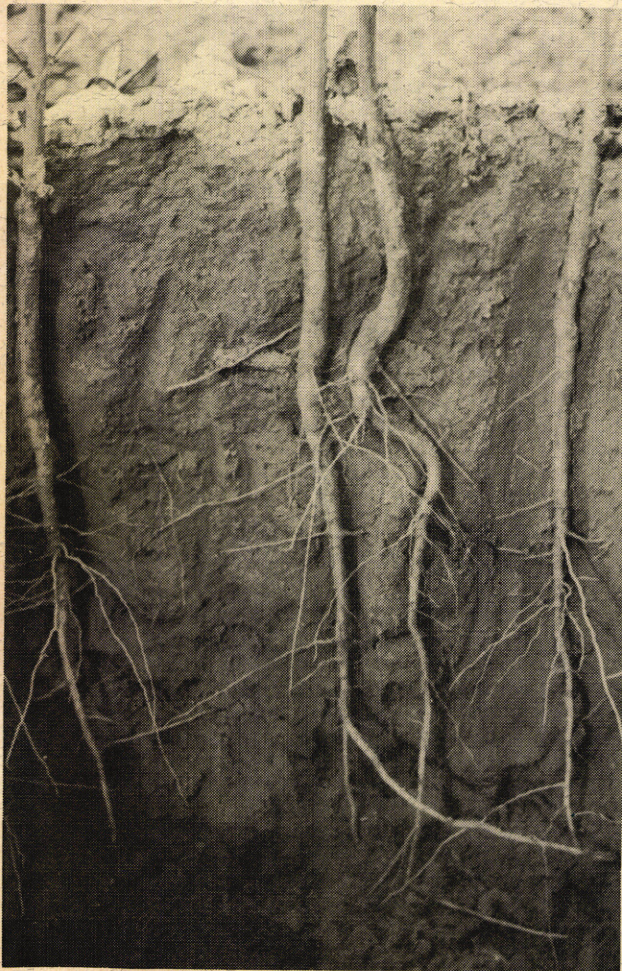


Office
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1964
Cotton Trials
Fresno County



Precision tillage



Check

COVER PICTURES

These photographs are of two adjacent cotton rows. The cotton on the left was fumigated for nematode control and precision tilled. The cotton on the right was neither precision tilled nor fumigated. The cotton on the left produced 61 percent greater yield.

Precision tillage means running a subsoil shank 20 to 24 inches below the planted row prior to planting. This may be done before or after the pre-irrigation.

Precision tillage is most effective on sandy soils. Clay loams and finer textured soil give little or no response.

Field Trial No. 1

Deep Placement Fumigation I

Location: Carl Gunland Farm
West Avenue, between Dinuba and Floral Aves.

Soil type: Dinuba sandy loam

Purpose: Field trials in Kern County show that placing a nematocide at the bottom of a precision shank was at least as effective as the "normal" placement of 10 to 12 inches. Data from several areas were necessary to learn whether this should be a generally recommended practice.

Experimental Design:

This test was a randomized complete block design with 5 treatments and 4 replications. Each plot is 4 rows wide and 1253 feet long. The row width was 38 inches.

Treatments:

1. Check - no treatment.
2. Precision tillage - 24 inches below top of bed.
3. Normal depth fumigation - 12 inches below top of bed.
4. Precision tillage plus normal depth fumigation.
5. Precision tillage plus fumigation at 24 inches.

Fumigation was with dichloropropene (D-D) at 9 gallons per acre. Area treated with 1 pound of Trifluralin per acre for weed control near March 1. Fumigated and precision tilled on March 18, 1964.

Cotton planted: April 12 and replanted on May 12, 1964.

Cotton harvested: November 21.

RESULTS

<u>Treatment</u>	<u>Lint Cotton *</u> <u>Per Acre</u>	<u>% Increase</u>
1	301 lbs. a **	-
2	379 b	26
3	382 b	27
4	453 c	51
5	485 c	61
LSD 5%	55.7	
LSD 1%	61.0	

* First picking only.

** Figures followed by the same letter are not significantly different - Duncan's Multiple range.

CONCLUSIONS

1. The use of a nematocide gave a highly significant increase in yield over the check treatment.
2. Precision tillage alone gave a highly significant increase in yield over the check. This shows that both soil compaction and nematodes were limiting cotton production in this field.
3. The combination of normal fumigation and precision tillage gave a highly significant increase in cotton yield over either treatment alone.
4. The deep placement of the nematocide was slightly better than the normal placement but not sufficiently greater to be statistically significant.
5. One important conclusion that can be made from this experiment that was not planned is that precision tillage was still effective even though it was necessary to replant the cotton.

The relatively low yields of these plots is attributed to the failure of the first planting and a late replanting was necessary.

Trial No. 2

Deep Placement Fumigation II

Location: David Zener Farm
Walnut Ave. between Central and American Aves.

Soil type: Dinuba fine sandy loam

Purpose: Same as Trial No. 1

Experimental design:

This test was a randomized complete block design with 6 treatments and 4 replications. Each plot was 4 rows wide and 1005 feet long. The row width was 38 inches.

Treatments

1. Check - no treatment
2. Precision tillage - 24 inches below top of bed.
3. Normal depth fumigation - 12 inches below top of bed.
4. Precision tillage plus normal depth fumigation.
5. Precision tillage plus fumigation at 24 inches.
6. Precision tillage plus increased dosage of fumigant at 24 inches.

Fumigation was with dichloropropene (D-D) at 9 gallons per acre on treatments 3, 4, and 5. Treatment 6 was with 12 gallons per acre.

On March 1 the entire field treated with 1 pound of Trifluralin per acre for weed control.

Cotton planted: April 6

Cotton harvested: October 20
December 8

RESULTS

<u>Treatment</u>	<u>Lbs. Lint/Acre</u>		<u>Percent Yield</u>
	<u>1st Pick</u>	<u>Total</u>	<u>1st Pick</u>
1	481	562 a *	86
2	590	667 a	87
3	735	850 b	87
4	802	915 b c	88
5	850	956 b c	89
6	865	993 c	87
LSD 5%	83	116	NSD
LSD 1%	115	160	NSD

* Duncan's Multiple range - figures followed by the same letter are not significantly different.

CONCLUSIONS

1. Even though there was an increase in yield owing to the use of nematocide, it was not great enough to be significantly different until 12 gallons per acre of D-D was used.
2. There was a slight but not significant increase in yield with 12 gallons over 9 gallons of D-D per acre.
3. Precision tillage gave a highly significant increase in yield over the shallower tillage plots.
4. Deep placement of the fumigant was slightly but not significantly better than the normal placement.
5. None of these practices had any effect on the earliness of the crop.

In summary, yields in this field were seriously reduced by soil compaction and only slightly affected by rootknot nematodes.

Acknowledgements

Trials No. 1 and 2 were done in cooperation with Lyle W. Carter, Agricultural Engineer, USDA; Galen Paxman, Nematology Technician, University of California; and the late John R. Stockton, Irrigation Specialist, University of California, all of Shafter.

The cooperating growers contributed much in time, land and patience.

The Shell Chemical Company, through Bill Whitehead, generously supplied the nematocide (D-D) used in these trials.

Trial No. 3

Cotton Seedling Disease Control

This trial was established to test the effectiveness of a few fungicides to prevent the development of a seedling disease complex in cotton.

This field was chosen because high incidence of these seedling diseases has plagued cotton planted here in previous years.

Many other fungicides are commercially available to growers. No criticism is made nor implied of those materials not included in this trial.

Cooperator: Charles and Phillip Sachs
51563 W. Nees Ave.
Firebaugh

Location: Sec. 36, T 12S, R 11E

Soil type: Panoche loam

Planting: April 4, 1964
Seed treated with Panogen and PCNB
2 x 2 - skip row.
Rows 40 inches wide and approximately 1200 ft. long.
40 lbs. mechanically delinted seed planted.
Soil temperature at 8 inches - 55°F.

Harvested: October 5
December 2 & 3

Plot Plan: Randomized complete block, 4 replications

Treatments:

- A - Check - (Panogen + PCNB on seed)
- B - Lanstan @ 2 lbs/A - EC
- C - Lanstan @ 2 lbs/A + 1 lb. PCNB - EC
- D - Lanstan - 40% granules @ 2 lbs/A
- E - SD 345 @ 2 lbs/A.
- F - Panterra (EP-256) @ 3 qts./A.
- G - Panterra granules - 10 lbs./A.

RESULTS

<u>Treatment</u>	<u>Plant Count in Plants Per Acre</u>		
	<u>April 20</u>	<u>April 29</u>	<u>Dec. 9 *</u>
D	48,900 a **	97,200 a **	63,900
A	77,900 b	109,500 a b	69,400
F	83,100 b c	110,600 b	69,800
G	83,900 b c	115,000 b	66,000
C	94,900 c d	134,300 c	73,600
E	100,400	d 135,400 c	84,500
B	108,500	d 139,300 c	76,900
LSD .05	18,700	12,900	NSD
LSD .01	25,700	15,700	NSD

* These include many plants from seed germinated after the first crop irrigation in mid-June.

** Figures followed by the same letter are not significantly different from one another - Duncan's Multiple Range.

<u>Treatment</u>	<u>Yield - Lbs. Lint/A.</u>	<u>% First Pick</u>
A	1109	70.4
B	1059	69.5
C	1097	70.6
D	1136	65.9
E	1122	69.5
F	1076	70.2
G	1068	69.8
	NSD	NSD

Plant Vigor Observations

On April 20, the plant vigor was evaluated in a subjective way. The vigor of the seedlings regardless of the population was evaluated. Vigorous plants were rated 1, plants of intermediate vigor rated as 2, while weak plants were rated as 3. Three observers evaluated two ends of the field. The ratings were averaged as follows:

<u>Treatment</u>	<u>Rating</u>
B	1.12
E	1.50
C	1.50
G	1.88
A	1.88
F	2.00
D	2.75

Admittedly these are subjective, but nonetheless interesting.

CONCLUSIONS

The effectiveness of the fungicides in producing a stand of cotton can best be measured on the April 29 count. Shortly thereafter the field was weeded and many plants were mechanically removed.

1. The Lanstan EC, SD-345 and Lanstan EC plus PCNB (Terrachlor) were the top three materials. There was no significant difference between them. The plant populations produced with these materials were significantly greater than those with all other treatments including the check.
2. The Panterra spray and Panterra granules were not significantly better than the check but were better than the Lanstan granules.
3. There was no significant difference between the check and the Lanstan granules. It is not clearly understood why the Lanstan granules showed so poorly while the Lanstan as a spray performed so well. It could possibly be that the vermiculite granules held the active ingredient so long that the germinating seed was damaged.
4. There was no significant difference in yield among the treatments. All treatments produced high plant populations -- possibly all of them were excessive. Except for some plant removal during weeding, there was no thinning of the plants.

5. These treatments had no effect on the earliness of the crop as shown by the percent of cotton in the first pick.
6. The field was not severely infected with seedling diseases. However, even under conditions of good weather and low incidence of disease an effective fungicide produced greater plant populations and greater vigor of seedlings.

Acknowledgments

The growers contributed much in land, time, and patience.

Mr. W. C. Jordan, Olin-Matheson Co., furnished the PCNB (Terrachlor) and assisted in making plant counts; Dr. Klaus von Ramm, Morton Chemical Company, assisted in planting as well as supplying the Panterra formulations and Mr. James Thomas, Niagara Division, FMC, assisted in planting, counting and harvesting of these plots as well as furnishing the Lanstan formulations. Needless to say, without this help, these data could not have been collected.

Trial No. 4

Acala Strain Trials

A few years ago Mr. Waldo W. Weeth, a Coalinga area grower, made a selection out of Acala 4-42 growing in Arizona. These plants had some characteristics that seemed to have advantages over the green tag Acala 4-42 commonly available to San Joaquin Valley growers.

The seed from these plants were increased by Weeth Ranches, Inc. Early in 1964 Mr. Weeth graciously invited the Agricultural Extension Service in Fresno to work with him to compare the performance of this Arizona-California seed with the 1964 green tag Acala 4-42.

Location: Weeth Ranches, Inc.
Coalinga
Sec. 8, T 21S, R 16E

Soil types: Panoche clay loam and
Panoche fine sandy loam

Plot Plan

An entire 160 acre block was planted with 1964 Acala 4-42 green tag seed and Arizona-California Acala 4-42 in alternate four rows.

Adjacent pairs of 4 rows each were selected at random in the field, harvested and weighed. Nine pairs were selected at the first picking. Seven of these nine pairs were harvested on the second pick. On the date of the second picking six additional pairs were harvested and compared. All of the data are shown.

Harvested: First pick - October 19
 Second pick - November 16

<u>RESULTS</u>	<u>Green Tag - 1964</u>			<u>Arizona-California</u>		
	<u>Lbs. Seed Cotton</u>			<u>Lbs. Seed Cotton</u>		
	<u>Per Plot</u>			<u>Per Plot</u>		
<u>Repli-</u> <u>cation</u>	<u>First</u> <u>Pick</u>	<u>Second</u> <u>Pick</u>	<u>Total</u>	<u>First</u> <u>Pick</u>	<u>Second</u> <u>Pick</u>	<u>Total</u>
1	1960	840	2800	2080	880	2960
2	2240	760	3000	1880	740	2620
3	1480	680	2160	1680	640	2320
4	1360	740	2100	1640	840	2480
5	1600	780	2380	1480	800	2280
6	1680	880	2560	1640	960	2600
7	1760	940	2700	1520	820	2340
Total	12080	5620	<u>17700</u>	11920	5680	<u>17600</u>
Turnout	33.2	31.0		33.2	31.2	
Net Lint	4011	1742	5753	3957	1772	5749
% First Pick	69.72			68.83		

Grade * 10 bales middling

Staple * 10 bales 1 3/32 middling

7 middling - 3 strict middling

10 bales - 1 3/32 strict middling

* First picking only for grade and staple.

Additional Pairs Harvested Nov. 19

<u>Replication</u>	<u>Pounds of Seed Cotton Per Plot</u>	
	<u>Green Tag - 1964</u>	<u>Arizona-California</u>
1	2100	2020
2	2640	2280
3	2680	2640
4	2740	2840
5	2700	2660
6	2720	2820
Total	15580	15260
Turn-out	31.0	31.2
Net Lint	4830	4761

CONCLUSIONS

1. There was no significant difference in yield between strains.
2. There was no difference in staple length.
3. There was no substantial difference in turn-out.
4. There was no substantial difference in grades.
5. This field was nearly free of verticillium wilt so that any differences in tolerance to this disease could not properly be evaluated. Samples of these same strains were compared on wilt infected land in Tulare County during 1964. Results from this trial will be available from the U.S. Cotton Field Station at Shafter.
6. There appears to be no substantial difference in earliness between these strains. The green tag seed had less than one percent more cotton in the first picking.

Acknowledgments

Our thanks to Messrs. Waldo, Evan, and Wallace Weeth, as well as their staff, for the excellent cooperation necessary to make a proper evaluation of these strains.

Potassium Fertilizer on Cotton

The requirements of the cotton plant for potassium has been studied in Fresno County for several seasons. Until 1962, all field trials have been on sandy soils.

Early in 1962, a fertilizer trial was established on some finer textured soil north of Firebaugh to check whether or not potassium could be profitably used on these soils.

The location of this test site was made strictly from soil analyses -- no potassium deficient cotton was seen on this field in previous years.

This was carried on in exactly the same rows for three years. In 1963, additional potassium was applied to one-half of the plots to check on the need for higher rates of fertilizers.

Location: Poso Ranch, approximately 6 miles northwest of Firebaugh.

Cooperator: Porter Estates Company, Eldon Cady, Ranch Superintendent

Soil type: Temple silty clay loam

Soil analysis: (summary of several samples)

pH - 7.40

Moisture holding capacity - 24%

Total salts - 460 parts per million (ppm)

Extractable bases -

Calcium - 2570 ppm

Magnesium - 358 ppm

Potassium - 80 ppm

Field plot procedure: 1962 - a paired plot of 10 replications.

Treatment:

- 1 - check
- 2 - 500 lbs. potassium per acre (1000 lbs. muriate of potash) sidedressed late May

Each plot was 4 rows wide and 625 feet long. Two center rows were harvested and weighed.

1963

An additional 500 lbs. of potassium was sidedressed late in May to one-half of the plots making a randomized complete block design of 5 replications and four treatments.

Treatment

- 1 - check
- 2 - 500 lbs. potassium 1962
- 3 - 500 lbs. potassium 1963
- 4 - 500 lbs. potassium in both 1962 & 1963

1964

No additional potassium applied. Plots harvested for carry-over effects only.

All plots received about 130 pounds of nitrogen fertilizer each year.

Cotton planted early April each year.

All plots were tilled normally and worked up in the usual manner for seeding each spring. Rows were carefully laid out so that they were placed in exactly the same location each year.

RESULTS

	<u>1962</u>	<u>1963</u>	<u>1964</u>
Check	1156	862	765
500 Lbs. Potassium Per Acre 1962	1290	940	901
500 Lbs. Potassium in 1963	-	953	942
500 Lbs. Potassium 1962 + 500 Lbs. Potassium 1963	-	968	910
LSD 19:1	50.3	31.3	63.2
LSD 99:1	70.5	43.9	78.3
LSD 999:1	99.6	62.0	125.3

CONCLUSIONS

1. The additional potassium added in 1963 did not significantly increase the yield of cotton.
2. The carry-over of the 1962 application was as effective in the second and third year as it was in the first year it was applied.

If we isolate just the checks and 1962 application of potassium it may be summarized as follows:

	<u>Pounds of Lint Per Acre</u>		
	<u>1962</u>	<u>1963</u>	<u>1964</u>
Check	1156	862	765
500 Lbs. Potassium in 1962	1290	940	901
Increase owing to Potassium	134	78	136
% Increase	11.6	9.0	17.8

Total increase of lint in 3 years was 348 lbs. owing to the addition of 1000 pounds per acre of muriate of potash.

3. Yields continue to decline generally in this field possibly because of the many successive years it has been planted to cotton.
4. At no time were there definite plant symptoms of potassium deficiency in this field. This indicates that economic responses to potassium may be possible at a potassium level above those which will produce symptoms.

Acknowledgments

The cooperation of Mr. Cady and the staff of the Poso Ranch during these three years has been excellent. Dr. Dick Bassett, U.C. Department of Agronomy; Marvin Hoover, Extension Specialist, and Forrest Fullmer, American Potash Institute, assisted greatly on the trials.

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