MULTIPLE APPLICATIONS OF REDUCED-RATE HERBICIDES FOR WEED CONTROL IN ONION. James R. Loken*, Harlene M. Hatterman-Valenti and Collin P. Auwarter, Graduate Research Assistant, Associate Professor and Research Specialist, 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 due to slow growth and 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 broadleaf weed control in onion prior to the two-leaf stage is obvious.

Greenhouse experiments evaluated nine herbicides, applied two times at reduced rates, on weed control of redroot pigweed and common lambsquarters, and crop safety to onion. The herbicides carfentrazone, bromoxynil, oxyfluorfen, metribuzin, halosulfuron, primisulfuron, mesotrione, bentazon, and acifluorfen were applied at 1/8 the lowest labeled rate in two sequential applications on a four day interval when weeds were in the cotyledon to first true-leaf stage and onion were in the flag-leaf stage. An untreated check was included for weed control and crop safety comparisons. To determine herbicide effectiveness, visual evaluations were taken 3 days after the first treatment (DAT 1), 7 DAT 1, and 3 days after the second treatment (DAT 2). Crop safety was evaluated visually and by measuring onion heights 3 DAT 2. Experiments were arranged in a randomized complete block design.

In the statistical analysis of percent injury 3 DAT 2, bromoxynil (0%), metribuzin (2%), bentazon (9%), and mesotrione (11%) were not significantly different than the untreated check (0%) and were considered safe to onion at reduced rates. Height measurements supported visual data as the treatments causing the least seedling onion injury symptomology were among the tallest 3 DAT 2. Oxyfluorfen, metribuzin, acifluorfen, and carfentrazone exhibited the best weed control of redroot pigweed 3 DAT 2 (all 100%). While oxyfluorfen (99%), carfentrazone (98%), bromoxynil (92%), and mesotrione (72%) exhibited the best control of common lambsquarters 3 DAT 2.

The results indicate that crop safety and weed control can be achieved with multiple applications at reduced rates and that further field research is warranted.