

AGRONOMIC UPDATE

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Why are Corn-after-Corn Yields Down this Year? - The coffee shop talk across much of Illinois is that corn-after-corn yields are significantly lower than rotated fields in the same proximity. This has left growers wondering what went wrong and if there is anything that can be done different for corn-after-corn fields next year.

The reason why corn-after-corn yields are lower is not due to any one stress, but rather a chain of events dating back to last fall. First, remember back a year ago that harvest was completed late and then cold temperatures occurred after harvest. For that reason, corn residue was “in the freezer” all winter and broke down very little. Add to that the fact that many fields were not tilled last fall and those that were tilled were probably done in less than ideal conditions meant residue was not buried properly. These factors meant there was much more residue than normal to deal with in the spring and summer of this year. Lots of residue at and around planting is undesirable for many reasons. The worst of these is the fact that corn residue ties up nitrogen causing the young corn seedling to be starved for nutrients. Because of this, “yellow flash” is often noticed in corn-on-corn in most years, but this year it lasted much longer and no doubt impacted yield as a result. The reason it lasted longer was for two reasons- 1) there was much more residue that had to be broken down by microorganisms than in past years 2) the wet weather after planting caused anaerobic conditions which further delayed breakdown of residue.

Compounding this nitrogen problem was the dry weather during and shortly after pollination. Corn needs to take up 40% of its overall nitrogen needs during grain fill. Much of this nitrogen is typically supplied by mineralization of nitrogen in the soil. In this process, soil microorganisms break down organic matter in the soil (more so than in the spring because soils are warmer), but this year this was drastically reduced due to the fact that soil moisture is necessary for the process and it was lacking. Exasperating this even more was the fact that rooting depth was shallow due to early season rains so corn roots were not able to access available nitrogen deeper in the soil profile.

Hindsight is always 20/20, but if these events could have been predicted some of this yield disadvantage could have been overcome with higher nitrogen rates. Growers who accidentally or purposely put on more nitrogen than normal were able to overcome some or most of this yield difference. The reason for this is the additional nitrogen “fed” microorganisms allowing them to break down residue faster and allowed for more plant available nitrogen in the root zone for corn seedlings to absorb. Also, growers who side-dressed nitrogen also benefited because this supplemental nitrogen was put on just when corn roots were able to absorb nitrogen allowing take-up before microorganisms could tie up nitrogen.

Nitrogen is probably indeed the main culprit why corn-on-corn yields were lower than rotated fields, but it is important to note that it is not the only reason. The wet spring and fall in 2009 lead to severe compaction in many fields and conditions were not dry enough after harvest to alleviate it with tillage. Besides compaction, the excessive residue kept soils cool and wet this spring which put stress on emerging seedlings and certainly delayed their development. And lastly, the earlier than normal planting that took place meant even less time for residue to break down and prolonged the period seedlings were exposed to cooler soils before temperatures warmed in May.

Looking to next year there may be growers questioning whether to do corn after corn after what happened this year. The conditions for raising corn after corn successfully next year are increased significantly over this year. The main reason being corn harvest is finishing much earlier and soils are dry enough to allow both the alleviation of compaction and the burying and subsequent decomposure of much residue yet this fall. It is of the utmost importance though for growers to immediately chisel-plow these fields before heavy rains come and allow as much time for residue to break down in the event temperatures remain warm through September and October. As for nitrogen, there is no way to predict the ideal amount needed for next year’s crop. But conditions for extra nitrogen as was needed this year are much less likely because of the lesser amount of residue that will probably be dealt with in the spring.