



Status of Invasive Field Crop Pests in Minnesota

2023 Annual Report

1/25/2024

Minnesota Department of Agriculture

Pest Detection and Export Certification Unit

625 Robert Street North

St. Paul, MN 55155-2538

reportapest@state.mn.us

www.mda.state.mn.us/reportapest

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.

Contents

- Surveys for Field Crop Invasive Pests1
- Corn, Small Grains, and Soybean Surveys1
 - Visual Survey.....2
 - Trapping Survey.....4
- Potato Survey4
 - Survey Procedure5
 - Survey Results.....5
- For More Information.....5

Surveys for Field Crop Invasive Pests

Several emerging and invasive insects and plant pathogens threaten Minnesota commodities. These pests have the potential to cause problems for both production and export if they were to become established. The Minnesota Department of Agriculture (MDA), along with partners at the United States Department of Agriculture (USDA) and the University of Minnesota (U of M), conduct an annual review of invasive pests that pose the greatest threat to crops in Minnesota. Many of these pests have not been found in Minnesota and others are present but not widely established. Survey efforts are designed to detect these organisms as early as possible by targeting high-risk areas. Commodity crops in Minnesota represent a large portion of the Minnesota agricultural industry. Surveys are focused on counties with the highest number of acres of the commodity being monitored.

Corn, Small Grains, and Soybean Surveys

The MDA monitored corn, small grains, and soybean fields in 2023 for several invasive pests that are currently not known to occur in Minnesota or have limited distributions within the state. These surveys were jointly funded by the USDA Animal and Plant Health Inspection Service (APHIS) Plant Protection Quarantine Program (PPQ) and the MDA. Table 1 shows the target pests and survey method for each of the surveys.

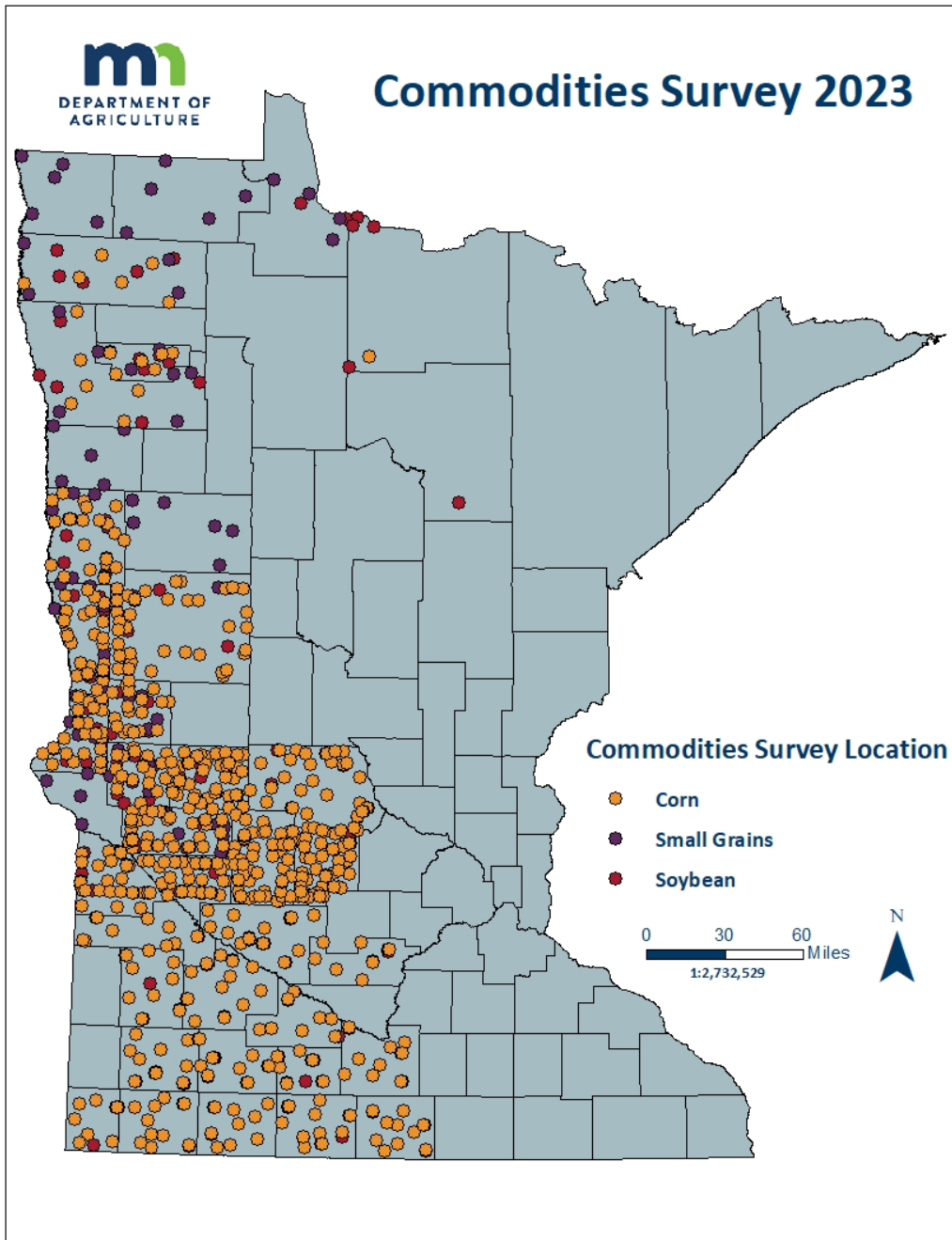
Table 1: Survey target pests and survey methods.

Survey	Scientific Name	Common Name	Survey Method
Corn	<i>Helicoverpa armigera</i>	Old World bollworm	Trap and pheromone lure
Corn	<i>Autographa gamma</i>	Silver Y moth	Trap and pheromone lure
Corn	<i>Diabrotica speciosa</i>	Cucurbit beetle	Visual observation
Corn	<i>Halyomorpha halys</i>	Brown marmorated stinkbug	Visual observation
Corn	<i>Magnaporthiopsis maydis</i>	Late wilt of corn	Visual observation
Corn	<i>Peronosclerospora philippinensis</i>	Philippine downy mildew	Visual observation
Corn	<i>Phyllachora maydis</i>	Tar Spot	Visual observation
Corn	<i>Popillia japonica</i>	Japanese beetle	Visual observation
Corn	<i>Puccinia polysora</i>	Southern corn rust	Visual observation
Corn	<i>Xanthomonas vasicola</i> pv. <i>vasculorum</i>	Bacterial leaf streak	Visual observation
Small Grains	<i>Tilletia controversa</i>	Dwarf bunt	Visual observation
Small Grains	<i>Urocystis agropyri</i>	Wheat flag smut	Visual observation
Small Grains	<i>Anguina tritici</i>	Wheat seed gall nematode	Visual observation
Small Grains	High Plains Virus	High Plains Virus	Visual observation
Soybean	<i>Macrosaccus morrisella</i>	Soybean tentiform leafminer	Visual observation

Visual Survey

Corn and small grain plants were visually inspected for the presence of target pests. Each field was surveyed at four locations with 10 plants randomly selected for observation, for a total of 40 plants per field. Fields were objectively selected for survey, but an effort was made to space out sampled fields within counties (Figure 1). Corn fields were scouted for five diseases and three insect pests (Table 1) from mid-June through mid-September. Small grain fields were observed for four pests from mid-July to early August. No target pests were found in 2023.

Figure 1. Corn, small grains, and soybean fields surveyed in 2023.



In collaboration with Dr. Bob Koch and Arthur Vieira Riberiro with the U of M, soybean fields were scouted for soybean tentiform leafminer (*Macrosaccus morrisellato*) to gain a better understanding of its presence in the state. This insect was previously known only to feed in forested areas on two plants related to soybeans but not on cultivated soybeans. It would appear there has been a host range expansion. Knowing its range within the state will be important information for growers. Observations consisted of 20 plants that were selected at random within 50 feet of a field edge by tree windbreaks. The underside of the lower leaves were observed for mines. Soybean fields were visually surveyed from mid-August through mid-September. All data points were sent to the U of M partners for follow up confirmation. The U of M project has been observing this insect since 2021 to gain a better understanding of its occurrence throughout Minnesota and neighboring states (Figure 2). The MDA was able to contribute 54 new locations in 32 counties to the project.

Figure 2. Soybean tentiform leafminer detections from 2021-2023. Map courtesy of U of M.

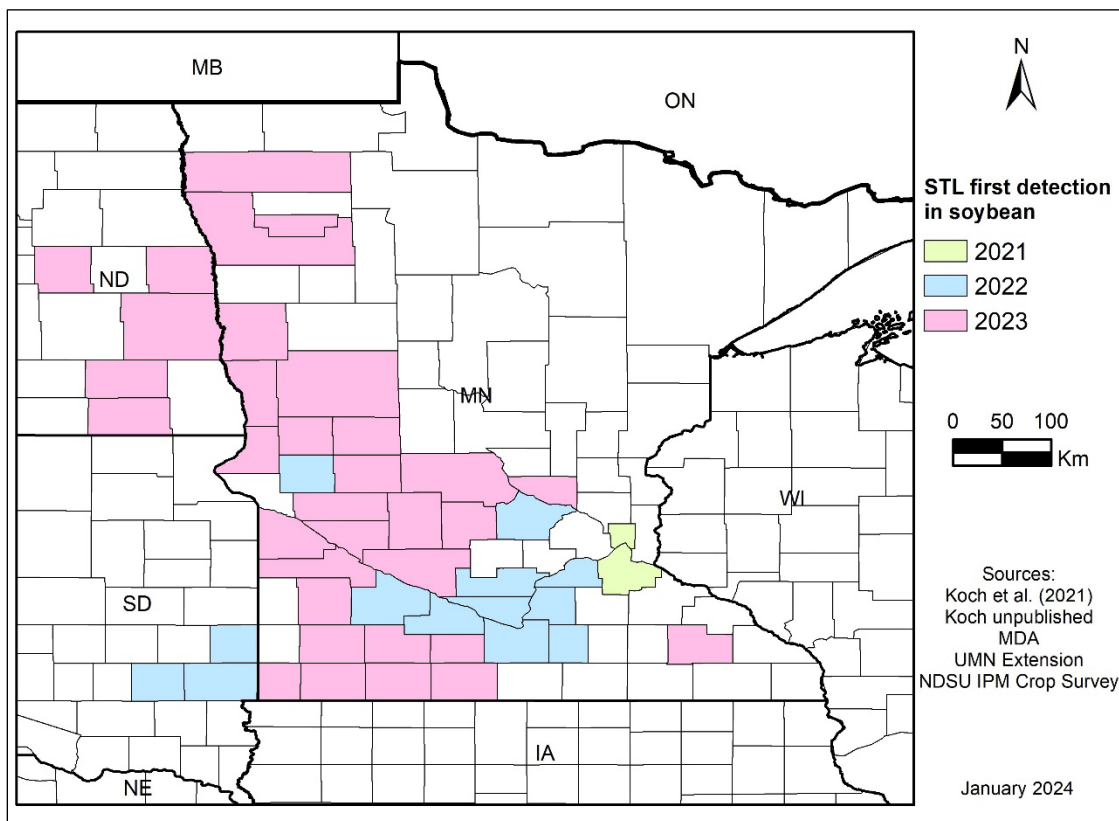


Table 2 : Number of fields visually surveyed and number of counties by survey.

Survey	Number of Counties	Number of Fields Surveyed
Corn	32	472
Small Grains	16	81
Soybean	34	155

Trapping Survey

Plastic bucket traps (Figure 3) with species-specific pheromone lures were placed for Old World bollworm, (*Helicoverpa armigera*) and Silver Y moth (*Autographa gamma*) at 137 sites in 28 counties. Each site had a trap set for both insects and were placed at a minimum of 65 feet apart along field edges. Traps were checked and lures refreshed mid-season. Trap samples were screened and specimens that could not be eliminated as target species were submitted to the MDA Laboratory Services Division. Specimens that could not be eliminated as suspects by the MDA were submitted to the USDA for final identification. No target pests were found in 2023.

Figure 3. Plastic bucket trap hanging next to corn field.



Potato Survey

Potatoes grown for seed are at high risk for moving certain soil borne pathogens. Unlike potatoes grown for other uses, seed potatoes are not washed at any time, and they are planted back into the soil. Some of the most important soil-borne pathogens that could affect seed potatoes are nematodes that produce cysts. Nematodes are microscopic worms that feed on the roots of plants, causing reductions in growth and yield. Female cyst nematodes attach to roots of potato plants to feed. When the female dies, she can have 200-600 eggs inside of her. Her body then becomes a tough protective casing called a cyst. This cyst protects the eggs and allows them to survive for many years in the field. One cyst moved on a seed potato can introduce hundreds of plant parasitic nematodes to the field where the seed is planted. Several cyst nematodes are considered quarantine pests, such that severe long-term restrictions would be placed on movement of plant material and equipment from an area found to contain one of them.

To export seed potatoes to Canada, a grower must have documentation to confirm that the field from which the seed potatoes were harvested was free of potato cyst nematodes (PCN) based on a survey following USDA guidelines. The MDA surveys Minnesota seed potato fields for two species of PCN, pale cyst nematode

(*Globodera pallida*) and golden nematode (*Globodera rostochiensis*). Both are quarantine pests in potato growing areas around the world, including the United States.

The Minnesota PCN survey has been conducted every year since 2009. As a result of this project's longevity and careful record keeping, the MDA can identify fields that qualify for exemption from sampling based on the 2014 USDA guidelines. Minnesota was first in the nation to have a field qualify for exemption based on this survey.

Survey Procedure

After harvest, samples are taken from the surface soil of the seed potato crop at the rate of one five-pound sample per acre. Samples are collected by hand and with a mechanical sampler.

Table 3: Potato pest targets and survey methods in 2023.

Scientific Name	Common Name	Survey Method
<i>Globodera pallida</i>	Pale cyst nematode	Soil sample
<i>Globodera rostochiensis</i>	Golden nematode	Soil sample
<i>Heterodera ciceri</i>	Chickpea cyst nematode	Soil sample
<i>Heterodera schachtii</i>	Sugar beet cyst nematode	Soil sample

Survey Results

In 2022, soil samples were collected from 666 acres in Clay, Kittson, Lake of the Woods, Polk, and Wilkin counties at the request of seed potato growers. All soil samples were sent to the USDA nematology lab in Idaho for processing and identification of cyst nematodes. No potato cyst nematodes were detected in 2022.

In 2023, soil samples were collected from 600 acres in Clay, Kittson, and Lake of the Woods counties at the request of seed potato growers. One 78-acre field in Lake of the Woods County qualified for exemption in 2023 and did not require sampling. All soil samples have been sent to the USDA nematology lab in Idaho for processing and identification of cyst nematodes. Results are pending.

More information on potato cyst nematodes can be found on the [MDA PCN webpage](#).

For More Information

Angie Ambourn

Entomologist/Supervisor, Pest Detection and Export Certification Unit

angie.ambourn@state.mn.us

651-201-6073