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Pest: A Method for Quickly Detecting Invasive Insects Introduced into an Area

Abstract

Agricultural regions are under constant threat of attack from invasive species. Washington State University Skagit County Extension encourages agents to use the *pest* methodology as a guide for ensuring that nonnative insects are quickly detected once introduced into their counties. The key components of this approach include working together with the *public*, ensuring *education* of Extension agents and other interested parties, obtaining *support* through funding and collaborations, and implementing a rigorous *trapping* protocol. The *pest* approach was used in capturing the first specimens of the brown marmorated stink bug, *Halyomorpha halys* (Stål), in Skagit County.

Keywords: [invasive species](#), [early detection](#), [pests](#), [brown marmorated stink bug](#)

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Introduction

Invasive pests can have devastating economic and ecological impacts in areas where they become wrongly established. In the United States alone, these losses have been estimated at over \$130 billion annually (Pimental, Lach, Zuniga, & Morrison, 2000). Like many county Extension offices, Washington State University (WSU) Skagit County Extension is on the first line of defense when our community is faced with the introduction of an invasive pest. To better prepare, we developed the *pest* methodology, which focuses on four key components: *public*, *education*, *support*, and *trapping*.

Establishing a direct line of communication with the *public* is essential as residents prefer to receive information about invasive species directly from Extension professionals or through Extension publications (Dellinger, Day, & Pfeiffer, 2016). Informed residents, especially those in the agricultural community, also can assist by alerting agents to areas of invasive pest activity. *Education* of Extension professionals on pest identification, biology, and ecology is a high priority. A detailed summary of a target pest should be widely distributed because of the low likelihood that county residents will be able to identify invasive species without training (Andreas, Halpern, DesCamp, & Miller, 2015). As funding for Extension programs is becoming more difficult to obtain (McDowell, 2004), *support* for combating invasive species also can be generated by developing collaborations with other government or university entities. Nagle, Osborne, Stone, McCullough, and Sadof (2014) found that cross-agency collaborations not only strengthened the impact of their message but also helped reduce overall costs. Development and implementation of various *trapping* strategies can confirm the presence of an invasive pest and

help agents estimate when and where these insects will be active in their counties (Leskey, Short, Butler, & Wright, 2012). In the next section, we detail how the *pest* methodology was used to find an invasive pest recently introduced into Skagit County.

Capturing the First Brown Marmorated Stink Bugs in Skagit County

Public

In order to warn Skagit County residents about the impending arrival of the brown marmorated stink bug, *Halyomorpha halys* (Stål), WSU Skagit County Extension began distributing information about this pest via social media platforms. Alerts called for county residents to bring potential brown marmorated stink bug specimens to their local Extension offices and included links to informative websites where more information could be obtained (Figure 2). Due to these actions, an informed resident contacted the WSU Skagit County Extension office with photographs of a brown marmorated stink bug specimen taken with the individual's mobile phone. Investigation of the sighting locality did not produce additional specimens. However, the presence of favorable host plants and its proximity to a major industrial corridor made this area a high priority for future monitoring efforts.

Figure 1.

Social Media Post Targeting Residents of Skagit County



Education

WSU Skagit County Extension professionals familiarized themselves with brown marmorated stink bug taxonomy, biology, and ecology by reviewing relevant literature and referencing Extension publications available in the form of fact sheets and informative websites. Knowledge of proper identification characteristics was important to avoid potential false positives as there are several stink bug species in western Washington that resemble the brown marmorated stink bug. After learning that these insects display a hitch-hiking behavior and often invade new areas via commercial vehicles or shipments of goods, WSU Extension agents developed a trapping protocol that targeted localities near an industrial corridor that follows a major interstate through Skagit County.

Support

WSU Skagit County Extension collaborated with numerous government and Extension programs in their search for brown marmorated stink bugs. Annual funding is provided by the Skagit County Board of County Commissioners and includes funding for the Horticultural Pest Control Board, which is responsible for controlling pests and diseases that threaten the agricultural community in our area. Extension professionals worked closely with members of Skagit County Master Gardeners to help educate residents on pest identification and widen the call for the public to bring in any suspected brown marmorated stink bug samples to their local Extension office. Funding related to trapping, which was conducted by WSU Skagit County agents, came from an ongoing research project occurring through the WSU Northwestern Washington Research & Extension Center.

Trapping

Monitoring for stink bugs in Skagit County occurred at five localities along the I-5 highway corridor where one or more target host plants were found. Multiple trap types were used, including a baffle trap with a collecting jar on top and a double-sided sticky card suspended on a wooden stake. Both types of traps were baited with a commercially available pheromone lure that is attractive to adults and later instar nymphs. Traps were serviced weekly, and those performing the trapping also conducted additional sampling using a beating sheet to knock insects from nearby vegetation. Trapping data in the following categories were recorded: date, locality, trap type, life stage, sex, and biological/ecological notes. Analysis of trapping data indicated when eggs most likely had been laid and when the next generation of adults would emerge (Figure 2). Estimating these critical developmental thresholds is crucial for developing future control strategies.

Figure 2.

Newly Eclosed Brown Marmorated Stink Bug Observed During Trap Servicing



Conclusion

The *pest* methodology provides a proven framework Extension professionals can follow to increase the chance of detecting invasive insect pests before they become a major threat to their counties. As the likelihood of invasive pest introductions increases in parallel with global trade and domestic travel, it is becoming even more important for Extension professionals to proactively have a system in place to combat these dangerous organisms. The *pest* strategy is easily adapted to target a breadth of potential invasive insects and can be used to monitor and control their populations if they do become established.

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