

ENVIRONMENTAL INFLUENCE ON IRRIGATED POTATO RECOVERY FROM GLYPHOSATE SIMULATED DRIFT. Harlene M. Hatterman-Valenti and Collin P. Auwarter, Professor and Research Specialist, Department of Plant Sciences, North Dakota State University, Fargo, ND 58105

Field research was conducted at the Northern Plains Potato Grower's Association Irrigation Research site near Tappen, ND to evaluate Russet Burbank growth the same year glyphosate simulated drift occurred to irrigated potatoes. In 2007 and 2008, glyphosate was applied at rates one-third, one-sixth, and-twelfth, and one-twenty-fourth the standard use rate (0.25, 0.125, 0.0625, and 0.0313 lb ae/A) at the tuber hooking (TH) - 0.25 lb ae/A only, tuber initiation (TI), early tuber bulking (EB), and late tuber bulking stage (LB).

In 2007, total yield from potatoes treated with glyphosate at the TH stage was significantly lower than any other treatment (88 cwt/A). This was followed by potatoes treated with 0.25 lb/A glyphosate at the TI stage (187 cwt/A). All other treatments had total yields similar to the untreated. Only plants treated with 0.25 lb/A glyphosate at the TH, TI, and LB stages or with 0.125 lb/A glyphosate at the TI stage yielded less marketable tubers than the untreated. Glyphosate caused an increase in cull tubers when potatoes were treated with 0.25 or 0.125 lb/A at TI in comparison to the untreated. Glyphosate also depressed tuber growth. Fewer 4 to 6 oz tubers were produced when potatoes were treated with 0.25 lb/A glyphosate at the TH stage. Likewise, fewer 6 to 10 oz tubers were produced when potatoes were treated with 0.25 lb/A glyphosate at the TH and TI stages. Large tuber production (>10 oz) was decreased when plants were treated with 0.25 lb/A glyphosate at the TH, TI, or LB stages, or when treated with 0.125 lb/A glyphosate at the TI stage.

In 2008, total yield from plants treated with 0.25 lb/A glyphosate at the TH, TI, and EB stages or with 0.125 lb/A glyphosate at the TI and EB stages were significantly lower than any other treatment, except 0.063 lb/A glyphosate at the TI stage. Results were similar for marketable tubers except that plants treated with 0.063 lb/A glyphosate at the TI stage also had significantly less marketable tubers. Glyphosate caused an increase in cull tubers when potatoes were treated with 0.25 or 0.125 lb/A at TI in comparison to the untreated. Glyphosate also depressed tuber growth. Fewer 4 to 6 oz tubers were produced when potatoes were treated with 0.25 lb/A glyphosate at the TH, TI, and EB stages. Likewise, fewer 6 to 10 oz tubers were produced when potatoes were treated with 0.25 lb/A glyphosate at the TH, TI, and EB stages, or with 0.125 lb/A glyphosate at the TI and EB stages, or with 0.063 lb/A glyphosate at the TI stage. Large tuber production (>10 oz) was decreased when plants were treated with 0.25 lb/A glyphosate at the TH, TI, or LB stages, or when treated with 0.125 lb/A glyphosate at the TI and EB stages, or when treated with 0.063 lb/A glyphosate at the TI stage.

The negative tuber yield effect from simulated glyphosate drift was most severe at the TH stage in 2007 whereas the TH, TI, and EB stages were equally sensitive to simulated glyphosate drift in 2008. However, total and marketable yield was reduced 5.6X and 8.8X when plants were treated with 0.25 lb/A glyphosate at the TH stage, respectively compared to the untreated in 2007. In contrast, total yield was reduced 2X, 2X, and 1.9X, respectively, when plants were treated with 0.25 lb/A glyphosate at the TH, TI, and EB stages, and marketable yield was reduced 2.7X, 4X, and 3.4X, respectively, when plant were treated with 0.25 lb/A glyphosate at the TH, TI, and EB stages, compared to the untreated in 2008. It was concluded that the effect of air temperature on vine growth and tuber production contributed to the differences between years.