

FILE ORANGE

RANGE FERTILIZATION TRIALS

Orange County 1958

A number of fertilizer test plots on range land were established in December of 1957 and January of 1958. Some were designed to be exploratory, others merely for observation purposes and still others, larger in area than the former, were established as result demonstration plots. These latter locations generally were either on former exploratory plots or on a similar soil series where growth responses were reasonably certain.

These trials have been conducted for the purpose of (1) determining what plant food elements were deficient in adequate amounts for optimum plant growth. (2) To determine the increments of fertilizer cost and value of forage yield. (3) Observe the effect of fertilizers upon density and composition of forage plants. (4) Determine what effect if any, the addition of fertilizers would have upon the analysis of range plants. (5) Observe the effect of fertilizer upon the palatability of range plants. Progress can be reported on all phases.

Fertilizer Trials

Moulton Ranch, El Toro

Soil Series, Diablo Clay Loam

Treatment	Amount /acre lbs.	Fertilizer cost /acre dollars	Yield dry forage /acre tons	Yield incr. /acre over check tons	Fertilizer cost of additional forage /acre dollars
Check-no treatment	---	---	1.6	---	---
Ammonium nitrate	100	4.60	2.7	1.1	4.20
Treble super- phosphate	100	4.25	2.3	.7	6.00
Ammo-phos. 16-20	200	8.40	3.3	1.7	5.00
Ammonium nitrate	200	9.20	3.5	1.9	4.84
Treble super- phosphate	200	8.50	2.5	.9	9.40
Ammo-phos. 16-20	400	16.80	4.4	2.8	6.00
Ammo-phos. 16-20	600	25.20	6.0	4.4	5.76

Whiting Ranch, El Toro

Soil Series, Altamont Gravelly Loam

Treatment	Amount /acre lbs.	Fertilizer cost /acre dollars	Yield dry forage /acre tons	Yield incr. /acre over check tons	Fertilizer cost of additional forage /acre dollars
Check-no treatment	---	---	.4 800	---	---
Ammo-phos. 16-20	300	12.60	1.5 3000	1.1	11.40
Ammo-phos. 16-20	400	16.80	2.1 4200	1.7	9.90

Nohl Ranch, Olive

Soil Series, Ramona Clay Loam

Treatment	Amount /acre lbs.	Fertilizer cost /acre dollars	Yield dry forage /acre tons	Yield incr. /acre over check tons	Fertilizer cost of additional forage /acre dollars
Ammonium sulphate	100	2.90	3.2 6400	1.7	1.70

Comments: Previous range fertilization trials have been made in years of less than normal rainfall. Rainfall this year was about 150% of normal which largely eliminated the factor of insufficient moisture. The first fall rain came in September, to be followed by monthly precipitation until approximately twelve inches had fallen by the first of the year. The rainfall pattern continued to be favorable until April, ending with a total of twenty to twenty-four inches or more on most range land. No storms were of such intensity as to cause any material runoff.

Mild winter temperatures accompanied the favorable rainfall pattern which enabled the forage to grow throughout most of the growing season. It was an ideal winter for range forage production. Forage growth is closely associated with soil moisture and available nutrients. It will also be noted from the data that responses vary with the soil series.

Fertilizer trials in previous years with annual rainfall of seven to ten inches indicated that total seasonal rainfall alone did not predetermine the forage yield. The pattern of rainfall is significant as well as the availability of plant nutrients. Earlier spring growth was secured in the fertilized plots. Growth was also extended for a longer period into the grazing season. Even at these low annual rainfall rates the cost of the fertilizer was more than repaid for in the increased forage yield.

Other conclusions indicated by these and other fertilization trials are:

- (1) The application of nitrogen and phosphates will increase forage yields on most soils commonly found in the county.
- (2) That the application of these elements in combination gave on the average a higher yield than either one used singly.
- (3) The optimum application per acre, considering cost and yield appears to be approximately 60 pounds nitrogen and 80 pounds of phosphate.

Nitrogen would need to be applied annually. Larger quantities of phosphates could be applied at one time--and then omitted for a period of time. It is less subject to leaching than nitrogen. Additional evidence is needed for more specific recommendations as to material and rate of application on different soil series. Evidence thus far accumulated indicate that applications at the above suggested rates will on the average, double or triple the forage yields otherwise obtained. Also that there is a carry-over into the second year. (4) Fertilization tended to stimulate the growth of desirable plant species to more fully extract available soil moisture and thus greatly induce the growth of summer weeds. (5) Increase in forage has been obtained at an average cost of one-half cent per pound for fertilizer. (6) Fertilized plots were more heavily grazed than unfertilized indicating a better acceptance of the forage.

Effect of fertilizer upon feed analysis

Moulton Ranch

Material per acre	% , dry basis							
	Dry Matter	Ash	Prot.	Fat	Fiber	NFE	Ca.	P
Check	88.2	8.5	4.4	2.5	34.0	50.6	.20	.13
100# Am. Nit.	90.3	8.1	4.9	2.3	36.1	48.6	.18	.17
200# Am. Nit.	89.2	8.0	4.3	2.2	36.0	49.5	.24	.11
100# Treble super	88.2	8.6	3.7	2.4	34.7	50.6	.19	.19
200# Treble super	88.7	7.9	4.1	2.2	37.1	48.7	.25	.19
200# 16-20	87.2	8.2	5.2	2.0	36.3	48.3	.24	.17
400# 16-20	88.9	7.2	5.6	1.9	36.2	49.1	.29	.25
600# 16-20	88.6	6.6	5.3	2.0	37.0	49.1	.28	.21

Whiting Ranch

Material per acre	% , dry basis							
	Dry Matter	Ash	Prot.	Fat	Fiber	NFE	Ca.	P
Check	90.3	10.4	4.4	2.0	28.1	55.1	1.89	.35
300# 16-20	90.0	9.5	3.0	1.9	31.0	54.6	1.67	.25
400# 16-20	89.9	10.0	3.9	2.1	31.9	52.1	1.78	.29

Nohl Ranch

Check	87.1	7.2	8.5	2.6	31.3	50.4	.39	.26
100#	88.7	9.0	7.8	2.3	32.9	48.0	.74	.34

Comments: The addition of nitrogen appears to have resulted in an increase in the protein content of the forage. There may be some increase in the phosphorus content particularly where larger amounts are applied. Nitrogen, a component of protein, is one of the essential elements in animal nutrition and also one of the more expensive.

Salt, calcium and phosphorus are the three major minerals needed by livestock for growth and reproduction. They are more apt to suffer from lack of phosphorus or calcium than of any mineral except common salt. Calcium and phosphorus make up about 75% of the entire mineral matter in the body and over 90% of the skeleton. Therefore, liberal amounts of calcium and phosphorus are needed by growing animals, by those that are pregnant, and by those which are producing milk.

The addition of these elements to the soil merely to increase the supply in the animal's diet would not be economical. However, when their addition increases the forage yield as well as to increase the nutritive value of the forage an extra dividend is returned from the fertilizer application.

It has been observed that fertilized plots are grazed more closely than the unfertilized portion. This indicates a preference by the animals for the forage there.

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200 copies