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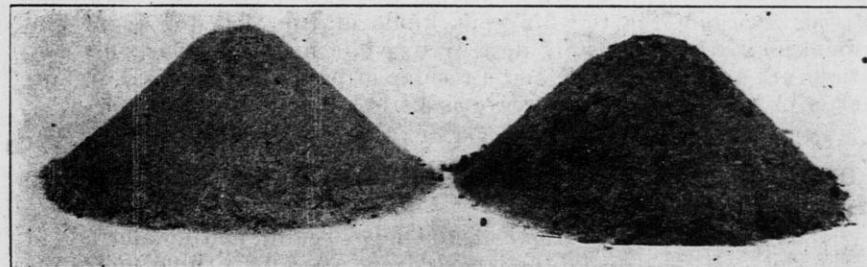
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WISCONSIN BANKERS' FARM BULLETIN

Building Up Light Soils For Bigger Crops

Wisconsin Agricultural Experiment Station



A SOIL MADE FROM PURE SAND

Crops of inoculated legumes were grown on the right hand pile. Each pile was the same color four years ago. This shows what can be done toward building up a light soil.

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Distributed by

Wisconsin Bankers' Association

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Building Up Light Soils For Bigger Crops

Every farmer knows the importance of an abundant supply of organic matter or humus in the soil. He knows that the sandy soils do not contain as much of this material as do the loam soils, and he knows that if the fertility of the sandy is to be increased, they must be made more like the loams as to their content of organic matter.

MYRIADS OF LIVING THINGS IN SOIL

The soil teems with tiny forms of life that feed on the plant and animal matter that is added to it. In the light, open soils conditions are so favorable for the different kinds of life that the plant and animal matter is completely destroyed, while in the heavier soils conditions are not so favorable and a residue of partly decomposed organic matter or humus remains, to serve as a store of food for the crop.

ORGANIC MATTER IN LIGHT SOILS MUST BE INCREASED

It is clear that the farmer cannot buy organic matter and add it to the soil. He must make the land redeem itself by turning under the crop or by returning that portion of it contained in the barnyard manure to the soil, and by so handling the land that the plant food will not be leached out.

DRAW PLANT FOOD FROM THE AIR

In an experiment made more than 300 years ago, it was found that a willow tree weighing 164 pounds had taken only two ounces of mineral matter from the soil, the rest of its food came from water and air. Thus if a crop is plowed under, the soil is improved because the organic matter in the crop was built of materials that came largely from the air and water.

The greatest amount of organic matter is added to the soil when the entire crop is turned under. Under usual conditions this is not a profitable plan and a modification of it must be used. As for example, the harvesting of the crop, feeding it to stock and returning the manure to the land. This will be a slower way of building up the soil, but it is the more practical way.

GETTING NITROGEN FROM THE AIR

The grains and grasses must obtain the phosphorus, potassium, sulphur and nitrogen from the soil. If such a crop is returned to the soil the organic matter therein will be increased but its content in the substances mentioned will not be changed. The only way to increase the amount of phosphorus, potash or sulphur in the soil is to buy these materials. Nitrogen is one of the elements most likely to be needed in the light soils, and it is fortunate that nature provided the farmer with a way by which he can draw upon the unlimited store in the air and add it to his soil, and thereby make it much better for the growth of grains and grasses. The legumes, clover, alfalfa, sweet-clover, soy beans, and peas, when grown together with the bacteria that can enter the roots and produce nodules or tubercles thereon, can in some unknown way make use of the nitrogen in the air. Therefore, if a leguminous crop, on the roots of which tubercles are abundant, is plowed under, the organic matter in the soil will be increased, just as when the crop of a grain is turned under, but the nitrogen content of the soil will also be increased, something that could not take place when a grain is grown. It is possible by the plowing under of well inoculated legume crops to build up a soil quite rapidly if no attention is paid to expense. The farmer can, however, by growing well inoculated legumes, harvesting and feeding them, and returning the manure to the land, slowly build up his soil at the minimum of expense.

MUST SUPPLY BACTERIAL SEED

It should be recognized that the legume alone cannot draw nitrogen from the air, but it can do so only when grown in company with the proper bacteria. The bacterial seed must be supplied as well as that of the legume.

In the lighter soils, and especially in those that are acid, it is probable that the bacteria do not live long in the soil in the absence of the legume. If a legume has not been grown on the land for two or three years, as might be the case if a rotation of crops is practiced, the bacteria may have disappeared or may have been so reduced in numbers that inoculation is necessary. If the legume in question is one not previously grown, inoculation is essential. Examples of this condition in Wisconsin are found in the introduction of alfalfa and soy beans.

PROPER KIND OF BACTERIA MUST BE PRESENT

The bacterial seed can be obtained by taking soil from a field on which the legume to be sown has been grown very recently. It is not enough to know that the crop on the field from which the soil is to be taken was a successful one, but the farmer must assure himself that plenty of nodules were present, otherwise the soil will not contain enough bacteria so that it can be used successfully for seeding the new

field. In a general way, it may be said that each legume requires a special kind of bacteria. The same kind is effective on the common clovers, red, white, alsike, and crimson, but is of no value for sweet clover or alfalfa, or are the bacteria which enable the latter to draw nitrogen from the air of any help to peas or beans.

The inoculating material may also consist of a culture of the proper bacteria grown in a laboratory. These organisms can be mixed with water with which the seed may be moistened. An abundance of nodules can usually be secured the first season by this method.

A SCHEDULE FOR IMPROVING LIGHT SOILS

Let us suppose that the main idea in your mind is to get organic matter into the soil as quickly as possible. What is the plan to follow? Sow a profuse-growing legume like soy beans. See that plenty of the proper kind of bacteria are in the soil or are added. Plow under the crop and sow the field to rye. In the spring plow this under and sow again to soy beans. Two years of this treatment will have its effect. This is not a feasible plan under farm conditions, but it is the one which we should approximate as closely as possible.

KEEP FERTILITY ON THE FARM

To build up a light soil, sell butter fat and milk, and hogs rather than beef or grain or hay because it means you will keep more of the potassium, phosphorus, and nitrogen you now own on your farm. Grow legumes as much as possible and see that the roots are always thickly studded with nodules. If they are not, inoculate the seed when you next sow that legume on that field. If the legume has not been grown on the field before, inoculate the seed, or if the legume has not been grown on the field for some time, seeding with bacteria may be essential. By growing legumes, properly inoculated, you may be taking dollars' worth of nitrogen from the air and putting it in your soil. This may double or treble your yield, and it is almost certain to increase its feeding value. It offers the best chance of getting something for next to nothing you are likely to meet.

Bare land loses plant food and washes easily. Keep a crop on your light land constantly and turn under as many of the crops as possible.

Consider the future of your most valuable possession, the soil, as well as the present.