DEXTER, ALAN G., ALLAN W. CATTANACH and JOHN L. LUECKE, Department of Crop and Weed Sciences, North Dakota State University, Fargo, ND 58105. -Timing of control of living cover crop.

ABSTRACT

Soil erosion and the loss of sugarbeet stands due to high winds sometimes occur in the spring in eastern North Dakota and Minnesota. Living cover crops can be utilized to reduce or prevent both problems but control of the cover crops and timing of control is important because living cover crops compete with sugarbeet the same as weeds. Field experiments were conducted from 1990 through 1992 in the Casselton and Fargo, ND area. Cover crops were fall-seeded winter rye and spring seeded barley.

Glyphosate (Roundup) plus X-77 surfactant plus ammonium sulfate at 0.75 lb/A plus 0.5% plus 1.5 lb/A applied at sugarbeet planting gave 96% control of fall-seeded winter rye while sethoxydim (Poast) plus Dash plus 28% N at 0.4 lb/A plus 1 qt/A plus 1 gal/A gave 84% control. Quizalofop (Assure) plus oil adjuvant at 0.18 lb/A + 1 qt/A gave winter rye control at sugarbeet planting similar to glyphosate at 0.75 lb/A. Fluazifop (Fusilade 2000) at 0.4 lb/A plus oil adjuvant and clethodim (Select) at 0.18 lb/A plus oil adjuvant were less effective than glyphosate.

Winter rye was more susceptible at two weeks after planting sugarbeet than at planting to sethoxydim, fluazifop, quizalofop, and clethodim. Sethoxydim at 0.4 lb/A plus Dash and 28% N gave better control of winter rye than 0.2 lb/A plus adjuvants. Appropriate adjuvants plus sethoxydim at 0.4 lb/A, fluazifop at 0.2 and 0.4 lb/A, quizalofop at 0.09 and 0.18 lb/A, and clethodim at 0.09 and 0.18 lb/A gave 91 to 97% control of winter rye two weeks after planting.

Sugarbeet seeded into winter rye yielded 5900 lb/A of sucrose when glyphosate was band-applied over the row at planting, 5700 lb/A when postemergence grass control herbicides were applied one week after planting, 3100 lb/A when post grass herbicides were applied two weeks after planting, and 6400 lb/A when glyphosate at planting was followed by a post grass herbicide. This suggests that winter rye should be treated with glyphosate at planting to minimize rye competition with sugarbeet and a second herbicide treatment may be needed for total control of the winter rye.

All previously mentioned herbicides postemergence grass control herbicides at all tested rates gave nearly total control of spring-seeded barley. Sethoxydim at 0.2 lb/A plus Dash at 1 qt/A was broadcast applied to sugarbeet in spring-seeded barley at the 2-, 3-, 4-, or 5-leaf stage of barley. Sugarbeet tended to yield less when barley control was delayed until the 4- or 5-leaf stage as compared to the 2- or 3-leaf stage. In a second management scheme, sethoxydim was band-applied at the 3-leaf stage of barley and the barley
between the rows was removed with a row-crop cultivator at the 2-, 3-, 4-, or 5-leaf stage of barley. Leaving the barley between the rows until the 5-leaf stage tended to improve sugarbeet yield compared to earlier cultivation. These results suggest that barley in the row needs to be controlled by the 3-leaf stage but barley between the row may provide beneficial protection if left until the 5-leaf stage.

Winter rye grows very rapidly. For example, winter rye was 2 to 4 inches tall at sugarbeet planting on May 4, 8 to 12 inches on May 21, 10 to 14 inches on May 28, 12 to 16 inches on June 1, and 14 to 18 inches on June 5. Glyphosate was band-applied at planting and winter rye

between the rows was cultivated on the dates listed. Sugarbeet yield was reduced when cultivation was delayed from May 21 (17 DAP) until May 28 (24 DAP). This suggests that winter rye between the rows must be controlled before rye height exceeds 8 to 10 inches to avoid sugarbeet yield loss from competition. Sugarbeet plants were in the cotyledon to early 2-leaf stage and not safe from wind damage when rye was 8 to 10 inches tall. An alternative to removing the rye with a cultivator would be to treat with sethoxydim when the rye reached 8 inches in height. This would stop further growth and the dead or dying rye plants could be left until the sugarbeet plants were wind-safe.

Winter rye was seeded in 21 inch rows diagonally to the sugarbeet rows or seeded parallel to and between the sugarbeet rows. Glyphosate was band-applied at planting over the diagonally seeded rows but was not applied to the plots with parallel seeded plots. Winter rye seeded diagonal to the sugarbeet rows was easier to remove with a row crop cultivator than rows seeded parallel to the sugarbeet rows. Also, early control of a portion of the diagonal rows with glyphosate probably reduced competition as compared to parallel seeded rows. Sugarbeet produced in diagonal seeded rows of rye yielded 7620 lb/A of sucrose while sugarbeet in parallel seeded rye rows yielded 6770 lb/A.