



Status of Invasive Fruit and Vegetable Pests in Minnesota

2025 Annual Report

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Minnesota Department of Agriculture

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Contents

- Pathways Survey for Invasive Pests of Fruits and Vegetables.....1
- Survey1
- Insect Finds4
- Disease Finds5
- Outreach8
- Collaborative Research Projects9
- Red Star Rust9
- Evaluating Biological Control of Brown Marmorated Stink Bug in Minnesota10
- More Information11

Pathways Survey for Invasive Pests of Fruits and Vegetables

The Pathways Survey, funded by the United States Department of Agriculture (USDA) Plant Protection Act 7721, focuses on agricultural systems near urban areas, such as apple orchards, and vineyards. In addition, high tunnels were surveyed for diseases affecting tomatoes, peppers, and ginger. These sites were chosen because high tunnels can be sheltered areas where invasive diseases may overwinter and become established. The Minnesota Department of Agriculture (MDA) expanded the Pathways Survey to additional high tunnel sites through funding from the USDA Specialty Crop Block Grant focused on the invasive plant diseases, tomato brown rugose fruit virus (ToBRFV) and ginger wilt.

Invasive species such as brown marmorated stinkbug and Swede midge were first found in urban areas before spreading into more rural areas of the state. Thus, agricultural systems in and around urban areas can be considered part of a system of pathways by which invasive species become established and spread. Urban agricultural systems also make good survey sites due to their high diversity of crops and the opportunity to monitor a broad range of invasive insects and plant pathogens.

The MDA works with partners, including the USDA Animal and Plant Health Inspection Service (APHIS) Plant Pest Quarantine (PPQ) and the University of Minnesota (UofM), to determine which insects and diseases to include in the survey.

Key criteria used for including an invasive pest in the survey are:

- The likelihood of an organism reaching Minnesota due to proximity to existing infestations or ease of movement.
- The prevalence and importance of potential hosts in Minnesota.
- Climatic suitability, particularly the likelihood of overwintering survival.

Survey

The 2025 Agricultural Pathways Survey was conducted from mid-June through mid-September. Sites were visited approximately every two weeks. A total of 18 orchards, 13 vineyards, 12 high tunnels, and one residential area were surveyed across 13 counties. Survey sites were located around the Twin Cities metropolitan area and surrounding suburbs (Figure 1) to monitor people driven pathways for possible introduction of new pests.

There were seven insect pests (Table 1) and 13 plant disease pests (Table 2) in the Agricultural Pathways Survey. On each site visit, a visual inspection was conducted on a portion of the plants. Plant samples were collected and submitted to the MDA Laboratory for further analysis when disease symptoms of target plant pathogens were found. Insect traps were checked at each site visit, and collected samples were submitted to the MDA Laboratory. Insects were then screened, and if suspects were found, those with national implications were submitted to the USDA for final identification.

Six vineyard sites were located within the endangered rusty patched bumble bee (RPBB) habitat zones, so adjustments in trapping had to be made. White wing traps were eliminated at these vineyard sites, as no alternative is approved for the survey.

Figure 1. Map of Ag Pathways Survey Sites in 2025.

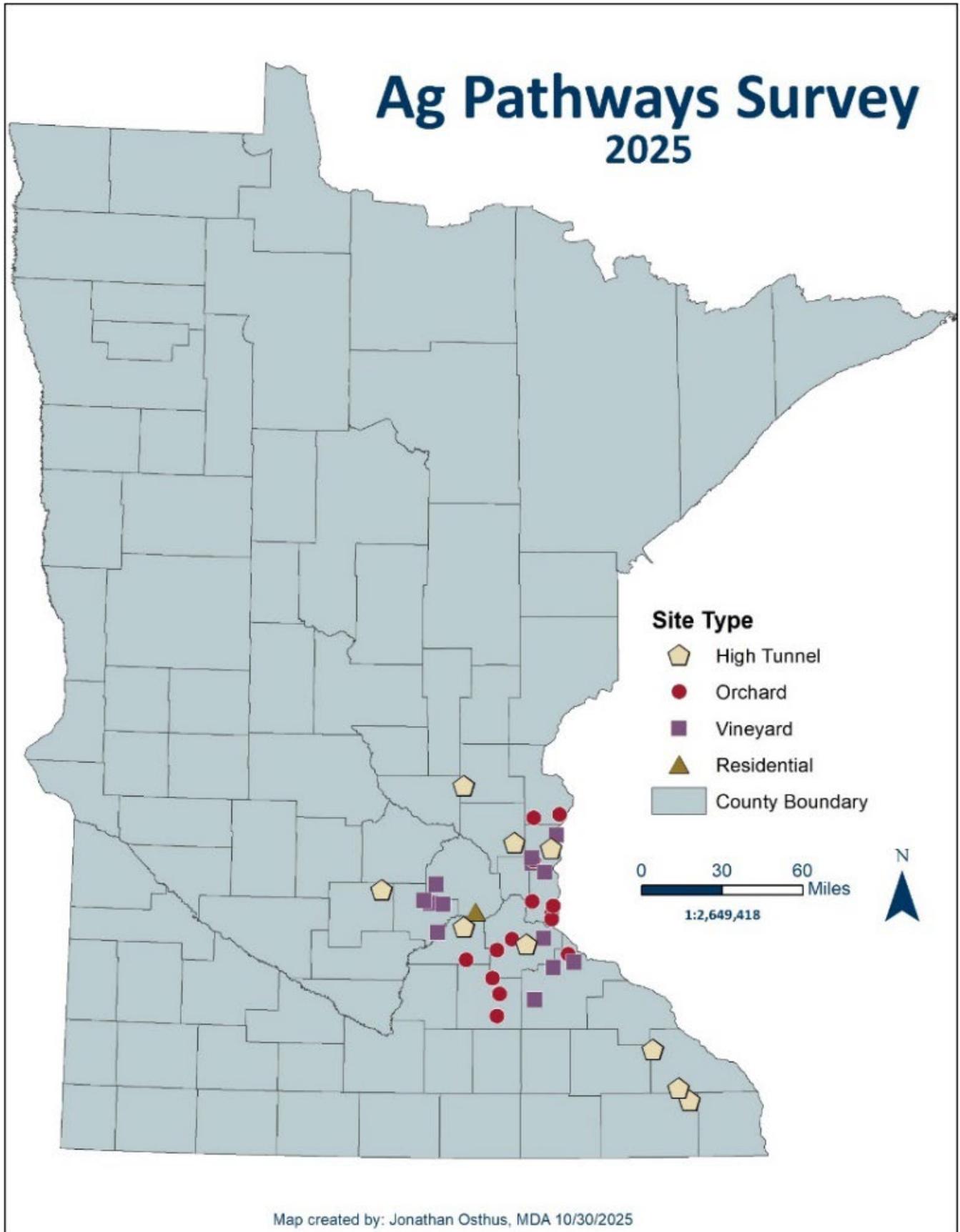


Table 1. Insect Pests in the Agricultural Pathways Survey.

| Scientific Name | Common Name | Survey Site Type | Survey Method |
|-------------------------------|----------------------------|---------------------|---------------|
| <i>Halyomorpha halys</i> | Brown marmorated stink bug | Orchards, Vineyards | Lure and trap |
| <i>Adoxophyes orana</i> | Summer fruit tortrix moth | Orchards | Lure and trap |
| <i>Epiphyas postvittana</i> | Light brown apple moth | Orchards | Lure and trap |
| <i>Lycorma delicatula</i> | Spotted lanternfly | Orchards | Visual |
| <i>Lobesia botrana</i> | European grapevine moth | Vineyards | Lure and trap |
| <i>Thrips parvispinus</i> | Thrips | High tunnels | Visual |
| <i>Cryptoblabes gnidiella</i> | Christmas berry webworm | Vineyards | Lure and trap |

Table 2. Plant Disease Pests in the Agricultural Pathways Survey.

| Scientific Name | Common Name | Survey Site Type | Survey Method |
|--|------------------------------|------------------|---------------|
| <i>Candidatus Phytoplasma mali</i> 16SrX-A | Apple proliferation | Orchards | Visual |
| <i>Candidatus Phytoplasma ziziphi</i> | Jujube witches' broom | Orchards | Visual |
| <i>Gymnosporangium yamadae</i> | Red star rust | Orchards | Visual |
| <i>Monilinia fructigena</i> | Apple brown rot | Orchards | Visual |
| <i>Ralstonia pseudosolanacearum</i> | Ginger wilt | High tunnels | Visual |
| <i>Ralstonia solanacearum</i> race 3 biovar 2 | Bacterial wilt | High tunnels | Visual |
| Tomato Brown Rugose Fruit Virus | ToBRFV | High tunnels | Visual |
| <i>Candidatus Phytoplasma australiense</i> 16SrXII-B | Australian grapevine yellows | Vineyards | Visual |
| <i>Candidatus Phytoplasma solani</i> 16SrXII-A | Stolbur disease | Vineyards | Visual |
| <i>Candidatus Phytoplasma vitis</i> 16SrV-C | Flavescence dorée | Vineyards | Visual |
| <i>Pseudopezicula tetraspora</i> | Angular leaf spot | Vineyards | Visual |
| <i>Pseudopezicula tracheiphila</i> | Rotbrenner disease | Vineyards | Visual |
| <i>Xylella fastidiosa</i> | Pierce's disease | Vineyards | Visual |

Insect Finds

Trapping and visual insect surveys began in early June. A total of 85 traps were set and spread out at each site to avoid different pheromone lures from interfering with each other. Each trap was checked biweekly by survey staff, and bait was replaced as needed. Brown marmorated stink bug was the only pest identified in the samples.

Brown Marmorated Stink Bug

Brown marmorated stink bug (BMSB) (*Halyomorpha halys*) was first introduced to the United States from eastern Asia in the mid-1990s. It became a serious problem for fruit growers in the mid-Atlantic states in 2009. Currently, BMSB is known to occur in most states, as well as in Canada. It is a generalist pest that feeds on many plants, including some crops of economic importance in Minnesota. It is considered both an agricultural and nuisance pest in Minnesota.

Brown marmorated stinkbug was first identified in Minnesota in 2010, and it continues to be detected throughout the state. To date, it has been found in 33 counties, with most detections in the greater Twin Cities metropolitan area. The insect is now considered established in the seven-county metropolitan area. The MDA tracks the distribution and abundance of BMSB across Minnesota in multiple ways, including citizen reports and field surveys.

Traps were set at orchard and vineyard sites from mid-June through mid-September. There were 14 survey sites with BMSB detections across seven counties.

Figure 2. Adult BMSBs are approximately ½ inch long.



Figure 3. A brown marmorated stink bug sticky trap in a Minnesota apple orchard.

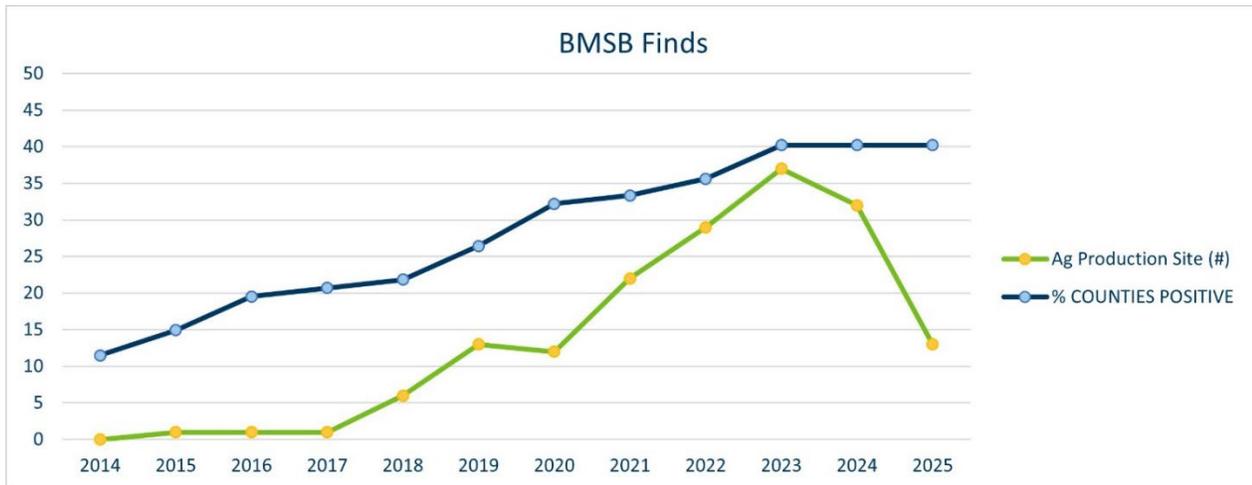


The MDA partners with the U of M through data sharing and research. The U of M is evaluating communities of natural enemies present in agricultural settings that may impact BMSB population dynamics. The MDA organizes a monitoring network for BMSB to better track its distribution and abundance. An interactive, map of BMSB detections in Minnesota is available on the MDA's [BMSB webpage](#).

In addition to monitoring BMSB, the MDA placed yellow sticky cards from mid-June through mid-September for *Trissolcus japonicus*, a non-native wasp species that parasitizes BMSB eggs. The MDA collected 33 cards from seven sites in four counties where BMSB nymphs had been detected in previous years. The cards were screened through December, and suspect *T. japonicus* were removed for further identification.

In 2022, four wasps were identified as *Trissolcus japonicus* by a specialist at the Florida Department of Agriculture. There were the first find in Minnesota. These specimens were collected from residential sites in St. Paul and Roseville, where reproducing populations of BMSB are well-documented. Other specimens were identified as *T. euschisi* and *T. thyantae*. In 2023, *T. japonicus* was detected at a residential site in St Paul and two residential sites in Roseville. In 2024, *T. japonicus* was detected at a residential site in St. Paul and at a residential site in Wyoming, MN. In 2025, *T. japonicus* was not detected. Due to cuts in federal and state funding, the number of survey sites and counties monitored in 2025 decreased.

Figure 4. Percent of Minnesota counties with BMSB detections and the number of agricultural production sites with BMSB detections since 2014.



Disease Finds

Red Star Rust

Red star rust (formerly Japanese apple rust), caused by the fungus *Gymnosporangium yamadae*, is native to Japan, China, and Korea. This disease was first identified in the United States in 2009 in several northeastern states and was first reported in Wisconsin in 2021 and Minnesota in 2022.

Red star rust fungus infects apple, crabapple, and juniper at different stages of its life cycle. The most common symptoms on apples and crabapples are bright red, orange, or yellow leaf spots. Some susceptible apple varieties drop infected leaves, resulting in yield loss. On juniper twigs, the fungus produces small (less than 0.4 inches in diameter) woody galls. In wet spring weather, these galls produce a bright orange, gelatinous mass containing fungal spores. Spores produced on infected junipers are carried by wind and rain to infect apple and crabapple leaves in spring. In fall, chestnut brown, powdery spores produced on infected apple and crabapple leaves are carried by wind to infect nearby junipers.

Figure 5. Red and orange leaf spots caused by red star rust on a Zestar apple tree.



In 2025, the MDA identified red star rust in Carver, Dakota, Goodhue, Scott, and Washington counties. Infected apple trees were present in commercial apple orchards and nurseries. This was the first report of red star rust in Goodhue County. To date, red star rust has been reported in 11 counties in Minnesota, all around the twin cities metro area.

Figure 6. Bright red leaf spot with long finger-like spore producing structures on the underside of a crabapple leaf infected with red star rust.



Angular Leaf Scorch

Angular leaf scorch, *Pseudopezicula tetraspora*, is a fungal disease believed to be native to North America. The disease was first described in New York by researchers looking for Rotbrenners, a closely related and highly destructive invasive grape disease found in Europe. Researchers noted that the disease is most severe in years with frequent rain in June.

Grape vines infected with angular leaf scorch have yellow to red blotches on leaves that expand into large wedge-shaped dead patches that extend to the leaf edge. Infected leaves often drop prematurely. Angular leaf scorch was found in Goodhue County in 2025.

Figure 7. Grapevine infected with angular leaf scorch.



Ginger Wilt

Ginger wilt is caused by the bacterial plant pathogen *Ralstonia pseudosolanacearum*. It was first found in Minnesota in 2023 in ginger grown in high tunnels. Infected plants have yellow leaves that wilt and turn brown, and the entire stem often falls over from the base. When dug up, infected ginger rhizomes are discolored, soft, mushy, and have a bad smell.

Ginger wilt is common in tropical and subtropical areas and had not previously been reported in the continental United States prior to 2023. It is believed that ginger wilt bacteria was brought into Minnesota through contaminated ginger seed and then spread within the warm high tunnel environment. Ginger wilt bacteria are unlikely to survive Minnesota's winter temperatures unless protected in a year-round greenhouse.

In 2025, ginger wilt was identified at one site in Dakota county. The affected growers were provided information about how to clean tools and equipment, and how to overwinter the high tunnel and plant residue to reduce the chance of survival into the next growing season.

Figure 8. Infected ginger plants are wilted and tan colored.



Figure 9. Rhizomes infected with ginger wilt are discolored, soft, mushy, and eventually shrivel.



Outreach

The Report a Pest reporting system allows people to report pests using an online form, by phone, email, or via EDDMapS (www.eddmaps.org/). This citizen participation tool helps focus awareness and makes early detection campaigns more efficient. This was a slow summer for reporting invasive species with 400 reports via all the methods mentioned. As invasive pests become more common in metro areas, residents contact their municipality for more information, which has reduced reports to the MDA.

The Report a Pest online reporting form was updated to include new species and to prompt users to input an address, picture, and contact information. These updates reduced the number of email correspondences needed to correctly identify invasive species and streamlined the tracking process by automatically assigning reports to the appropriate MDA staff based on the reporter's selection of species or question. The benefits of these updates include broader public awareness of invasive pests and better early detection of quarantine pests.

The Plant Pest Insider (PPI) newsletter is a monthly outreach tool used to educate Minnesota residents and industry professionals about invasive pests and how to report them. Sign up to receive emails at [Plant Pest Insider Newsletter | Minnesota Department of Agriculture](#).

The MDA also produces the Smarty Plants podcast as an outreach tool with the goal of highlighting the responsibilities and activities of the Plant Protection Division. Through engaging discussions with subject matter experts, researchers, and agency leaders, the podcast explores a range of topics including noxious weed regulation, pest management, emerging plant diseases, and more. Listen online at [Smarty Plants](#).

Figure 10. The Smarty Plants podcast was highlighted at the MDA State Fair exhibit.



The MDA and the Minnesota Department of Natural Resources hosted two “Ask the Bug Nerds” live sessions at the Minnesota State Fair. The MDA reused large educational signs with pictures of common and invasive insect pests to help attendees identify what they are finding in their yards, gardens, and homes. These signs were also used during environmental education days for elementary and middle school students in May and September. More than 600 students participated in the environmental education days to learn about the risks associated with moving firewood and about emerald ash borer.

Collaborative Research Projects

Red Star Rust

The detection of red star rust, *Gymnosporangium yamadae*, in Minnesota in 2022 revealed many gaps in information about how to manage this novel disease. In response, the MDA Plant Protection Division (PPD) and the University of Minnesota (UofM) Departments of Horticulture and Plant Pathology received funding and began work on a Specialty Crop Block Grant titled *Identifying Best Management Practices for Red Star Rust, an Invasive Pathogen of Apple & Nursery Crops*.

In 2024, 23 apple and crabapple cultivars were tested for resistance to red star rust. Resistance testing was expanded to 52 cultivars in 2025, including cultivars commonly grown in Minnesota, as well as several lines from the UofM apple breeding program. As a result of their resistance to red star rust, three breeding lines will be advanced within the program.

In addition, 511 crabapple trees at the Minnesota Landscape Arboretum and 209 apple trees at the UofM Horticulture research center were monitored for red star rust in 2024 and 2025. In 2025, 90% of trees were infected with red star rust, but the severity of disease varied by cultivar. UofM researchers are currently analyzing data from all resistance trials and will share results with nurseries, landscape professionals, and apple growers.

In 2024, six juniper cultivars were sprayed with five different fungicides and exposed to red star rust spores to determine which fungicides prevent infection. Because infections in junipers can take two years to develop, results from this trial will be recorded in spring of 2026 and used to make recommendations to nurseries and landscape professionals.

Spore traps were placed in areas known to be infested with red star rust to monitor for airborne spores. Researchers will analyze the collected spores to determine when spores are moving from junipers to apples and vice versa.

Figure 11. Trial to test juniper susceptibility and fungicide sprays.



Figure 12. Differences in red star rust disease response on crabapple varieties 'Sutyzam' Sugar Tyme® (A) and 'Bob White' (B) leaves 10 weeks after infection. Photos by T. Enzenbacher.



Evaluating Biological Control of Brown Marmorated Stink Bug in Minnesota

The samurai wasp, *Trissolcus japonicus*, is a parasitic wasp native to Asia that attacks brown marmorated stink bug (BMSB), an invasive pest that feeds on a variety of field, vegetable, and fruit crops. The arrival of this wasp in the United States in 2014 garnered research attention because of its potential to suppress BMSB populations, but also because *T. japonicus* has been documented to attack several native stink bug species. The hope is that the wasp will help control BMSB infestations; however, there is also a risk that it may attack our native stink bug species. The research goal is to compare those benefits and risks to help shape management strategies for BMSB.

In 2022 and 2023, surveys detected *T. japonicus* individuals in St. Paul, MN. This led to a Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) funded project lead by Dr. George Heimpel and Sabrina Celis with the University of Minnesota, to evaluate the benefits and risks of *T. japonicus* in the state. The project began with surveys for the wasp, BMSB, and native stink bugs in Minnesota apple orchards. The MDA is collaborating on this project by monitoring and collecting BMSB and suspected samurai wasps throughout the state.

Figure 13. An adult samurai wasp laying eggs in a mass of BMSB eggs. Photo by Chris Hedstrom, Oregon Department of Agriculture.



Figure 14. Sabrina Celis checking *Trissolcus japonicus* traps at a local Minnesota orchard. Photo courtesy of the Minnesota Invasive Terrestrial Plants and Pests Center, University of Minnesota.



In 2024, two *T. japonicus* individuals were found more than 30 miles from the initial detection site, in Rice and Washington counties, marking the first detections outside the Twin Cities. This shows that while populations are currently low, *T. japonicus* is likely present in more of the state than previously recognized. Low parasitism of BMSB by native parasitoids indicates an opportunity for a more effective parasitoid, like *T. japonicus*, to exert stronger control on BMSB populations. Eight species of native stink bugs were also detected during surveys. The results of these surveys, along with additional lab studies, will be used to determine whether the benefits of this wasp attacking BMSB outweigh potential risks to native species.

In 2025, surveys were conducted for the samurai wasp, native stink bugs, and other native insects in apple orchards surrounding the Twin Cities, where BMSB populations are highest. Captures of adult BMSB at research sites doubled between 2024 and 2025, indicating that populations are growing. In 2025, *T. japonicus* was found in Dakota County and was also observed attacking BMSB eggs. Additionally, 12 native stink bug species were found during surveys. Lab experiments are ongoing to look at which factors influence parasitism by the samurai wasp, with preliminary results indicating that high egg loads increase the chance of parasitism on native species. Additional projects include looking at the effect of BMSB feeding on native plants and how increases in pesticide use due to BMSB could impact native insects. Future goals include continuing to monitor BMSB, samurai wasps, and native stink bugs in 2026 and 2027.

For More Information

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