

EFFICACY AND TOLERANCE OF HPPD-INHIBITING HERBICIDES IN SWEET CORN. Joseph D. Bollman, Chris M. Boerboom, and Roger L. Becker, Graduate Research Assistant, Professor, Department of Agronomy, University of Wisconsin, Madison, WI 53706, and Professor, Department of Agronomy and Genetics, University of Minnesota, St. Paul, MN 55108.

Mesotrione and topramezone are HPPD-inhibiting herbicides that are currently labeled for postemergence (POST) applications in sweet corn. Tembotrione is a new HPPD-inhibiting herbicide being developed for use in sweet corn. Randomized complete block trials were conducted at Arlington, WI and Waseca, MN in 2006 to evaluate efficacy and hybrid tolerance to POST applications of these herbicides. Mesotrione, topramezone, and tembotrione were applied to Legacy sweet corn at 105, 12, and 138 g ai ha<sup>-1</sup>, respectively with and without 560 g ai ha<sup>-1</sup> of atrazine. Topramezone and tembotrione treatments were applied with 1 % v/v crop oil concentrate and 3.5 L ha<sup>-1</sup> of 28% urea ammonium nitrate while mesotrione treatments were applied with 0.25 % v/v nonionic surfactant. All treatments had *s*-metolachlor applied preemergence at 2.1 kg ai ha<sup>-1</sup> for grass control. These treatments were compared to 6 broadleaf herbicides currently registered on sweet corn in the efficacy trial. A second study was conducted to determine sweet corn hybrid tolerance to these three herbicides. A split-plot design was used where herbicide treatment was the main plot, rate was the sub-plot, and sweet corn hybrid was the sub-sub-plot. Treatments consisted of mesotrione plus atrazine at the rate above along with either 1 % crop oil concentrate or 0.25 % v/v nonionic surfactant, tembotrione with and without atrazine plus 1 % v/v crop oil concentrate and 3.5 L ha<sup>-1</sup> of 28% urea ammonium nitrate, and topramezone at 12 or 18 g ai ha<sup>-1</sup> plus 560 g ai ha<sup>-1</sup> of atrazine, 1 % v/v crop oil concentrate, and 3.5 L ha<sup>-1</sup> of 28% urea ammonium nitrate. These rates were applied once and twice (double rate) and were compared to a nontreated control. Six hybrids were used with suspected low, moderate, and high levels of sensitivity. The hybrids were Cahill, Dynamo, GH 2042, GH 2547, GH 9597, and Merit. A preemergence herbicide treatment was applied to the entire experiment to prevent early season weed competition.

Mesotrione, topramezone, and tembotrione with or without atrazine controlled greater than 90% of the velvetleaf and common ragweed at 14 days after treatment (DAT) at both sites. All treatments controlled common lambsquarters greater than 90% except for topramezone at Arlington where control was 88%. This was significantly less than the control provided by mesotrione, tembotrione or topramezone plus atrazine. At 35 DAT, all three herbicides with or without atrazine controlled greater than 90% of common lambsquarters and velvetleaf. These herbicides also controlled greater than 90% of common ragweed except for mesotrione at Waseca, which was controlled at 87%. Neither stunting nor chlorosis occurred at the Arlington site. However, slight chlorosis occurred at Waseca with no statistical difference among these three herbicides, with or without atrazine. Stunting from topramezone was 10%, which was significantly greater than all other treatments.

In the tolerance trial, hybrids were rated for chlorosis and stunting. Tembotrione killed the hybrid Merit at both locations. At 7 DAT, mesotrione caused up to 63% chlorosis of Merit at Arlington and 53% chlorosis at Waseca, whereas topramezone caused up to 2 and 9% chlorosis at Arlington and Waseca, respectively. Mesotrione stunted Merit more than topramezone at 14 DAT. On the other five hybrids, chlorosis at 7 DAT ranged from 0 to 10%, 0 to 9%, and 0 to 14% for tembotrione, topramezone, and mesotrione treatments for both rates at Waseca. Chlorosis at 7 DAT at Arlington ranged from 0 to 2%, 0 to 4%, and 0 to 38% for tembotrione, topramezone, and mesotrione treatments for both rates. The least amount of chlorosis occurred in GH 9597 and GH 2547 across all treatments. Excluding Merit, Dynamo was generally the most sensitive hybrid to these herbicides and the chlorosis was primarily caused by the mesotrione treatments.