Can sweet corn be grown using less atrazine?

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Atrazine is one of the most widely used herbicides in North American corn production, but heated controversy remains over the 50-plus-year-old product. Several other herbicides are used in corn production, and a host of non-chemical tactics are sometimes used, too. If the use of atrazine is restricted or banned altogether, how will sweet corn growers cope? A recent University of Illinois study shows sweet corn can be grown successfully without atrazine, but given today's approach, perhaps not very often.

"We wanted to know the implications of using less atrazine in current weed management systems of sweet corn," said USDA Agricultural Research Service ecologist at the U of I Marty Williams. "We conducted field studies at locations throughout North America and found that weed control falls apart pretty quickly as atrazine is removed."

Williams said that further restrictions or a complete ban of atrazine would increase occurrences of weed control failure and subsequent yield losses in sweet corn, so finding an alternative is important.

"Atrazine is relied on more heavily in sweet corn than field corn, and an economically comparable herbicide doesn't exist. Prior to our research, it wasn't known if the newest herbicide chemistry enabled the amount of atrazine to be reduced while maintaining yield protection."

As the fate of atrazine remains unknown and voices are heard pro and con, Williams said, his team's recent findings provide a research-based analysis of the implications of using less atrazine in sweet corn

production.

Performance consistency of reduced atrazine use in sweet corn will be published in the March issue of Field Crops Research, and is currently available online. Coauthors include Rick Boydston (Agricultural Research Service at Prosser, WA), Ed Peachey (Oregon State University), and Darren Robinson (University of Guelph, Canada).

Field experiments were conducted in the primary North American production areas of sweet corn grown for processing to determine how reduced applications of atrazine would affect weed control and crop yield. One of the newest herbicides available for use in sweet corn, tembotrione, was applied postemergence at a low dose with a range of atrazine doses from 0 to 1 pound per acre. Also, the authors conducted this work in two hybrids differing in canopy architecture and competitive ability with weeds.

Atrazine reduced the risk of poor performance of tembotrione. Atrazine doses up to 1 pound per acre with tembotrione improved grass control and broadleaf weed control in 5 of 8 and 7 of 8 environments, respectively.

"We saw a risk-reducing benefit, in terms of weed control and yield stability, of using some atrazine in most conditions," Williams said. "Of the three environments that had particularly low broadleaf weed control with tembotrione alone, sweet corn yield was improved with low doses of atrazine."

The bottom line, Williams said, is that a small amount of atrazine applied postemergence reduces the risk of herbicide failure. "When atrazine use is reduced, the typical hybrids having poor competitive ability disproportionately release grass and broadleaf weeds and suffer higher crop losses."

Atrazine wasn't needed when other aspects of weed management worked well in reducing weed pressure. For instance, a hybrid with more competitive growth characteristics performed better in systems using less atrazine. "The research also demonstrates room for improvement in non-chemical components of weed management, such as with cultural tactics," Williams said.

"Because atrazine is inexpensive, its use enables growers to reduce the risk of variable weed control and potential crop losses at minimal cost, which means there is little economic incentive for alternatives unless, of course, the herbicide is restricted further or no longer available."

Although weed management systems in corn are dominated by herbicides, a simple replacement herbicide for atrazine doesn't exist in sweet corn. "I believe overcoming such a challenge would be possible", he said. "But knowing how to make the transition will require an investment in sound research."

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