SMITH, LARRY J.[1], and ALBIN W. ANDERSON[2], [1]Northwest Experiment Station, University of Minnesota, Crookston, MN 56716, and [2]Dept. of Entomology, North Dakota State University, Fargo, ND 58105. - The effect of pre- and postemergence applications of liquid and granular insecticides for the control of the sugarbeet root maggot (Tetanops myopaeformis).

ABSTRACT

The sugarbeet root maggot (SBRM) is the most significant economic insect pest on sugarbeet in northwest Minnesota and eastern North Dakota. Drought conditions beginning in 1987 and continuing through 1991 in a major portion of this region resulted in record populations of SBRM, a prolonged period of adult emergence and activity, and earlier planting dates. The standard at-plant insecticide application was not providing adequate SBRM control because of these conditions, and major economic losses occurred in many areas. In 1992, postemergence applications of granular and liquid insecticides were recommended in combination with planting time applications for the first time. These postemergence recommendations were based on limited data from 1991 trials and were recommended for those areas that were experiencing extremely high SBRM populations, with below normal soil moisture and early planting dates (prior to April 30). Insecticides were used on over 75% of the acreage in 1992 to control the insect.

In 1992, field experiments were established at Baker and Crookston, MN, and St. Thomas, ND to further refine and validate recommendations on when and where postemergence insecticide applications should be used. The three sites were characterized as having 1) moderate, high and high SBRM populations, 2) adequate, low and excessive soil moisture reserves, and 3) light, intermediate and heavy soil types, respectively. In this text, the dual insecticide applications are compared with the single at-plant application. At-plant granular insecticide application (pre) followed by a second granular application (post) at first fly appearance, increased extractable sucrose/A from 0 to 1889 lb, depending on location, insecticide combination, and rate of insecticide applied at planting (Baker, Crookston). Application of Lorsban 15G (Chlorpyrifos) pre at either 1.5 or 2.0 lb ai/A followed by Counter 15G (Terbufos) post at 1.5 lb ai/A increased extractable sucrose/A 1889 and 1487 lb respectively at Crookston, and 536 and 620 lb, respectively, at Baker. The combination of Counter 15G pre at either 1.5 or 1.8 lb ai/A followed by Lorsban 15G post at 1.5 lb ai/A increased extractable sucrose/A by 538 and 763 lb at Crookston, and 813 and 508 lb at Baker, respectively. Post applications of Lorsban 15G and Counter 15G in combination with Diazinon 14G pre at 1.5 lb ai/A increased extractable sucrose/A 881 and 1376 lb respectively, at Crookston. Only the dual application of Diazinon 14G pre plus Counter 15G post gave a significant increase at Baker. Signinifcant increases in extractable sucrose/A were recorded at Crookston when Diazinon 14G at 1.5 lb ai/A post was used with either rate of Lorsban 15G pre. A single post application of Lorsban 4EC and Diazinon 4EC liquid insecticides, at peak fly emergence (primarily for adult control), in combination with a pre granular insecticide, increased extractable sucrose/A from 240 to 1346 lb depending on location and insecticide combination. Post applications of Lorsban 4EC or Diazinon 4EC at 0.5 lb ai/A in combination with Lorsban 15G pre at 1.5 lb ai/A increased extractable sucrose 1346 and 700 lb respectively, at Crookston. The same liquid insecticides in combination with Counter 15G at 1.5 lb ai/A pre resulted in 1094 and 700 lb increases. Post liquid insecticide treatments at the two other locations resulted in smaller

increases in extractable sucrose (240-551 lb) and were not statistically significant.

Cool and windy weather conditions in late May and early June 1992 affected movement of adult flies from 1991 sugarbeet fields. A single, rapid peak of adult activity occurred between June 8-11, followed by a rapid decline in activity. This factor may have improved SBRM control and increased extractable sucrose noted at the Crookston location with the use of the liquid insecticides, and may have decreased the control of the larvae and maximum extractable sucrose gain from the use of dual granular treatments. Timing studies with post liquid applications gave increases in extractable sucrose only if applied at peak fly emergence. A similar timing study with the post granular insecticides indicated that an additional 1200 lb of extractable sucrose would have been obtained had the post treatment been applied on June 2 rather than on May 15 (assuming adequate moisture for activation of the insecticide).

A return to normal rainfall patterns in much of the region, and a reduction in SBRM populations has dramatically reduced the need for dual application of insecticides for SBRM control in 1993. Dual applications are recommended only in areas of high population, low soil moisture and early planting. Further recommendation of the dual applications beyond 1993 are not anticipated if environmental conditions continue to improve.