SUGARBEET ROOT MAGGOT FLY MONITORING IN THE RED RIVER VALLEY IN 2021

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Sugarbeet root maggot (SBRM), *Tetanops myopaeformis* (Röder), fly activity was monitored at 150 grower field sites throughout the Red River Valley during the 2021 growing season. This effort was carried out as a collaborative effort between the NDSU Department of Entomology and American Crystal Sugar Company.

The 2021 growing season marked the fourth consecutive year in which root maggot fly activity had increased when compared to the previous year (Figure 1). In fact, 2021 had the highest overall average fly infestation levels in the last 15 years since the expanded fly monitoring program began in 2007. The most intense SBRM fly activity was observed in the central and northern Red River Valley in 2021. This suggests that control efforts between 2017 and 2020 were unsuccessful in reducing overall population levels for many producers.

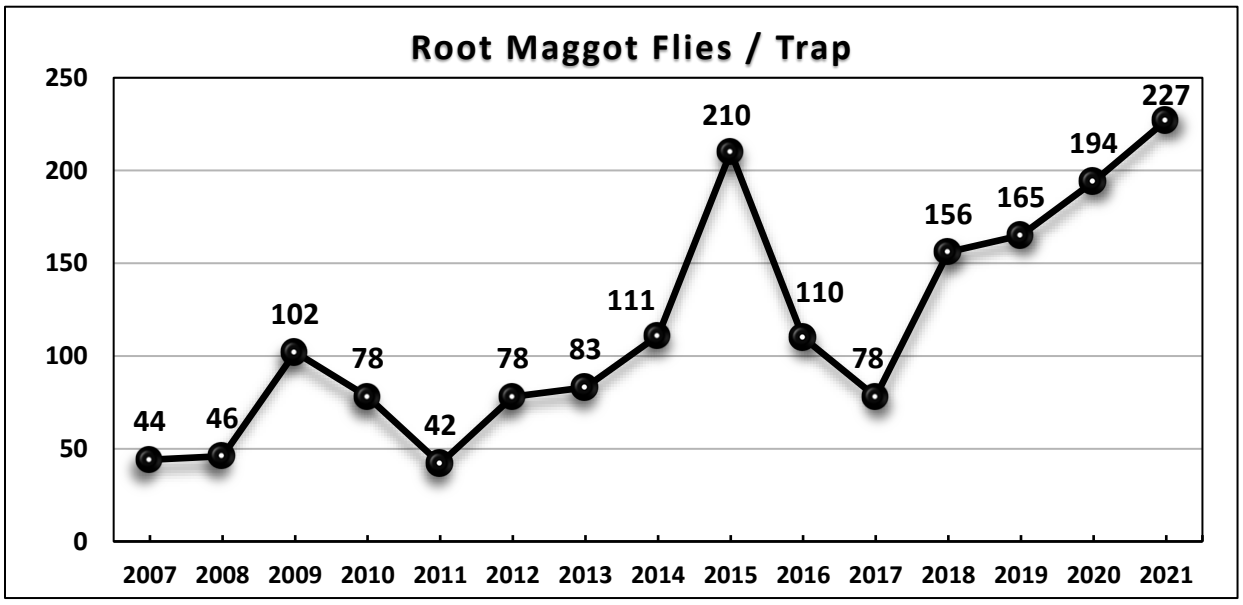

Figure 1. Yearly averages of sugarbeet root maggot flies captured on sticky-stake traps (Blickenstaff and Peckenpaugh, 1976) in the Red River Valley from 2007 to 2021.

High to severe levels of SBRM fly activity (i.e., cumulative capture of at least 200 flies per sticky stake) were observed in 2021 in fields near the following communities (cumulative flies per stake in parentheses): Auburn (234), Buxton (882), Cavalier (828), Crystal (632), Drayton (420), Oakwood (274), Reynolds (436), St. Thomas (585), and Thompson (274), ND, as well as Ada (494), Argyle (214), Climax (397), Crookston (304), East Grand Forks (554), and Warren (297), MN. Moderately high levels of activity were also recorded near Bathgate (51), Caledonia (53), Forest River (133), Grand Forks (188), Hamilton (46), Hoople (180), Leroy (46), Merrifield (108), Minto (49), and Walhalla (161) in North Dakota, and near Alma (184), Angus (160), Borup (152), Donaldson (113), Euclid (109), Fisher (189), Kennedy (65), and Sabin (76), MN. Fly activity was either economically insignificant or undetectable in most other areas.

Figure 2 presents SBRM fly monitoring results from three representative sites (i.e., Ada and East Grand Forks, MN and St. Thomas, ND) during the 2021 growing season. Fly emergence began at a somewhat normal time (i.e., late May) of the season; however, the main Valley-wide peak in activity occurred between June 8 and 9, which was about four to five days earlier than the historical average. Significant secondary peaks in fly activity occurred near St. Thomas, ND, as well as near Ada, MN, but no secondary peak was observed near East Grand Forks. The occurrence of two peaks in one growing season is somewhat rare, but it occurs about every three to five years.

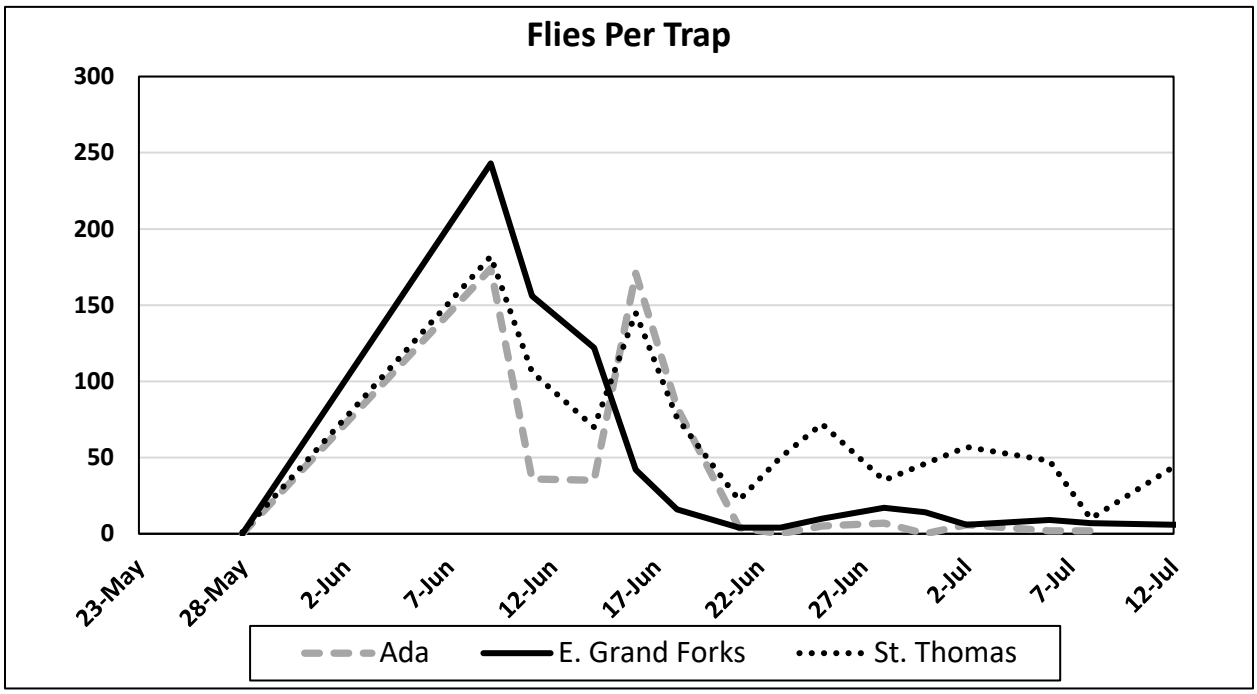

Fig. 2. Sugarbeet root maggot flies captured on sticky-stake traps at selected Red River Valley sites, 2020.

In late-August of 2021, after the larval feeding period had ended, 58 of the fly monitoring sites were rated for sugarbeet root maggot feeding injury in accordance with the 0-9 scale of Campbell et al. (2000) to assess whether fly outbreaks and larval infestations were managed effectively. The resulting data was subsequently overlaid with corresponding fly count data to develop the root maggot risk forecast map for the subsequent growing season (the SBRM risk forecast for next year is presented in the report that immediately follows this one).

Root maggot feeding injury, averaged across all RRV fields that exceeded the generalized economic threshold (43 cumulative flies per trap), was 1.65 on the 0 to 9 rating scale. That amounted to a 23% decrease over the same figure recorded in 2020. A list of RRV locations where the highest average root injury ratings were observed is presented in Table 1. Cumulative SBRM fly activity in those fields ranged from 70 flies/trap near Forest River, ND to 634 flies/trap near Crystal, ND.

Table 1. Sugarbeet root maggot fly activity and larval feeding injury in Red River Valley commercial sugarbeet fields where injury exceeded 2.5, 2021

Nearest City	Township	State	Flies/stake	Average Root Injury Rating[a]
St. Thomas	S. St. Thomas	ND	585	6.24
East Grand Forks	Sullivan	MN	458	4.40
Ada	Green Meadow	MN	358	3.00
Crystal	Elora	ND	404	2.73
Cavalier	Lodema	ND	828	2.50

[a]**Sugarbeet root maggot feeding injury rating based on the 0 to 9 root injury rating scale (0 = no scarring, and 9 = over ¾ of the root surface blackened by scarring or dead beet) of Campbell et al. (2000).**

The relatively high root injury ratings observed at a few of the locations listed in Table 1 are of concern, and growers in those areas should expect severe levels of SBRM fly activity in the 2022 growing season; however, the relatively small number of locations on this list suggest that control practices in much of the growing area were successful. This is supported by the fact that it is rare for SBRM feeding injury ratings in grower-managed fields to exceed 3.0 on the 0 to 9 scale.

Careful monitoring of fly activity in moderate- and high-risk areas (see Forecast Map [Fig. 1] in subsequent report) will be critical to preventing economic loss in 2022. Vigilant monitoring and effective SBRM management on an individual-field basis by sugarbeet producers could also help prevent significant population increases from one year to another, because even moderate levels of root maggot survival in one year can be sufficient to result in economically damaging infestations in the subsequent growing season.

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References Cited:

Campbell, L. G., J. D. Eide, L. J. Smith, and G. A. Smith. 2000. Control of the sugarbeet root maggot with the fungus *Metarhizium anisopliae*. J. Sugar Beet Res. 37: 57–69.

Blickenstaff, C.C., and R.E. Peckenpaugh. 1976. Sticky-Stake traps for monitoring fly populations of the sugarbeet root maggot and predicting maggot population and damage ratings. J. Am. Soc. Sugar Beet Technol. 19: 112–117.