

REGITNIG, PETER J.*, JENNIFER J. NITSCHELM, PETER BERGEN, Rogers Sugar Ltd., 5405 – 64th Street, Taber, Alberta, T1G 2C4. **Insecticide treatments for sugar beet root maggot control in Alberta.**

ABSTRACT

Granular insecticides such as carbofuran (Furadan 10G), aldicarb (Temik 10G) and terbufos (Counter 15G), applied modified-in-furrow at planting, have been used effectively for sugar beet root maggot (SBRM) control for many years in Alberta. Some granular products, namely carbofuran and aldicarb, are no longer registered on sugar beets in Canada and more environmentally friendly insecticide control options are being pursued. The objective of this paper is to summarize modified-in-furrow applications, seed treatments and irrigated postemergence drench applications of insecticides evaluated in SBRM tests over a 17-year period.

Postemergence drench applications of liquid carbofuran (Furadan FI) and liquid chlorpyrifos (Lorsban 4E) were evaluated for their efficacy in controlling SBRM in 3 tests conducted between 1983 and 1985. Postemergence treatments were applied on a 4- or 5-inch band over the row at the onset of SBRM feeding and immediately sprinkler-irrigated with 1 to 1.5 inches of water. Carbofuran and chlorpyrifos were both applied at 2 lbs ai/acre (1.9 L product/ac) in 1983 and at 1 lb ai/ac (0.95 L product/ac) in 1984 and 1985. Terbufos was applied modified-in-furrow at a rate of 1 lb ai/ac (3.04 kg product/ac) in all three years. SBRM damage was observed in each year of study and a significant increase in extractable sugar per acre (ESA) occurred when carbofuran treatments were compared to check treatments in all tests. Terbufos increased ESA significantly when compared to the check treatment in two of three tests while chlorpyrifos only increased ESA significantly in one test. These studies indicated that drench applications of insecticides to control SBRM could be used successfully and that carbofuran gave the best results of the insecticides tested. Six additional SBRM drench tests were conducted in Alberta between 1994 and 1996. Average increases in ESA of 10.8% with 1 lb ai/ac carbofuran and 4.3% with 0.9 or 1 lb ai/ac chlorpyrifos occurred relative to the check treatment.

Six SBRM trials that included a range of chlorpyrifos rates applied at the peak fly emergence stage were conducted in 1997 and 1998. All postemergence drench treatments were applied on a 4-inch band over the sugar beet row and drenched in using sprinkler irrigation. Visual injury and ESA were similar when chlorpyrifos rates between 0.19 and 0.62 lb ai/ac were compared to a 1 lb ai/ac carbofuran rate. A chlorpyrifos rate of 1 lb ai/ac tended to reduce ESA and increase sugar beet injury relative to carbofuran. These trials suggested that a phytotoxic effect of 1 lb ai/ac chlorpyrifos might have been part of the reason for reduced ESA relative to carbofuran in 1983-85 and 1994-96 trials.

Six trials were conducted in 1999 to evaluate the optimum application stage for postemergence drench treatments of chlorpyrifos and carbofuran. Carbofuran treatments were applied at 1 lb ai/ac on a 4-inch band. Chlorpyrifos treatments were applied at 0.33 lb ai/ac and 0.5 lb ai/ac on a 7-inch band. Insecticide treatments were immediately sprinkler irrigated with 0.5 to 1 inch of water. ESA of chlorpyrifos treatments was similar to or greater than the ESA of the carbofuran treatment in 3 tests where insecticides were applied at peak SBRM fly emergence. Significant ESA differences between insecticide treatments and the check occurred in one of the three trials. In three other tests where insecticides were applied after maggot feeding was observed, ESA of the carbofuran treatment tended to be higher than for chlorpyrifos treatments.

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Seed treatments of imidacloprid (Gaucho) have shown promise in controlling SBRM in trials conducted between 1992 and 2000. In two SBRM trials conducted in 1999 and 2000 ESA was significantly increased over the check treatment when imidacloprid was applied to naked seed at rates of 30 and 45 g ai/kg seed. In the 2000 trial ESA was also significantly increased by the same rates of thiamethoxam applied to naked seed. These seed treatment products provide alternative chemistries to the products currently registered on sugar beets in Canada.

Current commercial SBRM control recommendations in Alberta suggest applying modified-in-furrow terbufos in known areas of recurring SBRM infestation. Applying a postemergence chlorpyrifos drench at peak SBRM fly emergence is recommended if high numbers of SBRM flies are observed and an at-planting insecticide was not used. A postemergence carbofuran drench is recommended as a late season rescue treatment when SBRM feeding is observed.