

Will Corn Following Corn Face “Issues” In 2011?



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The 2010 season was one of the most disappointing in years for corn in many parts of Illinois, with the statewide average yield only 157 bushels per acre, just 4.2 bushels higher than the U.S. average and the third-worst yield in the past decade. Over the past 10 years, the Illinois corn yield has averaged 13.7 bushels per acre above the U.S. national average and has been below the national average only once (by 4.9 bushels in 2005) and above it by as much as 25.1 bushels (2008).

The major problem in 2010 was heavy rainfall in June that resulted in standing water and saturated soils, which in turn resulted in nitrogen loss and damage to root systems that could not be repaired. As a result, affected fields and parts

of fields ended up with shortages of both nitrogen and water, problems made worse by high temperatures and early maturity, and in some cases by dry weather during the latter part of the grain-filling period.

Most importantly, field and soil conditions as we head into 2011 are much different than they were a year ago. None of the factors of a year ago – late fall harvest, poor tillage conditions, lots of fresh residue on the surface, and much nitrogen yet to apply – exist this spring. I do not believe I have ever in my 30 seasons in Illinois seen the state as “tilled up” going into the spring as it is this year. For certain, if tillage can solve our problems, we can consider them solved as we head into this season. One additional benefit is that it has not been wet for extended periods when soil temperatures were warm since nitrogen was applied, meaning that most of the nitrogen we applied last fall should still be present, with a good deal of it still in the ammonium form and so not subject to loss.

Though we can certainly feel good about preparations we’ve been able to make for this spring, we know from history that a good fall

Table 1. Corn yields in rotation, 2008-09 compared to 2010, in Illinois trials.

Corn crop in rotation	4 sites in northern Illinois		2 sites in southern Illinois	
	2008-09	2010	2008-09	2010
Continuous corn	193	159	160	124
Corn-soybean	217	197	169	129
1st-year corn in corn-corn-soybean	214	191	167	137
2nd-year corn in corn-corn-soybean	204	177	162	119

Corn following corn was particularly hard-hit in 2010, and there were numerous reports of larger yield penalties than most have seen for a number of years for corn following corn compared to corn following soybean. We saw the same thing in our research trials, where we have been comparing continuous corn, corn rotated with soybean, and corn following either corn or soybean in a 3-year corn-corn-soybean rotation. This study was established in 2003, and so 2008 was the fifth or sixth year of continuous corn.

While we have found at some sites that the yield loss in corn following corn or continuous corn compared to corn following soybean has generally been less in recent years than the old 10 percent rule of thumb, we have certainly found little evidence that this yield penalty has gone away (Table 1). Across four northern Illinois sites, this penalty for continuous corn was about 11 percent in 2008-09 and 19 percent in 2010. We did find that second-year corn in the corn-corn-soybean rotation yielded only 5 percent less than soybean following corn in 2008-09 and 10 percent less in 2010, indicating that having soybeans recently in the rotation does help to lessen the negative effect of having corn as the previous crop. At the two southern Illinois locations, with considerably lower yields, the penalty for continuous compared to rotated corn was substantially less, measured either as bushels or as a percentage.

I provided in an article last fall some of the reasons that corn following corn did so poorly in some areas in 2010. In certain ways it was a “perfect storm” of problems, resulting from lots of well-preserved residue, cool temperatures for several weeks after planting, considerable soil compaction, very little opportunity for spring tillage, and marginal seedbed conditions, followed by the large amounts of rain in May and June.

Does the relatively poor performance of corn following corn in 2010 mean that we should worry that 2011 will show similar results? Most indications are that this shouldn't be our ex-

pectation. While the fact that soils are starting to dry out nicely in some areas of the state is a good sign as we head into April, we need to be careful not to undo the compaction relief provided by last fall's tillage by driving on soils before they're dry enough. We know that any driving we do on soils this spring will do some compaction; soils are typically at or near field capacity when we're ready to plant in the spring, and it's at field capacity that they are most subject to compaction. Waiting until soils are dry enough at depth (not just over the surface) will help minimize compaction effects, as will using controlled traffic, making fewer tillage passes, and lowering tire pressure.

Because we had some 3 million more corn acres than soybean acres in 2010, and we grow less than a million acres of crops other than corn and soybean, we know that some 20 percent of the corn acres in Illinois in 2011 will follow corn, providing corn acreage doesn't drop from 2010. With high corn prices and a lot of nitrogen already applied, such a drop seems unlikely.

So should we change anything for corn following corn this year? No. Our research shows that both respond similarly to planting date and to plant population, so those should change only as soil conditions and productivity might indicate. We've never been able to identify hybrids that do consistently better in corn following corn, though corn following corn may tend to experience stress (primarily drought stress) a little more often, so that should be factored in. Diseases related to residues can also be more of a challenge. And corn following corn typically needs a little more nitrogen – see the N Rate Calculator for current numbers.

The important things-having good soil conditions where the seed is placed and good rooting conditions underneath the surface-are critically important for corn no matter what the previous crop. And the crop needs to be well supplied with nutrients and protected from pests. Once we cover these basics, the crop will respond mostly to weather factors – water and temperature – that we don't control. That has always been true, and will be true again in 2011. Δ

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