

DEXTER, ALAN G., JOHN L. LUECKE, Department of Plant Sciences, North Dakota State University, and the University of Minnesota, Fargo, ND 58105, WILLIAM E. LUESCHEN AND JODIE K. GETTING, University of Minnesota, Southwest Experiment Station, Lamberton, MN 56152. -Herbicide carryover into sugarbeet.

ABSTRACT

Sugarbeet commonly follows soybean and corn in crop rotations in eastern North Dakota and Minnesota. Sugarbeet is susceptible to relatively low levels of carryover of several corn and soybean herbicides. The objective of these experiments was to evaluate sugarbeet injury from herbicide carryover.

Experiments were initiated in 1989, 1990, 1992 and 1993 on a silty clay soil with 5.7% organic matter and pH 8.0 near Fargo, ND. Soybean was solid seeded in late May to early June of the first year of the experiments. Herbicides were applied postemergence in late June to early July to soybean with two to six trifoliolate leaves. Sugarbeet was seeded in mid to late May in the second year of the experiment and thereafter. Average annual precipitation at Fargo is 20.8 inches. Annual precipitation at Fargo was 1.6, 3.7 and 0.4 inches below normal in 1989, 1990 and 1991, respectively. Annual precipitation was 0.1 and 1.1 inches above normal in 1992 and 1993, respectively. An experiment also was initiated in 1993 at Hector, MN on a silty clay loam soil with 6.8% organic matter and pH 8.1. Rainfall throughout the growing season was well above normal at Hector in 1993 and 1994. Plots were evaluated visually but were not harvested.

Nicosulfuron (Accent) at 0.06 or 0.125 lb/A applied in 1989 at Fargo caused significant sugarbeet injury in 1990 but not in 1991. Primisulfuron (Beacon) at 0.03 or 0.06 lb/A applied in 1989 at Fargo caused severe sugarbeet injury in 1990, 1991, 1992 and 1993 but no injury in 1994. Chlorimuron (Classic) at 0.004 lb/A applied in 1990 at Fargo caused severe sugarbeet injury in 1991, 1992 and 1993 but no injury in 1994. Chlorimuron at 0.008 lb/A applied in 1990 at Fargo still caused 14% sugarbeet injury in 1994. Metribuzin (Sencor, Lexone) at 0.25, 0.5, and 1.0 lb/A and imazamethabenz (Assert) at 0.15, 0.3 and 0.6 lb/A applied at Fargo in 1989 gave significant sugarbeet injury in 1990 but no injury in 1991. MON 12000 (Permit, Battalion) at 0.03 and 0.09 lb/A applied at Fargo in 1992 caused significant sugarbeet injury in 1993 and 1994. Thiazopyr (Visor, Spindle) at 0.25 lb/A applied at Fargo in 1992 caused no sugarbeet injury in 1993 but 0.5 lb/A caused 15% injury in 1993.

Imazethapyr (Pursuit) at 0.06 or 0.12 lb/A applied at Fargo in 1989 caused severe sugarbeet injury in 1990 and 1991 but no significant injury in 1992. Imazethapyr at 0.03 lb/A applied in 1989 caused only 14% injury in 1991 and 0.015 lb/A caused no injury in 1991. The soil at Fargo had pH 8.0.

Observations of commercial sugarbeet fields with pH 6.0 to 6.5 suggest that imazethapyr may carry over longer on low pH soils. Low pH fields have been observed where imazethapyr reportedly applied in 1989 had caused severe sugarbeet injury in

1993. Absolute verification of rates and last date of ALS inhibitor herbicide application is not possible on commercial fields so these field observations should be considered as preliminary. However, results with flumetsulam (Broadstrike) may support the effect of soil pH. Flumetsulam plus metolachlor (Dual) was applied at Fargo on a pH 8.0 soil and at Northwood, ND on a pH 6.5 soil. The experiment at Northwood was conducted by Mark Peterson of Dow-Elanco. Sugarbeet was not injured one year after application on the high pH soil at Fargo but sugarbeet was severely injured on the low pH soil at Northwood in 1992, 1993 and 1994 after a 1991 application of flumetsulam plus metolachlor at 0.064 plus 2.3 lb/A.

Imazethapyr at 0.063 lb/A and AC 299,263 at 0.063 lb/A were applied at Fargo, ND and Hector, MN in 1993. Sugarbeet in 1994 were injured by imazethapyr but were not injured by AC 299,263 at Fargo or Hector. Sugarbeet injury at Fargo from imazethapyr carryover was 96% on June 25 and 95% on July 18 while sugarbeet injury at Hector was 41% on June 11 and 13% on July 12. Very few sugarbeet plants survived at Fargo while the sugarbeet yield at Hector was not significantly reduced by imazethapyr carryover compared to an untreated check. The soils at Fargo and Hector had similar pH, texture and organic matter, so factors other than soil characteristics probably caused the large difference in imazethapyr carryover between Fargo and Hector. Rainfall was adequate to surplus during the 1993 and 1994 growing seasons at both locations but total rainfall was greater at Hector.