MULTIPLE REDUCED RATE HERBICIDE TREATEMENTS FOR WEED CONTROL IN ONION. James R. Loken* and Harlene M. Hatterman-Valenti, Graduate Research Assistant, and Assistant Professor, Plant Sciences Department, North Dakota State University, Fargo, ND 58105.

Onion (*Allium cepa* L.) is a crop with tremendous yield potential and economic return in North Dakota. However, due to the poor competitiveness of onion and the relatively short North Dakota growing season, weed control in onion has no margin for error. Weed competition is most damaging to yield as the onion plant grows to the two-leaf stage because of slow onion establishment to this point. Currently, no herbicides are labeled that provide broad-spectrum annual broadleaf weed control prior to the onion two-leaf stage. Thus, the importance of effective weed control in onion prior to the two-leaf stage is obvious.

Much like the multiple reduced-rate herbicide management practices (micro-rates) used for sugarbeet production in the Red River Valley, this project evaluated the effect of labeled and non-labeled herbicides applied at micro-rates to emerging annual broadleaf weeds, such as redroot pigweed and common lambsquarters, when onion 'Teton' was at growth stages less than two leaves.

The herbicides bromoxynil, oxyfluorfen, metribuzin, and acifluorfen were applied at rates 1/4, 1/8, and 1/16 the lowest labeled rate, and either two or three times at 1 wk intervals. A hand-weeded check and conventional herbicide application check were maintained for comparison to the micro-rates for overall weed control effectiveness. To determine herbicide micro-rate effectiveness, weed counts were taken seven days after each application in a 0.093 m^2 quadrant and a mid-season visual evaluation was performed.

In the factorial analysis, there was a herbicide-by-rate interaction for percent control of common lambsquarters and redroot pigweed. The 1/4 rate of bromoxynil provided the best control of common lambsquarters. The 1/4 rates of bromoxynil and oxyfluorfen provided the best control of redroot pigweed. In the analysis with checks, three applications of bromoxynil or oxyfluorfen at the 1/4 rate (70.1 g ae/ha and 70.1 g ai/ha, respectively) provided excellent early-season broadleaf weed control. Two applications of bromoxynil at the 1/4 rate and three applications of oxyfluorfen at the 1/8 rate (35.0 g ai/ha) provided adequate early-season control of common lambsquarters and redroot pigweed. Micro-rate applications of metribuzin and acifluorfen did not effectively control common lambsquarters or redroot pigweed. Yield data supports these results.

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