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ESTABLISHING RED CLOVER STANDS ON "RED HILL" SOILS
by
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There are about 500,000 acres of so-called "red hill" soils in the Willamette Valley where red clover could be grown under the proper conditions. In 1941 the Willamette Valley harvested an estimated 5,700 acres of red clover for seed valued at \$73,000. This acreage was increased in 1942. Red clover, while not grown as extensively in this area as formerly, is still the best legume in a three or four-year crop rotation. It is one of the most economical legumes for hay production and is also one of the best for soil improvement. A crop rotation including a legume is almost a thing of the past in many red soil areas, due to the inability of farmers to obtain stands of red clover. The "red hill" soils in the Willamette Valley, as a general rule, are run down and low in humus. Legumes such as clovers are needed to build this soil up and make it productive again.

Results obtained from four years of cropping on the Red Soils Experimental Area at Oregon City demonstrate that red clover can be grown on impoverished "red hill" soils. The following practices are given credit for obtaining successful stands of red clover.

1. Application of lime (About two tons per acre).
2. Proper seedbed preparation (Must be fine and firm).
3. Plant without a nurse crop on depleted red soil.
4. Proper method of seeding.
5. Artificially inoculate seed on soils where clover was not recently grown.
6. Use 100 to 150 pounds per acre of superphosphate at planting time.
7. Proper time of seeding (Late spring if seeded alone; early spring if seeded with nurse crop).
8. Proper rate of seeding (8 to 12 pounds per acre when drilled or 12 to 16 when broadcasted).

Note: The author extends special thanks to the following men who read the manuscript and made helpful suggestions: D. D. Hill, Head of the Farm Crops Department; J. J. Inskip, Clackamas County Agricultural Agent; and Chester E. Otis, Assistant Extension Farm Crops Specialist.

Application of Lime

Experimental plantings since the spring of 1940 have demonstrated clearly that lime may be considered the first essential for growing red clover on rundown "red hill" soils. With lime nearly perfect stands and good yields of red clover have been obtained on ground where clover had not been grown for forty years, and where many doubted the advisability of planting clover until the fertility of the soil had been improved.

The first experimental seedings of red clover were made May 15, 1940 on a range of thirty-three one-twentieth-acre plots receiving an application of two tons of lime per acre. Over a two-year period an unlimed plot in this range averaged 1.6 tons of clover hay per acre, while the adjacent check plot which was limed averaged 3.1 tons per acre for the two years. All unlimed plots have shown a heavy weed growth in comparison to the limed plots. If you are in doubt about the use of lime on your ground, take a dried soil sample to your county agent, who will test it for lime requirement and make recommendations as to the rate of application.

Proper Seedbed Preparation

Red clover like other small seed crops needs a good seedbed, fine and firm. Lack of a good seedbed is responsible for many failures to obtain a stand. Fall or winter plowing is best where conditions permit. After the ground is worked down the soil should be cultivated just often and deep enough to destroy newly germinated weeds as they appear. Needless working of soil permits moisture to escape. The use of a homemade clod masher and packer described in Oregon Station Circular of Information No. 330 is given equal credit along with the application of lime for the successful stands of red clover on the Red Soils Experimental Area when planted alone in May. This packer has been used successfully in the final preparation to firm the seedbed beneath the surface and to smooth and form a fine mulch. A loose seedbed which results in too deep a coverage of the seed is a common practice by the average farmer.

When early spring seedings are made with a nurse crop fall plowing is essential. The field should be left rough to prevent erosion. Due to the excess moisture available at this time of the year it is not necessary to pack the seedbed as firm as for the later seedings.

Planting Without a Nurse Crop on Depleted Soil

The first successful stands of red clover at the Red Soils Experimental Area were obtained by planting alone about the middle of May. If clover stands are to be successful on poor red soils they should be planted alone. However, successful stands of red clover have been obtained by spring plantings when seeded with a nurse crop of grain on worn-out red soil after the fertility has been improved. Planting red clover with a nurse crop is a common practice which results in clover failures. This is especially true on poor soils where the more rapidly growing nurse crop of grain always has the advantage.

Proper Method of Seeding

Late spring seedings have been successful on the Red Soils Experimental Area when using a double-disk drill with a grass-seed attachment. The lower ends of the seed tubes were disconnected and left hanging loose against the frame of the drill in front of the discs which were lowered to the ground when seeding was started. After seeding the corrugated roller was used to finish covering the seed.

If seedings are made with a nurse crop early in the spring the method described above has proved successful. Rolling will not be necessary as the drill disks which have been lowered into the ground for seeding the nurse crop will cover the clover seed sufficiently.

The method used in seeding the clover seed will have a great deal to do with the securing of a good stand. The clover seed should be in contact with the moisture and at a very shallow depth--not over one-fourth inch. Many stands are lost because of planting too deep.

Inoculation of Seed

On the red soils in the Willamette Valley it is usually desirable to inoculate with artificial inoculant. The depleted soils which have not been growing clover normally will not contain sufficient of the clover bacteria to inoculate the new seeding. Without this inoculation the growth of the clover will be unsatisfactory. Fresh inoculant may be had either from your county agent or directly from the Bacteriology Department, Oregon State College. Satisfactory inoculation may also be supplied by commercial cultures if the material is fresh.

Application of Phosphates

Red clover, in common with other legumes, is a heavy user of phosphorus. Unless adequate supplies of phosphates are available the growth of red clover will not be satisfactory. As much of the phosphorus of the clover plant is found in the seed this material is essential for seed production.

As a general rule red soils are low in available phosphates. It is desirable that 100 to 150 pounds per acre of superphosphate be added, especially if a seed crop is to be harvested. Phosphates should be applied at planting time with a fertilizer attachment which will leave the seed and phosphates in direct contact if the best results are to be obtained. If the phosphates are broadcast just prior to seeding the rate of application should be doubled.

Proper Time of Seeding

Spring seedings here on the experimental area have been the most successful. Relative late spring seedings are best when planting red clover alone, as this gives an opportunity to control the weeds before planting time. Seedings can be made from early May to the middle of June, or even up to the first of July where there is plenty of moisture. If plantings are made with a nurse crop they should be as early in the spring as moisture conditions will permit. To date, fall seedings have not been successful on the experimental area.

Proper Rate of Seeding

Eight to 12 pounds of red clover seed per acre when seeding with a drill and 12 to 16 pounds when broadcasting by hand will give a good stand under ordinary conditions. If the proper procedure has been followed a good deal of time and money has been expended by seeding time. This investment can best be protected by using plenty of seed.