

DREGSETH, ROBERT J. \*, MARK A. BOETEL, ALLEN J. SCHROEDER, ROBERT B. CARLSON, and GARY J. BREWER, Department of Entomology, North Dakota State University, Fargo, ND 58105-5346. **Use of cereal cover crops to enhance insecticidal control of sugarbeet root maggot.**

Producers in the Red River Valley growing region occasionally plant cereal cover crops in their sugarbeet fields to minimize early-season wind erosion and plant injury due to soil abrasion. This is the case where light sandy soil is present which makes a good environment for survival of the sugarbeet root maggot (SBRM), *Tetanops myopaeformis* (Roder). Previous observations in commercial fields have suggested that establishment of an oat cover crop may result in less feeding injury by larvae of the SBRM. The insecticides compared during 1996 to 2000 were terbufos (Counter 15G), chlorpyrifos (Lorsban 15G), fonofos (Dyfonate 15G) and aldicarb (Temik 15G). Our experiment was initiated in 1996 to determine the impact of oat cover crops on performance of planting-time soil insecticides for SBRM control. Fonofos and chlorpyrifos were enhanced when the oat cover crop was used in combination of these two insecticides. The results of the damage rating were significantly different from its counter part with out the oats. The rating for terubos was 1.85 vs 3.05 respectively on a 0-5 damage rating scale developed by Blickenstaff, Peckenpaugh, Mahrt with USDA ARS at Kimberly, ID. The yield although non-significant was higher when the oat cover crop was present.

The study was expanded in 1999 and continued in 2000 to evaluate barley, wheat, and rye, in addition to oats, as cereal cover crops for potential enhancement of insecticide efficacy against SBRM. Maggot feeding injury was significantly reduced when terbufos (Counter 15G) plots were interseeded with an oat cover crop plot. This occurred with terbufos at both low and standard (1.05 and 1.5 lb (AI)/ac, respectively) application rates during both 1999 and 2000. Also, terbufos applications consistently performed better in plots seeded with rye and barley cover crops during the 1999 and 2000 seasons. In 1999, we found that increasing the seeding rate of oats from 1.75 to 3 bu/acre in terbufos-treated (1.5 lb (AI)/acre) plots resulted in a reduction in SBRM feeding injury of 5.83 vs 5.00 respectively. The damage rating scale used in 1999 and to the present is the 0-9 with 0 being no damage and 9 a heavily damaged root. This damage rating scale developed by Campbell with the USDA ARS in Fargo, ND. Rye in 1999 resulted in the lowest injury rating however not significant. Those findings were not repeated during the 2000 season; however, terbufos at 1.5 lb (AI)/acre performed significantly better with rye and barley cover crops seeded at 1.75 bu/acre than the same insecticide rate in plots sown at a 0.75 bu seeding rate. In addition, oat cover crop plots treated with chlorpyrifos (Lorsban 15G) applied at 1.5 lb (AI)/acre incurred significantly less SBRM feeding injury than those without oats. Interestingly, our 2000 findings showed that sugarbeets interseeded with rye at the higher (1.75 bu) rate without insecticide had a significantly lower degree of SBRM feeding injury than plots treated at the standard 1.5 lb (AI)/acre application rate of terbufos and chlorpyrifos without a cover crop. The findings of our 3-year investigation strongly suggest beneficial interactions between planting-time soil insecticides and cereal cover crops, and offer promise for future development of integrated SBRM control programs.