

INFLUENCE OF TILLAGE AND HERBICIDES IN ONION. Sarah L. Gegner*, Harlene M. Hatterman-Valenti, Walter L. Albus, and Collin P. Auwarter, Graduate Student, Associate Professor, and Research Specialists, Carrington Research Extension Center, Oakes, ND and North Dakota State University, Fargo, ND 58105.

A field experiment was conducted during the field seasons of 2007 and 2008 at the NDSU Research Extension Center near Oakes, ND to evaluate the potential for strip-tillage in onion production and to understand the influence of strip-tillage on factors such as weed seed germination, soil moisture content, and soil temperature. In addition, the effect of strip-tillage on herbicide efficacy in onion prior to the two-leaf growth stage was evaluated. The experiment was arranged as a 2X4 factorial in 2007 and a strip plot with herbicide as the whole plot and tillage as the subplot in 2008. Herbicides included DCPA, pedimethalin, oxyfluorfen, and bromoxynil. DCPA and pedimethalin were applied pre-emerge at rates of 10 lbs/acre and 1.5 pt/acre, respectively. Four weekly micro-rate applications of oxyfluorfen and bromoxynil were made starting shortly after onion emergence at rates of 2 oz/acre and 4 oz/acre, respectively. Plots were hand harvested on September 4, 2007 and September 24, 2008. Onion bulbs were graded according to USDA standards into four classes: small (1-2 ¼ inches), medium (2 ¼-3 inches), large (3-4 inches), and colossal (>4 inches). Total marketable yield includes classes medium and large.

Results indicated that herbicide did not injure onions during establishment in either field season. In 2007, tillage had an effect on the germination of lambsquarters and redroot pigweed. There were significantly more weed seedlings in the conventionally tilled plots than the strip-tilled plots. Hairy nightshade was significantly reduced with the weekly applications of herbicide. 2007 showed a significantly higher amount of lambsquarters weed seedlings in the pedimethalin treatment. Redroot pigweed and hairy nightshade were best controlled with micro-rate applications of oxyfluorfen and bromoxynil. There was little to no redroot pigweed pressure in all treatments during the 2008 field season. In 2008 lambsquarters and hairy nightshade weed pressure was significantly reduced with the weekly applications of herbicide. DCPA had significant more hairy nightshade pressure than the other three herbicides. Results of 2008 showed no significant difference of tillage on weed seed germination.

In 2007 and 2008, onion yield grade did vary between tillage system and herbicide but generally was only numerically higher with the strip-tillage and herbicide treatment for the various onion grades. Results of 2007 indicated a significant increase in onions graded between 3 and 4 inch diameters within the strip-tilled treatments.