AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF CALIFORNIA

RANGE IMPROVEMENT THROUGH RESEEDING AND FERTILIZATION

by
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Range Resource

Rangeland is a valuable resource along the Central Coast and as a resource we must use it wisely. Range improvement may be approached as any other crop, that is to say, man can manipulate the soil, plant and harvest (grazing) technique to obtain optimum production. However, the major limiting factor over which we have little control is climate; thus we must work within its local limitations.

The local range improvement practices can be separated into three situations:

(1) improving established rangeland;

(2) converting marginal cropland to dryland pasture; and

(3) converting brushland to grassland

RANGE FERTILIZATION

Efforts to improve existing rangeland centers around fertilization. In general, the experience has been that greater improvement may be accomplished in areas of greater rainfall. Practical limits seem to be around an average of 15 inches rainfall. Because of extreme variation in condition, it is impossible to determine fertilizer response to the degree we would like. However, on a statewide basis, research has shown that a pound of nitrogen applied to rangeland will produce an additional pound of beef.

Range fertilization is divided into two approaches: First, the direct stimulation of grasses through the use of nitrogen (also phosphorus and sulfur if shown deficient). Secondly, the stimulation of legumes with phosphorus and/or sulfur to improve the protein content of the range, the overall quality of dry feed, and the indirect stimulation of grasses through nitrogen fixation.

Nitrogen Fertilization - For the full benefit of increasing grass production and to advance the grazing period from 2 to 6 weeks, nitrogen should be applied before the fall rains. The amount of nitrogen applied is expressed in pounds of nitrogen and is determined by the percent nitrogen in a given fertilizer (the first number in the formulation, i.e. 16-20-0 has 16 percent nitrogen). Field trials have shown that applying 25-30 pounds of nitrogen per acre is to trade dollars. Practical rates used in this area range from 40 to 80 pounds of nitrogen per acre. It should be remembered that the response to nitrogen is limited to the year applied. Many areas of the two counties need sulfur along with nitrogen for maximum response.

Phosphorus Fertilization - Optimum response to this element occurs when legumes are present. Therefore, it is best used to increase Bur clover or seeded legumes. Phosphorus is more stable than nitrogen and is effective for at least three years. Thus higher rates may be used without fear of waste. Suggested rates range from 50 to 100 pounds of P_2O_5 per acre. P_2O_5, or "phosphate", has been the expression of the amount of phosphorus in fertilizer (this is the second number on the label, i.e. 16-20-0 has 20 percent P_2O_5). Currently there is a move to express phosphorus as such and not as "phosphate".

Application Costs - Ground application has a lower cash cost (approximately $1 to $1.50 per acre) than by air (ranging from $1 to $1.50 per hundred pounds). Low analysis fertilizers are usually applied by ground, while high analysis fertilizers are flown on.

Agricultural Extension Service, University of California

SAMPLE COSTS OF ESTABLISHING IMPROVED PASTURE IN SAN LUIS OBISPO COUNTY - 1967

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I. Clover mixture for aerial application into stubble in an area of less that 15 inches of rainfall.

Operation	Estimated Cost per Acre
Fertilizer: 400 pounds single superphosphate	$10.00
Fertilizer application @ 50¢/acre + 1¢/pound	4.50
Seed:	
2 pounds Rose clover	
2 pounds Crimson clover	
2 pounds Yarloop Subclover	6.00
2 pounds Geraldton Subclover	
2 pounds Dininup Subclover	
Inoculation	1.00
Seed application	1.50
Ring roll or drag	1.25
Total Cost	$24.75

II. Grass-clover mixture broadcasted by ground application into prepared seedbed in area of greater than 15 inches of rainfall.

Operation	Estimated Cost per Acre
Fertilizer: 400 pounds single superphosphate	$10.00
Fertilizer application (prior to disking)	1.25
Disking (lightly)	1.50
Seed:	
2 pounds Hardinggrass	
2 pounds Rose clover	
2 pounds Crimson clover	6.60
2 pounds Yarloop Subclover	
2 pounds Mt. Barker Subclover	
Inoculation	.80
Seeding and ring rolling	2.00
Total Cost	$22.15

Combining any of the operations will reduce the equipment operating time, thus reducing costs.

The above seedings are eligible for ACP payments which account for 30 to 40 percent of the cost. Information on this program maybe obtained from the ASCS County Office, 6750 El Camino Real, Atascadero, California 93422.

RANGE RESEEDING

Most of the central coastal rangeland is called an "annual type" range. This is because a majority of the plants reseed themselves each year and grow during the winter and spring. There are perennial plants of interest to the coastal area. These persist for several years. Perennials suitable to dryland conditions grow during the winter and are dormant in the summer; thus differ from those used in irrigated pastures which are summer grown. There are many acres considered for improvement, but the first condition is that a seedbed must be available, either as ash of a burn or by farming methods. Here we consider only the establishment of an improved dryland pasture on cropland (or at least worked land).

Competition from resident or native plants will reduce the effective establishment of seeded forage. The seeding should be done in October or November. Undisturbed grain or sudan stubble is the best seedbed. A well prepared firm seedbed is also suitable. Seeding into the stubble reduces competition and prevents the seed from being planted too deep (below 3/4 inches). Seeding should be followed by ring rolling or dragging to cover the seed. A drill might be used if care is taken to insure shallow seeding.

Fertilization to meet plant needs at seeding time is a must. With annual legumes, phosphorus and sulfur are the nutrients of most concern. Nitrogen applied at seeding will increase competition and reduce the effectiveness of legumes to produce their own nitrogen. Many of the soils in the county are deficient in both phosphorus and sulfur. The application of 400 to 500 pounds of single superphosphate will meet the needs for these nutrients. If the land is to be disked, the application of the fertilizer prior to disking will place the fertilizer in the root zone of the plants.

Seed Inoculation is necessary to put the right strain of bacteria on the seedbed legumes, since this type is not present in the soil. This bacteria (Rhizobium) is called a "nitrogen-fixing" bacteria and is responsible for the legume's ability to make its own nitrogen. The pelleting of the inoculant on the seed is an improved method of seed inoculation. This method is available commercially and is explained further in the publication, "Seed Pelleting", AXT-200, which is available at the Agricultural Extension Service Office. Results from field tests at this time, throughout the state, leads to a strong recommendation of this procedure.

Grazing in the spring of the first year helps remove grass and competition. But remove livestock during the clover blooming period, usually by April 1st. After the first year, graze during late summer and early fall to shatter seed and trample it into the ground.

Plants of interest for reseeding rangeland are as follows:

	Grasses	Legumes
Annuals	Wimmera Ryegrass Blando brome (soft chess)	Rose clover varieties Subclover varieties Crimson clover Lana vetch Barrel medic Bur clover
Perennials	Hardinggrass Veltgrass Ryegrass Smilo Pubescent Wheatgrass	Alfalfa

FERTILIZER COSTS PER ACRE AT VARYING LEVELS OF NITROGEN APPLIED

Fertilizer	Pounds N Desired/A	Pounds/A Required	Cost per Ton[1/]	Cost per Acre[2/]	Cost of Application[3/]	Total Cost Per Acre
16-20-0-15	40	250				
	80	500				
20-20-0-12	40	200				
	80	400				
21-0-0-24	40	190				
	80	380				
45-0-0-0	40	89				
	80	177				

FERTILIZER COSTS PER ACRE AT VARYING LEVELS OF P_2O_5 APPLIED

Fertilizer	Pounds P_2O_5 Desired/A	Pounds/A Required	Cost per Ton[1/]	Cost per Acre[2/]	Cost of Application[3/]	Total Cost Per Acre
16-20-0-15	60	300				
	100	500				
0-20-0-12	60	300				
	100	500				
0-46-0-2	60	130				
	100	217				
11-48-0-2	60	125				
	100	208				

1/ Secure from your supplier
2/ Cost per ton x pounds material required per acre ÷ 2,000
3/ 1 to 1 1/2¢/pound for aerial application, or $1/acre on the ground