Bt Corn:

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begin with, then this analysis probably holds true. However, if the Bt gene is put into a hybrid that has lower yield potential, then there may not be a benefit from using the Bt technology.

Put simply, it is quite possible that a superior non-Bt hybrid will still outperform an inferior Bt hybrid. In the end, yield of the corn hybrid will be some combination of having a good yielding hybrid to begin with, and having the addition of the Bt gene. Thus, hybrid trials are still as important as ever.

If this new technology means that in 50-80 percent of the corn fields of the U.S., using Bt corn will give economic returns in most fields. But that still leaves 30-50 percent of the fields in which that $7/acre premium may not pay off.

How does a grower maximize returns on this $7/acre premium?

Here is a rule of thumb to help corn growers maximize their investment in Bt corn: corn borer usually attacks the earliest planted fields (the tallest) during its June or first generation, and the latest planted fields (the younger ones, espcially in in silk stages) in its August or second generation. Fields planted in between the earliest and latest are less likely to be attacked. Also, because tillage destroys much of the corn borer population, fields near no-till may experience higher corn borer populations.

To give you a better feel for which of your fields corn borer is attacking, try a few things, and some of these you can do now. Think about which fields had the most June damage — the "shothole" damage. Were these the earliest planted ones in your area or farm? If so, these would be good ones in which to use Bt corn next year.

For the August and September damage (stalk tunnels, ear damage), you can visit your fields now and get a feel for where corn borer attacked. Were the ones attacked those which were showing green silk in August, when others were drying down? Then these might be good fields for Bt corn. Again, remember the rule of thumb: corn borer usually attacks the earliest planted fields in June and the latest planted fields in August.

Some of our research at Penn State is addressing this question: which fields (planting dates) do corn borer attack?

Bt corn is a dramatic new technology that all growers should be interested in seeing around for a long time, which brings this article to its last subject: Will insects become resistant to Bt corn if enough of it is planted in our fields? There is a lot of theory, but my opinion is that it is difficult to predict at this time whether resistance will occur.

All corn growers have an important role to play in this "resistance management," or helping us to preserve this valuable new technology: Watch your fields and look for corn borer. If you have a field of Bt corn and see corn borer damage, several possibilties exist. First, perhaps the field is not Bt corn as you think, or that Bt hybrid doesn't have a high level of Bt toxin. There are test kits which allow you to know whether that field has the Bt toxin in the plants. Second, you may have mixed Bt and non-Bt seed, or alternated rows of Bt and non-Bt, so that the larger worms moved from non-Bt to Bt plants (even with Bt plants, the larger worms may survive). Third, all Bt corn hybrids are not necessarily equal. Some have the toxin in all plant parts, whereas others may only have the toxin in the living green tissues, so that corn borer may survive on non-green plant parts.

These examples so far are not cases of resistance. However, if the whole field is Bt corn, and you are seeing many corn borer worms, you may have a case of resistance. In any case, it is important to contact the producer of the seed and your local extension agent and let them know that you may have a problem. In the end, it helps all corn growers for all of us to be aware of the potential of insects becoming resistant to Bt corn. Any potato grower dealing with potato beetle knows that insect resistance can be a significant economic concern. Let's preserve this valuable new technology.

Corn Talk News

RESEARCH UPDATE

CORN TALK NEWS
PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.

USEFULNESS OF PSNT FOLLOWING ALFALFA IN WISCONSIN

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A 4-year study at the University of Wisconsin recently published in the Journal of Production Agriculture revealed that the presidedress soil nitrogen test (PSNT) often overestimates the N requirements for corn grown following alfalfa.

In this study, researchers L.G. Bundy and T. W. Andraski of the University of Wisconsin measured the response of corn to N at 24 sites between 1988 and 1991. At each site, corn followed alfalfa and a sample to 1 foot was taken when the corn was 6 to 12 inches tall.

Where no fertilizer was applied to the corn, the PSNT levels at sidedressing ranged from 10 to 43 ppm nitrate-N and at 11 of the 24 sites the PSNT level was less than 21 ppm, indicating that the field would be responsive to N fertilizer.

In Pennsylvania, we use 25 ppm as a critical level to decide whether fields would be responsive. Corn yields did not respond to N at any of the sites in the study, however, so the PSNT overestimated the N requirement at nearly one half of the sites. The authors believe that the failure of the test was caused by slow mineralization of residual N from the alfalfa at some of the sites, probably due to the lower soil temperatures that are often encountered in the spring in Wisconsin.

Most studies indicate that corn following alfalfa rarely responds to more than 30 to 50 pounds of additional N. The authors suggest that a small N application of 50 pounds per acre or less could be applied on those fields following alfalfa where the PSNT is below the critical level. They feel the PSNT is a good tool to convince growers on the need to take a credit for the alfalfa in their N fertility program, since often it will indicate that no additional N is necessary.

Pennsylvania research has revealed very similar results. We have documented a number of cases where PSNT level were relatively low following a legume sod, resulting in a higher than expected N recommendation.

Dr. Dick Fox and his colleagues at Penn State have found that to date the PSNT overestimated N requirements on 12 of 41 sites, or 29 percent of the time when following a legume sod that has not received manure. Fox also attributes this to inadequate mineralization of nitrate by the time the sample is taken. In all but one of the other sites the PSNT correctly predicted that there would be no response to additional N.

Thus a high PSNT level in a field following a forage legume is a reliable indicator of adequate N for the corn crop. However, a low level following a forage legume can be misleading and often indicates the need for more N than is really required.

Our recommendation has been not to use the PSNT on fields where corn is following a legume that has not been manured. On these fields, we suggest using the standard recommendations for corn following a legume of 20 to 50 pounds N/acre depending on the expected corn yield and the per cent legume in the old stand. PSNT sampling should be concentrated on fields that have received manure where the test has been found to do a reliable job of indicating whether additional sidedress N is required.