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**PLANTING AND MANAGING ANNUAL LEGUMES AND
PERENNIAL GRASSES ON DRYLAND RANGE**

By

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RANGE SEEDING - A LONG-TERM INVESTMENT

Although the seeding of rangeland with annual legumes and perennial grasses may seem expensive, a successful seeding, when properly grazed, will last indefinitely. So, the increased forage yield and protein content during the long life of a range seeding should make it a wise investment. Consider also that this practice may qualify for 60% costsharing up to \$3,500 per year through the federal Agricultural Conservation Program.

As with any dryland agriculture, however, variable factors such as weather, soil and management cause results to vary. If the weather is very dry the first year, seedling establishment may be disappointing or even a failure. Usually, however, if proven recommendations are carefully followed, some establishment will be made the first year and the stand will improve in following years.

Following are some comments about plant species and a step-by-step list of seeding and management recommendations. For more details, contact the livestock and range farm advisor in your county.

BENEFITS OF SEEDED PLANTS

Annual legumes, such as rose and subterranean clovers and barrel medics, increase forage protein content during summer and fall months while also contributing nitrogen to the soil for added forage production. Some varieties of these legumes are adapted to areas which receive 10 or more inches of annual rainfall while other varieties require 15 or 20 inches.

Rose clover derives its name from its upright, round, rose-colored blossoms. Subterranean (sub) clover, as its name implies, buries part of its seed-producing burs thus protecting the seed from close grazing. The barrel medics are not true clovers but are members of the Medicago genus which includes bur clover and alfalfa.

Palestine orchardgrass, Hardinggrass and Perla grass, a selection of Harding with high seedling vigor, extend the green season and increase forage production on ranges with 15 or more inches of annual rainfall. They are especially beneficial during dry years because they are perennial plants with long roots that extract deep soil moisture. This was demonstrated on Hardinggrass range east of Arroyo Grande where annual cattle gains of 100 to 160 pounds per acre were recorded over a seven-year period (1967-73) which included dry as well as wet years.

PREPARATIONS BEFORE SEEDING

Range seedings should be made before November 1 in order to catch the early rains and allow for germination before cold weather begins. Seed and fertilizer should be ordered well in advance since some items may be in short supply. Applications for costsharing from the Agricultural Conservation Program must be approved before work begins in order to qualify for payment. If a range drill or other seeder is going to be borrowed or rented, it is advisable to reserve it in advance.

RECOMMENDED SEED MIXTURES

Since plant species and varieties vary in their adaptability to different sites, it is advisable to initially seed a broad mixture of species. In later years, it may be more economical and effective to select fewer varieties based on previous results and/or use different mixtures on different sites.

Here are two seed mixtures of varieties adapted to San Luis Obispo County. The rates are in pounds of raw seed per acre.

- a) On clay-loam soils where annual rainfall is 15 inches or more (most coastal areas):

2 Hykon rose clover
1-2 ~~Kondin~~ and/or California Common rose clover
1 ~~Northam~~ and/or Trikkala^{1/} sub clover
2 Seaton Park and/or Howard sub clover
1 Woogenellup, Esperance and/or Clare^{2/} sub clover
1 Mt. Barker sub clover
2 Jemalong medic
1-2 Perla grass
1 Palestine orchardgrass
12-14 Total pounds per acre

- b) On gravelly or sandy soils and/or where annual rainfall is 10 to 15 inches:

4 Hykon rose clover (do not substitute other varieties)
1-2 Kondin and/or California Common rose clover
1 ~~Northam~~ sub clover
1 Seaton Park and/or Trikkala^{1/} sub clover
3 Jemalong medic
10-11 Total pounds per acre

INOCULATION

Seed should be purchased which is freshly pellet-inoculated with the proper bacteria for each legume species. This method of introducing nitrogen-fixing bacteria is important because many soils either lack root nodule bacteria or contain ones that do not fix nitrogen.

SEEDBED PREPARATION AND SOWING

An ideal seedbed is a stubble field that has been farmed to sudangrass or cereal grain using good weed control practices. Legumes and grasses may be sown directly into the stubble with a range drill or a Brillion seeder which drops the seed between two ringrollers.

^{1/} For waterlogged conditions.

^{2/} For neutral or basic soils.

Seeding in the ash of recent brush burns or on fuelbreaks made with bulldozers or disks can be effective too. Herbicide application may be needed the following spring to reduce brush regrowth.

Seedings can also be made in established grassland using only a range drill. The low-growing legumes, such as sub clover, respond well to this method if livestock are left on the range to reduce competition from other plants.

Seed loss to birds and rodents is reduced and germination is more successful if the seeding is covered with about 1/4 inch of soil by using a ringroller. Seed shouldn't be buried deeper than 1/2 inch, however, or germinating plants will be unable to reach the soil surface.

FERTILIZATION AT SEEDING

The amount of fertilizer to be applied at seeding time depends on the available soil phosphorus which can be determined in a commercial soil testing laboratory by the sodium bicarbonate extraction soil test. If this test shows that phosphorus is less than 10 parts per million (ppm), broadcast seedings should be preceded by an application of 250 to 500 pounds of single superphosphate. If a drill seeder is used, however, and the fertilizer is placed in a row with the seed, rates of only 150 pounds of single superphosphate per acre are adequate for establishing vigorous legumes.

GRAZING MANAGEMENT THE FIRST SEASON

Competition from nonseeded plants should be reduced by grazing which keeps the faster growing weeds and grasses from overtopping the legumes. As a rule, if the soil is not too soft and muddy, a new field should be kept grazed to about 3 inches until April or May when the legumes are flowering and the annual grasses have headed out. At that time, livestock will eat the legumes selectively and should then be grazed in other fields until the legume seeds are dry and hard.

In the case of sub clover seedings in established grassland, however, livestock grazing throughout the season will not harm the low-growing sub clovers. This allows seeding on ranges where livestock removal is impossible or inconvenient.

GRAZING AND FERTILIZING ESTABLISHED STANDS

After the first year, graze early each growing season to control competition and later as the forage is needed. Legumes are good dry forage because of their high protein content and palatability.

More stands of clover are lost because of too little grazing than by too much grazing. So, if a good stand is established the first year and the seed matures, it is usually not necessary to restrict spring and early summer grazing in later years. Seed production in poor stands of rose clover can be encouraged, however, by restricting grazing when the plants are in bloom and until the seed hardens.

For best results from range legumes, adequate levels of phosphorus and sulfur must be maintained in the soil. This can be done by making periodic applications of a fertilizer such as single superphosphate which supplies both phosphorus and sulfur.

If the available soil phosphorus level is less than 10 ppm, 200 to 300 pounds per acre of single superphosphate, or equivalent amounts of phosphorus and sulfur from another fertilizer, are recommended every second year. For phosphorus levels above 10 ppm, 100 pounds of single superphosphate per acre every second year are recommended.

BLOAT AND ESTROGEN PROBLEMS

Although bur clover can cause bloat, this is not a problem with rose and sub clovers or barrel medics.

Sub clovers contain varying amounts of pigments that can have estrogenic effects on animals. In Australia, estrogen levels of some sub clover varieties in nearly pure stands have reduced lambing percentages. This has not been a problem in California because sub clovers usually are not over 50 to 60 percent of the stand even in the best pastures and varieties high in estrogen have not been widely used.

COOPERATIVE EXTENSION PUBLICATIONS WITH MORE DETAILS

Management of Clovers on California Annual Grasslands, Leaflet 2661

Range-Legume Inoculation and Nitrogen Fixation by Root-Nodule Bacteria, Leaflet 1842

Barrel Medic - Can It Improve Your Range? FAF 13