SWEET CORN HYBRID TOLERANCE: FROM FIELD EVALUATIONS TO GROWER RECOMMENDATIONS. Joseph D. Bollman, Chris M. Boerboom, Roger L. Becker, Mark J. VanGessel, Robin R. Bellinder, and Ed Peachey, Graduate Research Assistant, Professor, Department of Agronomy, University of Wisconsin, Madison, WI 53706, Professor, Department of Agronomy and Genetics, University of Minnesota, St. Paul, MN 55108, Professor, Department of Plant and Soil Sciences, University of Delaware, Georgetown, DE 19947, Professor, Department of Horticulture, Cornell University, Ithaca, NY 14852, and Assistant Professor, Department of Horticulture, Oregon State University, Corvallis, OR 97331.

Sweet corn weed management can be challenging because of the limited number of postemergence herbicides and the potential for these herbicides to cause injury. Currently, nicosulfuron, mesotrione, and topramezone are labeled for use in sweet corn. Dicamba plus diflufenzopyr and tembotrione are being developed for postemergence applications in sweet corn. Two field studies were conducted to evaluate hybrid tolerance to these postemergence herbicides.

The first study evaluated hybrid tolerance to nicosulfuron, mesotrione, topramezone, and dicamba plus diflufenzopyr in experiments with a strip-plot arrangement and a single replication at sites in Oregon, Minnesota, Wisconsin, Illinois, New York, and Delaware. The main plot at each site was herbicide treatment and the subplot was sweet corn hybrid. Hybrids were planted in 6-m long single-row plots and hybrid order was randomized among sites. Seed companies entered hybrids to be evaluated for each herbicide treatment. Treatments were nicosulfuron at 70 g ai/ha; mesotrione at 210 g ai/ha; topramezone at 37 g ai/ha; dicamba at 28 g ae/ha plus diflufenzopyr at 11 g ae/ha plus the safener isoxadifen-ethyl; and a nontreated control for each herbicide treatment. Herbicide rates were twice the labeled or anticipated labeled rate to differentiate among tolerant and susceptible hybrids. Herbicides were applied at the V3 growth stage. Crop injury ratings were taken at 3, 7, and 14 days after treatment (DAT).

The second study was designed as a preliminary study to determine the potential need for future hybrid tolerance testing to tembotrione and if dicamba plus diflufenzopyr affected late-season sweet corn development. The study had a strip-plot arrangement with a single replication at sites in Minnesota, Wisconsin, New York, and Delaware. Twenty-eight hybrids were planted in 6-m long single-row plots and hybrid order was randomized among sites. Treatments were tembotrione at 184 g ai/ha plus the safener isoxadifen-ethyl; dicamba at 28 g/ha plus diflufenzopyr at 11 g/ha plus the safener isoxadifen-ethyl; and a nontreated control. Crop injury ratings were taken at 3, 7, and 14 DAT and sweet corn was harvested for yield.

In the first study, 58 of the 87 topramezone-treated hybrids had 1% or less chlorosis at 7 DAT. No hybrid exceeded 5% chlorosis when treated with topramezone. All of the 72 hybrids treated with dicamba plus diflufenzopyr had lodging of at least 10% of the plants within the plot at 3 DAT. Stunting of at least 10% occurred in 43 of the 72 hybrids by 14 DAT. At least 10% general leaf wrapping occurred in 42 of 72 hybrids. Hybrids treated with mesotrione or nicosulfuron exhibited differential hybrid response as expected. The 59 hybrids that were evaluated for mesotrione tolerance had 0 to 51% chlorosis at 7 DAT. At least 10% chlorosis was observed in 21 of 59 hybrids evaluated. The 64 hybrids that were evaluated for nicosulfuron tolerance ranged from no injury to plant death. At least 10% stunting was observed for 33 of 64 hybrids evaluated.

In the second study, Merit was the only hybrid of the 28 hybrids that had significant injury from tembotrione and was killed. Dicamba plus diflufenzopyr caused greater than 10% lodging for 27 of the 28 hybrids in the study. At least 10% stunting occurred in 17 of 28 hybrids at 14 DAT while leaf wrapping was observed on 23 of 28 hybrids at 30 DAT.

Field research has been conducted for 3 years to determine the postemergence tolerance of 185 and 179 hybrids to nicosulfuron and mesotrione applications, respectively. The tolerance of the field-tested hybrids was classified as tolerant, intermediate, sensitive, or highly sensitive. Guidelines to manage the

risk of nicosulfuron or mesotrione injury of specific sweet corn hybrids based on their tolerance have been developed to supplement guidelines on the label provided by DuPont for Accent® or Syngenta for Callisto®.

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