

# A Future Of Seed Mixtures In The Corn Belt Seems Certain: Potential Consequences

DR. MICHAEL GRAY

URBANA, ILL.



The U.S. Environmental Protection Agency (EPA) has given regulatory approval to several companies to move forward with the full-scale commercialization of Bt hybrids in which a seed mixture forms the basis of resistance management. A paper

was recently published in the *Journal of Economic Entomology* (Vol. 104, No. 2, pp. 343-352; DOI: 10.1603/EC10388) titled "Seeds of Change: Corn Seed Mixtures for Resistance Management and Integrated Pest Management." The lead author is David Onstad, a professor in the University of Illinois Department of Crop Sciences. David is an internationally respected modeler and has been instrumental in developing models that help the scientific community and the EPA better understand how resistance to Bt corn may develop. Provided are some summary quotes from this important and timely article.

- "We conclude that seed mixtures will make pest monitoring more difficult and that seed mixtures may make IRM [insect resistance management] riskier because of larval behavior and greater adoption of insecticidal corn."

- "Conversely, block refuges present a different suite of risks because of adult pest behavior and the lower compliance with IRM rules expected from farmers."

- "This risk-management approach to corn pest management has certainly provided tangible benefits to producers in corn-producing regions where target pests were once abundant, as in the case of Bt corn hybrids targeting European corn borers. However, this approach carries with it the tendency to ignore many aspects of IPM, such as monitoring pest levels and concentrating treatments when or where appropriate, because there is an assumption that most pests are controlled throughout the season, regardless of pressure levels. Although field corn has never been considered an IPM-intensive cropping system, there is less impetus than ever for growers or crop consultants to enter fields."

- "We expect that growers will have fewer choices in what hybrids they grow in their fields. Therefore, from the perspective of overall IPM, we are concerned that seed companies will provide fewer options for regional needs, secondary pests, disease control, and refuge plantings."

- "We question whether pyramided toxins will actually increase mortality in targeted pests. Without this increase in mortality through independent activity of each toxin, the pyramid has much less value for IRM. The U.S. Environmental Protection Agency recently acknowledged that a corn hybrid pyramided with two toxins active against corn rootworms does not significantly increase larval mortality."

These statements are worthy of reflection as the industry transitions to the new paradigm of 95-to-5 seed blends across the Corn Belt. The authors of this paper represent a diversity of our land-grant institutions: University of Illinois, University of Wisconsin, University of Minnesota, Purdue University, Michigan State University, Iowa State University, Kansas State University, and Penn State University. Scientists from additional organizations contributed to the article, including the USDA-ARS, the Illinois Natural History Survey, and the Ontario Ministry of Agriculture.

Another significant consequence of the seed mixture infrastructure emerging within the corn insect protection arena is increasing pressure on the long-term sustainability of the soil insecticide market. As the number of refuges configured as blocks, strips, or separate fields declines, soil insecticide use should also be reduced. Ultimately, loss of soil insecticide products will result in a reduced flexibility for producers to effectively manage economic infestations of white grubs, wireworms, and other soil insects. In addition, if resistance develops to Bt hybrids and becomes widespread, growers will need to have some remaining tools to manage insect pests of corn. It remains to be seen whether some groups within the agribusiness sector are interested in maintaining their investments in this competitive arena just in case resistance develops or to offer products targeted against secondary soil insect pests. Δ

DR. MICHAEL GRAY: Professor, Crop Production, University of Illinois



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