

Humus or Organic Matter in the Soil

(Concluded from page 5, this issue)

free phosphorus and potassium to feed the growing crops.

But important as are these two services performed by decaying humus, supplying nitrogen and other plant foods and making the supplies already in the soil available for feeding the plants, these do not begin to make up the important services of humus in the soil.

Already we have seen the importance of water in making soils and moving them, and in dissolving plant foods and carrying them into and through the plants. In holding sufficient water in the soil to perform these two services, as well as many others, humus performs a third important service. Every soil particle, and we found there might be 16,000,000,000,000,000,000 of them in an acre to the depth of 6 or 7 inches, is surrounded with a very thin layer of water or moisture. If these soil particles become glued together the water cannot cover the outside of each one. Humus separates these soil particles, and while holding large quantities of water also keeps the soil particles of a clay soil from sticking together and enables these soil particles to also hold more water.

Try This Experiment, Boys

THIS making the soil to hold more water for dissolving and carrying plant foods to the growing plants is one of the most important services performed by humus. If any boy wants to try an experiment to show how humus aids the soil to hold water, let him take 5 tin cans of the same size, say two pound cans, and punch 10 holes in the bottom of each with a ten-penny nail. Then fill one with sand, as near pure sand as he can find; one with stiff clay, as stiff as he can find; and one with well rotted, very fine, black humus. This may be found at the bottom of a manure heap that has stood for a long time, or in the woods under the top layers of leaves which have fallen more recently. The fourth can may be filled with two-thirds sand and one-third humus, such as the first and third cans were filled with. The fifth can may be filled with two-thirds clay and one-third humus. The can filled with humus should be well packed full, and the humus and sand, and the humus and clay should be thoroughly mixed before being put into the cans four and five and well packed.

When the cans are all filled put them in an oven that is not very hot and leave the oven door open so as to slowly dry them out or drive all the water out of the materials with which the cans are filled. It will take some time to do this, for the oven must not be too hot or it will burn the humus and destroy it. When they are all thoroughly dry take the can filled with humus and very slowly pour water over the top of the can until it begins to drip from the holes in the bottom. Measure the water poured on this can of humus so you can tell just how much has been put on, before the water began to drip from the bottom. A very good way is to put it on with a teaspoon and count the teaspoonfuls.

Then put water on the can of sand in the same way, counting the teaspoonfuls until the water drips from the bottom of the can. Then do the same with the can of clay, and then with the can of sand and humus, and last with the can of clay and humus. If you have done the experiment well and carefully you will have found that the can of humus held the most water before it began to drip from the bottom of the can; that the clay and humus hold more than the clay alone, and the sand and humus more than the sand alone. The can of sand will hold least of all, because its particles are so large there are fewer of them to hold water on their surfaces.

But even these three services performed by humus are not yet all that it does in the soil. We have already learned how important air is in soil making, and it also performs other services, which we cannot now discuss. Well, if the soil particles glue together, as the particles of clay often do, the air cannot enter the soil. Humus holds the particles of a clay soil apart or prevents them sticking together and allows air to enter the soil. In a coarse sandy soil the spaces between the soil grains are so large that too much air enters and the soil dries out too much. Humus helps to fill these spaces and prevents the soil drying out so quickly.

But there is still another service performed by humus. A clay soil deficient in humus becomes hard and

the surface bakes and cracks in hot, dry weather. In this condition it not only loses water rapidly and will not take in or absorb rain when it falls, but the water runs off over the surface. Humus prevents such a soil from getting hard, and it is not only easier to work and make fine, but it will also take in and hold more of the rain water which falls on it.

Has any boy begun to think that humus does everything? Well, it pretty nearly does everything necessary to make a fertile soil. Put enough of it into a soil and you can grow big crops every year, unless the land overflows with water, or hail or wind or some other extraordinary calamity comes.

How can we add this wonderful aid to soil fertility to our lands?

1. By plowing under crops, especially legume crops and the stubble or stalks left on the land after the crops are gathered.

2. By pasturing for a number of years.

3. By the application of stable or livestock manures.

In a warm, moist climate, the bodies of plants and animals rot more rapidly than where it is cool and dry. That is the chief reason why our soils are so deficient in humus and also the reason why we should add humus in larger quantities and more frequently.

Next week in our article on "Farm Facts Every Boy Should Know" we will discuss "Nitrogen: What It Is and How to Get It."

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