EFFECT OF SOIL-APPLIED HERBICIDE APPLICATION TIMING ON FOXTAIL SPECIES CONTROL AND CORN YIELD. Damian D. Franzenburg, James F. Lux, and Micheal D.K. Owen, Agricultural Specialists and Professor, Department of Agronomy, Iowa State University, Ames, IA 50011.

Experiments were conducted near Ames, IA from 1999 to 2002 to determine the effect of application timing of several herbicides on weed control and corn yield. The experimental design was a randomized complete block with three replications for 1999, 2000, and 2001, and six replications for 2002. Plots were 3 by 7.6 m and experiments were planted with 76 cm row spacing on no tillage soybean ground. Acetochlor, dimethenamid, flufenacet & metribuzin, and s-metolachlor were included in the 1999, 2000, and 2001 experiments, and dimethenamid was replaced by flufenacet in the 2002 experiment. All herbicides were applied at labeled rates and were tank mixed with glyphosate at 0.84 kg/ha to control existing weeds. Applications occurred at approximately 60, 45, 30, and 15 days before planting (DBP) and preemergence (PRE), following planting. Dicamba was applied early postemergence at 0.56 kg/ha to all plots to control broadleaf weeds. Percent visual control of foxtail species was evaluated at four and eight weeks after planting. Giant foxtail was the primary species in 1999 through 2001, and a mix of green and yellow foxtail occurred in 2002. Plots were machine harvested and yield was corrected to 15.5% moisture.

In 1999, 2000, and 2001, foxtail species control was above 87% for flufenacet & metribuzin, regardless of application timing. Control was above 82% control for s-metolachlor, with the exception of 67% control at the 60 DBP timing in 2000. Acetochlor provided 82 to 95% control across timings in 1999 and 2001. However, in 2000 marginal control was provided at most timings and only 52% control occurred at 60 DBP. Dimethenamid provided less control each year at the 60 DBP timing than the other herbicides.

Application timing was determined significant when yield data was combined for 1999, 2000, and 2001. However, only the 60 DBP timing was significantly lower than the other timings. Yields from flufenacet & metribuzin were at least 10% higher than all other treatments when averaged over all application timings. There were no significant differences between the remaining herbicides, averaged across timings. There were no significant differences between herbicides at individual timings of 45 and 30 DBP and PRE timings. However, s-metolachlor and dimethenamid had significantly lower yields than others at 60 DBP, and acetochlor and s-metolachlor had lower yields for the15 DBP treatment.

Unlike 1999 through 2001 combined data, 2002 yields were very responsive to application timing. Heavy foxtail species pressure occurred in the 2002 experiment. PRE and 15 DBP timings yielded similarly and were followed by the 30 and 60 DBP. The 45 DBP timing provided the lowest yields. Flufenacet & metribuzin and flufenacet treatments yielded significantly higher than s-metolachlor and acetochlor when data was combined for 2002. S-metolachlor yielded significantly higher than acetochlor. There were also differences between herbicides at each timing.

The trend for corn yields could generally be predicted by weed control from combined data for 1999, 2000, and 2001. This trend was very strong for 2002. Weed control and corn yields improved from 45 to 60 DBP. Weed control and yield continued to increase for 30 and 15 DBP and PRE timings. The timing effect was significant ($P<0.05$) for data combining 1999 through 2001 and for 2002. However, differences were more pronounced between application timings during 2002, when much greater foxtail pressure existed. Considering all four years of data, 15 DBP and PRE timings consistently provided better foxtail control and higher corn yields.

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