



Ohio Vegetable & Small Fruit Research & Development Program

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2012 Grant Application Outline for Vegetable & Small Fruit Research

Final Report on Continued Monitoring for the Brown Marmorated Stink Bug

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Background information:

The Brown Marmorated Stink Bug (BMSB) is a relatively new non-native invasive pest in Ohio likely to significantly alter our current approach to integrated pest management on many vegetable and fruit crops. This bug is challenging to control for many reasons; 1. It has a broad host range of nearly 300 plant species including sweet corn, peppers, tomatoes, snap beans, eggplant, raspberries, grapes, apples, peaches, soybeans, and field corn, 2. It has very few natural enemies for biological control, 3. It is readily transported around the state by any form of mass transit (car, truck, train, airplane, etc.), 4. It is most susceptible to pyrethroid and neonicotinoid insecticides which are disruptive to current IPM programs, and 5. These insects are highly mobile and can rapidly reinvade treated areas. Feeding damage on fruit from BMSB resembles sunken pits, dimples, and surface blemishes, often rendering them unsalable. It is important to document the initial invasion in counties throughout the state and monitor the spread across key crops in the landscape so that growers can be alerted to its presence and begin to recognize this bug and its injury. As a consequence of this new pest, we will slowly need to adapt our current pest management practices to include strategies to control this insect.

Summary of monitoring network:

In 2012, a BMSB monitoring network of 16 pheromone trap sites and five blacklight traps was established in 13 counties across the state in four crops (sweet corn, brambles, apple, and soybean) to monitor for this insect weekly from mid June through mid October (figure 1).

At all pheromone trap sites except those in Clinton, Warren, Monroe and Franklin counties, two large black and two large yellow pyramid traps baited with the original methyl-decatrienoate (MDT) lure were deployed along a field edge with a trap spacing of ca. 50-75'. In Monroe county, only one black and one yellow large pyramid trap baited with MDT was placed at three separate sweet corn sites. At each site in Clinton and Warren counties, in addition to the standard four large pheromone trap arrangement, two small yellow "Dead Inn" pheromone traps were placed on the ground and two more "Dead Inn" traps were secured four feet high on a wooden post in line and with the same spacing as the original protocol. All of these traps used the original MDT lure except for one large black and yellow pyramid trap, which used the experimental BMSB attractant known as USDA #10.

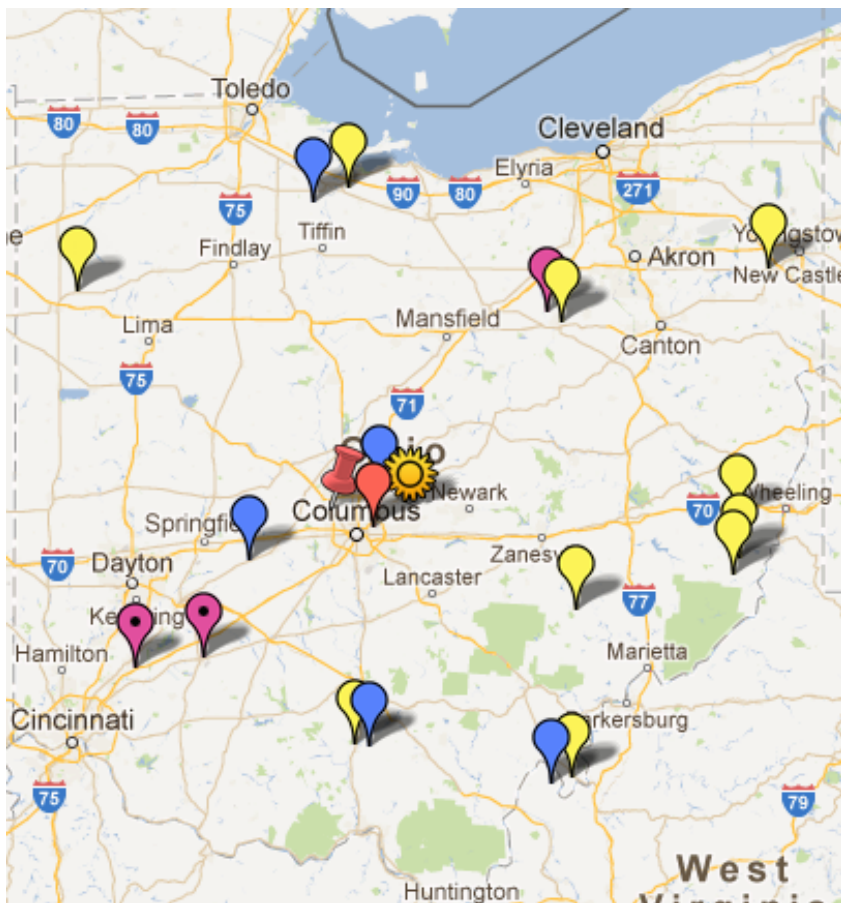


Figure 1. Pheromone and blacklight trap locations for BMSB around Ohio in 2012. Blue balloons indicate blacklight sites, yellow, purple, red balloons indicate pheromone traps at sweet corn, raspberry, and apple sites respectively. The red thumbtack and gold flower indicate pheromone traps at apple and soybean sites respectively. Balloons with a dot indicate sites where eight traps were deployed.

In Franklin county there were three different trapping sites and protocols, all located on the Waterman Farm at the western edge of OSU's Columbus campus. The first site was in apples and used nine large black pyramid pheromone traps set up in a 3 x 3 grid across the orchard. The experimental USDA #10 lure was used in these traps. The second site was in a different block of apples on Waterman farm where four Dead Inn traps were attached to a four foot post. These traps also used the newly formulated USDA #10 lure. The third site was a soybean field, with nine Dead Inn traps attached to four foot high post deployed in a 3 x 3 grid across the field. The standard MDT lure was used with these traps. Regardless of lure type, all pheromone traps were checked weekly.

All traps used in this study, including the large black and yellow pyramid and small Dead-Inn traps, were originally purchased from AgBio with OVSFRDP funds awarded in 2011.

BioQuip bucket style blacklight traps were deployed in Clark and Meigs county, and the Gemplers tall metal blacklight trap were used at the Franklin, Sandusky, and Pike county sites. These traps were checked in intervals ranging from 1-14 days for BMSB.

The ten network cooperators centrally reported their trap counts using the OARDC BMSB website developed last year to efficiently enter and present trap capture information. Views of current trapping information can be seen by the public here (<http://www.oardc.ohio-state.edu/BMS/viewdata.asp>)

Pheromone trap captures

Pheromone traps caught BMSB in five counties; Clinton, Franklin, Highland, Meigs and Warren. The Waterman Farm located on OSU's campus in Franklin county was again this year the single highest source of BMSB in our trapping network, catching over 1,000 bugs in apple and soybean crops over a four month period. In apples, the earliest detection was the week of 19 June and in

soybeans it was the week of 10 July. The last BMSB was captured in a pheromone trap in both apples and soybeans during the week of 2 October.

Comparing the two lure types over apples and soybeans at Waterman Farm revealed 449 bugs captured using the USDA #10, with 441 bugs captured using the MDT lure. In trapping networks in other states, there is often a 5X-10X difference in the trap catches in favor of the USDA #10 lure. There were also 112 bugs captured in seven unbaited pheromone traps in both apple and soybean fields at Waterman Farm.

For comparison, only four BMSB were captured in pheromone traps outside of Franklin county (Table 1). The distribution of BMSB trapped across the state appear only to be in the southern part of the State, as seen in figure 2. There have been many confirmed reports of BMSB being found in high numbers in locations we did not trap, such as Delaware, Mahoning, and Washington county.

Table 1. Cumulative BMSB caught in pheromone and blacklight traps from mid June to mid October 2012.

County	Crop	# BMSB	# Traps
Allen	Sweet Corn	0	4
Clark ¹	Sweet Corn	0	1
Clinton	Raspberries	1	8
Franklin	Apple	728	9
Franklin	Apple	100	4
Franklin	Soybean	174	9
Franklin ¹	Sweet Corn	356	1
Highland	Sweet Corn	1	4
Mahoning	Sweet Corn	0	4
Meigs	Sweet Corn	1	4
Meigs ¹	Sweet Corn	0	1
Monroe	Sweet Corn	0	2
Monroe	Sweet Corn	0	2
Monroe	Sweet Corn	0	2
Morgan	Sweet Corn	0	4
Pike ¹	Sweet Corn	7	1
Sandusky	Sweet Corn	0	4
Sandusky ¹	Sweet Corn	3	1
Warren	Raspberries	1	8
Wayne	Raspberries	0	4
Wayne	Sweet Corn	0	4

¹ Blacklight trap

Blacklight trap captures

Blacklight traps have consistently caught BMSB from May through September at the Franklin county Waterman Farm location (356 bug total). Captures at the Waterman farm location began 25 June and ended 13 September. Brown Marmorated Stink Bug captures were sparse at the other two locations, Pike county (7 bugs total) and Sandusky county (3 bugs total). In Pike county, captures began 15 July and ended 9 August. In Sandusky county, the first capture was 3 July and

the last capture was on 10 August. There were no BMSB captures at the Clark or Meigs county locations.

Summary

It is evident that BMSB have increased dramatically across the state according to personal sightings on various crops and buildings. Ohio experienced a slight uptick in pheromone and blacklight trap captures compared to last year. While it is difficult to know why the traps don't seem to be catching the bugs more efficiently given all the visual observations in the fields and on buildings, most likely the attractant pheromone lure does not compete well with other plant or environmental stimuli and requires further refinement. While the lure is being reformulated to be even more attractive, it is still not as attractive as various field, fruit and vegetable crops.

Blacklight traps are still detecting these bugs earlier and later in the season than pheromone traps, but have the drawback of needing a power supply, to be checked frequently, and added skill to sort through a range of non-target insects. We intend to continue this monitoring project in 2013, so we can provide accurate up to date information to growers about the distribution and magnitude of the invasion.



Note

A large number of BMSB were observed in Mahoning county in pepper fields and on outside structures from 9-4 through 9-24, but no BMSB were found in pheromone traps adjacent to the target crop sweet corn.

Figure 2. Cumulative distribution of BMSB captured in pheromone traps per county from mid June through mid October.