

## Question open for debate

# Is nitrogen needed to speed decay of Bt stalks?

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Corn seed containing bacillus thuringiensis (Bt) and other genetically modified traits have played a big role in the continued increase in corn yields across the country. Like most things, the good comes with a little taste of bad medicine.

The slow decomposition of Bt-con-

taining corn stalks after harvest has been heralded by some as another good thing, because it may slow feeding of insects and make laying eggs more difficult for other insect species and generally provide a less desirable environment for both insects and disease organisms.

### Causing nitrogen deficit

However, research and plenty of farmer reports in recent years indicate these slow

decaying corn stalks, which produce a high yield and high volume of residue, tie up a lot of nitrogen in the soil and in some fields has caused a nitrogen deficit.

The time required for conventional or Bt corn stalks to decay depends on the carbon-nitrogen ratio. This is simply the ratio of carbon to nitrogen in the corn stalk. Though the problems associated with poor nitrogen performance in corn is commonly attributed to thicker rind and slower

degradation of the stalk, the problem existed long before Bt corn hit the market.

Whether or not Bt-corn stalks decay slower than non Bt-corn stalks is still open for debate. Early research indicated some differences, but recent USDA studies indicate no difference in rate of stalk decay in Bt-corn versus non Bt-corn.

### Some differences indicated

In this study, differences in rates of decomposition and biomass fraction contents were observed for leaf, stalk, and cob plant parts. Differences in total C, total N, and biomass fractions of the initial Bt and non-Bt hybrid plant materials did not

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correspond to differences in rates of decomposition. The difference in rate of stalk decomposition was more likely a result of varietal differences rather than the Bt gene, according to USDA researchers.

Microorganisms that cause decay of corn stalks work best if the carbon to nitrogen ratio is less than 30. Most conventional corn hybrids have a ratio less than 30 and most Bt-containing corn hybrids have a carbon to nitrogen ratio higher than 30.

Adding extra nitrogen to speed the decaying process is a natural solution, but the high cost of nitrogen and the time and cost of application has left many farmers wondering how much nitrogen to use and how and when to apply it.

It is widely accepted that wet soils can lead to nitrogen losses. If so, could leaving Bt-containing corn stalks in wet fields further speed the loss of N? The continued increase in the use of Bt corn, and of the renewed popularity of corn in general seem to indicate a need among corn growers in the Southeast to take a look at the potential problem prior to planting their 2011 crop.

The use of Bt corn isn't as widespread in the Southeast as it is in the Midwest, but it is growing. Bt corn debuted in 1996, and by 2010 was planted on nearly 60 million of 87 million total corn acres in the U.S.

Other staple crops in the Southeast have shown even more dramatic increases in Bt-containing varieties. It is estimated nearly 75 percent of this year's cotton crop was planted to Bt-containing genes. Nationwide, over 90 percent of soybeans are Bt-containing varieties.

In some areas of the Southeast, the use of Bt-containing

crops has grown along with the popularity of no-till and other conservation-tillage practices. The combination of no-till and Bt corn may be reason enough for growers in the Southeast to look at fall nitrogen application.

Though the heavier soils of the Midwest aren't a true comparison of growing corn there and in the upper Southeast, the use of fall nitrogen is becoming a standard practice in fields in which corn stalks are left standing.



**CORN STALKS and other crop residue can create nitrogen shortages in crops that follow corn.**

Veteran Kansas State Agronomist Dave Mengel says, "There has been a lot of work over the years showing that adding 30-40 pounds of N will speed up the decay process. Ideally, this N is sprayed on in a UAN solution that gives more uniform coverage.

If a grower decides to add N to corn stalks, they should do it as soon as possible. The whole idea is to get N into the system so that microbes will tie it up and utilize it. So, in this situation you want the nitrogen to be lost — because that's what gets the residue to break down quicker, Mengel explains.

"Back in the 1980s there was a big push to get nitrogen in a corn field to break down the residue. Back then we did a lot of deep tillage and by adding additional N farmers could get the stalks broken down quicker and get them out of the way and ready for fall or spring tillage.

"Now, no-till is so popular, and farmers just don't think the same way about corn residue as they did back then. However, plenty of high yield producing farmers in Kansas, especially those who grow corn after corn, are getting a tremendous buildup of residue. Going back to some of the practices we did in the 1980s, specifically adding extra N to corn residue, can help solve that problem," the Kansas State researcher contends.

Whether corn growers in the Southeast need to apply extra nitrogen to speed decay of standing corn stalks likely depends more on the variety of Bt-corn planted and the rotation crop that follows. If corn is following corn, the extra N is likely a good insurance policy against N loss from slow decaying varieties.