

IMIDAZOLINONE-TOLERANT WINTER WHEAT RISK ASSESSMENT. Phillip W. Stahlman, Anthony D. White, Patrick W. Geier, and John C. Frihauf, Professor, Visiting Scientist, Assistant Scientist, Kansas State University Agricultural Research Center, Hays, KS 67601, and Biological Science Technician, USDA-ARS, Urbana, IL 61801.

An experiment has been conducted annually since 2001 near St. John, KS to assess the risk of moving imidazolinone herbicide tolerance into a jointed goatgrass population, to determine the rate of resistance integration into jointed goatgrass and investigate jointed goatgrass-wheat hybrid population dynamics, and to investigate management practices to prevent development of imidazolinone tolerant jointed goatgrass. The experimental area was initially overseeded with spikelets of three jointed goatgrass accessions grown in different years and environments. Conventional hard red winter wheat ('Jagger') and imidazolinone-tolerant hard red winter wheat ('AP502CL') were grown using Best Management Practices (inversion tillage after the third crop year and non-inversion tillage in other years; large sized-seed; 50% higher-than-normal seeding rate; and narrow row spacing; in-furrow starter fertilizer plus spring N topdress) compared to conventional production practices (non-inversion tillage; normal sized seed, seeding rate and row spacing; and broadcast fertilizer without starter plus spring N topdress). Certified Jagger and AP502CL winter wheat was seeded each year as well as certified AP502CL the first year followed by saved (bin-run) seed in subsequent years. Jagger wheat was sprayed each year with sulfosulfuron at 0.031 lb/A, and AP502CL wheat was sprayed with imazamox at 0.024 or 0.40 lb/A. In all years, combining BMPs with imazamox use in imidazolinone-tolerant wheat dramatically reduced jointed goatgrass populations, both in the crop and in the 3-month fallow period between crops, compared to conventional wheat production. Occurrence of jointed-goatgrass-wheat hybrid spikes varied by year; none were found in the 2002 or 2004 wheat crops but 441 and 376 were found in the 2003 and 2005 wheat crops, respectively. The germination rate of hybrid spikelets collected in 2003 was 1.1%. These were transplanted to pots and grown in a greenhouse. Twenty-five of 63 F₁ hybrid plants (40%) survived treatment with imazamox at 0.031 lb/A to produce 139 spikes and 1360 spikelets. From these, only five seeds were recovered, three germinated, and two survived transplanting to pots in the greenhouse and were sprayed with imazamox at 0.031 lb/A. One of the two plants died and the other was severely injured and did not produce seed. Winter wheat yield differences between treatments within years were significant only in 2003. In that year, despite jointed goatgrass presence, Jagger yielded more than AP502CL sprayed with imazamox. Yields of AP502CL were higher when grown using BMPs than when grown using conventional production practices. The experiment is continued.