SUNFLOWER MIDGE — 1982

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Contarinia schulzi Gagné (a sunflower midge) has caused economic loss in certain sunflower production areas since 1971. Severity of sunflower midge damage has varied from one growing season to another, but as a general rule the most severe midge damage has been within 20 miles of the Red River of the North. Minnesota, Manitoba and North Dakota sunflower growers have experienced economic loss to this pest.

Since the sunflower midge can cause extensive damage to cultivated sunflower, assessing the present range of the insect is necessary to determine possible future range expansion and corresponding damage potential. The first sunflower midge survey (Grinaker, 1981) was made by North Dakota State University and the North Dakota Department of Agriculture in 1981. This survey was our first attempt to determine the range of the insect and evaluate the severity of the infestation in Minnesota, South Dakota and North Dakota. In 1981, midge was found ranging 20 to 40 miles on either side of the Red River of the North (Fig. 1). The northern range of midge extended beyond the survey area and the southern range reached the Morris, Minnesota vicinity. The major limitations of the 1981 survey were time and personnel. In 1982 the University of Minnesota, South Dakota State University, Manitoba Agriculture Production Division, North Dakota Department of Agriculture and North Dakota State University cooperated on a joint survey to define the range of the sunflower midge as well as the severity of the damage caused by the insect. The 1982 survey was much more comprehensive than the 1981 survey in geographic area, personnel and number of fields rated.

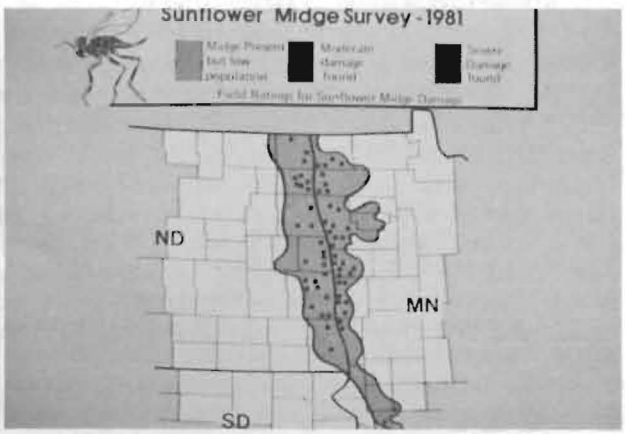

Figure 1

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METHODS AND MATERIALS

Manitoba Agriculture surveyed Canadian locations. North Dakota State University and North Dakota Department of Agriculture surveyed North Dakota and the Minnesota Red River Valley north of Breckenridge. South Dakota State University surveyed South Dakota. The University of Minnesota surveyed all areas east of the Red River Valley and south of Breckenridge.

The survey was conducted from mid-August to mid-September of 1982. A total of 595 fields were evaluated in southern Manitoba, eastern North Dakota, northwestern Minnesota and northeastern South Dakota. Fields were rated from 0-3 (Table 1) and the ratings recorded on road maps from which composite maps of the affected areas were produced (ie. Fig. 2).

Table 1. Field Rating Scale For Sunflower Midge.

0—No midge larvae or damage found in field checked.

1—Midge present — Ray flowers distorted, bracts with brown necrotic areas, little effect on florets.

2—Moderate midge infestation — Sunflower heads cupped in the edge rows with some damage extending into the field. Yield reduction apparent in field margins but little damage throughout the field.

3—Severe midge infestation — Sunflower heads cupped throughout large areas of the field. Yield reduction expected throughout the field.

RESULTS AND DISCUSSION

The 1982 survey involved about 350 more field evaluations than the 1981 survey. The range of the insect (Fig. 2) was quite similar to 1981 with variations being more reflective of the increased number of survey sites than a shift in the range of the midge. This is

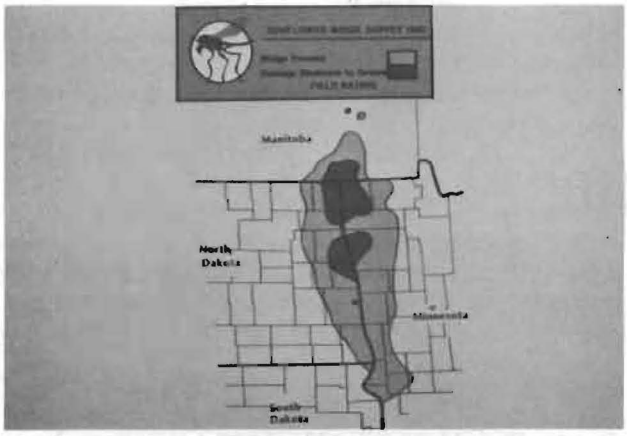

Figure 2

especially true on the eastern boundary of the midge range in Minnesota. The range of the midge damage extended beyond the survey limits in 1981. Superimposing the 1981 and 1982 surveys (Fig. 3) emphasized the geographic limitations of the 1981 survey.

Figure 3

The sunflower midge problem can be put into perspective by considering the percentage of the sunflower growing area in the upper Great Plains affected by this pest. The sunflower growing area affected by the midge is the lower drainage area of the Red River of the North. The range of detectable field populations was along a line and 20 to 40 miles either side of a line extending from Ortonville, Minnesota to Morris, Manitoba encompassing 2,000 square miles. The most severe damage in 1982 occurred in the northern ⅓ of this area or along a line and 10 to 15 miles either side of a line extending from Hillsboro, North Dakota to Morris, Manitoba. Based on the 1982 survey, an estimated 15 to 20 percent of the total sunflower acreage in the tristate area and Manitoba was infested with sunflower midge. Total sunflower yield loss in the tristate area and Manitoba due to the sunflower midge in 1982 was estimated at 3 to 5 percent.

Damage caused by the midge and yield reduction varied markedly from field to field. Areas designated moderate to severe (dark shaded, Fig. 2) showed yield loss in individual fields from 10 to 80 percent. Later planted fields in affected areas consistently showed less midge damage than earlier planted fields.

From earlier observations and these two surveys, we believe the range of the sunflower midge does not appear to be expanding rapidly east or west. The north-south range of this insect transects nearly the entire sunflower growing area. Regular monitoring of the range of this insect is essential to detect expansions of range that might occur.

In addition to the range of the sunflower midge, this survey has delimited the areas of moderate to severe midge infestations (Fig. 2). Many fields in the dark shaded areas were rated as 2 or 3 on the field rating scale (Table 1). The Red River Valley area from Hillsboro, North Dakota to Morris, Manitoba showed the most severe midge infestations in 1982. The southern end of the Red River Valley had much lower midge populations in 1982 than in 1981. The range of the sunflower midge has apparently remained relatively stable but the areas of the moderate to severe midge infestation vary from season to season.

The cause of the shift of the moderate to severe areas of infestation from year to year is not completely understood. Observations indicate that seasonal environmental factors affect midge population levels. Soil type, moisture and temperature are all factors that appear to have an influence on midge population. Continuing ecological studies at NDSU will expand our understanding of this insect and the relationship of midge to the environment and commercially grown sunflower.

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LITERATURE CITED

Grinaker, G. 1981. **Sunflower midge — a look at its life cycle.** The Sunflower 7(8):24-25.