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DO CORN HYBRIDS DIFFER IN FERTILIZER NEED?

We often hear that certain corn hybrids respond to fertilizer more than others. For example, Wisconsin research found that those with later relative maturity were more likely to respond to starters. This could mean that recommendations need to be tailored to the hybrid. How can we be sure that each gets what it needs?

There are good reasons why hybrids might differ in the nutrients they require. We know they differ in the way they grow roots, in their yield potential, and in the quality of their grain. They also respond differently to weather. Temperature and water in the soil influence both nutrient availability and the plant's capacity to take up what is available.

But there are also indications that it is difficult to predict what each hybrid requires. Recent research in Illinois tested the response of 10 hybrids to rates of nitrogen ranging from zero to 240 pounds per acre. In both 2003 and 2004, hybrids differed widely in the rates found to be optimum for yield. But their optimum rates did not correlate from the first year to the second year of the study. Apparently, weather affected each hybrid's relative need for nitrogen.

In 1997 and 1998, Ontario research compared five hybrids for their yield response to potassium fertilizer. While responses ranged at least 5 to 21 bushels per acre each year, the hybrids were fickle: the size of their responses varied from the one year to the other.

One can only speculate why results like this might occur. It is possible that hybrids differ in the way the weather influences their root growth. They may also differ in the way their yield potential responds to weather, though the Illinois study found no association between yield and optimum rate. Possibly, hybrids differed in the way weather influenced the amount of protein—and therefore nitrogen—that ended up in the grain. An older Ontario study found that 18 corn hybrids ranged from 1.30 to 1.75% in grain nitrogen concentration.

Hybrids can also differ in the way they interact with soil organisms like mycorrhizal fungi. Another study found that six hybrids differed significantly in early phosphorus uptake. The seedlings differed by as much as 44% in phosphorus concentration.

Hybrids also differ in nutrient removal. Recent research in Nebraska found big differences among a dozen corn hybrids. A new hybrid removed 83 pounds of P_2O_5 per acre — 54% more than an older hybrid. Part of the difference was due to higher yield, but interestingly, the hybrids varied twice as much in nutrient concentration as they did in yield — and the differences were consistent over two years. The implications for feed quality and for nutrient management plans are considerable.

When we consider that many hybrids come and go within as little as 3 years, we can't realistically expect to know their specific nutrient needs precisely. But it is important to be aware that nutrient requirements can change with new hybrids. As more products of genetic engineering arrive on the marketplace, testing for interactions with nutrient levels should be a high priority for on-farm research.

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