North Dakota Professor Points Out Methods for Successful Dry Farming

Recently at the Farmers' Institute, held at Mott, N. D., Prof. W. C. Palmer, of the State Agriculture College and Experiment Station, gave an address that was somewhat in the nature of an A, B, C on dry-farming. He used simple illustrations explaining the theories of scientific farming that also may be helpful to many readers. Some of Prof. Palmer's statements were:

"Dry-farming is simply making the best use of the rain that falls—getting it into the soil and keeping it there till the crop needs it.

"This kind of soil management started in the West, in the regions where the rainfall was so small that crops could not be grown when given the handling in practice in the humid states. The crops that were raised by this new kind of soil management were surprising, and set even the farmers and experimenters in the East to taking notice. The result was that even they saw that this system of saving the moisture could be applied in their farming. While they had rain enough, it did not always come when wanted, with the result that the crops often suffered during August and September, sometimes even resulting in crop failure.

"The rainfall here varies from 15 to 18 inches a year, while the evaporation from a water surface during the growing season is about 30 inches. From this it is easy to see that it is necessary to make some effort to get the rain into the ground and to keep it from evaporating. To do this, the soil must be handled according to the principles that will save the moisture. A 15-inch rainfall is sufficient for growing a 30-bushel crop of wheat, if properly taken care of; while it can be so wasted through improper soil tillage or through letting weeds grow that it will not produce 10 bushels per acre."

The professor, in explaining this, dipped a piece of loaf sugar into some ink and the ink quickly went through the sugar. He then took another lump and put some POWDERED sugar on top of it and put this in the ink. The ink went through the solid lump quickly, as it had through the other, but when it came to the powdered sugar it stopped. He then drew a diagram with large circles on the blackboard, representing the soil grains, the lower one in water. He stated that the water would mount over the grains as long as they were as close together as they were in the lump sugar. He then represented grains that were apart, as in the case of the powdered sugar. Here there was a little space between the sugar grains, and the ink could not jump across the space. The same holds with soil. Leaving the surface soil loose puts the particles so far apart that the moisture cannot get from one grain the next. Consequently all it can do is to stop. The amount of moisture that passes up through a soil is beyond belief, till one tries to keep track of it. When there is a good moisture content in the soil and the soil is compact to the surface as much as an inch of moisture can evaporate in a week, hence the need of loosening up the soil after a rain, as that packs the soil grains together, so that the moisture can again climb up to surface. He then lit a lamp and called attention to the amount of soil that passes up through the wick, and that water passes up through the soil a good deal the same way. Cutting the wick would stop the oil from going up. Loosening up the soil does to it as cutting the wick—it breaks the connection so that the water cannot get up.

The teacher next called attention to the fact that the plant feeds in the soil that is turned with the plow. To show this he drew a picture of a plant growing in the dead furrow and one growing outside of it. He explained that the small growth of the plant in the dead furrow was due to the fact that it was growing in the sub-soil, and that the plant food in the sub-soil is not available, hence the small plant in the dead furrow. He also called attention to the fact that the largest plant grows on the back furrow, and here there is more plowed soil than elsewhere in the field. This teaches that the soil should be plowed deep so that there will be a lot of soil that has been turned up to the weathering agencies to make its plant food available. The deep-plowed soil will also take in more water when it rains, so that the plant on the deep-plowed soil will have both more food and more moisture. Then it can make a better growth, and it can also stand a hot wind much better.

As stated above, the plant food that is available is in the soil that has been turned with the plow. That is where the moisture is needed by the plant. It can only take up the plant food in solution, hence it must have its water where the food is. The professor also illustrated how the moisture might fail to get up into the plowed soil. He had two lumps of sugar that he placed one on top of the other, and touched the lower one to the ink, which went through the lower lump, but into the top lump very little. He said this was due to the slight break between the lumps. Likewise, when the soil is plowed, the plowed soil is apt to lay loosely on the sub-soil, so that the moisture may not pass up into it. In that case the plant might starve and yet there be plenty of food in the plowed soil and plenty of moisture in the sub-soil. The way to remedy this is to sub-surface pack the soil. This will only be necessary where the soil does not pack down naturally, as it will on most heavy land. The sub-surface packer does not disturb the surface soil, but packs the lower portion of the furrow slice, pressing it into good contact with the sub-soil, permitting the moisture to pass up freely. He used the homely illustration to make it plainer. If a lady was to make soup and put the meat in one kettle and the water in another kettle, it would not make very good soup. That is just what is done when the soil is left in such a condition that the moisture in the sub-soil cannot pass up into the furrow slice and dissolve the plant food there for the plant.

In a good many places, when the soil is put in a condition to keep moisture from evaporating, the soil is so loose that it will blow. This is a serious problem, and it will get worse. The first thing to do is to keep the soil full of roots, as of grasses and alfalfa. The roots hold the soil grains together into soil granules or little lumps, and then it cannot drift. They act a good deal as the band about a bunch of shingles. As long as it is in place the bunch cannot blow, but if the band is broken then the wind can take the singles one at a time and scatter them over a 40-acre lot. Organic matter of any kind is helpful; spreading manure, and especially putting it on thin with the manure spreader, is helpful. In case a crop has been sown and the land begins to drift, then putting on a thin covering of straw will help.

On soil that is inclined to drift avoid using the roller or the planker when the soil is bare. These two implements pack the soil near the surface, where it is wanted loose. Worse yet, their action is to break up the soil granules or small lumps, leaving each little soil grain by itself so that the wind can get hold of it and carry it away. In harrowing this kind of land, do it when the soil is moist to the surface. The action of the harrow is then to break up the soil into small lumps, while if the soil is dry on top it may break up the soil into the individual soil grains that can blow away.

Plow deep, keep the surface loose but the bottom of the furrow slice compact, in good contact with the sub-soil, and plenty of roots or other organic matter in the soil to hold the soil grains together.

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