GROWING CLOVER ON LIGHT SOILS

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The progressive farmer located on poor sandy soils realizes distinctly that he can not continue to farm successfully for any period of time without growing clover. The common saying in central Wisconsin is: 'I used to grow clover five or six years ago, but I can not do so any more. Last summer I spent $100 for clover seed but I lost all of it and do not have any clover growing at the present time.' The situation is very serious and it is the duty of every farmer who tills these soils to make every possible effort to grow clover, for it will aid materially in increasing soil fertility.

It can safely be said that the farmer who does not grow clover—or some legume crop in its place—on his sandy soil is doomed to failure, for it is impossible to economically and efficiently maintain the supply of nitrogen and organic matter in the soil without clover. By purchasing lime to grow clover and then feeding the crops grown, very little additional fertilizer will have to be purchased.

On sandy soils underlaid by sand, spring plowing is preferable to fall plowing. It is necessary to have a cover crop on this soil in the fall and early spring to prevent loss of plant food by leaching and the loss of the most fertile part of this soil by severe winds which carry away the finer sand particles. Rye seeded in corn at the time of the last cultivation or in potatoes at digging time will prevent loss of fertility. Sometimes it is advisable to disk the rye in the spring, especially where winds are severe, thus leaving a light nurse crop which protects the young clover plant. Disking thoroughly aids in making plant food available.

Compacting Sandy Soils

Sandy soils are naturally quite loose and open, thus permitting the rapid circulation of air, which in turn causes considerable loss of moisture or water by evaporation. The size of the crop grown on these soils is very often limited by the lack of sufficient moisture.

This is frequently true at the time when seeds germinate. In the summer during periods of drought when plants are dependent upon capillarity for their moisture it is quite essential to have sandy soils well compacted to reduce the loss by evaporation to a minimum.

By using a heavy roller to press the soil particles closer together so that the air space between the separate grains would become smaller, the capillary water would rise higher and more water could be utilized by the plants. A roller which leaves the surface of the ground smooth has been, and is now being used in many localities. It can not, however, be recommended, for it will offer less resistance to the wind and consequently the sand will blow and evaporation go on more quickly.

A light harrow is often used after the roller to roughen the surface and prevent this loss. There is on the market today a combined corrugated roller or pulverizer which packs the soil
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Medium red clover growing on light sand
and at the same time leaves the surface of the ground very rough, and thus stops the progress of the winds. This corrugated roller has been used very effectively on sandy soils in producing better stands and larger yields of clover, alfalfa, potatoes and in fact the clover plant and take nitrogen from the air in the soil. This must also be done when alfalfa or other legume crops are grown for the first time on a piece of land.

The bacteria which live with clover may have been present in these soils.

DISK RYE THOROUGHLY WHEN SEEDING TO CLOVER

The above picture shows a field of fall sown rye, which was manured, disked twice, seeded to clover with a disk drill and rolled with a corrugated roller. Some rye killed, but notice good stand of clover in rye as well as size of remaining rye and length of heads.

all crops grown on these soils. At the Sparta station the yield of clover hay was increased 610 pounds per acre by the use of this roller. If used properly it is one of the most important of farm tillage implements.

On sandy soils where it has been impossible to grow clover for several years it is necessary to inoculate by adding the bacteria which live on the roots of but due to the fact that clover has not been grown for some time they have disappeared. Under these conditions inoculation is very important and often the crop would be a failure without it.

Soil Inoculation for Clover

The soil method of inoculation is preferable to others as it produces bet-
ter results. Ordinarily this is done by securing soil from a field where red clover has been grown previously, and where the roots show a good development of nodules. The thoroughness of the inoculation will depend on the amount of inoculating soil and the thoroughness of its mixture with the ground.

![ANOTHER GOOD CLOVER FIELD ON DRIFT SAND AT HANCOCK](image)

Treat the clover right, it will help win the fight for bigger crops

Where such soil is near at hand, with only the cost of a short haul, it is best to use 1000 to 2000 pounds per acre. Where, however, it must be shipped in, half of these quantities will produce a fair development when the soil is kept in moist condition. On fields where soil is secured, the top two inches of soil are rejected as the sun may have killed the germs present. It is also advisable to cover the soil with moist burlap sacks to prevent its drying out and to protect it from the sun.

It is better to apply this soil on the field to be inoculated just before seeding and thoroughly disk or drag it in immediately. An old fashioned broadcast seeder, lime spreader or a manure spreader may be used for this purpose. If none of these are available, a drag may be hitched to the rear axle of a wagon, and the soil spread by hand just in front of the drag. This would necessitate securing someone to drive the team. It is very essential to cover the soil applied to protect the bacteria from the sun.

**Culture Method Sometimes Used**

Commercial cultures are sometimes used for inoculating purposes, but where the seeds are small, like clover
and alfalfa seed, they have not always proven successful. Sufficient culture to inoculate one bushel of seed of any variety may be secured from the United States Department of Agriculture, Washington, D. C. In order to insure the best of success it may sometimes be advisable to use both soil and culture method of inoculation to insure thorough results, for upon it depends the success or failure of all legume crops.

The Use of Lime

Lime and inoculation go hand in hand for clover, alfalfa, vetch and sometimes soy beans. If the soil is sour it must be limed in order to have the bacteria do their work properly. If the field is inoculated carefully but not limed, very little benefit will be derived, and vice versa, if limed and not inoculated similar results will be secured. One is very frequently used without the other, and lime is often condemned for producing no results when it really has not been used correctly.

Acidity Varies in Soils

The degree of acidity or sourness in soils varies considerably and different amounts of lime are needed for each individual field. To illustrate, black sands are often very sour. This may also be true of sandy soils that have been cropped for a long time, while virgin or newly cleared lands are as a rule only slightly acid. Good results can not be expected if only one ton of lime is applied on land that needs five.
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Mammoth clover growing on light sandy soil. Medium red clover does well but you will notice that mammoth clover does better.
or six tons per acre, therefore it is very important to have an acidity test made to determine the degree of acidity on fields that are to be limed.

These tests are made free of charge by the Soils Department of the College of Agriculture, Madison, Wisconsin, and recommendations made as to the amount of lime to apply under different conditions. To secure the best results and to save money it is always advisable to have this test made for otherwise lime may be applied on land that is not acid. The usual application of lime on sandy soil is from one to two tons per acre.

**Lime Benefits Sand**

That lime is very beneficial on legume crops on sandy soil has been definitely proven. At the Sparta station a two-ton application per acre with manure increased the yield of clover hay 1110 pounds per acre over that field where manure only was used. At the Marinette County Demonstration Farm the yield of alfalfa hay was increased from 1820 to 4160 pounds per acre by the use of one ton of lime. The five year average increase on soy beans by the use of two tons of lime at the Sparta station was 1164 pounds of soy bean hay per year. All of these fields were thoroughly inoculated as well as limed.

Most sandy soils that have been cropped for some time need available plant food. In order to give the young clover plant, which has only a small root system and very little food stored in the seed, a good start, available food must be supplied. A light top dressing of eight to ten tons of manure per acre applied on the plowed field and disked in will aid materially in developing a strong, vigorous mass of roots that later will be able to secure more moisture and plant food from the soil. A top dressing of 300 pounds of acid phosphate and 200 pounds of muriate of potash with a green manuring crop will produce similar results.

**Seeding Clover**

Mammoth clover does better on light soils than medium red clover, for it is more hardy and a more vigorous grower, being able to secure its plant food more readily. It grows to about the same size on sandy soils as medium red clover does on heavy soils.

It is better to seed from six to eight quarts of seed per acre on the more sandy soils as a large portion of the seed may not grow due to a lack of moisture, available plant food, or a poor quality of seed. The better the soil the less seed need be used per acre for good results. A drill is better than a broadcast seeder because the seed can be planted from an inch to one and one-half inches deep to secure more moisture. On clay soils or where clay and silt are mixed with sand more shallow planting is advisable.