Post-Harvest Control and Ecology of Russian Thistle in Continuous Annual Spring Wheat

W.F. SCHILLINGER, H.L. SCHAFER, S.E. SCHOFSTOLL, AND B.E. SAUER, DEPT. OF CROP AND SOIL SCIENCES, WSU

More on the Web

A 5-year experiment was conducted at the WSU Dryland Research Station at Lind on post-harvest management of Russian thistle in continuous annual spring wheat. The post-harvest Russian thistle control treatments were: i) paraquat + diuron herbicide applied 7 days after wheat harvest; ii) tillage with overlapping adjustable-pitch 32-inch-wide V-blade undercutter sweeps conducted 7 days after wheat harvest, and; iii) check (do nothing, let Russian thistle grow). Use of the undercutter V-sweep resulted in a complete kill of all Russian thistle plants with absolutely no subsequent seed production. With contact herbicide, some Russian thistle grew back and/or escapes occurred and seed production averaged 490 seeds per square yard. The check treatment produced a 5-year average of 7910 Russian thistle seeds per square yard. The undercutter V-sweep treatment had significantly more water in the 6-ft soil profile at time of wheat harvest, after killing frost in October, and in mid-March compared to the herbicide and check treatments. Spring wheat grain yield was significantly less in the check compared to the herbicide and undercutter V-sweep treatments. Results show that tillage with a low-disturbance undercutter V-sweep is more effective than contact herbicide for post-harvest control of Russian thistle.

Winter Wheat Seedling Emergence after Rainfall Simulation

W.F. SCHILLINGER, H.L. SCHAFER, S.E. SCHOFSTOLL, AND J.R. ALLDREDGE, DEPT. OF CROP AND SOIL SCIENCES AND DEPT. OF STATISTICS, WSU

Stand establishment of winter wheat planted into summer fallow is hindered when rain showers after planting crust the soil. In a laboratory experiment conducted at Lind, a rainfall simulator was used to deliver rainfall at two different rates onto newly-planted winter wheat in pots. The experimental design was a 5-factor factorial in a randomized complete block. Thirty seeds each of Edwin and Eltan were planted 1-inch deep in pots containing 3 inches of wet (i.e., 13% soil moisture) soil. The wet soil was covered with 5 inches of dry soil immediately after planting. Beginning one day after planting, the rainfall simulator was used to apply 0.05 inch/hr for 3 hours (total = 0.15 inch) or 0.10 mm/hr for 2.5 hours (total = 0.25 inch). Rainfall simulation was repeated three and five days after planting. Factorial treatments for this experiment are as follows:

1. Two winter wheat varieties (Edwin and Eltan).
2. Two rainfall intensities and durations (as described above).
3. Three rainfall timings (1,3, and 5 days after planting + a check, i.e., no rain).
4. Three surface residue conditions (bare soil, 750 lb/ac of straw, and 1500 lb/ac of straw).
5. Two heat factors (50% of pots put under a sun lamp at 85^{0}F air temperature at the soil surface for 9 hr/day, the remaining 50% of pots kept at room temperature without the sun lamp).

There were 96 pots for each run (i.e., replication) and we conducted three runs. By far the most important factor affecting winter wheat seedling emergence ($P < 0.0001$) was timing of rainfall after planting. Rainfall 5 days after planting impeded emergence much more than rainfall 3 days after planting. Similarly, rainfall 3 days after planting impeded emergence more than rainfall 1 day after planting. The pots with 750 lb/ac and 1500 lb/ac of straw on the surface had better winter wheat seedling emergence than pots with a bare soil surface, presumably because the straw intercepted rain drops to reduce crusting. There were no differences in seedling emergence as affected by the 0.15 inch and 0.25 inch simulated rainfall. We were surprised to find that seedling emergence was greater in pots placed under the sun lamp for 9 hr/day compared to pots left at room temperature. Seedling emergence was apparently enhanced by warming of the soil by the sun lamp; not adversely affected by soil crusting as we thought would occur. Averaged across all factors, Edwin emergence was significantly greater than that of Eltan. We plan to continue and expand this experiment in 2005 and 2006.