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Monitoring and Management Strategies for *Halyomorpha halys* (Hemiptera: Pentatomidae) a Newly Invaded Insect Pest of Specialty Crops in Florida

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FAMU FLORIDA A&M UNIVERSITY CENTER FOR BIOLOGICAL CONTROL COLLEGE OF AGRICULTURE AND FOOD SCIENCES

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Introduction

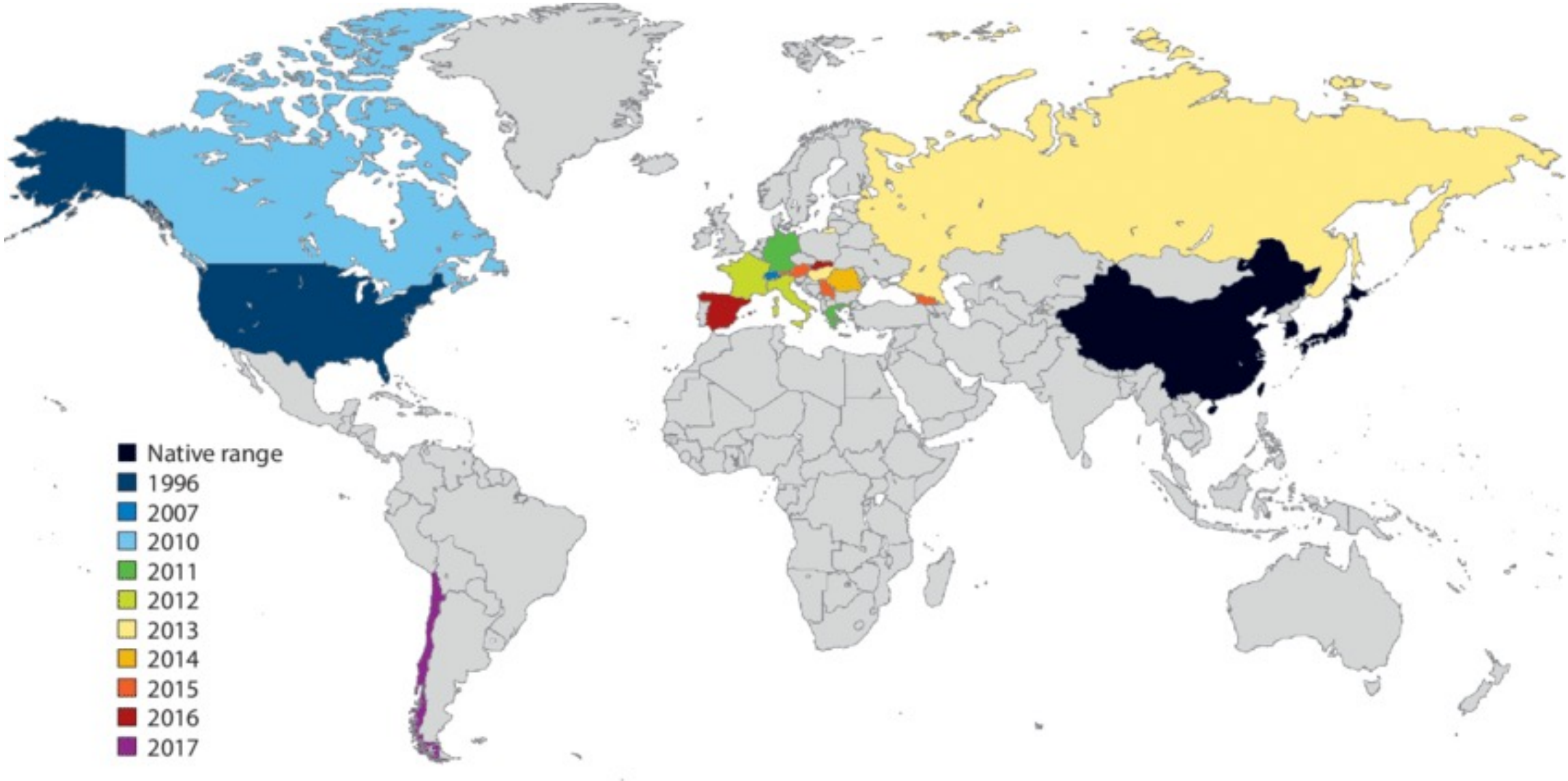
1. The brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål), is an invasive pest in the United States from Asia.

2. First detected in eastern Pennsylvania in the mid-1990, the BMSB has spread throughout much of the United States and Canada.

3. The BMSB is polyphagous pest and feeds on over 170 host plants, many of agricultural importance, including various fruits, vegetables, nuts, row crops, and ornamentals.

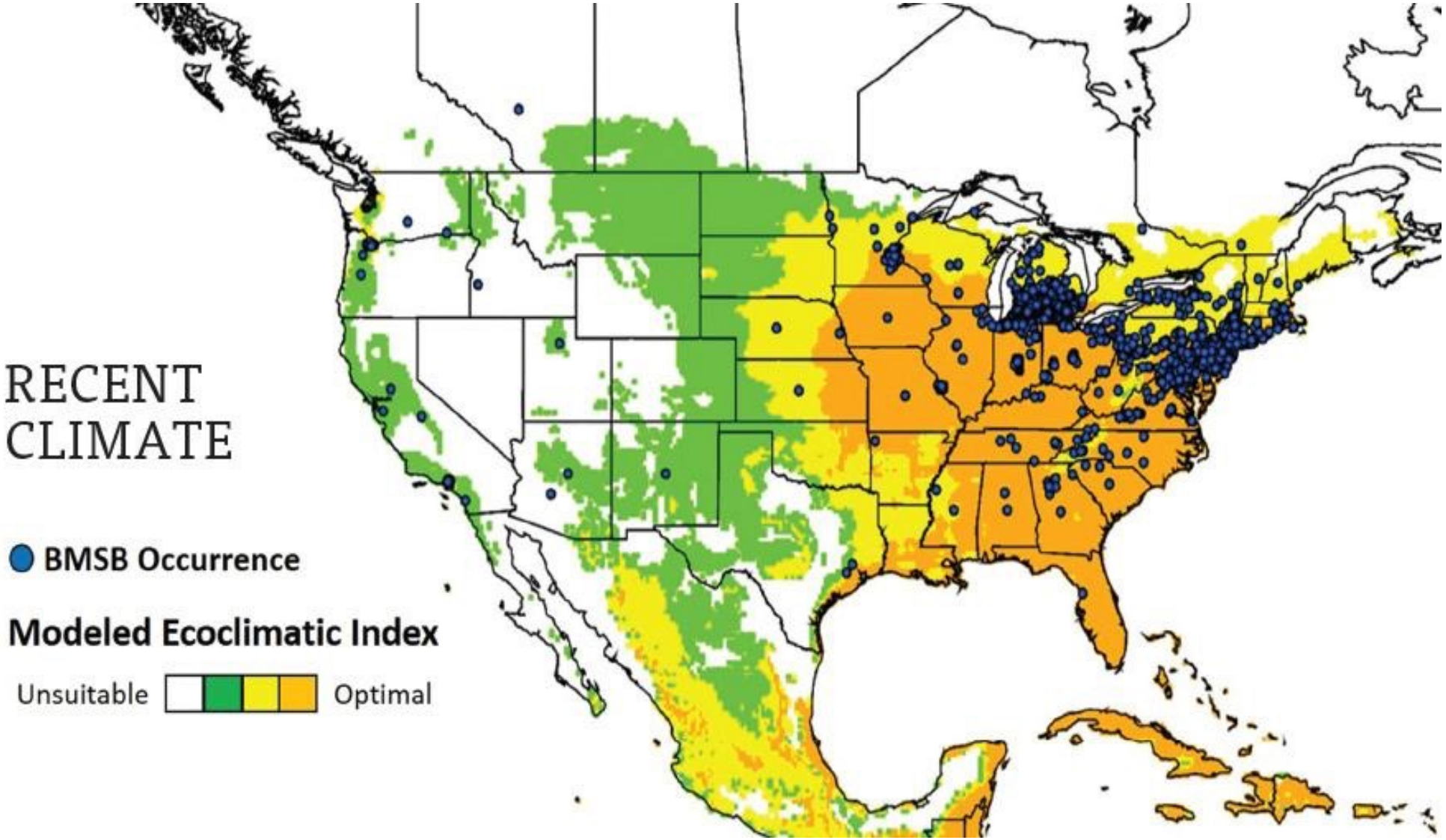
4. The BMSB is capable of long-distance flights and walking dispersal and frequently moves among open fields and wild hosts.

5. In 2010, the BMSB outbreak has caused over $37 million losses to apples, and many other specialty and row crops, including peaches, nectarines, tomatoes, peppers, sweet corn and soybeans in the mid-Atlantic region.



Global distribution of the BMSB in native and invaded ranges (yearly detection).

Source: Leskey and Nielsen 2018 (ARE).



BMSB modeling showing the potential for further expansion across the United States.

Source: Kistner 2017 (EE).

Potential hosts of *Halyomorpha halys* in Florida

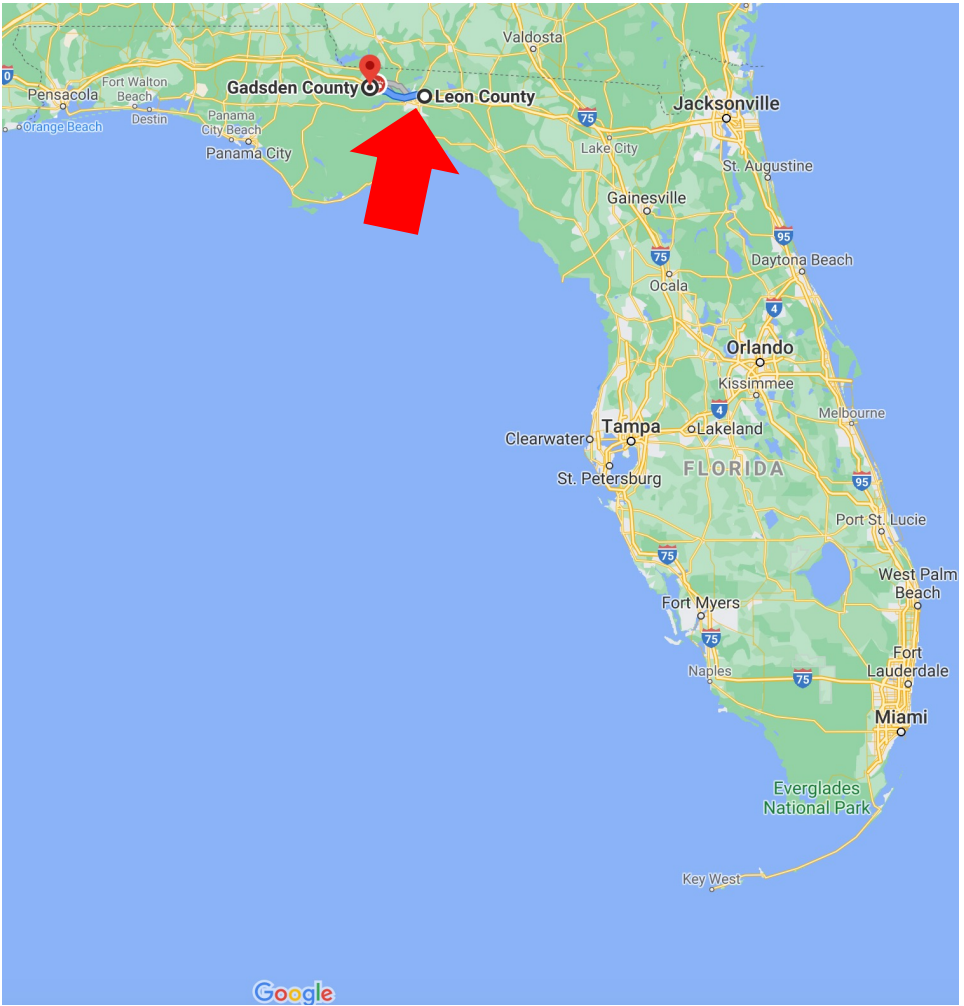
Fruits	Vegetables	Nuts	Row Crops	Ornamentals/Landscapes
Citrus	Tomato	Chestnut	Field corn	Dogwood
Blueberry	Pepper	Pecan	Soybean	Ash
Blackberry	Bean	Hickory	Sunflower	Sunflower
Strawberry	Okra		Sorghum	Crape Myrtle
Fig	Eggplant		Carinata	Magnolia
Persimmon	Cabbage		Hemp	Cherry
Grape	Cauliflower			Oak
Peach	Pea			Rose
Plum	Sweet corn			Willows
Mulberry	Cucumber			Lime
Olive				Elm
Pear				Maple
Apple				Princess tree
Avocado				
Mango				

Objectives

- To conduct surveys and find out the presence of the BMSB in north Florida,
- To collect and determine the potential biocontrol agents of the BMSB in north Florida, and
- To alert the growers, public, and industry about the arrival of the BMSB in north Florida.

Materials and Methods

- Surveys were conducted in the Leon and Gadsden Counties in north Florida in the Summer and Fall 2020 (14 weeks).
- Two type of traps were installed in the chestnuts and persimmons (site 1) and blueberries and muscadine grapes (site 2).
- Traps were serviced every 15 days and pheromone lures were replaced.
- Data of adult BMSBs were collected every week.
- Biocontrol agents found in the traps or on the bodies of the BMSB were collected and identified.



Materials and Methods *Continue*

- On September 4, 2020., several sentinel egg masses of the BMSB were placed in the infested area to determine parasitoids and predators of the BMSBs already available in north Florida.

Results and Discussion

Site 1:

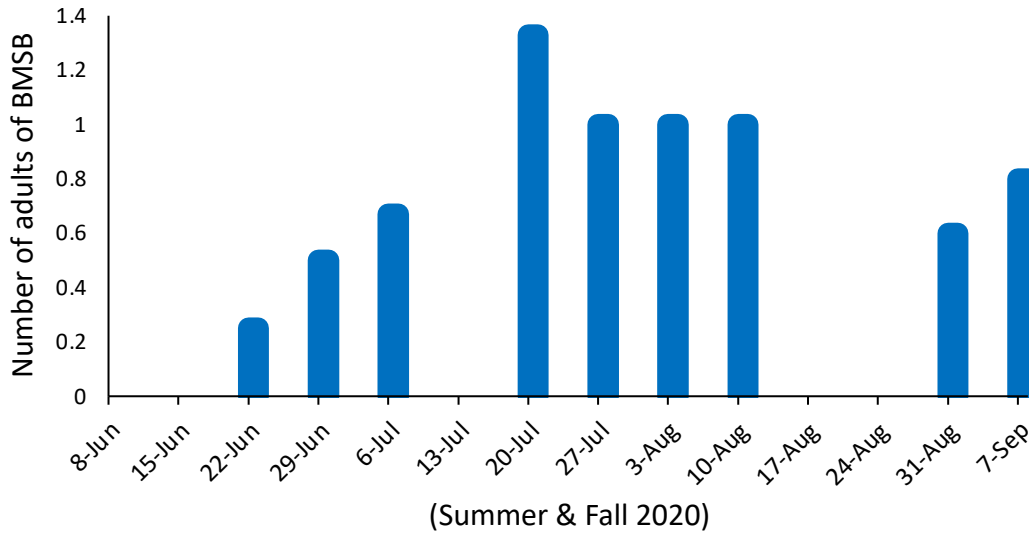


Figure 1. Number of adults of *Halyomorpha halys* caught in the pyramid traps in the chestnuts and persimmons in north Florida.

Results and Discussion *Continue*

Site 2:

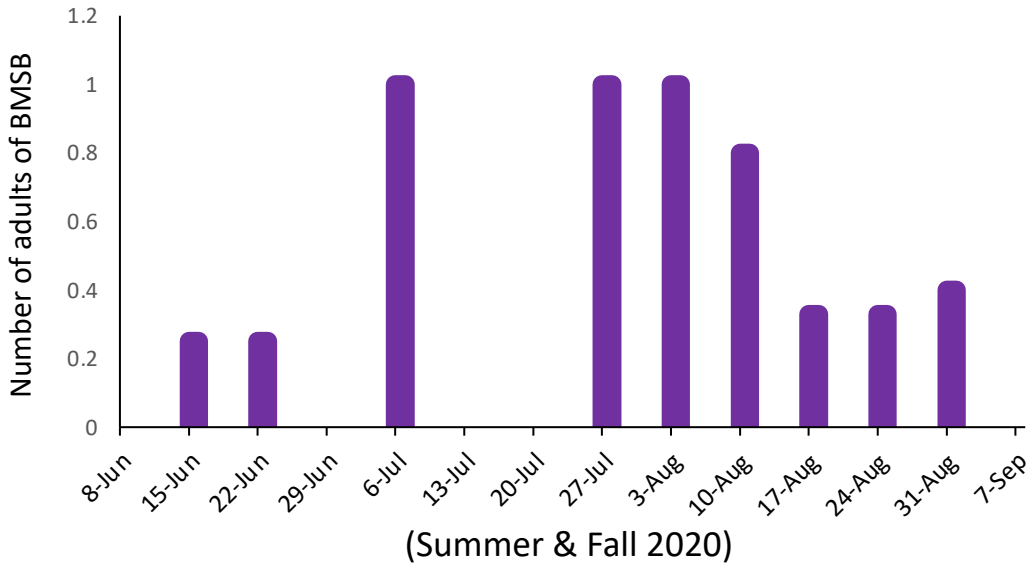


Figure 2. Number of adults of *Halyomorpha halys* caught in the pyramid traps in the blueberries and muscadine grapes in north Florida.

Podisus maculiventris

Euthyrhynchus floridanus

Trissolcus basalis

Trichopoda pennipes

Potential biocontrol agents of *Halyomorpha halys* in north Florida

New pest arrival alert (Growers, Public, and Industry)

Commodity-Based Insect Pest Info.
College of Agriculture and Food Sciences, CBC, FAMU

2020

Brown Marmorated Stink Bug, *Halyomorpha halys* (Hemiptera: Pentatomidae), a New Invasive Insect Pest in Florida

Muhammad Haseeb[1], Jesusa Crisostomo Legaspi[2] and Lambert H.B. Kanga[1]

Brown marmorated stink bug (BMSB), *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae), is an invasive pest new to Florida. First specimens of the pest in Leon County, Tallahassee were collected by us in the Center for Viticulture and Small Fruit Research (CVSFR), Florida A&M University on June 15 and 19, 2020 from the chestnuts and persimmons. Later, on June 26, the species identification and new county record was confirmed by Susan E. Halbert of Florida Department of Agriculture and Consumer Services, Division of Plant Industry (FDACS, DPI). Since introduction into Allentown, Pennsylvania in the mid 1990s, the pest has spread to at least 46 States. The species is native to Eastern Asia and is a highly polyphagous (feeds on > 300 reported plants). Since its arrival in the United States, it has caused millions of dollars damage to several economically important crops including vegetables, fruits, nuts, ornamentals, and row crops. Also, it is extremely nuisance pest in and around the buildings. Physical damage to fruit crops includes pitting and scarring, sometimes leading to a mealy texture. This injury makes the fruit unmarketable as a fresh product and in severe cases can even render the crop unusable for processed products. The BMSB feeds on leaves too, which show a characteristic symptom of leaf injury stippled areas approximately 0.30 cm in diameter around the feeding sites. In the field crops, damage caused by the BMSB is not usually evident immediately upon visual inspection. The presence of the BMSB is concerning for farmers because it feeds on a large number of high-value crops and ornamental plants. In north Florida, our current research focus is on pest biology, ecology, and behavior leading to the development of potential long-term integrated pest management strategies and landscape level management solutions. This commodity-based pest information was developed to support stakeholders and clientele to properly identify, monitor, and manage this serious pest.

Eggs and Freshly Emerged 1st Instars of BMSB

BMSB Adult on a Developing Blackberry Fruit Notice Antennae (black and white bands)

BMSB Tedder/Pyramid Trap in Chestnuts (Pheromone Lure)

Photos by Muhammad Haseeb © Florida A&M University

Identification: An adult of the BMSB is 1.5 cm in length and mottled brownish grey in color. Females are usually larger than the males. They have a shield shaped body. The species resemble the native brown stink bugs; however, its antennae have black and white bands. Shoulders are smooth. Abdomen edges have light and dark bands. Legs with faint white bandings. The BMSB has five nymphal instars (size ranges 2.4 mm to 12 mm). First instars are not very active and remain around the hatched egg mass. Nymphs have dark reddish eyes and a yellow-red striped with black abdomen. Eggs are often laid on the underside of leaves and are usually light green in color. They are elliptical in shape and are often deposited in masses. Each egg mass usually contains 20-28 eggs.
Host Plants: The BMSB is reported to feed on more than 300 host plants (Kriticos et al., 2017). The pest prefers numerous tree fruits, nut trees, shade trees, vegetables, ornamentals and leguminous crops. The crops most affected are citrus, apple, pear, peach, plum, nectarine, persimmon, lima bean, snap pea, tomato, pepper, sweet corn, field corn, and soybean. Other identified host crops include raspberry, blueberry, grape, hazelnut, pecan, chestnut, cucumber, okra, cabbage, collards, and hemp.

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Tallahassee Democrat.

LIFE

The brown marmorated stink bug is a new Florida pest

Muhammad Haseeb Guest columnist

Published 5:00 a.m. ET Aug. 28, 2020

Unfortunately, the brown marmorated stink bug (Halyomorpha halys) is a new invasive pest in Florida. First specimens of the pest in Leon County were collected by scientists at the Center for Viticulture and Small Fruit Research at Florida A&M University in June of this year on chestnut and persimmon trees. The pest was later confirmed by Susan E. Halbert of Florida Department of Agriculture and Consumer Services, Division of Plant Industry.

Notice the distinctive black and white bands on the antennae of this brown marmorated stink bug adult on a developing blackberry fruit. *Muhammad Haseeb*

Since its introduction into Allentown, Pennsylvania, in the mid-1990s, the pest has spread to at least 46 states. The species is native to Eastern Asia and can feed on over 300 different plants.

Since its arrival in the United States, it has caused millions of dollars of damage to several economically important crops, including vegetables, fruits, nuts, ornamentals and row crops. Additionally, it can be an extreme nuisance in and around buildings.

Conclusions

1. The presence of *Halyomorpha halys* was confirmed by us in the Leon County Florida for the first time and was determined by the FDACS, DPI.

2. The pest is in initial stages of establishment in north Florida. A list of potential host plants of the BMSB was developed.

3. A preliminary list of potential biocontrol agents of the BMSB was developed in 2020 and this study is being continued for 2021.

4. Growers, public, and industry were alerted about the arrival of this new invasive pest in north Florida.

5. Graduate students are being trained to study this invasive pest in north Florida.

Acknowledgements

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We are grateful to Dr. Amanda Hodges (UF, IFAS) and Dr. Mrittunjai Srivastava (FDACS) for the traps and sentinel egg masses of the BMSB for the study. Graduate Students Sarah Birkmire and Andy Jean (UF, IFAS) assisted in the traps and egg masses installation in the open fields.

We greatly appreciate helps of Dr. Susan Halbert and Dr. Catherine White, FDACS, DPI who determined the identity of the specimens of the BMSBs.

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