DEXTER, ALAN G. and JOHN L. LUECKE. Department of Crop and Weed Sciences. North Dakota State University, Fargo, ND 58105. Simulated herbicide drift and carryover in sugarbeet.

ABSTRACT

Sugarbeet is susceptible to spray drift and carryover of a number of herbicides used in rotational crops in North Dakota and Minnesota. The objective of these experiments was to determine the relative susceptibility of sugarbeet to some of these herbicides.

Herbicide carryover experiments were established in 1987 and 1989 on a silty clay soil with pH 7.9 and 3.9% organic matter near Fargo, ND. Annual precipitation was 15.0, 14.5, and 19.2 inches in 1987, 1988 and 1989, respectively, as compared to the normal annual precipitation of 20.8 inches. Sugarbeet was seeded the year after herbicide application and thereafter. Thifensulfuron (Pinnacle), tribenuron (Express), lactofen (Cobra), and acifluorfen (Blazer) did not injure sugarbeet one year after herbicide application. Imazethapyr (Pursuit), imazamethabenz (Assert), fomesafen (Reflex), metribuzin (Sencor/Lexone), DPX-V9360 (Accent) and CGA-136872 (Beacon) caused significant sugarbeet injury one year after application at normal use rates. Pursuit at 0.06 lb/A applied in 1987 caused severe sugarbeet injury in 1988 and 1989 but insignificant injury in 1990. Pursuit at 0.12 lb/A applied in 1987 caused severe sugarbeet injury in 1988, 1989, and 1990. Assert and Reflex caused no sugarbeet injury two years after application. Sencor/Lexone, Accent, and Beacon were first applied in 1989 and sugarbeet will be seeded in 1991 to examine injury two years after application.

Herbicides were applied at low rates directly to hand weeded sugarbeet to simulate herbicide drift in 1988 and 1989 near Amenia, ND. Pursuit at 0.001 lb/A or 2% of a normal rate reduced extractable sucrose per acre by an average of 29%. Thifensulfuron + tribenuron (Harmony Extra) at 0.0005 lb/A or 3% of a normal rate reduced extractable sucrose per acre by 34%. Pinnacle at 0.0005 lb/A also reduced extractable sucrose per acre by 34%. Assert at 0.1 lb/A or 28% of a normal rate, 2,4-D at 0.06 lb/A or 25% of a normal rate, bromoxynil (Buctril) at 0.06 lb/A or 25% of a normal rate, and Basagran at 0.2 lb/A or 40% of a normal rate reduced extractable sucrose per acre by 24, 49, 22, and 8%, respectively. Thus, Pinnacle, Harmony Extra, and Pursuit were relatively more injurious to sugarbeet than Assert, 2,4-D, Buctril, or Basagran based on the % of a normal application rate which caused sugarbeet yield loss. Injury symptoms from Assert, Pinnacle, Pursuit, and Harmony Extra were visually indistinguishable.

Harmony Extra and Pursuit were applied in 1990 near Casselton, ND to sugarbeet previously treated with Counter insecticide at planting, Lorsban insecticide postemergence, or no insecticide. The insecticide treatments did not affect sugarbeet susceptibility to Harmony Extra or Pursuit. The reduction in extractable sucrose per acre caused by the herbicides was similar in insecticide treated or untreated plots.