How Much Tillage Does Corn Need?

Nafziger Says None For Many

REGINA LAROSE
MidAmerica Farmer Grower

DIXON SPRINGS, ILL.

University of Illinois, Extension Agronomist, Emerson Nafziger spoke recently about how much tillage corn needs. "For a lot of people the answer is none." Nafziger explained that the focus of corn tillage decisions should be on what corn actually needs as opposed to what piece of equipment do growers need to buy.

Nafziger was speaking at Dixon Springs, where no-till began during the 50s and 60s with George McKibben. "Thirty years ago, when I first came to Illinois, I thought it looked like everybody was sort of headed to no-till, and that we were going to find a way to make that work. At Dixon Springs, one of the centers of where no-till started people were discovering that soil would actually produce a crop if you didn't till it up and beat it to pieces every spring. That was an important lesson for us to learn."

Today Nafziger says there are only two reasons to till. "The first one would be to improve the seedbed. We can't risk getting a good stand, and if we need to do tillage to do that in a particular soil for a particular reason, then that's what we need to do. We need to stir the surface soil about three or four inches deep so we can place the seed and get good seed-soil contact. The other reason we do tillage is to improve our rooting, increasing the chances that the roots will get down into the soil and be able to extract water and nutrients."

According to Nafziger, many soils in southern Illinois do not need tillage to improve the seedbed. "But some do have a clay pan. It can be a struggle to get roots through that clay pan or to get them tapped into the water that is there. But the pan is deep enough that we often don't really help ourselves very much when we till to help break it up. It depends on the soil. As we go farther north in Illinois, soil temperature becomes a limiting factor in the spring and many growers feel they need to till to get the soil temperatures up for better establishment. That is not a large factor here in southern Illinois. So the answer to how much tillage does corn need, for many growers, is none. They can get this good seedbed and they can get a good chance for the roots to get into the soil and tap the water and nutrients that are there without doing much."

Nafziger was asked how much soil above a hard pan is needed for a successful crop. "When we call it a hard pan we have this vision that it is like rock that the roots are never going to get through. It really doesn't work that way. Our best hope is that some of the roots can get through the clay pan or tap into it in a way that will help it continue to bring water up from below. With adequate rainfall, you need very little soil, but soils in southern Illinois don't provide as much water to the crop as deeper, darker, prairie soils would. That is both because the soil doesn't hold as much water and because the roots can't access it quite as well here. But we can't work miracles; if the water is not there, the water is not there."

Crops are able to draw on subsurface water explained Nafziger. "When the roots are tapped well into the soil and so have access to water from deeper layers, corn can take it up and make a crop even if we don't get much rainfall. When that happens down in these shallower soils or the clay pan soils, often the crop goes under stress earlier and stays under stress longer, and that is where we start to lose the yield."

"Some have had the idea that we can do tillage with our large equipment to break a clay pan so it no longer acts like one. That hasn't worked very where it's been tried. Clay pans form naturally, and they tend to reform quickly. In flatter soils say up in south-central Illinois, we have found that more tillage can actually allow more water into the soil in a wet spring, and this can sometimes lead to lower yields than under no-till. This simply reconfirms that doing only as much tillage as needed is usually the best way to go."

Nafziger added, "We can't forget the importance of both keeping soil in place and keeping some of our residue to keep water from evaporating from the surface." Δ

University of Illinois Extension Agronomist, Emerson Nafziger, explained corn tillage decisions and how much tillage corn needs.
Photo by John LaRose

REGINA LAROSE: Associate Editor, MidAmerica Farmer Grower