Rangeland Forage

almost trebled by seeding rose clover and use of sulfur-bearing fertilizers

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Rose clover seeded on ranges in Stanislaus County during the past two years increased forage production 82% and crude protein production 234% on an acre basis.

When sulfur-bearing fertilizers were also used, a marked improvement in the growth of rose clover was achieved, which resulted in an increase of 285% in total forage and 662% of crude protein over the unfertilized and unseeded range.

Rose clover—an annual legume—has proven valuable in other areas because of its ability to produce nutritious feed under conditions of limited rainfall and infertile soil. It provides late green feed since it matures from two to five weeks later than most of the plants present on this type of range. It also helps build up the nitrogen level in the soil, which in turn stimulates the growth of the more desirable grasses.

Because large areas of land—formerly growing barley and wheat—have been returned to range pasture and because the resultant plant cover, in many cases, has provided a rather short grazing season with limited production, field trials—for the introduction of rose clover—were established on experimental plots on a ranch near La Grange. The soil—classified as Snelling sandy loam—is fairly representative of large areas of dry farmed grain land extending along the eastern side of the Great Valley from Placer County to Tulare County. Alfilaria, soft chess, wild oats, foxtail, and ripgut are the dominant species, with—a common association of plants in range pastures converted from grain farming—a few native clovers, lupine, and widely scattered patches of bur clover present.

The test field—formerly cropped intermittently to grain since 1900—was planted in part to rose clover in October 1952. Eight pounds of inoculated seed were broadcast on oat stubble from which a volunteer hay crop had been cut. Fertilizer plots were established across the border of the seeding during the fall of 1953. Four fertilizer treatments—including gypsum, single superphosphate, treble superphosphate, and 16-20-0—were applied. There were five replications of each. Plots were harvested April 28 when the rose clover was in bloom and the alfilaria had set seed and was almost mature.

Fertilization of the unseeded range with phosphate and sulfur-bearing materials showed little effect upon either total forage or protein produced. A small increase in total forage was observed where nitrogen—16-20-0—was included, but there was no increase in the total protein produced.

The presence of rose clover without fertilization nearly doubled the total forage production and tripled the protein production at the time of harvest, April 28. The addition of relatively small amounts of sulfur-bearing fertilizers—largely because they had a favorable effect on the legume content of the nearly doubled forage—gave a further increase of 50% over the unfertilized rose clover planting. Thus the total forage obtained was almost three times more than that of the unfertilized and unseeded range. The effect of reseeding plus fertilization was even more marked on the crude protein produced—381 to 388 pounds per acre as compared to 50 to 67 pounds for the resident range. While such large increases may not be realized over wide areas, responses even half as great would still make this kind of range improvement profitable.

Effect of Fertilization on the Rose Clover Content and Nutrient Content of Forage Produced by a Second-year Stand of Rose Clover.

Fertilizer	Sulfur*	Rose clover†	Protein	Phosphorus	Sulfur
	lbs./acre	%	%	%	%
Unfertilized	0	29	8.5	.27	.09
100 treble superphosphate	2	30	8.5	.26	.10
50 16–20–0	8	49	12.0	.25	.11
230 single superphosphate	21	67	13.6	.24	.15
500 gypsum	90	64	12.4	.22	.22

* Content of fertilizer. † In forage.

Although 100 pounds per acre of treble superphosphate—containing only two pounds of sulfur—increased both

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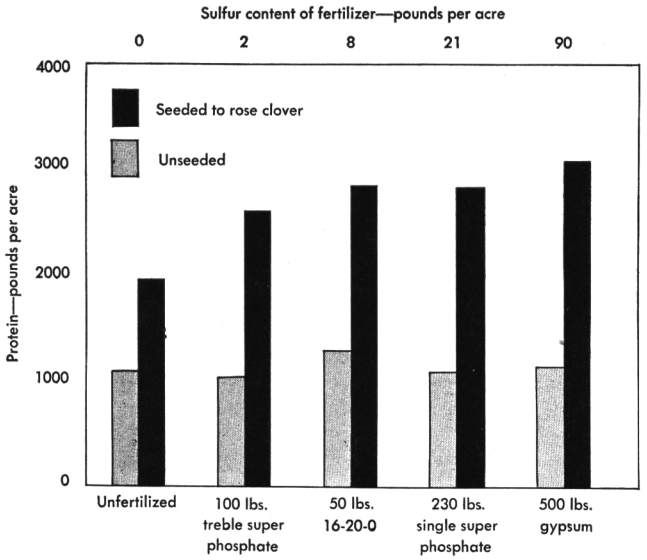
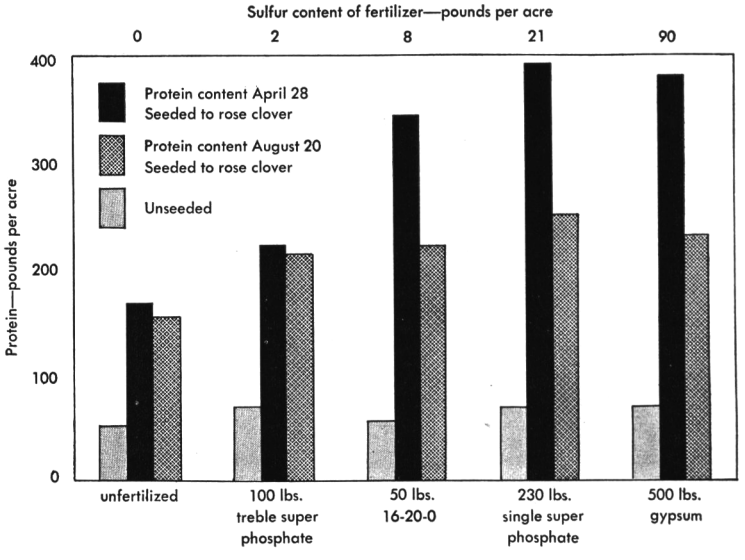
Effect of fertilizer on total forage production on reseeded rose clover and resident range on old grain land, Stanislaus County.



The effect of fertilizer on protein production on reseeded rose clover range and resident range on old grain land, Stanislaus County.



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FORAGE

Continued from preceding page

total forage and crude protein, there was no appreciable change in the per cent of phosphorus in the feed; so it is possible that the increased growth was due mainly to the sulfur.

The effects of sulfur and phosphate were not completely isolated by the experiments, but the close relationship between the sulfur content of the feed and the amount of sulfur applied in the fertilizer clearly indicates the importance of sulfur nutrition on this soil. A marked stimulation of native clovers through application of sulfur on an experimental range in Madera County has been reported.

The value of phosphate fertilizer—while remaining in doubt on this plot—is important elsewhere, particularly on hardpan soils. Further work will determine more precisely the relative importance of sulfur and phosphate fertilizers and the most economical levels of application.

The accepted practice in this area is to leave a portion of the vegetation to be used for fall grazing and to afford protection for the new growth of plants in the fall. Prior to the fall storms, this residual feed is still high in total food value but deficient in protein.

The resident range—sampled April 28—contained no more than 4.6% to 6% protein, whereas the protein content of feed containing rose clover remained at 7.4% to 7.8% throughout the summer.

The results of the field trials have encouraged range improvement through reseeding and fertilization among Stanislaus County ranchers. As the trials are continued and the benefits more definitely established, these practices—although they should be limited to soils formed from granitic parent material which have been shown to respond to the addition of sulfur-bearing fertilizers to legumes—are expected to become more widespread.

Additional studies will show the duration of the beneficial effects of seeding and fertilization and the most economical rates and methods of application.

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