

Progress Report

STANISLAUS

County

ROSE CLOVER FORAGE YIELD

Name of Project



PROJECT NUMBER: State \_\_\_\_\_ County \_\_\_\_\_

W. N. Helphinstine

REPORT PREPARED BY

Farm Advisor

March 29, 1955

DATE

Are project and progress reports to continue? Yes  No

I. PROCEDURE USED: Four different fertilizer treatments were made on two-year-old Rose Clover and adjacent land on which clover

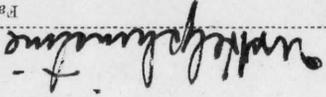
was not planted. The purpose of the trial was to determine how much additional forage could be produced through the introduction of Rose Clover on old grain land and what fertilizers could be expected to give increases. Five replications of the treatments were made. The plots were established on a site which had been in oats the crop year of 1951. A volunteer crop of oat hay had been harvested from the area in the spring of 1952. The Rose Clover was planted in the fall of 1952, thus this will not give us a true picture of the yield differentials which can be expected from Rose Clover in the introduction on the native range but rather of old grain land that is being returned to range pasture.

III. CONCLUSIONS: The addition of Rose Clover to old grain land being returned to native pasture will almost double the total forage produced the second year after being planted. The production of protein also trebled. The above is not considering the gradual build-up or nitrogen in soil which in turn will make for more desirable forage plants. These tests are to be continued as long as they appear to be giving us any information. It appears that we are getting most of our response so far from the sulfur.

II. RESULTS: The plots were harvested April 28 when the Rose Clover was about in full bloom. The adjacent plots on which no Rose Clover was planted were already matured, the species present were both broad leaf and narrow leaf alfalfa, some soft chess and a few plants of lupine. Forage samples were taken at time of harvest and also again on August 20. The purpose of the sampling was to determine protein, phosphate, and sulfur—amounts in the feed—both at harvest time and later in the summer. Dr. W. A. Williams of the Agronomy Division assisted me very much in getting these samples analyzed at Davis. Results of the different treatments will be found in back of this report.

Copy — Lester Berry, Range & Conservation Specialist  
W. A. Williams, Agronomy Division

SIGNATURE:



Farm Advisor

Progress Report

STANISLAUS

County

ROSE CLOVER FORAGE YIELDS

Name of Project

*Rank*

I. PROCEDURE USED: The original 1953 plots were harvested in the fall of 1954. A factorial rate test involving 4 rates each of gypsum and triple superphosphate were applied to the existing stand of rose clover to determine the response level and the interaction between S and P on the soil. In the fall of 1955 duplication of the plots established in 1954 were made. Factorial rate tests established in conjunction with Dr. Williams.

III. CONCLUSIONS: Rose clover and the other annual legumes will certainly provide larger quantities of range feed as well as feed which is of much higher quality. It is especially important that the carry-over dry feed is both palatable and has a higher per cent of protein than the native range. Rose clover and the other clovers are going to make a big change in our range improvement practices.

II. RESULTS: Observations on February 1955 indicate that the Rose clover responded strongly to sulfur and slightly to phosphorus. Results of the 1955 clipping presented below. The statistical data this year are taken from Dr. Williams' report on his cooperation on this range trial.

Copies sent to: L. J. Berry, Extension Range Improvement  
W. A. Williams, Professor of Agronomy  
W. E. Martin, Soils Agriculturist

SIGNATURE: *W. A. Williams*

Farm Advisor

PROJECT NUMBER: State 4717 County 216  
REPORT PREPARED BY: W. M. Helphinstine Farm Advisor  
DATE: June 4, 1956  
Are project and progress reports to continue? Yes  No

clover and resident range species, Stanislaus Co., Dolling Ranch. Harvested May 16, 1955. (5 replications).

| Fertilizer applied in fall 1953 - lbs./a. | Sulfur content of fert. lbs./a. | Feed produced dry basis lbs./a. | Rose Clover % | Protein % | S % | P % |
|---|---------------------------------|---------------------------------|---------------|-----------|-----|-----|
|---|---------------------------------|---------------------------------|---------------|-----------|-----|-----|

Seeded to rose clover fall 1952.

|                         |    |       |    |      |      |     |
|-------------------------|----|-------|----|------|------|-----|
| 500 Gypsum              | 90 | 2,270 | 53 | 11.9 | .131 | .26 |
| 230 Single s. phosphate | 21 | 2,170 | 50 | 11.4 | .099 | .24 |
| 100 Treble s. phosphate | 2  | 1,610 | 39 | 10.3 | .116 | .29 |
| 50 16-20-0              | 8  | 1,950 | 42 | 10.9 | .101 | .29 |
| Check                   | 0  | 1,540 | 38 | 10.1 | .087 | .27 |
| L.S.D. 5%               |    | 300   |    |      |      |     |

Resident range

|                         |    |     |   |     |      |     |
|-------------------------|----|-----|---|-----|------|-----|
| 500 Gypsum              | 90 | 730 | 0 | 6.8 | .141 | .36 |
| 230 Single s. phosphate | 21 | 800 | 0 | 5.9 | .142 | .35 |
| 100 Treble s. phosphate | 2  | 750 | 0 | 8.0 | .100 | .36 |
| 50 16-20-0              | 8  | 720 | 0 | 7.0 | .146 | .34 |
| Check                   | 0  | 680 | 0 | 6.8 | .120 | .32 |
| L.S.D. 5%               |    |     |   |     |      |     |

A drought during March and early April interfered with growth and differences were not so apparent when the plots were harvested on May 16, 1955 (table 55). Yields were improved by the lowest level of fertilization by each material and by the combination of these levels. Higher rates depressed yields somewhat. Apparently the higher rates encouraged growth so much that the moisture supply was outstripped, and greater injury was sustained on the heavily fertilized plots.

The sulfur content of the rose clover was markedly increased by the gypsum. The protein content was increased somewhat. The phosphorus fertilization did not affect phosphorus content appreciably although it did tend to increase the protein content slightly at the two intermediate levels of gypsum. This test is being repeated in 1955-1956, and if satisfactory results are obtained, a long term rate and frequency of reapplication test will be initiated in 1956.

Table 55. Sulfur and phosphate fertilizer rate test on Snelling sandy loam seeded to rose clover, Stanislaus Co., Dolling Ranch. Harvested May 16, 1955. (2 replications.)

| Fertilizer        |                        | Feed produced<br>dry basis<br>lbs./a. | Rose clover<br>% | Rose clover composition |        |        |
|-------------------|------------------------|---------------------------------------|------------------|-------------------------|--------|--------|
| Gypsum<br>lbs./a. | Treble s.p.<br>lbs./a. |                                       |                  | Protein<br>%            | S<br>% | P<br>% |
| 0                 | 0                      | 1,640                                 | 43               | 14.7                    | .081   | .26    |
| 0                 | 50                     | 1,920                                 | 55               | 14.6                    | .060   | .24    |
| 0                 | 100                    | 1,890                                 | 62               | 14.4                    | .092   | .24    |
| 0                 | 200                    | 1,730                                 | 54               | 14.9                    | .103   | .27    |
|                   | Ave.                   | 1,800                                 |                  |                         | .084   |        |
| 100               | 0                      | 1,820                                 | 48               | 15.2                    | .131   | .24    |
| 100               | 50                     | 2,310                                 | 51               | 15.4                    | .118   | .21    |
| 100               | 100                    | 2,000                                 | 41               | 15.7                    | .101   | .26    |
| 100               | 200                    | 1,980                                 | 48               | 16.1                    | .142   | .27    |
|                   | Ave.                   | 2,030                                 |                  |                         | .123   |        |
| 200               | 0                      | 1,660                                 | 47               | 15.8                    | .153   | .24    |
| 200               | 50                     | 2,160                                 | 53               | 16.0                    | .151   | .24    |
| 200               | 100                    | 1,860                                 | 55               | 16.3                    | .181   | .25    |
| 200               | 200                    | 2,220                                 | 41               | 16.4                    | .182   | .26    |
|                   | Ave.                   | 1,980                                 |                  |                         | .167   |        |
| 400               | 0                      | 1,660                                 | 51               | 15.8                    | .220   | .22    |
| 400               | 50                     | 1,860                                 | 51               | 15.8                    | .179   | .24    |
| 400               | 100                    | 2,120                                 | 63               | 15.7                    | .208   | .25    |
| 400               | 200                    | 1,820                                 | 52               | 15.9                    | .148   | .24    |
|                   | Ave.                   | 1,860                                 |                  |                         | .189   |        |

1956

|            | Dry Matter<br>lbs./acre | Rose Clover<br>% |
|------------|-------------------------|------------------|
| 500 Gyp    | 1200                    | 53               |
| 230 Super  | 990                     | 52               |
| 100 Treble | 800                     | 36               |
| 50 16-20   | 820                     | 41               |
| Check      | 940                     | 42               |

The averages from the fertilizer plots put out last fall (1955) are (lbs./acre dry):

| Gypsum<br>(lbs./acre) | 0    | Treble (lbs./acre) |      |      | Gyp<br>Ave. |
|-----------------------|------|--------------------|------|------|-------------|
|                       |      | 50                 | 100  | 200  |             |
| 0                     | 1100 | 1000               | 1060 | 1040 | 1040        |
| 100                   | 1330 | 1390               | 1420 | 1250 | 1360        |
| 200                   | 1680 | 1570               | 1640 | 1530 | 1610        |
| 400                   | 1430 | 1520               | 1570 | 1640 | 1540        |
| Treble Ave.           | 1390 | 1370               | 1420 | 1370 |             |

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS  
U. S. DEPARTMENT OF AGRICULTURE AND THE UNIVERSITY OF CALIF.

COOPERATING

*Red*

PROGRESS REPORT

COUNTY

STANISLAUS

NAME OF PROJECT: Rose Clover Forage Yields

I. PROCEDURE USED: The 1955 duplication of plots

established in 1954 were harvested in May 1957, plus the plots established by Dr. Bill Williams that involve one-year, two-year and three-year applications of gypsum established in October 1956. Results of harvesting these gypsum plots have not yet been received. Dr. Williams will send them as soon as he has completed the analyses.

III. CONCLUSIONS: Rose clover and other annual legumes provided larger quantities of range feed as well as higher quality range feed in the Shelling sandy loam. Rose clover and other annual legumes are being used more and more each year by our ranchers in this area. Attached to this copy are results of the 1956 clip-pings of tests with annual legumes on sulfur deficient soil. I have not received the results of the 1957 clippings as yet. This data is taken directly from the report by Dr. W. A. Williams.

PROJECT NUMBER: State 4747 County 216  
REPORT PREPARED BY S. W. Thurber  
DATE: December 10, 1957  
Are project and progress reports to continue? Yes  No

II. RESULTS: Harvesting of 1955 plots showed still a slight carry-over of gypsum response.

DEC 13 A.M.

Copies sent to:

N. D. Hudson  
L. J. Berry  
W. A. Williams  
W. E. Martin  
G. A. Cross

SIGNATURE: J. W. Williams, Farm Advisor

The fertilizer plots established on rose clover in the autumn of 1953 and reported on in 1954 and 1955 were again harvested in May 1955 to obtain the residual effect of the treatments in the third season after fertilization. The unseeded plots were not harvested this season because of the encroachment of rose clover. The gypsum treatment yielded slightly more than check, a significant difference, but there was little residual sulfur as indicated by the sulfur analysis of the clover (Table 78). Values of all treatments were less than .09 per cent. Indirect evidence suggests that the critical value of the stage of growth at which harvest was made (late bloom) is in the neighborhood of .15 per cent sulfur.

Table 78. Effect of residual fertilizer in Snelling sandy loam on rose clover, Stanislaus County, Dolling Ranch. Harvested May 18, 1956.

| Fertilizer applied in fall 1953 (lbs./a.) | Sulfur content of fert. (lbs./a.) | Dry matter produced (lbs./a.) | Rose Clover % | Protein % in feed | S %  | P %  |
|---|-----------------------------------|-------------------------------|---------------|-------------------|------|------|
| Gypsum - 500                              | 90                                | 1200                          | 53            | 10.6              | .087 | .214 |
| Single Superphos.- 230                    | 21                                | 990                           | 52            | 9.9               | .072 | .236 |
| Treble Superphos.- 100                    | 2                                 | 800                           | 36            | 9.4               | .067 | .262 |
| 16-20-0 - 50                              | 8                                 | 820                           | 41            | 9.5               | .065 | .247 |
| Check                                     | 0                                 | 940                           | 42            | 9.6               | .073 | .258 |
| L.S.D.                                    |                                   |                               |               |                   |      |      |

1955 Experiment. In October 1955, a factorial rate test involving gypsum and treble superphosphate was established based on the same plan as the 1954 test reported in 1955. Although a midwinter drought reduced the total growth potential somewhat, a good response surface was obtained from the yield data from the May 18, 1956 harvest.

One hundred pounds of gypsum per acre increased forage yield about 29%, 200 about 53%, with 400 showing no additional increase (Table 79).

Phosphorus alone or in combination with sulfur did not increase yields further. With these fairly conclusive test results showing that sulfur is the dominant deficiency and phosphorus unimportant on Snelling sandy loam, a rate and frequency of reapplication experiment was established in October 1956. This experiment is designed to test the relative efficiency of annual, biennial and triennial gypsum applications on rose clover seeded range. The same test is being repeated on unseeded range on Vista sandy loam soil at the San Joaquin Experiment Range.

Table 79. Effect of sulfur and phosphorus bearing fertilizers on yield of rose clover forage, Dolling Ranch, 1955 experiment.

| Gypsum<br>(lbs./a.) | Dry Forage (lbs./a.) |                                 |       |       |       |
|---------------------|----------------------|---------------------------------|-------|-------|-------|
|                     | 0                    | Treble superphosphate (lbs./a.) |       |       | Ave.  |
|                     |                      | 50                              | 100   | 200   |       |
| 0                   | 1,320                | 1,200                           | 1,270 | 1,260 | 1,260 |
| 100                 | 1,600                | 1,670                           | 1,710 | 1,500 | 1,630 |
| 200                 | 2,020                | 1,880                           | 1,970 | 1,840 | 1,930 |
| 400                 | 1,720                | 1,820                           | 1,880 | 1,970 | 1,850 |
| Ave.                | 1,660                | 1,640                           | 1,710 | 1,640 |       |

**Fertilizer Trial on Reseeded (Rose Clover) Range and Resident Range  
Dolling Ranch, Stanislaus County**

| Fertilizer<br>(lbs./acre)                | Sulfur<br>content<br>of fert.<br>(lbs./acre) | Feed<br>produced<br>dry basis<br>(lbs./acre) | Rose clover<br>%<br>in feed | August 20               |                   |                   |                         |                   |      |
|--|--|--|-----------------------------|-------------------------|-------------------|-------------------|-------------------------|-------------------|------|
|  |  |  |                             | Protein<br>%<br>in feed | P<br>lbs.<br>acre | S<br>%<br>in feed | Protein<br>%<br>in feed | P<br>%<br>in feed |      |
| <b>Seeded</b>                            |  |  |                             |                         |                   |                   |                         |                   |      |
| 400 Gypsum                               | 90   | 3080   | 64                          | 12.4                    | 381               | 0.22              | 0.22                    | 7.4               | 0.09 |
| 230 Single S. phosphate                  | 21   | 2860   | 67                          | 13.6                    | 388               | 0.24              | 0.15                    | 8.7               | 0.12 |
| 100 Treble S. phosphate                  | 2  | 2600   | 30                          | 8.5                     | 220               | 0.26              | 0.10                    | 8.2               | 0.10 |
| 50 16-20-0                               | 8  | 2870   | 49                          | 12.0                    | 343               | 0.25              | 0.11                    | 7.6               | 0.09 |
| Check                                    | 0  | 1970   | 29                          | 8.5                     | 167               | 0.27              | 0.09                    | 7.8               | 0.12 |
| <b>Resident Range</b>                    |  |  |                             |                         |                   |                   |                         |                   |      |
| 400 Gypsum                               | 90   | 1120   | 0                           | 6.0                     | 67                | 0.29              | 0.13                    |                   |      |
| 230 Single S. phosphate                  | 21   | 1110   | 0                           | 5.9                     | 65                | 0.29              | 0.10                    |                   |      |
| 100 Treble S. phosphate                  | 2  | 1030   | 0                           | 6.4                     | 66                | 0.32              | 0.11                    |                   |      |
| 50 16-20-0                               | 8  | 1300   | 0                           | 4.2                     | 55                | 0.26              | 0.11                    |                   |      |
| Check                                    | 0  | 1080   | 0                           | 4.6                     | 50                | 0.32              | 0.18                    |                   |      |
| <b>Exploratory Fertilizer Experiment</b> |  |  |                             |                         |                   |                   |                         |                   |      |
| Check                                    | 0  | 1690   | 39                          | 11.6                    | 196               |                   | 0.09                    |                   |      |
| N  | 0  | 3590   | 1                           | 5.8                     | 207               |                   | 0.08                    |                   |      |
| P  | 4  | 2090   | 26                          | 10.3                    | 215               |                   | 0.11                    |                   |      |
| S  | 90   | 1990   | 42                          | 11.2                    | 222               |                   | 0.19                    |                   |      |
| NP                                       | 4  | 3140   | 0                           | 6.6                     | 207               |                   | 0.07                    |                   |      |
| NS                                       | 90   | 3810   | 5                           | 7.9                     | 301               |                   | 0.14                    |                   |      |
| NPS                                      | 94   | 3360   | 7                           | 7.4                     | 249               |                   | 0.14                    |                   |      |
| PS                                       | 94   | 2720   | 53                          | 13.9                    | 379               |                   | 0.21                    |                   |      |

SIGNATURE: *W. H. ...*