of 256 lbs. of seed cotton. These nitrogen side dressed plots were on the E. L. Rogers farm. A demonstration on placements of (11-48) ammonium phosphate was conducted on the same farm. An average application of 156 lbs. of ammonium phosphate (11-48) gave an increased yield of 172 lbs. of seed cotton per acre.

Mr. O'Dell Massey, manager of the Lee Moor Ranch, cooperated in conducting demonstrations on both side dressings and fertilizer placements on cotton during the 1946 crop season. The side dressings on Mr. Massey's demonstrations showed increases of 392 lbs. of seed cotton per acre from an application of 384 lbs. of Chilean nitrate per acre, and 164 lbs. of seed cotton from an application of 140 lbs. of ammonium sulphate. The placements in Mr. Massey's demonstration didn't show up so well. The increases were approximately equal to the decreases on the different plots. It is believed that the placements which were made $1\frac{1}{2}$ inches to the side of the seed row and about three inches deep, may have been at fault.

The two following tables are the completed data from the cotton fertilization demonstrations conducted on the Lee Moor Ranch in 1946:

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Summary - Placements

| Row Nos. | Treatment # 11-43 Ammonium Phosphate Per Acre | Lbs. Seed Cotton Per Acre | | | | Increase Over Check |
|----------|---|---------------------------|------|-----|-------|------------------------|
| | | 1st | 2nd | 3rd | Total | |
| 6 & 7 | Buffer | 432 | 832 | 376 | 1640 | |
| 8 & 9 | 40 | 408 | 664 | 352 | 1422 | |
| 10 & 11 | Buffer | 552 | 736 | 304 | 1592 | |
| 13 & 14 | Check | 488 | 633 | 280 | 1401 | |
| 15 & 16 | Check | 504 | 656 | 344 | 1504 | |
| 17 | 40 | 432 | 784 | 384 | 1600 | 148 |
| 18 & 19 | Buffer | 584 | 1000 | 480 | 2064 | |
| 20 & 21 | 40 | 600 | 800 | 472 | 1872 | |
| 22 & 23 | Buffer | 840 | 880 | 472 | 2192 | |
| 24 | 160 | Missed | 1400 | 464 | 1864 | |
| 25 & 26 | Check | 688 | 864 | 472 | 2024 | |
| 29 | 160 | 768 | 864 | 416 | 2048 | 24 |
| 30 & 31 | Buffer | 864 | 944 | 448 | 2256 | |
| 32 & 33 | 160 | 936 | 832 | 424 | 2192 | |
| 34 & 35 | Buffer | 944 | 880 | 368 | 2192 | |
| 37 & 38 | Check | 904 | 1272 | 472 | 2648 | |
| 39 & 40 | Check | 1048 | 1016 | 536 | 2600 | |
| 42 & 43 | Buffer | 816 | 888 | 496 | 2200 | |
| 44 & 45 | 160 | 960 | 832 | 400 | 2192 | |
| 46 & 47 | Buffer | 1080 | 776 | 336 | 2192 | |
| 48 | 160 | 704 | 752 | 336 | 1792 | |
| 49 & 50 | Check | 984 | 1080 | 488 | 2552 | |
| 51 & 52 | Check | 1152 | 1058 | 592 | 2802 | |
| 53 | 160 | 752 | 1328 | 528 | 2608 | |
| 54 & 55 | Buffer | 904 | 864 | 456 | 2224 | |
| 56 & 57 | 160 | 936 | 952 | 360 | 2248 | |
| 58 & 59 | Buffer | 944 | 808 | 424 | 2176 | |
| 60 | 160 | 912 | 928 | 464 | 2304 | |
| 68 & 69 | 160 | 712 | 696 | 392 | 1800 | |
| 70 & 71 | Buffer | 1144 | 776 | 504 | 2424 | |
| 72 | 160 | Missed | 1728 | 560 | 2288 | |
| 73 & 74 | Check | 816 | 1048 | 416 | 2280 | |
| 75 & 76 | Check | 976 | 1240 | 504 | 2720 | |
| 78 & 79 | Buffer | 1154 | 1352 | 464 | 2970 | |
| 80 | 160 | 944 | 768 | 592 | 2304 | |
| Average | 40# Fertilizer Application | | | | 1631 | 179 |
| Average | Corresponding Checks | | | | 1452 | |
| Average | Corresponding Buffers | | | | 1872 | 220 |
| Average | 160# Fertilizer Application | | | | 2148 | |
| Average | Corresponding Check | | | | 2523 | |
| Average | Corresponding Buffer | | | | 2286 | |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager

| Row No. | Treatment | Lbs. Seed Cotton Per Acre | | | | |
|-----------|------------------------|---------------------------|------|-----|-------|----------|
| | | 1st | 2nd | 3rd | Total | Increase |
| 91 & 92 | 384# Chilean Nitrate | 1000 | 1304 | 488 | 2792 | 392 |
| 95 & 96 | Check | 968 | 936 | 496 | 2400 | |
| 101 & 102 | Check | 808 | 896 | 512 | 2216 | |
| 105 & 106 | 140# Ammonium Sulphate | 848 | 1136 | 512 | 2496 | 164 |
| 109 & 110 | Check | 808 | 1160 | 480 | 2448 | |

It is readily seen that negative results from the placement fertilization were obtained. The 160 pounds of ammonium phosphate 11-48 placements actually showed a loss in yield of 375 pounds. The 40-pound applications could have possibly showed a loss also had all fertilized rows been picked out. Since some of them were single rows and a regular picking crew was used for the picking, it was very difficult to get these fertilized rows picked.

The side dressings on the Lee Moor Ranch demonstration gave some indication of positive results. However, the results were not outstanding and, of course, should not be considered seriously in making recommendations to farmers in general. Here again difficulties with pickers were encountered. About half of the demonstration on the side dressings had to be omitted. The only demonstration which showed absolute positive results was a side dressing on the E. L. Rogers farm. Here the effect of the nitrogen fertilizer showed up in better plant growth and then in consistently higher yields which were outstanding enough to eliminate possible errors from soil differences, the difference in picking, etc. It is believed that the nitrogen level on the Rogers farm is exceptionally low and that any crop would respond to nitrogen fertilization on that farm.

Another small demonstration on the J. B. Bull farm was picked out with a single picking. Here there was no results either way in evidence. However, the demonstration was so small and the stand was irregular so that it was not a fair comparison. There did, however, appear to be some difference in the appearance of the plants which indicated that some favorable results should have accrued.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

The agent prepared summaries on the 1946 cotton fertilization demonstrations and presented the material at meetings, on the radio, in the press, and through office calls. There was no unqualified recommendation for the use of commercial fertilizer on cotton given to growers from this office. Where poor growth of cotton plants was noted during previous years and a low nitrogen content in the soil was revealed, a recommendation on the use of nitrogen side dressings was made. A few growers went ahead on such recommendations and appear to be well satisfied with the results on their 1947 crop.

It was felt that further demonstration work was called for on this practice in order to demonstrate, if possible, the feasibility of expanding the practice to general use. With this in mind, a demonstration was conducted in cooperation with Mr. O'Dell Massey on the Lee Moor Ranch again this year. Soil samples from over the entire field were taken, and complete analyses run by the Agricultural Chemistry Department of the University of Arizona. Three sets of samples were taken during the summer months. A fourth set of samples will be taken from the same locations during cold weather. The soil analyses present some very interesting data. A wide variance in available phosphates and nitrates shows up from the different locations in the field.

There are also wide variations in available plant food from samples taken from the same locations, but at different times, approximately one month apart. When the yield data are complete, it will be attempted to correlate soil analyses data with cotton yield data.

The following tables are presented for a permanent record and to illustrate the high variability of soil fertility in one field, which otherwise appears to be uniform:

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Soil Samples Taken June 23, 1947

| Row No. | Depth Inches | Treatment plus rate | pH | T.S.S. | NO ₃ | PO ₄ |
|---------|--------------|--|------|--------|-----------------|-----------------|
| 20 | 6" | Check | 7.5 | 1340 | 39 | 5.0 |
| 20 | 6"-12" | Check | 7.8 | 965 | 25 | 6.7 |
| 20 | 12"-24" | Check | 7.65 | 790 | 95 | Trace |
| 27 | 6" | 400# Treble plus 110# ammonium nitrate | 7.55 | 2770 | 55 | 14 |
| 27 | 6"-12" | 400# Treble plus 110# ammonium nitrate | 7.80 | 2260 | 28 | 14 |
| 27 | 12"-24" | 400# Treble plus 110# ammonium nitrate | 7.55 | 1470 | 20 | 7.2 |
| 76 | 6" | 200# ammonium phosphate (16-20) | 7.60 | 2865 | 55 | 7.0 |
| 76 | 6"-12" | 200# ammonium phosphate (16-20) | 7.70 | 1470 | 69 | 6.0 |
| 76 | 12"-24" | 200# ammonium phosphate (16-20) | 7.75 | 905 | 20 | tr. |
| 100 | 6" | Check | 7.80 | 1665 | 37 | 6.0 |
| 100 | 6"-12" | Check | 7.85 | 1020 | 65 | 6.0 |
| 100 | 12"-24" | Check | 7.85 | 510 | 48 | 4.5 |
| 108 | 6" | 200# Treble | 7.60 | 933 | 35 | 8.0 |
| 108 | 6"-12" | 200# Treble | 7.65 | 940 | 46 | 17.0 |
| 108 | 12"-24" | 200# Treble | 7.80 | 455 | 25 | 14.0 |
| 180 | 6" | Check | 7.85 | 750 | 105 | 12.0 |
| 180 | 6"-12" | Check | 7.85 | 485 | 93 | 9.0 |
| 180 | 12"-24" | Check | 7.85 | 600 | 227 | 3.3 |
| 188 | 6" | 200# Treble | 7.90 | 1185 | 247 | 25 |
| 188 | 6"-12" | 200# Treble | 7.90 | 600 | 139 | 13 |
| 188 | 12"-24" | 200# Treble | 7.50 | 630 | 21 | 7 |
| 292 | 6" | Check | 7.60 | 1470 | 42 | 5 |
| 292 | 6"-12" | Check | 7.60 | 720 | 30 | 5 |
| 292 | 12"-24" | Check | 7.60 | 5370 | 21 | 5 |
| 300 | 6" | 200# Treble | 7.70 | 750 | 23 | 7 |
| 300 | 6"-12" | 200# Treble | 7.80 | 725 | 13 | 13 |
| 300 | 12"-24" | 200# Treble | 7.80 | 415 | tr. | tr. |
| 365 | 6" | 200# Treble plus 110# ammonium nitrate | 7.60 | 1665 | 79 | 11 |
| 365 | 6"-12" | 200# Treble plus 110# ammonium nitrate | 7.60 | 865 | 55 | 14 |
| 365 | 12"-24" | 200# Treble plus 110# ammonium nitrate | 7.70 | 405 | 78 | 16 |
| 374 | 6" | Check | 7.70 | 1185 | tr. | tr. |
| 374 | 6"-12" | Check | 7.70 | 975 | 39 | 10 |
| 374 | 12"-24" | Check | 7.90 | 740 | 19.8 | 9 |

Note: T.S.S., NO₃, and PO₄ are expressed in parts per million.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Soil Samples Taken July 21, 1947

| Row No. | Depth Inches | Treatment plus rate | pH | T.S.S. | NO ₃ | PO ₄ |
|---------|--------------|--|--------|--------|-----------------|-----------------|
| 20 | 6" | Check | 7.9 | 405 | 35 | 25 |
| 20 | 6"-12" | Check | 7.9 | 405 | 21 | 33 |
| 20 | 12"-24" | Check | 8.0 | 530 | 40 | 12 |
| 27 | 6" | 400# Treble plus 110# ammonium nitrate | 7.8 | 1155 | 185 | 50 |
| 27 | 6"-12" | 400# Treble plus 110# ammonium nitrate | 7.9 | 710 | 62 | 50 |
| 27 | 12"-24" | 400# Treble plus 110# ammonium nitrate | 7.9 | 795 | 51 | 20 |
| 76 | 6" | 200# Ammonium phosphate (16-20) | 7.5 | 3060 | 555 | 14 |
| 76 | 6"-12" | 200# Ammonium phosphate (16-20) | 7.4 | 750 | 138 | 25 |
| 76 | 12"-24" | 200# Ammonium phosphate (16-20) | 7.6 | 550 | 138 | 10 |
| 100 | 6" | Check | 7.5 | 1275 | 277 | 7 |
| 100 | 6"-12" | Check | 7.6 | 325 | 185 | 8 |
| 100 | 12"-24" | Check | 7.6 | 510 | 139 | 3 |
| 108 | 6" | 200# Treble | 7.5 | 1540 | 255 | 9 |
| 108 | 6"-12" | 200# Treble | 7.5 | 405 | 277 | 33 |
| 108 | 12"-24" | 200# Treble | 7.7 | 1575 | 70 | 6 |
| 180 | 6" | Check | Missed | Missed | Missed | Missed |
| 180 | 6"-12" | Check | Missed | Missed | Missed | Missed |
| 180 | 12"-24" | Check | Missed | Missed | Missed | Missed |
| 188 | 6" | 200# Treble | 7.7 | 1250 | 277 | 8 |
| 188 | 6"-12" | 200# Treble | 7.6 | 350 | 140 | 12 |
| 188 | 12"-24" | 200# Treble | 7.6 | 325 | 55 | 7 |
| 292 | 6" | Check | 7.7 | 280 | 55 | 5 |
| 292 | 6"-12" | Check | 7.8 | 605 | 140 | 5 |
| 292 | 12"-24" | Check | 7.7 | 435 | 79 | 8 |
| 300 | 6" | 200# Treble | 7.6 | 1575 | 555 | 7 |
| 300 | 6"-12" | 200# Treble | 7.7 | 325 | 30 | 5 |
| 300 | 12"-24" | 200# Treble | 7.9 | 250 | 15 | 5 |
| 365 | 6" | 200# Treble | 7.6 | 750 | 185 | 10 |
| 365 | 6"-12" | 200# Treble | 7.7 | 275 | 55 | 10 |
| 365 | 12"-24" | 200# Treble | 7.8 | 325 | 70 | 7 |
| 374 | 6" | Check | 7.8 | 470 | 80 | 6 |
| 374 | 6"-12" | Check | 7.9 | 280 | 55 | 7 |
| 374 | 12"-24" | Check | 7.8 | 2055 | 46 | 9 |

Note: T.S.S., NO₃, and PO₄ are expressed in parts per million.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Soil Samples Taken Week of July 21, 1947

Middle

| Row No. | Depth Inches | Treatment plus rate | pH | T.S.S. | NO ₃ | PO ₄ |
|---------|--------------|--|-----|--------|-----------------|-----------------|
| 20 | 0"-6" | Check | 8.1 | 530 | 50 | 93 |
| 20 | 6"-12" | Check | 8.1 | 550 | 33 | 31 |
| 20 | 12"-24" | Check | 8.1 | 435 | 25 | 16 |
| 27 | 0"-6" | 400# Treble superphosphate plus 110# ammonium nitrate | 7.8 | 1155 | 50 | 185 |
| 27 | 6"-12" | 400# Treble superphosphate plus 110# ammonium nitrate | 7.9 | 710 | 50 | 62 |
| 27 | 12"-24" | 400# Treble superphosphate plus 110# ammonium nitrate | 7.9 | 795 | 20 | 51 |
| 92 | 0"-6" | 270# Ammonium nitrate | 7.5 | 1060 | 9 | 277 |
| 92 | 6"-12" | 270# Ammonium nitrate | 7.5 | 475 | 5 | 92 |
| 92 | 12"-24" | 270# Ammonium nitrate | 7.5 | 334 | 5 | 70 |
| 100 | 0"-6" | Check | 7.5 | 1275 | 7 | 277 |
| 100 | 6"-12" | Check | 7.6 | 325 | 8 | 185 |
| 100 | 12"-24" | Check | 7.6 | 510 | 3 | 139 |
| 172 | 0"-6" | 100# Ammonium nitrate | 7.7 | 600 | 11 | 270 |
| 172 | 6"-12" | 100# Ammonium nitrate | 7.6 | 435 | 12 | 140 |
| 172 | 12"-24" | 100# Ammonium nitrate | 7.7 | 1250 | 5 | 70 |
| 252 | 0"-6" | 200# Potassium sulphate, 200# Treble superphosphate, 110# ammonium nitrate | 7.6 | 325 | 10 | 140 |
| 252 | 6"-12" | 200# Potassium sulphate, 200# Treble superphosphate, 110# ammonium nitrate | 7.6 | 265 | 7 | 93 |
| 252 | 12"-24" | 200# Potassium sulphate, 200# Treble superphosphate, 110# ammonium nitrate | 7.6 | 405 | 4 | 79 |
| 284 | 0"-6" | 300# Ammonium nitrate | 7.5 | 710 | 5 | 123 |
| 284 | 6"-12" | 300# Ammonium nitrate | 7.7 | 360 | 4 | 70 |
| 284 | 12"-24" | 300# Ammonium nitrate | 7.8 | 360 | 5 | 39 |
| 292 | 0"-6" | Check | 7.7 | 280 | 5 | 55 |
| 292 | 6"-12" | Check | 7.8 | 605 | 5 | 140 |
| 292 | 12"-24" | Check | 7.7 | 435 | 8 | 79 |
| 380 | 0"-6" | 250# Ammonium nitrate | 7.8 | 845 | 11 | 114 |
| 380 | 6"-12" | 250# Ammonium nitrate | 7.8 | 470 | 6 | 114 |
| 380 | 12"-24" | 250# Ammonium nitrate | 7.9 | 360 | 7 | 70 |

Note: T.S.S., NO₃, and PO₄ are expressed in parts per million.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Soil Samples taken August 27, 1947

| Row No. | Depth Inches | Treatment Lbs. per Acre | pH | T.S.S. | NO ₃ | PO ₄ |
|---------|--------------|---|-----|--------|-----------------|-----------------|
| 20 | 0-6 | Check | 7.7 | 340 | 36 | 14 |
| 20 | 6-12 | Check | 7.7 | 325 | 39 | 14 |
| 20 | 12-24 | Check | 7.7 | 350 | 55 | 14 |
| 27 | 0-6 | 400 Treble superphosphate, 110 ammonium nitrate | 7.9 | 1055 | 28 | 16 |
| 27 | 6-12 | 400 Treble superphosphate, 110 ammonium nitrate | 7.9 | 360 | 28 | 8 |
| 27 | 12-24 | 400 Treble superphosphate, 110 ammonium nitrate | 8.2 | 3655 | 14 | 8 |
| 76 | 0-6 | 200 Ammonium phosphate, 16-20 placed | 7.9 | 1610 | 280 | 20 |
| 76 | 6-12 | 200 Ammonium phosphate, 16-20 placed | 7.9 | 750 | 71 | 20 |
| 76 | 12-24 | 200 Ammonium phosphate, 16-20 placed | 7.9 | 405 | 71 | 12 |
| 92 | 0-6 | 270 Ammonium nitrate | 8.0 | 375 | 51 | 14 |
| 92 | 6-12 | 270 Ammonium nitrate | 8.0 | 275 | 111 | 14 |
| 92 | 12-24 | 270 Ammonium nitrate | 7.9 | 325 | 74 | 12 |
| 100 | 0-6 | Check | 7.9 | 1155 | 222 | 20 |
| 100 | 6-12 | Check | 8.0 | 970 | 55 | 20 |
| 100 | 12-24 | Check | 8.2 | 375 | 55 | 20 |
| 108 | 0-6 | 200 Treble superphosphate | 8.7 | 950 | 222 | 20 |
| 108 | 6-12 | 200 Treble superphosphate | 7.8 | 170 | 111 | 33 |
| 108 | 12-24 | 200 Treble superphosphate | 7.9 | 325 | 55 | 25 |
| 192 | 0-6 | 200 Treble superphosphate | 7.8 | 360 | 27 | 16 |
| 192 | 6-12 | 200 Treble superphosphate | 7.8 | 305 | 25 | 10 |
| 192 | 12-24 | 200 Treble superphosphate | 7.8 | 370 | 22 | 16 |
| 180 | 0-6 | Check | 7.9 | 840 | 55 | 11 |
| 180 | 6-12 | Check | 7.9 | 290 | 39 | 12 |
| 180 | 12-24 | Check | 7.9 | 340 | 19 | 9 |
| 188 | 0-6 | 200 Treble superphosphate | 8.0 | 745 | 55 | 11 |
| 188 | 6-12 | 200 Treble superphosphate | 8.0 | 670 | 55 | 7 |
| 188 | 12-24 | 200 Treble superphosphate | 7.7 | 430 | 55 | 10 |
| 252 | 0-6 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate | 8.0 | 265 | 37 | 20 |
| 252 | 6-12 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate | 8.2 | 200 | 31 | 20 |
| 252 | 12-24 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate | 8.2 | 340 | 27 | 20 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
Soil Samples taken August 27, 1947 (continued)

| Row No. | Depth Inches | Treatment Lbs. per Acre | pH | T.S.S. | NO ₃ | PO ₄ |
|---------|--------------|---------------------------|-----|--------|-----------------|-----------------|
| 284 | 0-6 | 300 Ammonium nitrate | 8.2 | 340 | 27 | 17 |
| 284 | 6-12 | 300 Ammonium nitrate | 8.2 | 265 | 21 | 8 |
| 284 | 12-24 | 300 Ammonium nitrate | 8.1 | 180 | 21 | 10 |
| 292 | 0-6 | Check | 8.0 | 470 | 139 | 33 |
| 292 | 6-12 | Check | 7.9 | 365 | 69 | 25 |
| 292 | 12-24 | Check | 8.0 | 470 | 111 | 20 |
| 304 | 0-6 | 200 Treble superphosphate | 7.8 | 2040 | 139 | 25 |
| 304 | 6-12 | 200 Treble superphosphate | 7.9 | 545 | 55 | 50 |
| 304 | 12-24 | 200 Treble superphosphate | 7.9 | 430 | 55 | 33 |
| 380 | 0-6 | 250 Ammonium nitrate | 7.8 | 545 | 55 | 25 |
| 380 | 6-12 | 250 Ammonium nitrate | 7.9 | 235 | 70 | 20 |
| 380 | 12-24 | 250 Ammonium nitrate | 7.9 | 430 | 46 | 20 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Phosphate Records on Lee Moor Ranch
1947 Cotton Fertilization Demonstration

| Row No. | Depth Inches | PO ₄ June 23 | PO ₄ July 21 | PO ₄ Aug. 27 | Treatment, Rate per Acre |
|---------|--------------|-------------------------|-------------------------|-------------------------|---|
| 20 | 0-6 | 5.0 | 25.0 | 14.0 | Check |
| 20 | 6-12 | 6.7 | 33.0 | 14.0 | Check |
| 20 | 12-24 | Tr. | 12.0 | 14.0 | Check |
| 27 | 0-6 | 14.0 | 50.0 | 16.0 | 400# Treble superphosphate plus 110# ammonium nitrate |
| 27 | 6-12 | 14.0 | 50.0 | 8.0 | 400# Treble superphosphate plus 110# ammonium nitrate |
| 27 | 12-24 | 7.2 | 20.0 | 8.0 | 400# Treble superphosphate plus 110# ammonium nitrate |
| 76 | 0-6 | 7.0 | 14.0 | 20.0 | 200# Ammonium phosphate (16-20) |
| 76 | 6-12 | 6.0 | 25.0 | 20.0 | 200# Ammonium phosphate (16-20) |
| 76 | 12-24 | Tr. | 10.0 | 12.0 | 200# Ammonium phosphate (16-20) |
| 92 | 0-6 | xx | 9.0 | 14.0 | 270# Ammonium phosphate (16-20) |
| 92 | 6-12 | xx | 5.0 | 14.0 | 270# Ammonium phosphate (16-20) |
| 92 | 12-24 | xx | 5.0 | 12.0 | 270# Ammonium phosphate (16-20) |
| 100 | 0-6 | 6.0 | 7.0 | 20.0 | Check |
| 100 | 6-12 | 6.0 | 8.0 | 20.0 | Check |
| 100 | 12-24 | 4.5 | 3.0 | 20.0 | Check |
| 108 | 0-6 | 8.0 | 9.0 | 20.0 | 200# Treble superphosphate |
| 108 | 6-12 | 17.0 | 33.0 | 33.0 | 200# Treble superphosphate |
| 108 | 12-24 | 14.0 | 6.0 | 25.0 | 200# Treble superphosphate |
| 180 | 0-6 | 12.0 | xx | 11.0 | Check |
| 180 | 6-12 | 9.0 | xx | 12.0 | Check |
| 180 | 12-24 | 3.3 | xx | 9.0 | Check |
| 188 | 0-6 | 25.0 | 8.0 | 11.0 | 200# Treble superphosphate |
| 188 | 6-12 | 13.0 | 12.0 | 7.0 | 200# Treble superphosphate |
| 188 | 12-24 | 7.0 | 7.0 | 10.0 | 200# Treble superphosphate |
| 252 | 0-6 | xx | 10.0 | 20.0 | 200# Potassium sulphate, 200# Treble, 110# ammonium nitrate |
| 252 | 6-12 | xx | 7.0 | 20.0 | 200# Potassium sulphate, 200# Treble, 110# ammonium nitrate |
| 252 | 12-24 | xx | 4.0 | 20.0 | 200# Potassium sulphate, 200# Treble, 110# ammonium nitrate |
| 292 | 0-6 | 5.0 | 5.0 | 33.0 | Check |
| 292 | 6-12 | 5.0 | 5.0 | 25.0 | Check |
| 292 | 12-24 | 5.0 | 8.0 | 20.0 | Check |
| 300 | 0-6 | 7.0 | 7.0 | 25.0 | 200# Treble superphosphate |
| 300 | 6-12 | 13.0 | 5.0 | 50.0 | 200# Treble superphosphate |
| 300 | 12-24 | Tr. | 5.0 | 33.0 | 200# Treble superphosphate |
| 365 | 0-6 | 11.0 | 10.0 | xx | 200# Treble Super, 110# Ammonium nitrate |
| 365 | 6-12 | 14.0 | 10.0 | xx | 200# Treble Super, 110# Ammonium nitrate |
| 365 | 12-24 | 16.0 | 7.0 | xx | 200# Treble Super, 110# Ammonium nitrate |
| 374 | 0-6 | Tr. | 6.0 | xx | Check |
| 374 | 6-12 | 10.0 | 7.0 | xx | Check |
| 374 | 12-24 | 9.0 | 9.0 | xx | Check |

Note: PO₄ expressed in parts per million.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Nitrate Records on Lee Moor Ranch
1947 Cotton Fertilization Demonstration

| Row No. | Depth Inches | NO ₃ June 23 | NO ₃ July 21 | NO ₃ Aug. 27 | Treatment, Rate per acre lbs. |
|---------|--------------|-------------------------|-------------------------|-------------------------|--|
| 20 | 0-6 | 39 | 93 | 36 | Check |
| 20 | 6-12 | 25 | 31 | 39 | Check |
| 20 | 12-24 | 95 | 16 | 55 | Check |
| 27 | 0-6 | 55 | 185 | 28 | 400 Treble superphosphate plus 110 Ammonium nitrate |
| 27 | 6-12 | 28 | 62 | 28 | 400 Treble superphosphate plus 110 Ammonium nitrate |
| 27 | 12-24 | 20 | 51 | 14 | 400 Treble superphosphate plus 110 Ammonium nitrate |
| 76 | 0-6 | 55 | 555 | 280 | 200 Ammonium phosphate (16-20) |
| 76 | 6-12 | 69 | 138 | 71 | 200 Ammonium phosphate (16-20) |
| 76 | 12-24 | 20 | 138 | 71 | 200 Ammonium phosphate (16-20) |
| 92 | 0-6 | xx | 277 | 51 | 200 Ammonium phosphate (16-20) |
| 92 | 6-12 | xx | 92 | 111 | 200 Ammonium phosphate (16-20) |
| 92 | 12-24 | xx | 70 | 74 | 200 Ammonium phosphate (16-20) |
| 100 | 0-6 | 37 | 277 | 222 | Check |
| 100 | 6-12 | 65 | 185 | 55 | Check |
| 100 | 12-24 | 48 | 139 | 55 | Check |
| 172 | 0-6 | xx | 270 | xx | 100 Ammonium nitrate |
| 172 | 6-12 | xx | 140 | xx | 100 Ammonium nitrate |
| 172 | 12-24 | xx | 70 | xx | 100 Ammonium nitrate |
| 180 | 0-6 | 105 | xx | 55 | Check |
| 180 | 6-12 | 93 | xx | 39 | Check |
| 180 | 12-24 | 227 | xx | 19 | Check |
| 252 | 0-6 | xx | 140 | 37 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate |
| 252 | 6-12 | xx | 93 | 31 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate |
| 252 | 12-24 | xx | 79 | 27 | 200 Potassium sulphate, 200 Treble superphosphate, 110 ammonium nitrate |
| 284 | 0-6 | xx | 123 | xx | 300 Ammonium nitrate |
| 284 | 6-12 | xx | 70 | xx | 300 Ammonium nitrate |
| 284 | 12-24 | xx | 39 | xx | 300 Ammonium nitrate |
| 292 | 0-6 | 42 | 55 | 139 | Check |
| 292 | 6-12 | 30 | 140 | 69 | Check |
| 292 | 12-24 | 21 | 79 | 111 | Check |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Nitrate Records on Lee Moor Ranch (continued)
1947 Cotton Fertilization Demonstration

| Row No. | Depth Inches | NO ₃ June 23 | NO ₃ July 21 | NO ₃ Aug. 27 | Treatment, Rate per acre lbs. |
|---------|--------------|-------------------------|-------------------------|-------------------------|---|
| 365 | 0-6 | 79 | 185 | xx | 200 Treble superphosphate, 110 ammonium nitrate |
| 365 | 6-12 | 55 | 55 | xx | 200 Treble superphosphate, 110 ammonium nitrate |
| 365 | 12-24 | 78 | 70 | xx | 200 Treble superphosphate, 110 ammonium nitrate |
| 374 | 0-6 | Trace | 80 | xx | Check |
| 374 | 6-12 | 39 | 55 | xx | Check |
| 374 | 12-24 | 20 | 46 | xx | Check |
| 380 | 0-6 | xx | xx | 55 | 250 Ammonium nitrate |
| 380 | 6-12 | xx | xx | 70 | 250 Ammonium nitrate |
| 380 | 12-24 | xx | xx | 46 | 250 Ammonium nitrate |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Lee Moor Ranch, O'Dell Massey, Manager

Soil Analysis Data

| Date of Sampling | Ave. Check | Ave. PO ₄ | Ave. Check | Ave. PO ₄ | Ave. Check | Ave. PO ₄ |
|------------------|--------------------------|------------------------------|---------------------------|-------------------------------|----------------------------|--------------------------------|
| | 0"-6" PO ₄ | Ap1.0"-6" PO ₄ | 6"-12" PO ₄ | Ap1.6"-12" PO ₄ | 12"-24" PO ₄ | Ap1.12"-24" PO ₄ |
| June 23 | 5.6 | 12.0 | 7.3 | 12.8 | 4.4 | 7.4 |
| July 21 | 10.0 | 14.6 | 13.2 | 18.4 | 8.0 | 8.0 |
| Aug. 27 | <u>19.5</u> | <u>18.0</u> | <u>16.5</u> | <u>21.7</u> | <u>15.8</u> | <u>17.5</u> |
| Total | 35.1 | 44.6 | 37.0 | 52.9 | 28.2 | 32.9 |

| Date of Sampling | Ave. NO ₃ | Ave. NO ₃ | Ave. NO ₃ | Ave. NO ₃ | Ave. NO ₃ | Ave. NO ₃ |
|------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Check | Check | Check | Check | Check | Check |
| June 23 | 44.6 | 63.0 | 48.4 | 51.0 | 102.2 | 39.0 |
| July 21 | 126.2 | 231 | 102.8 | 96.0 | 70.0 | 73.0 |
| Aug. 27 | <u>113.0</u> | <u>90.0</u> | <u>50.0</u> | <u>62.5</u> | <u>120.0</u> | <u>46.0</u> |
| Total | 283.8 | 384.0 | 201.2 | 209.5 | 292.2 | 158.0 |

Note: PO₄ and NO₃ expressed in parts per million.

Note: Average PO₄ and Average NO₃ are the averages of all phosphate placement rows and nitrogen side dressed rows. The Average PO₄ and Average NO₃ checks are the average of all checks adjacent to the above fertilizer treatments.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

It is difficult to trace the movement of the phosphates and nitrates in the fertilized rows that were sampled from the soil analyses data. A greater PO_4 content is found in the phosphated rows at all three levels, than in the adjacent check rows when averages are considered. This is also true with the NO_3 content in the first two six-inch levels, but not in the second foot. Since the phosphate material was placed in the second six-inch level, a higher PO_4 content should show up in the 6"-12" samples; and it generally does, but also the same proves true with the check rows. There is some evidence that the phosphates have some downward movement, but it is slight. The downward movement of nitrates from the first six-inch level to the 6"-12" level is readily noted from the soil analyses data, but the movement from the first foot level to the second foot level doesn't show up, except in the average check rows. It may be that the movements of nitrates exceeded the second foot level during the month of August.

It is interesting to note that the average check rows for the phosphate applications increased from 5.8 P.P.M. in June to 10.6 P.P.M. phosphates in July, and on up to 17.3 P.P.M. phosphates in August. Then the average phosphated rows sampled started with 10.7 P.P.M. phosphates in June, went to 13.7 P.P.M. in July and on up to 19.1 P.P.M. phosphates in August. The average phosphate checks nearly trebled from June 23 to August 27, while the phosphated rows were practically doubled over the same period. While the fertilized rows showed practically twice as much available phosphates June 23 as the check rows, they were very close together on August 27, then being only 1.8 P.P.M. available phosphates difference. These soil analyses data strongly indicate that the availability of phosphates in this particular field at least, increases with warm weather and subsequent irrigations. This may account for the decreased response of phosphate fertilizer on alfalfa during the hot summer months.

The average nitrate content on the check rows that were sampled increased from 65.1 P.P.M. to 99.7 in July, and then dropped down to 66.2 P.P.M. in August. The nitrogen side dressed rows which were sampled increase from 51.0 P.P.M. nitrates in June to 133.3 P.P.M. nitrates

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

in July and then dropped down to 66.2 P.P.M. nitrates in August. It is suspicioned that the nitrates applied as a sidedressing may have leached on down below the two foot level. These data strongly indicate that such is the case. Then, if the cotton plant needs the extra nitrogen for plant growth, smaller but more frequent applications of nitrogen fertilizer seems advisable. It appears that an application with the July irrigation would have kept the nitrogen level high through August.

The yield data on the first picking are as variable as the nitrate and phosphate content in different parts of the field, as shown by the soil analyses data. When the harvest data is completed, a table will be prepared to show the relationship between nitrate and available phosphate to cotton yields.

The results of the first picking indicate a profit on the average, for all the different types of fertilizer applications used in the demonstration, except the combined side dressings and placements. One difficult question to answer, is, why did the phosphate placements and nitrogen side dressings give an average increase of 176 lbs. and 175 lbs. per acre respectively, and the average of the combined placements and side dressings came out even? The last picking will be "bollies," and may possibly make up the margin of difference between the straight placements, the straight side dressings, and the combination of both.

Mr. Clyde Stauder, manager of the Intercontinental Ranch, cooperated in conducting a cotton fertilization demonstration. Side dressings of Chilean nitrate were applied after chopping. Mr. Stauder obtained the records on yields which are presented herewith:

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

Cotton Fertilization Demonstration
Intercontinental Rubber Company Ranch
Clyde Stauder, Manager, Cooperating
First and Final Picking

| Plot | Treatment, Lbs. per Acre | Yield - Increase | |
|------|----------------------------------|------------------------|-----------------------|
| | | Seed Cotton # Per Acre | Over Check # Per Acre |
| 1 | Check - 100 (10-20) | 550 | |
| 2 | 200 Chilean nitrate, 100 (10-20) | 887 | 337 |
| 3 | Buffer | 883 | |
| 4 | 400 Chilean nitrate, 100 (10-20) | 800 | 550 |
| 5 | Check - 100 (10-20) | 250 | |
| 6 | 200 Chilean nitrate, 100 (10-20) | 750 | 400 |
| 7 | Check - 100 (10-20) | 450 | |
| | Average Check | 416 | |
| | Average Chilean nitrate | 812 | 396 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

After the Chilean nitrate plots were side dressed, the entire field was fertilized; and for that reason, the rows left for checks received 100# of (10-20) mixed fertilizer.

Soil samples taken from this field and analyzed by the Agricultural Chemistry Department of the University of Arizona showed a very low nitrogen level, there being only about five P.P.M. nitrates. There was a very distinct difference in plant growth between the plots receiving the additional nitrogen.

The crop rotation experiments carried on by the Bureau of Plant Industry at the U. S. Field Station, Bard, California, showed increased cotton production on the alfalfa-cotton rotation plots when the alfalfa had received phosphate fertilizer. It was for that reason that yield records from the 1946 alfalfa fertilization demonstration plots were obtained. The 1947 cotton yield data from the first picking are represented in the following table:

Cotton Yield Data on Alfalfa Fertilization Plots

Lee Moor Ranch
First Picking

| Row Nos. | Treatment | Yield per A. # Seed Cotton |
|----------|--|-------------------------------|
| 9 & 10 | 200# Ammonium phosphate (11-48) applied to alfalfa in spring of 1946 | 760 |
| 11 & 12 | 200# Ammonium phosphate (11-48) applied to alfalfa in spring of 1946 | 944 |
| 19 & 20 | Check | 912 |
| 21 & 22 | Check | 920 |
| 33 & 34 | 200# Ammonium phosphate (11-48) applied to alfalfa in spring of 1946 | 1024 |
| 35 & 36 | 200# Ammonium phosphate (11-48) applied to alfalfa in spring of 1946 | 1024 |
| 46 & 47 | Check | 1112 |
| 48 & 49 | Check | 1016 |
| Average | Alfalfa fertilized borders | 938 |
| Average | Checks | 990 |

It will be noted that the check rows gave a yield on the first picking of 52 lbs. of seed cotton per acre more than the rows on which the alfalfa was fertilized with phosphates in 1946. A fair second picking will be made from these plots.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager

Location: Fifth field from south line, east side
of ranch. Rows numbered from east to west.

1st Picking - November 24 to 26, 1947

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|---|-------------------------------|--|
| 3-6 | Check | 1252 | |
| 7-10 | Guard | 1592 | 214 |
| 11-14 | 200# Ammonium nitrate* | 2020 | 458 |
| 15-18 | Guard | 1940 | 388 |
| 19-22 | Check | 1852 | |
| 23-26 | Guard | 1696 | 68 |
| 27-30 | 400# Treble superphosphate, 110# Ammonium nitrate* | 1732 | 104 |
| 31-34 | Guard | 1572 | -56 |
| 35-38 | Check | 1404 | |
| 39-42 | Guard | 1592 | 104 |
| 43-46 | 200# Treble superphosphate | 1720 | 232 |
| 47-50 | Guard | 1580 | 92 |
| 51-54 | Check | 1572 | |
| 55-58 | Guard | 1772 | 172 |
| 59-62 | 200# (6-14) mix | 1608 | 8 |
| 63-66 | Guard | 1616 | 16 |
| 67-70 | Check | 1628 | |
| 71-74 | Guard | 1596 | -4 |
| 75-78 | 200# Ammonium Phosphate (16-20) | 1636 | 36 |
| 79-82 | Guard | 1784 | 184 |
| 83-86 | Check | 1628 | |
| 87-90 | Guard | 1900 | 468 |
| 91-94 | 200# Ammonium Phosphate (16-20)* | 1828 | 396 |
| 95-98 | Guard | 2156 | 724 |
| 99-102 | Check | 1236 | |
| 103-106 | Guard | 1872 | 298 |
| 107-110 | 200# Treble superphosphate | 1628 | 54 |
| 111-114 | Guard | 1816 | 242 |
| 115-118 | Check | 1912 | |
| 119-122 | Guard | 2468 | 684 |
| 123-126 | 200# Treble superphosphate, 200# ammonium nitrate* | 1672 | -112 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager

Location: Fifth field from south line, east side
of ranch. Rows numbered from east to west. (continued)

1st Picking - November 24 to 26, 1947

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|---|-------------------------------|--|
| 128-130 | Guard | 1596 | -188 |
| 131-134 | Check | 1656 | |
| 135-138 | Guard | 1628 | 184 |
| 139-142 | 200# (6-14) mix | 1636 | 192 |
| 143-146 | Guard | 1792 | 348 |
| 147-150 | Check | 1232 | |
| 151-154 | Guard | 1620 | -24 |
| 155-158 | 200# Ammonium phosphate (16-20) | 1528 | -116 |
| 159-162 | Guard | 1488 | -56 |
| 163-166 | Check | 2056 | |
| 167-170 | Guard | 1432 | -464 |
| 171-174 | 100# Ammonium nitrate* | 1272 | -624 |
| 175-178 | Guard | 1820 | -76 |
| 179-182 | Check | 1736 | |
| 183-186 | Guard | 1892 | 180 |
| 187-190 | 200# Treble superphosphate | 1904 | 192 |
| 191-194 | Guard | 1544 | -168 |
| 195-198 | Check | 1688 | |
| 199-202 | Guard | 1812 | 122 |
| 203-206 | 200# Treble superphosphate, 210# ammonium nitrate* | 1700 | 10 |
| 207-210 | Guard | 1620 | -70 |
| 211-214 | Check | 1692 | |
| 215-218 | Guard | 1620 | -58 |
| 219-222 | 200# (6-14) mix | 1116 | -562 |
| 223-226 | Guard | 1948 | 270 |
| 227-230 | Check | 1664 | |
| 231-234 | Guard | 1892 | 436 |
| 235-238 | 200# Ammonium phosphate (16-20) | 1956 | 500 |
| 239-242 | Guard | 1500 | 44 |
| 243-246 | Check | 1248 | |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager

Location: Fifth field from south line, east side
of ranch. Rows numbered from east to west. (continued)

1st Picking - November 24 to 26, 1947

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|---|-------------------------------|--|
| 247-250 | Guard | 1136 | -412 |
| 251-254 | 200# Potassium sulphate, 200# treble superphosphate, 110# ammonium nitrate* | 1256 | -292 |
| 255-258 | Guard | 1432 | -116 |
| 259-262 | Check | 1848 | |
| 263-266 | Guard | 1760 | 70 |
| 267-270 | 200# (10-20) mix | 2036 | 346 |
| 271-274 | Guard | 1420 | -270 |
| 275-278 | Check | 1532 | |
| 279-282 | Guard | 1280 | -172 |
| 283-286 | 300# Ammonium nitrate* | 1360 | -92 |
| 287-290 | Guard | 1984 | 532 |
| 291-294 | Check | 1372 | |
| 295-298 | Guard | 1540 | 78 |
| 299-302 | 200# Treble superphosphate | 1744 | 282 |
| 303-306 | Guard | 1784 | 322 |
| 307-310 | Check | 1552 | |
| 311-314 | Guard | 1248 | -358 |
| 315-318 | 200# (10-20) mix | 1764 | 158 |
| 319-322 | Guard | 1612 | 6 |
| 323-326 | Check | 1660 | |
| 327-330 | Guard | 1152 | -450 |
| 331-334 | 200# Treble superphosphate, 110# ammonium nitrate* | 1330 | -272 |
| 335-338 | Guard | 1136 | -466 |
| 339-342 | Check | 1544 | |
| 343-346 | Guard | 1632 | 40 |
| 347-350 | 150# Ammonium nitrate* | 2452 | 860 |
| 351-354 | Guard | 1820 | 228 |
| 355-358 | Check | 1640 | |
| 359-362 | Guard | 1844 | 248 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager

Location: Fifth field from south line, east side
of ranch. Rows numbered from east to west. (continued)

1st Picking - November 24 to 26, 1947

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|--|-------------------------------|--|
| 363-366 | 200# Treble superphosphate, 110# ammonium nitrate* | 1816 | 220 |
| 367-370 | Guard | 1668 | 72 |
| 371-374 | Check | 1552 | |
| 375-378 | Guard | 1684 | 224 |
| 379-382 | 250# Ammonium nitrate* | 1440 | -20 |
| 383-386 | Guard | 1688 | 228 |
| 387-390 | Check | 1368 | |
| 391-394 | Guard | 1260 | 204 |
| 395-398 | 200# Treble superphosphate, 120# ammonium nitrate 1st 4 rows only* | 1396 | 340 |
| 399-402 | Guard | 1288 | 232 |
| 403-406 | 200# Treble superphosphate | 1176 | 120 |
| 407-408 | Check | 744 | |

Note: *Side dressed after chopping. All other applica-
tions were placements 8" under seed rows.

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
1st Picking - November 24 to 26, 1947

Placements Only

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|---------------------------------------|-------------------------------|--|
| 35-36 | Check | 1404 | |
| 39-42 | Guard | 1592 | 104 |
| 43-46 | 200# Treble superphosphate | 1720 | 232 |
| 47-50 | Guard | 1580 | 92 |
| 51-54 | Check | 1572 | |
| 55-58 | Guard | 1772 | 172 |
| 59-62 | 200# (6-14) mix | 1608 | 8 |
| 63-66 | Guard | 1616 | 16 |
| 67-70 | Check | 1628 | |
| 99-102 | Check | 1236 | |
| 103-106 | Guard | 1872 | 298 |
| 107-110 | 200# Treble superphosphate | 1628 | 54 |
| 111-114 | Guard | 1816 | 242 |
| 115-118 | Check | 1912 | |
| 131-134 | Check | 1656 | |
| 135-138 | Guard | 1628 | 184 |
| 139-142 | 200# (6-14) mix | 1636 | 192 |
| 143-146 | Guard | 1792 | 348 |
| 147-150 | Check | 1232 | |
| 151-154 | Guard | 1620 | -24 |
| 155-158 | 200# Ammonium phosphate (16-20) | 1528 | -116 |
| 159-162 | Guard | 1488 | -56 |
| 163-166 | Check | 2056 | |
| 179-182 | Check | 1736 | |
| 183-186 | Guard | 1892 | 180 |
| 187-190 | 200# Treble superphosphate | 1904 | 192 |
| 191-194 | Guard | 1544 | -168 |
| 195-198 | Check | 1688 | |
| 211-214 | Check | 1692 | |
| 215-218 | Guard | 1620 | -58 |
| 219-222 | 200# (6-14) mix | 1116 | -562 |
| 223-226 | Guard | 1948 | 270 |
| 227-230 | Check | 1664 | |
| 231-234 | Guard | 1892 | 436 |
| 235-238 | 200# Ammonium phosphate (16-20) | 1956 | 500 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
1st Picking - November 24 to 26, 1947

Placements Only (continued)

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|--|-------------------------------|--|
| 239-242 | Guard | 1500 | 44 |
| 243-246 | Check | 1248 | |
| 259-262 | Check | 1848 | |
| 263-266 | Guard | 1760 | 70 |
| 267-270 | 200# (10-20) mix | 2036 | 346 |
| 271-274 | Guard | 1420 | -270 |
| 275-278 | Check | 1532 | |
| 291-294 | Check | 1372 | |
| 295-298 | Guard | 1540 | 78 |
| 299-302 | 200# Treble superphosphate | 1744 | 282 |
| 303-306 | Guard | 1784 | 322 |
| 307-310 | Check | 1552 | |
| 311-314 | Guard | 1248 | -358 |
| 315-318 | 200# (10-20) mix | 1764 | 158 |
| 319-322 | Guard | 1612 | 6 |
| 323-326 | Check | 1660 | |
| 387-390 | Check | 1368 | |
| 403-406 | 200# Treble superphosphate | 1168 | 120 |
| 407-408 | Check | 744 | |
| Average | Complete 200# Treble superphosphate application | | 176 |
| Average | Guard 200# Treble super- phosphate application | | 143 |
| Average | Complete 200# (6-14) mix application | | -121 |
| Average | Guard 200# (6-14) mix application | | 155 |
| Average | Complete 200# Ammonium phosphate (16-20) ap- plication | | 192 |
| Average | Guard 200# Ammonium phos- phate (16-20) application | | 100 |
| Average | Complete 200# (10-20) mix application | | 252 |
| Average | Guard 200# (10-20) mix application | | -138 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
1st Picking - November 24 to 26, 1947

Placements plus Side Dressings

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|--|-------------------------------|--|
| 19-22 | Check | 1852 | |
| 23-26 | Guard | 1696 | 68 |
| 27-30 | 400# Treble superphosphate plus 110# ammonium nitrate | 1732 | 104 |
| 31-34 | Guard | 1572 | -56 |
| 35-38 | Check | 1404 | |
| 115-118 | Check | 1912 | |
| 119-122 | Guard | 2468 | 684 |
| 123-126 | 200# Treble superphosphate, 200# ammonium nitrate | 1672 | -112 |
| 128-130 | Guard | 1596 | -188 |
| 131-134 | Check | 1656 | |
| 195-198 | Check | 1688 | |
| 199-202 | Guard | 1812 | 122 |
| 203-206 | 200# Treble superphosphate, 210# ammonium nitrate | 1700 | 10 |
| 207-210 | Guard | 1620 | -70 |
| 211-214 | Check | 1692 | |
| 243-246 | Check | 1248 | |
| 247-250 | Guard | 1136 | -412 |
| 251-254 | 200# Treble superphosphate, 200# potassium sulphate, 210# ammonium nitrate | 1256 | -292 |
| 255-258 | Guard | 1432 | -116 |
| 259-262 | Check | 1848 | |
| 323-326 | Check | 1660 | |
| 327-330 | Guard | 1152 | -450 |
| 331-334 | 200# Treble superphosphate, 110# ammonium nitrate | 1330 | -272 |
| 355-358 | Check | 1640 | |
| 359-362 | Guard | 1844 | 248 |
| 363-366 | 200# Treble superphosphate, 110# ammonium nitrate | 1816 | 220 |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
1st Picking - November 24 to 26, 1947

Placements plus Side Dressings (continued)

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|--|-------------------------------|--|
| 367-370 | Guard | 1668 | 72 |
| 371-374 | Check | 1552 | |
| 387-390 | Check | 1368 | |
| 391-394 | Guard | 1260 | 104 |
| 395-398 | 200# Treble superphosphate, 120# ammonium nitrate | 1396 | 340 |
| 399-402 | Guard | 1288 | 232 |
| 407-408 | Check | 744 | |
| Average | Rows completely fertilized | | Even |
| Average | Guard rows - fertilized partially | | 18 gain |

COTTON PRODUCTION (continued)

Cotton Fertilization (continued)

1947 Cotton Fertilization Demonstration
Lee Moor Ranch - O'Dell Massey, Manager
1st Picking - November 24 to 26, 1947

Nitrogen Side Dressings

| Row Nos. | Fertilizers Used Rate per Acre Lb. | Lb. Seed Cot- ton Per Acre | Increase or Decrease over Adjacent Checks Lb. per Acre |
|----------|---------------------------------------|-------------------------------|--|
| 3-6 | Check | 1252 | |
| 7-10 | Guard | 1592 | 214 |
| 11-14 | 200# Ammonium nitrate | 2020 | 458 |
| 15-18 | Guard | 1940 | 388 |
| 19-22 | Check | 1852 | |
| 67-70 | Check | 1628 | |
| 71-74 | Guard | 1596 | -4 |
| 75-78 | 200# Ammonium phosphate (16-20) | 1608 | 36 |
| 79-82 | Guard | 1784 | 184 |
| 83-86 | Check | 1628 | |
| 163-166 | Check | 2056 | |
| 167-170 | Guard | 1432 | -464 |
| 171-174 | 100# Ammonium nitrate | 1272 | -624 |
| 175-178 | Guard | 1820 | -76 |
| 179-182 | Check | 1736 | |
| 275-278 | Check | 1532 | |
| 279-282 | Guard | 1280 | -172 |
| 283-286 | 300# Ammonium nitrate | 1360 | -92 |
| 287-290 | Guard | 1984 | 532 |
| 291-294 | Check | 1372 | |
| 339-342 | Check | 1544 | |
| 343-346 | Guard | 1632 | 40 |
| 347-350 | 150# Ammonium nitrate | 2452 | 860 |
| 351-354 | Guard | 1820 | 228 |
| 355-358 | Check | 1640 | |
| 371-374 | Check | 1552 | |
| 375-378 | Guard | 1684 | 224 |
| 379-382 | 250# Ammonium nitrate | 1440 | -20 |
| 383-386 | Guard | 1688 | 228 |
| 387-390 | Check | 1368 | |
| Average | Rows completely fertilized | | 175 Gain |
| Average | Guard rows - partially fertilized | | 89 Gain |

COTTON PRODUCTION (continued)

Pure Seed Program

While the entire Cortaro Farms project in the Marana district was eligible for the production of Registered and Certified California Acala cotton seed, there was only one grower who applied for certification. Mr. Louis Anway produced pure cotton seed of the California Acala variety on 220 acres. During the two years previous to this year, from two to three thousand acres of registered and certified seed have been grown in the Marana district. All of the growers in the district this year planted Registered California Acala cotton seed.

The pure seed program, Smith-Doxey Cotton Classing, and current cotton breeding results were discussed at two cotton growers' meetings. Dr. R. L. Matlock, Professor E. H. Preseley, and Mr. William Thomas were the speakers on these subjects. It is believed that some improvements in cotton seed stocks are about ready to be released. Growers appear to be very receptive to taking advantage of new improved seed. In this connection, it is very important to keep the Cotton Improvement Association work intact.

COTTON PRODUCTION (continued)

Insect Control

Dr. J. N. Roney, Extension Entomologist, and Mr. W. A. Stevenson of the Bureau of Entomology cooperated with the county agent in educational work on cotton insect control. Four meetings were devoted to this work. Two of these meetings were field meetings and proved to be most interesting. The cotton growers met at the two gins located at Marana and Sahuarita. The fields visited were those selected by the growers as insect problem fields.

Several series of sweepings were made in each field, counts made of the different insects identified as damaging insects, and then recommendations and discussions on insect control in each field followed. It is believed that a considerable amount of dusting and dusting material was saved by these educational meetings. Timely dusting operations is the goal, and these meetings were pointed toward that goal. A good majority of the growers in the county attended these meetings.

Considerable work on cotton insect control with individual growers was carried on by the agent this year. A major portion of the acreage was periodically checked for insect populations by men trained by Mr. Stevenson and his co-workers and employed by the growers. All of the Cortaro Farms project growers and the Oro Verde Ranch at Sahuarita followed this plan.

Insect damage was not as severe this year as usual, but Grass Rust attacked the crop severely in August. Some fields were almost completely defoliated by the rust. It is interesting to note that late irrigations on some of the rust damaged fields appeared to start a second growth which put on a considerable amount of cotton. However, many other fields stopped growing and did not put on any more crop after the middle of August. Growers who were severely effected with the Grass Rust are very eager to have research work initiated on its control.

COTTON PRODUCTION (continued)

Cotton Defoliation

Two cotton defoliation demonstrations were carried on during this year. The Food Machinery Corporation brought over a power whirl sprayer from San Jose, California, to put on a demonstration. The American Cyanamid Company furnished the material which consisted of sodium cyanide. Eight pounds of material per acre was used on both demonstrations. Fifty gallons of water per acre was used on the demonstrational spraying at Marana, while there was 100 gallons per acre used on the demonstration at Sahuarita. While the spray material was well applied, the results were not satisfactory.

Approximately 40 rows of cotton were covered by the sprayer at one time, and the plants seemed to be damp enough to give the material a chance to defoliate. However, the defoliation was not successful on either demonstration. It may be that more of the sodium cyanide per acre is required or that more water must be used. All cotton growers were interested in these demonstrations, and they are all in agreement that further work should be done on this phase of cotton production. It is felt that defoliation is necessary for the successful operation of mechanical pickers, and then too some growers believe that defoliation with a defoliant such as calcium or sodium cyanide might possibly increase the yield of cotton. It is very desirable for even hand picking to have all the plant defoliated and all the bolls open.

ORCHARD MANAGEMENT

Pima County appears to be on the borderline for successfully growing either citrus or deciduous fruits and nut crops. However, there is a great deal of interest in all of these agricultural enterprises, both from a home orchard standpoint and a commercial production aspect. No doubt this is due to so many people wanting to establish homes in this area and the absence of industrial employment.

The County Agent's Office receives a large number of calls relative to establishing both home and commercial orchards. The available information on the feasibility of establishing commercial fruit orchards is rather meager, since very few attempts have been made on such enterprises and very little experimental work has been accomplished. The small home orchard plantings which have been made during the past three or four decades furnish the main information on the subject. Mr. W. T. Dudgeon of the Flowing Wells District has taken this into account and is doing something about it. Mr. Dudgeon has made a ten-acre planting of deciduous fruit trees, using a wide selection of varieties. He believes that there are adaptable varieties of deciduous fruits which can be found for the Tucson area and that when they are grown under proper cultural practices, that commercial fruit growing can be profitable.

Mr. M. F. Furrey, also of the Flowing Wells District, has made a variety planting of deciduous fruit trees. Mr. I. A. Beal, an experienced deciduous fruit grower from California, purchased a farm on the Arivaca Road and has started a commercial fruit orchard, mainly apricots and peaches. Mr. Beal's twenty-acre planting made an excellent growth during the first year. He intends to expand his enterprise during the coming year.

These three orchardists are cooperating closely with the Extension Service in establishing and caring for their orchards. Mr. Dudgeon is keeping a detailed record on his ten-acre planting, and the information gained from his varietal planting is intended to be his contribution to the community. This appears to be one of the finest contributions a man could make to this community. It should be of great benefit to both the home orchardist and the prospective commercial orchardist. Mr. Furrey's planting should also be of real benefit to the community. While Mr. Beal's fruit growing enterprise is designed primarily as a commercial planting, it should offer valuable information on the subject to other prospective fruit growers. In any event, the local fruit markets will offer better fresh fruit to local consumers.

ORCHARD MANAGEMENT (continued)

Mr. H. F. Tate, Extension Horticulturist, has rendered timely assistance to these growers in selection of varieties, planting plans, and cultural practices.

PASTURES

Interest in the planting of permanent pastures south of Tucson is still running high. Bacillio Caranzano now has most of his farm in permanent pasture. The newer plantings are making an abundance of good feed. The first planting which is now past two years old is still producing well, but not as well as the newer plantings which are one year younger. Mr. Caranzano is very enthusiastic about his permanent pasture. Fertilization demonstrations on his oldest planting were made last year where nitrogen, phosphates, and potassium and sulphur were all used. No residue affects could be noted from these different treatments at this time. Perhaps the nitrogen applications were the only materials to which the plants responded.

Nitrogen applications have been recommended for applications during the colder months. The applications continue to show increased growth response in about the proportion of the soil texture. Light soils require more frequent applications in order to maintain maximum growth. Permanent pasture growers as well as growers of small grain winter pastures have adopted the practice of nitrogen fertilization to some degree. The agent has used the press, radio, meetings, and individual contacts for the furtherance of this work.

TRUCK CROPS AND HOME GARDENING

While the commercial acreage of vegetables was drastically reduced in the county this year, many calls on vegetable growing are received by the County Agent's Office. These calls cover the fields of insect and disease control, fertilization, varietal recommendations, planting dates, and general cultural practices.

The agent has used the radio, the press, and individual contacts in furthering this work. Mr. H. F. Tate, extension horticulturist of the University of Arizona, has given valuable and timely assistance to this office in furnishing information on vegetable growing in this county.

A great many calls have been received on home landscaping, care of lawns, shrubbery and trees. While this office cannot make it a policy to call on each one of these people at their individual homes, timely information is most often given from the County Agent's Office in answer to these city home owners' calls on landscaping and maintenance of home plantings. Many of these calls are combinations of home gardening and landscaping.

WEED CONTROL

Demonstrations on the use of 2,4-D for the eradication of broadleaf plants were carried on over a two-year period. While the demonstrations were successful on such weeds as the Field Bindweed and White Horse Nettle, farmers were not greatly interested, since Johnson Grass is their most serious weed pest.

Spraying Johnson Grass with fuel oil has received a great deal of attention from most Pima County farmers during the past year. Considerable interest in the comparative effectiveness of different oils and mixtures was manifested by several growers.

The late Donald L. Hitch and the agent cooperated with Mr. Charles Hooper, manager of the Oro Verde Ranch, in establishing a result demonstration on the use of six different oil sprays. An oil designated as Shell "20" appeared to give best results.

In addition to the demonstration on the Oro Verde Ranch, Mr. Dan Clarke and others used different oil sprays including a 50% fuel oil - 50% water with four lbs. of wettable sulphur per 100 gallons of spray material. Reports from California had been received on this weed spray mixture, which were favorable. Negative results were obtained by local farmers. The 2,4-D found its main value as a weedicide among urban dwellers. The County Agent's Office used the radio, news articles, meetings, and individual contacts to disseminate information on weed control. Special warnings on care to be used in spraying with 2,4-D were given.

DAIRY

Dairy Herd Improvement

The Pima County Agricultural Agent's Office assisted the Pima-Pinal County Dairy Herd Improvement Association in carrying on their program during the past year. Keeping a tester on the job has been one of the most perplexing problems in this work during the war years. Mr. W. R. Van Sant, Extension Dairy Specialist, and the agent gave the association all of the assistance possible on this problem; and after breaking in and trying out several testers during the past year, an experienced tester was finally located. Mr. Bernard Law came to the Association as tester in February with ten years' experience behind him.

The number of herds on test at the beginning of the year was only 12 with 689 cows. At the end of the testing year period, the number of herds increased to 21 with 1,353 cows. The tester situation became so serious in December and January that university students were employed on part time basis to carry on the testing, and even then a majority of the herds were not tested. The new tester, Mr. Law, changed this complex situation since he came on the job; and the testing work is going forward in good shape.

The herd averages for the year are somewhat lower than last year. The following table, prepared by Mr. W. R. Van Sant, Extension Dairy Specialist, gives the averages for the past four years:

Pima-Pinal County D. H. I. A.

| Year | No. Herds | Cow Cows | Ave. Cow Years | Ave. Days in Milk | Ave. Milk Lb. | Ave. Fat Lb. | No. of Cows Producing 400# Fat & Over |
|------|-----------|----------|----------------|-------------------|---------------|--------------|---------------------------------------|
| 1947 | 9 | | 577 | | 9,072 | 353.4 | 179 |
| 1946 | 10 | 376 | | 306 | 9,558 | 380.9 | 151 |
| 1945 | 12 | 533 | | 297 | 8,926 | 348.6 | 156 |
| 1944 | 10 | 369 | | 291 | 8,788 | 324.8 | 77 |

The use of Markton oats as a winter pasture for dairy cattle was adopted by Mr. G. F. Woods. He was very enthusiastic about the results and will no doubt be a strong factor in selling the practice to other dairymen in the county.

BEEF CATTLE

Although beef cattle production is a major enterprise in the county, very little work was accomplished in relation to it this year. There was one demonstration meeting held which was well attended. Dr. J. N. Roney, extension entomologist, and Mr. Walter Armer, extension animal husbandman, cooperated with the agent in putting on a cattle spraying demonstration at the Midvale Farms. High pressure spraying with rotenone, sulphur, and DDT solution was used for lice and warble control. Other control methods were discussed both by Dr. Roney and Mr. Armer. The two specialists also outlined some of the advantages and disadvantages of these different methods pointing out that the best method would depend greatly on the conditions and circumstances under which the lice and warble control work was being carried on. News articles and radio programs have been used to further promote warble and lice control of cattle.

Considerable interest is being shown in cross breeding beef cattle with Brahman cattle. The agent was requested to obtain all available literature on the subject which is published by the United States Department of Agriculture. Twenty copies of one of the publications have been received, part of them distributed to those making requests. Colonel Matthew Baird, of the Ruby Star Ranch, invited the agent to look over his Brahma breeding project. It is believed that he has a range on which the use of cross bred Brahma cattle may be very advantageous. Colonel Baird's project will be watched with a great deal of interest since it may be one of those pioneer movements which would change the aspects of the cattle business to a great extent.

POULTRY

Miscellaneous calls on poultry keeping continues to be the main work carried on by this office under the heading of poultry. These calls include disease and parasite control, feeding, culling, and calls from prospective poultrymen.

There are many people who come to Pima County for health reasons and who select poultry raising as their most feasible means of livelihood. A great many of the prospective poultrymen are without sufficient capital to establish themselves in the poultry business and find themselves greatly discouraged when the necessary money needs are explained to them. While this type of work may not seem constructive at a first glance, it is believed to be a necessary function of the County Agent's Office. A considerable amount of time is spent in answering this type of office call. It is endeavored to show a true picture of the situation, which includes an excellent local market for poultry and poultry products, some of the past history of the poultry enterprise, and necessary capital outlay for establishing a commercial size flock. The cost figures used have been worked out by Professor Harry Embleton, head of the Poultry Department, University of Arizona.

The agent has encouraged all poultrymen to vaccinate for the control of fowl pox, grow and feed green feeds, purchase high grade, pullorum free chicks, use year around culling methods, and practice sanitary precautions.

Mr. W. R. Van Sant, Extension Poultry Specialist, has cooperated in the county in carrying out the Poultry Improvement Plan.

GRASSHOPPER CONTROL

A spotted infestation of grasshoppers during the spring months did not receive attention from the growers, although they were urged to apply control measures by the County Agent's Office. A rather heavy, general infestation appeared this fall, and it was very difficult to obtain kills with the sawdust - bran - sodium fluosilicate bait. When the bait material failed, some farmers resorted to dusting with Chlordane. This material was very effective for controlling grasshoppers.

A total of 230 sacks of bran, approximately 25 tons sawdust, and 2,525 lbs. of sodium fluosilicate was used for grasshopper control. This material was purchased by the U. S. Bureau of Entomology and distributed through the County Agent's Office.

An estimated total of 4,770 acres of crop land was baited to protect crops of alfalfa, cotton, beans, pasture, and truck crops. It is estimated that a total savings of approximately \$22,700 was effectuated by grasshopper control measures. Chlordane was found to be much more effective than the mash bait.

RODENT CONTROL

Two hundred five quarts of poison grain, 32 cans of gopher poison, and 12 cans of rabbit poison were distributed to 93 cooperators for protecting 1,489 acres of vegetables, fruits, alfalfa, cotton, and pasture.

SOILS & IRRIGATION

Soil Amendments

The use of gypsum and sulphur as a soil corrective for alkaline and tight soils has received considerable attention from farmers in Pima County during the past several years and especially during the last three years. Many soil samples have been submitted by this office to the Agricultural Chemistry Department of the University of Arizona for analyses. Recommendations for the use of sulphur on gypsum have been made to land owners on the strength of these soil analyses reports. These recommendations are made by the Agricultural Chemistry Department, mainly on the pH values of the soil samples. Since the feasibility of this soil management practice has been frequently challenged, the agent has attempted to set up demonstrations which would support these recommendations in Pima County.

The plan of these soil amendment demonstrations is to first, obtain information on the soil in question, as to its chemical and physical properties and its behavior; then, second, to follow out the soil amendment practices; third, to obtain further data on chemical and physical properties of the treated and untreated soil; then, fourth, to obtain data on the behavior of the treated and untreated soil as to water penetration and crop yields. While several of these demonstrations have been established, complete records are almost impossible to obtain. The following data has been accumulated and in a measure is of some value to farmers in this county:

SOILS & IRRIGATION (continued)

Soil Amendments (continued)

Soil Analyses

Midvale Farms, Dan Clarke, Manager, Cooperating

| Field No. & Date, First Foot | Treatment # Per Acre & Date | pH Value | T.S.S. P.P.M. | PO ₄ P.P.M. | NO ₃ P.P.M. | M.E. % |
|------------------------------------|---|-------------|------------------|---------------------------|---------------------------|-----------|
| 6 - July 31, 1946 | Before treatment | 8.10 | 480 | 3 | 52 | 31 |
| 6-A - Nov. 3, 1947 | 1,000 Gypsum, December, 1946 | 7.5 | 780 | 7 | 25 | 34.2 |
| 6-B - Nov. 3, 1947 | 600 Sulphur, 5 Tons manure, Dec., 1946 | 7.6 | 815 | 7 | 25 | 40.0 |
| 7 - July 31, 1946 | Before treatment | 8.10 | 635 | 4 | 26 | 38.0 |
| 7-A - Nov. 3, 1947 | 1,000 Gypsum, Dec. '46 | 7.6 | 480 | 10 | 17 | 37.0 |
| 7-B - Nov. 3, 1947 | No treatment | 7.7 | 285 | 10 | 25 | 33.8 |
| 8 - July 31, 1946 | Before treatment | 8.35 | 425 | 4 | Trace | 28 |
| 8-A - Nov. 3, 1947 | No treatment | 7.4 | 500 | 12 | 32 | 39 |
| 8-B - Nov. 3, 1947 | 1,000 Gypsum, December, 1946 | 7.7 | 230 | 6 | 32 | 37.5 |

SOILS & IRRIGATION (continued)

Soil Amendments (continued)

Comparative Soil Analyses
E. L. Rogers - Soil Amendment

| 1st Ft. Date of Sampling | pH Value | T.S.S. P.P.M. | PO ₄ | NO ₃ | M.E. % | Treatment # Per Acre |
|--------------------------------|-------------|------------------|-----------------|-----------------|-----------|---|
| 12/45 | 8.15 | 1955 | 2.5 | 18 | 43.4 | Before treatment |
| 11/46 | 7.85 | 1435 | 15.0 | 20 | 43.0 | Sulphur 800, Gypsum 1,200, Manure 5 Tons |
| 1/47 | 7.75 | 1480 | 17.0 | 26 | 40.0 | Sulphur 800, Gypsum 1,200, Manure 5 Tons |
| 1/47 | 7.85 | 1435 | 15.0 | 20 | 52.0 | Sulphur 800, Gypsum 1,200, Manure 5 Tons |
| 7/47 | 7.95 | 1062 | 9.5 | 55 | 48.0 | Sulphur 800, Gypsum 1,200, Manure 5 Tons |
| 12/45 | 8.15 | 1955 | 2.5 | 18 | 43.4 | Before treatment |
| 11/46 | 7.90 | 1345 | 20 | 21 | 38.0 | Gypsum 1,200, manure 5 Tons |
| 1/47 | 7.90 | 1345 | 20 | 21 | 45.0 | Gypsum 1,200, manure 5 Tons |
| 1/47 | 7.80 | 1160 | 8 | 15 | 36.0 | Gypsum 1,200, manure 5 Tons |
| 7/47 | 7.95 | 872 | 9.5 | 38.5 | 33.0 | Gypsum 1,200, manure 5 Tons |
| 12/45 | 8.15 | 1955 | 2.5 | 18 | 43.4 | Before treatment |
| 11/46 | 7.80 | 1540 | 10.0 | 18 | 37.0 | Gypsum 1,200 |
| 1/47 | 7.70 | 1100 | 8.0 | 11 | 46 | Gypsum 1,200 |
| 1/47 | 7.80 | 1540 | 10.0 | 18 | 43 | Gypsum 1,200 |
| 7/47 | 7.80 | 907 | 11.5 | 5.5 | 32.4 | Gypsum 1,200 |
| Change to 7/47 | -.20 | -893 | +7.0 | +37 | +4.6 | Sulphur 800, Gypsum 1,200, manure 5 Tons |
| Change to 7/47 | -.20 | -1083 | +7.0 | +20.5 | -10.4 | Gypsum 1,200, manure 5 Tons |
| Change to 7/47 | -.35 | -415 | +7.5 | +12.5 | -11.0 | Gypsum 1,200 |

SOILS & IRRIGATION (continued)

Soil Amendments (continued)

Comparative Analyses
G. F. Woods - Soil Amendment

| 1st Ft. Date of Sampling | pH Value | T.S.S. P.P.M. | PO ₄ | NO ₃ | M.E. % | Treatment Rate Per A. | Border No. |
|--|-------------|------------------|-----------------|-----------------|-----------|--------------------------------|---------------|
| 7/15/'47 | 8.00 | 550 | 20 | Trace | 22.5 | Check | 4 |
| 7/15/'47 | 7.80 | 1150 | 33 | 55 | 15.8 | Check | 5 |
| 10/14/47 | 8.50 | 348 | 2.7 | Trace | 28.6 | Check | 5 |
| 4/'46 | 8.60 | | | | 26.2 | Before treatment | 6 |
| 7/15/47 | 7.90 | 550 | 25 | 92 | 29.9 | 800# Sulphur, 5 Tons manure | 6 |
| 10/14/47 | 8.85 | 360 | 2.5 | Trace | 34.8 | 800# Sulphur, 5 Tons manure | 6 |
| 10/14/47 | 8.70 | 447 | 2.0 | Trace | 31.4 | Check | 7 |
| *Change from Ave. Check | + .12 | -172 | -.7 | +32.2 | +7.7 | 800# Sulphur, 5 Tons manure | 6 |
| Change from Analyses of 4/'46 Sampling | -.35 | | | | -1.6 | Check | 4, 5, & 7 |
| *Change from Analyses of 4/'46 Sampling | -.23 | | | | -6.1 | | 6 |

Note: *Average of 7-15-1947 and 10-14-1947 samplings used for Border #6.

SOILS & IRRIGATION (continued)

Soil Amendments (continued)

The results of both sulphur and gypsum applications appear to be favorable upon first examination of chemical and physical analyses, when the data obtained from the different fields before treatment are compared with the data obtained from the same fields several months after soil amendment practices were put into effect; but when the data between the treated and untreated portions of the fields, taken on the same date, are compared, the results are not apparent.

The Rogers soil amendment demonstration also looks satisfactory when comparing the soil analyses data on the treated plots with the data obtained before treatment and the data obtained after treatment. One would have to stretch his imagination, however, to give the sulphur or gypsum applications credit for these favorable changes, which are decreases in alkalinity, soluble salts, and moisture equivalent, and increases in phosphates and nitrates. The reasons that it would not be fair, sound judgment to arrive at the conclusion that the soil amendment materials are responsible for the soil improvement, may be summed up as follows: First, the entire field was ripped both ways with deep tillage implements, and 1,200 lbs. of gypsum per acre was applied. There were no checks left with which to compare the gypsum, gypsum plus manure, and gypsum plus sulphur plus manure treated plots. Then, there were no plots left without deep tillage for comparison with the land receiving deep tillage. Second, the favorable changes in the chemical and physical properties of the soil were inversely proportional to the amount of soil corrective materials used. The plot which received 1,200 lbs. of gypsum only, gave more favorable results than the plot which received in addition to the 1,200 lbs. gypsum, 800 lbs. soil sulphur and 5 Tons of manure. The plot receiving 1,200 gypsum and 5 Tons manure showed results which ranked between the heaviest and lightest applications. The cotton yields from the 1946 crop gave the gypsum application the highest yield, gypsum plus manure the second highest, and the sulphur plus gypsum plus manure plot the lowest yield. The third reason it is difficult to find justification for recommending the sulphur and gypsum applications from these soil analyses data, is that the data fluctuate considerably from one sampling date to another.

SOILS & IRRIGATION (continued)

Soil Amendments (continued)

The G. F. Woods soil amendment plots gave some outstanding variabilities in soil analyses data. These fluctuations might well lead to the conclusion that so great a number of soil samples would be necessary in order to make accurate recommendations that it would be impractical. The actual proof of the value of any farm practice to the farmer is the net profit gained from increased production, due to the practice. Until the actual value of using gypsum or sulphur as a soil amendment in Pima County is proved, the recommendation for its adoption is status quo.

According to Professor W. T. McGeorge, head of the Agricultural Chemistry Department of the University of Arizona, leaching in conjunction with the use of soil sulphur and gypsum is necessary in order for success. This one item alone is very apt to make the practice impractical on a majority of our Pima County farms.

SUMMARY OF ACTIVITIES AND RESULTS
of
Agricultural Extension Work
Pima County, 1947

ORGANIZATION

The agent cooperated with the following organizations in carrying on an Agricultural Program in Pima County: Pima County Cotton Improvement Association, Pima-Pinal D. H. I. A., Pima County Agricultural Conservation Association, Pima County Fair Commission, Tucson Livestock Show Committee, Tucson Chamber of Commerce Livestock Committee, Tucson Chamber of Commerce Water and Irrigation Committee, and Pima County Farm Bureau.

The Emergency Farm Labor Program functioned to place 360 farm and ranch workers on 98 different farms and ranches.

COTTON

One cotton fertilization demonstration carried over from 1946 was completed, and one other was completed for 1947. An extensive demonstration on cotton fertilization was started and completed except for a picking of "bollies." Demonstration meetings on insect control, pure seed, irrigation, weed control, defoliation, and varietal improvement were held. Insect control operations were carried on by a large majority of growers. All growers used pure seed that was acid delinted and ceresan treated. Two growers used nitrogen fertilizer for the first time.

ALFALFA

Two variety tests of alfalfa were carried on, and one was completed. A three year alfalfa fertilization demonstration was completed. Several growers have adopted the practice of applying phosphates to alfalfa.

SMALL GRAINS

One grower produced registered Markton oats. The use of this variety of oats is being encouraged for winter pasture. The practice is slowly being adopted. Demonstrations on small grain fertilization were carried on. Both increased pasturage and grain yields were demonstrated on oats and barley crops by the use of nitrogen fertilizer during the cold weather. This practice is being adopted by several farmers for the first time this year.

SUMMARY (continued)

SOILS & IRRIGATION

Records on three soil amendment demonstrations were complete for the year. Three other demonstrations have been established and are under observation. The true value of sulphur and gypsum has not been clearly demonstrated, and recommendations on the wholesale use of these soil corrective materials are being withheld by the agent until more positive results are obtained. Deep tillage and other less expensive soil management practices are being recommended. Several growers are vitally interested in this project.

GRASSHOPPER CONTROL

An estimated thirty tons of poison bait (dry basis) was distributed by the agent for grasshopper control on 4,770 acres of crop land. Chlordane was used for the first time and proved to be successful.

BEEF CATTLE

One demonstration on warble and lice control of beef cattle was well attended.

DAIRY

The agent assisted the Dairy Herd Improvement Association with its program. Testing work was materially expanded. Improved variety of grain for winter dairy cattle pasture was successfully introduced.

MISCELLANEOUS

Some general work on truck crops, orchards, poultry, and rodent control has been carried on through office calls, meetings, news articles, radio programs, and personal contacts.

OUTLOOK & RECOMMENDATIONS,
Including a Program of Work for Next Year

ORGANIZATION

Continue cooperation with present organizations. Encourage strengthening county Farm Bureau membership and organization.

COTTON

Cotton is the leading crop in the county. The work now in progress should be continued. The fertilization demonstration work should by all means include frequent nitrogen applications. All growers should be kept well informed on this work. New varieties which may be released should be handled through the crop improvement organization. All growers should be kept well informed on the latest insect control methods. Field meetings on insect control should be continued.

ALFALFA

The variety test demonstrations should be continued, and if possible, proper cutting dates for each variety followed. The program on phosphate fertilization should be continued with another result demonstration on best methods of application, as type of material, frequency of application, and most economical amounts. This work is showing results, and all farmers should be kept well informed on the aspects of this practice.

SOILS & IRRIGATION

Land levelling and deep tillage should be encouraged wherever practicable. The work on soil amendments and green manure cropping should be continued. As many records of comparative crop yields should be obtained so as to determine the feasibility of gypsum and sulphur applications for correction of tight and alkaline soils. All farmers should be informed on details of demonstrations on soil correctives which have been carried on to date.

BEEF CATTLE

The work on external parasite control should be continued by use of demonstrations, the press, circular letters, and news articles.

OUTLOOK & RECOMMENDATIONS (continued)

DAIRY

Cooperation with the D. H. I. A. should be continued. All dairymen should be encouraged to increase summer and winter pasturage. Nitrogen fertilizer for winter pastures should be encouraged on the strength of past demonstrations. Markton oats as a winter pasture should be encouraged. Further demonstrations are feasible.

SMALL GRAINS

Continued small grain fertilization demonstrations appear feasible, since the practice is still new and improved methods are always appearing. Due to present information, this practice should be encouraged in every way possible.

MISCELLANEOUS

General work on poultry, home gardens, and orchards should be continued. All assistance possible should be given to the growers of three new deciduous orchards recently planted in the county. Poultrymen should be encouraged to grow more green feed and also how to increase their efficiency in growing green feeds.



The cotton left received a normal application of nitrogen, 200 lbs. Chilean nitrate, plus 100 lbs. (10-20), while the cotton on the right received only 100# (10-20). Intercontinental Rubber Company Ranch, Continental, Arizona
1947 Cotton Fertilization Demonstration



Comparing nitrogen fertilized rows on left with non-fertilized rows on right. Intercontinental Rubber Company Ranch, Continental, Arizona - 1947 Cotton Fertilization Demonstration



Showing difference in growth of cotton plants between heavy nitrogen application and light nitrogen application on nitrogen deficient soil. Intercontinental Rubber Company Ranch, Continental, Arizona - 1947 Cotton Fertilization Demonstration