Title

Deborah G. Grantham

Northeastern IPM Center

Funding

USDA United States Department of Agriculture National Institute of Food and Agriculture

Specialty Crop Research Initiative

Collaborating Institutions

NC State University, PennState, OSU Oregon State, University of Maryland, University of Georgia, Washington State University, Northeastern IPM Center, Cornell University, Utah State University, Rutgers University, The Ohio State University, University of Kentucky, UC Davis, University of Minnesota, Virginia Tech, Berkeley, Michigan State University, UC Riverside

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BMSB SCRI NEIPM Center Update

February 2019

USDA United States Department of Agriculture National Institute of Food and Agriculture

Fully staffed as of September 2018

* **New:**
  * Deborah G. Grantham, Director
  * Mike Webb, Communication Specialist
  * David Lane, Evaluation Specialist
* **Continuing:**
  * Nancy Cusumano, Program/Extension Aide
  * Susannah Reese, Program Coordinator, StopPests in Housing
  * Kevin Judd, Web Administrator
  * Jana Hexter, Grants/Partnerships Coordinator

Funding

* Core funding for NEIPM Center is USDA-NIFA
* Renewed as of September 1, 2018 for 4 years
* Provides basis for participating in other projects such as the BMSB SCRI work

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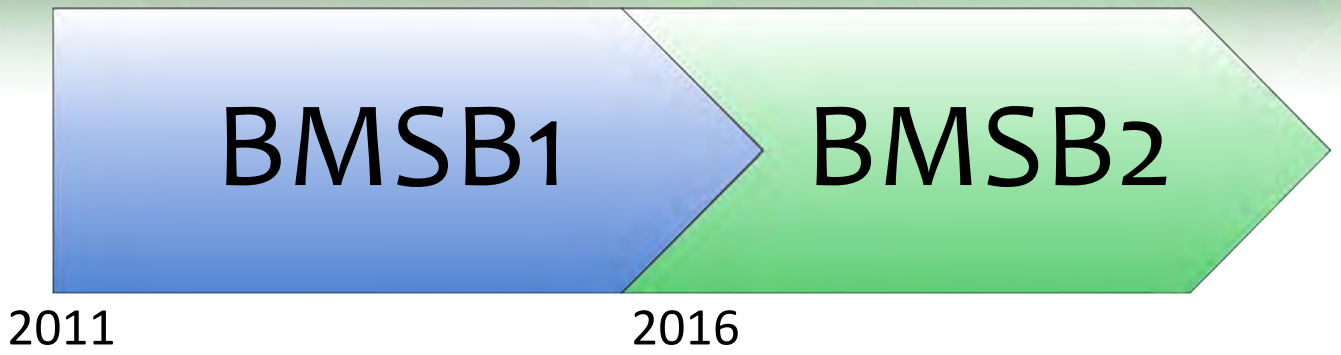
Outreach for USDA SCRI Projects



- Launched StopBMSB.org website in 2012
- Established awareness, shared biological and ecological information (host range, monitoring, pheromones, natural enemies)

- Building upon existing resources, adding new ones over time
- Added more partners from Midwest, Southeast, West
- Landscape ecology, biological control, BMPs, economics, outreach

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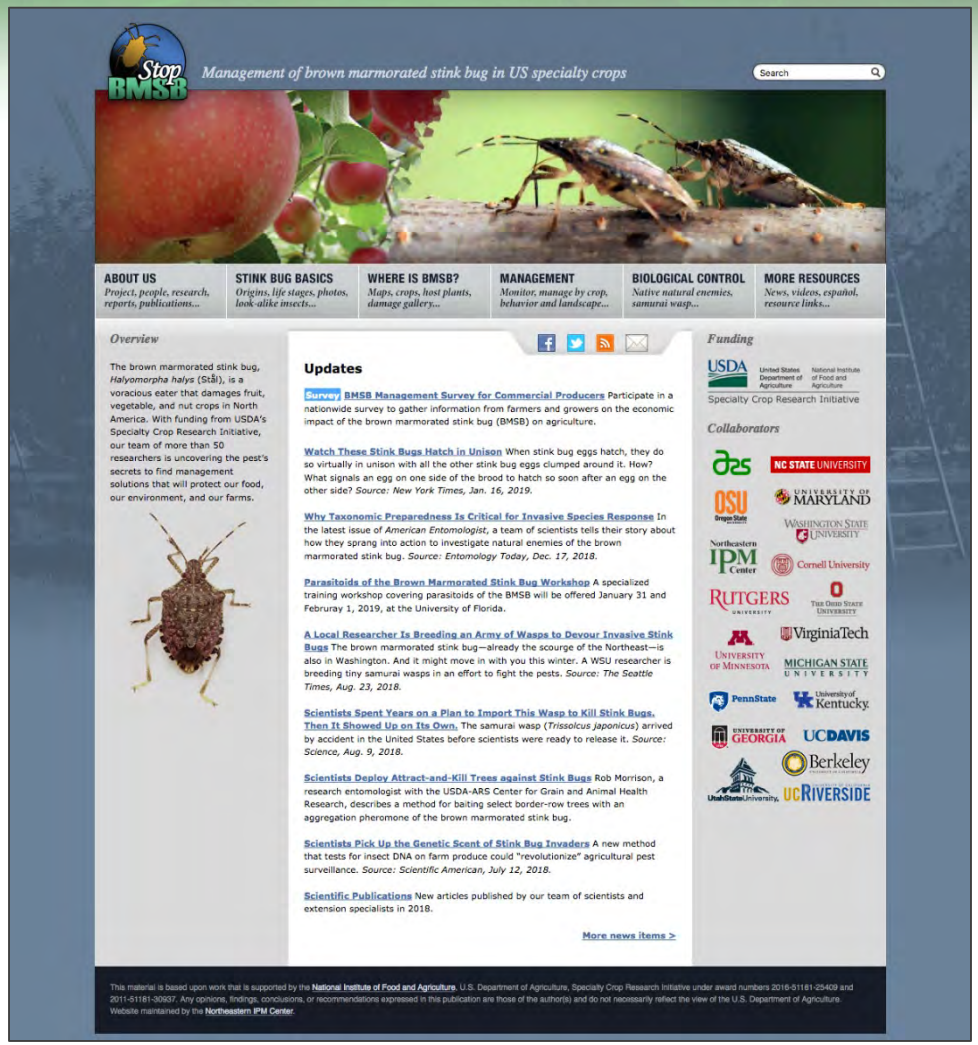
StopBMSB.org

- Widely used and cited interactive map
- Basic biology & identification
- Host plants info
- Management info
- Biological control (*Trissolcus japonicus* info)
- Repository for videos, management documents, list of publications
- News & updates
- Spanish resources



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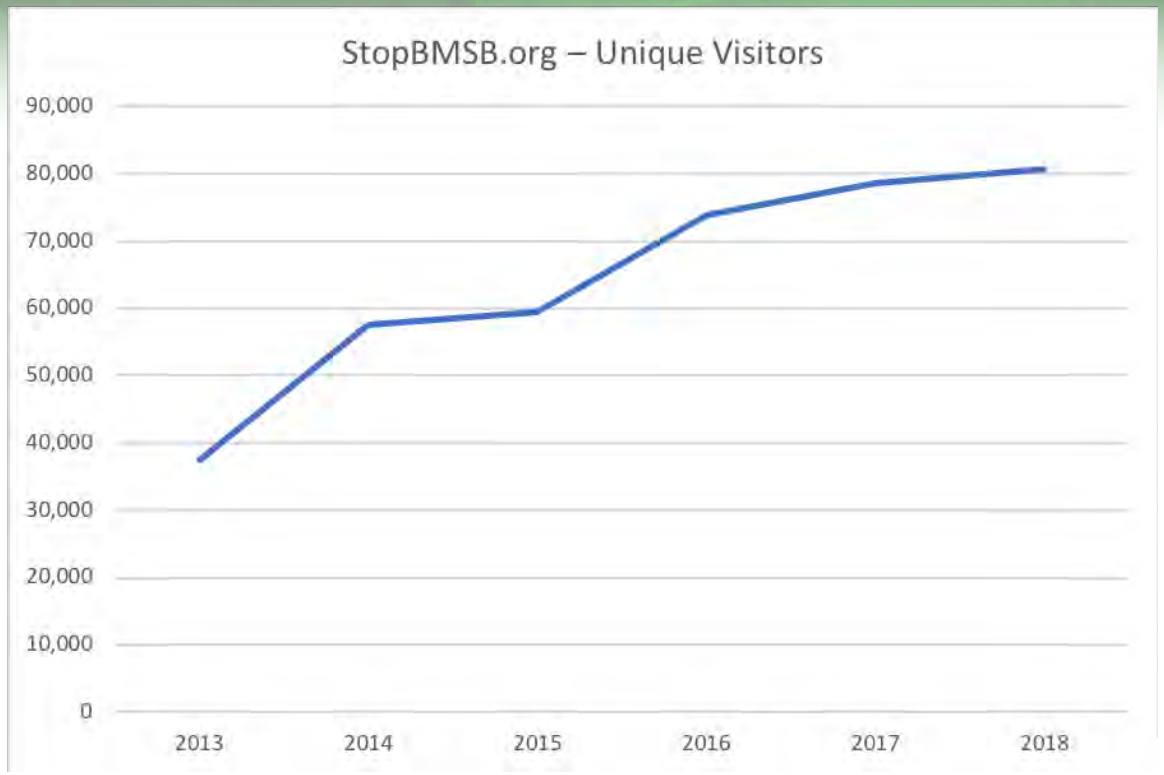
StopBMSB.org – Unique Visitors



Compared to five years ago, yearly traffic has doubled

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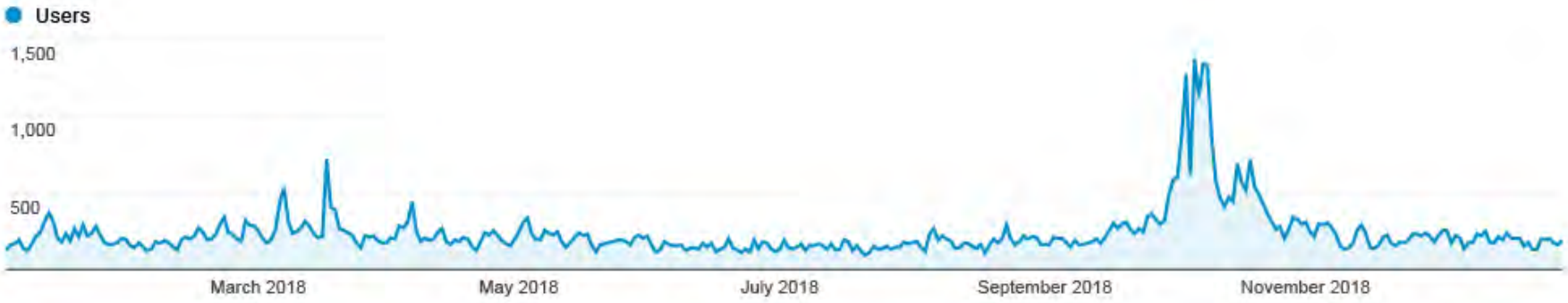
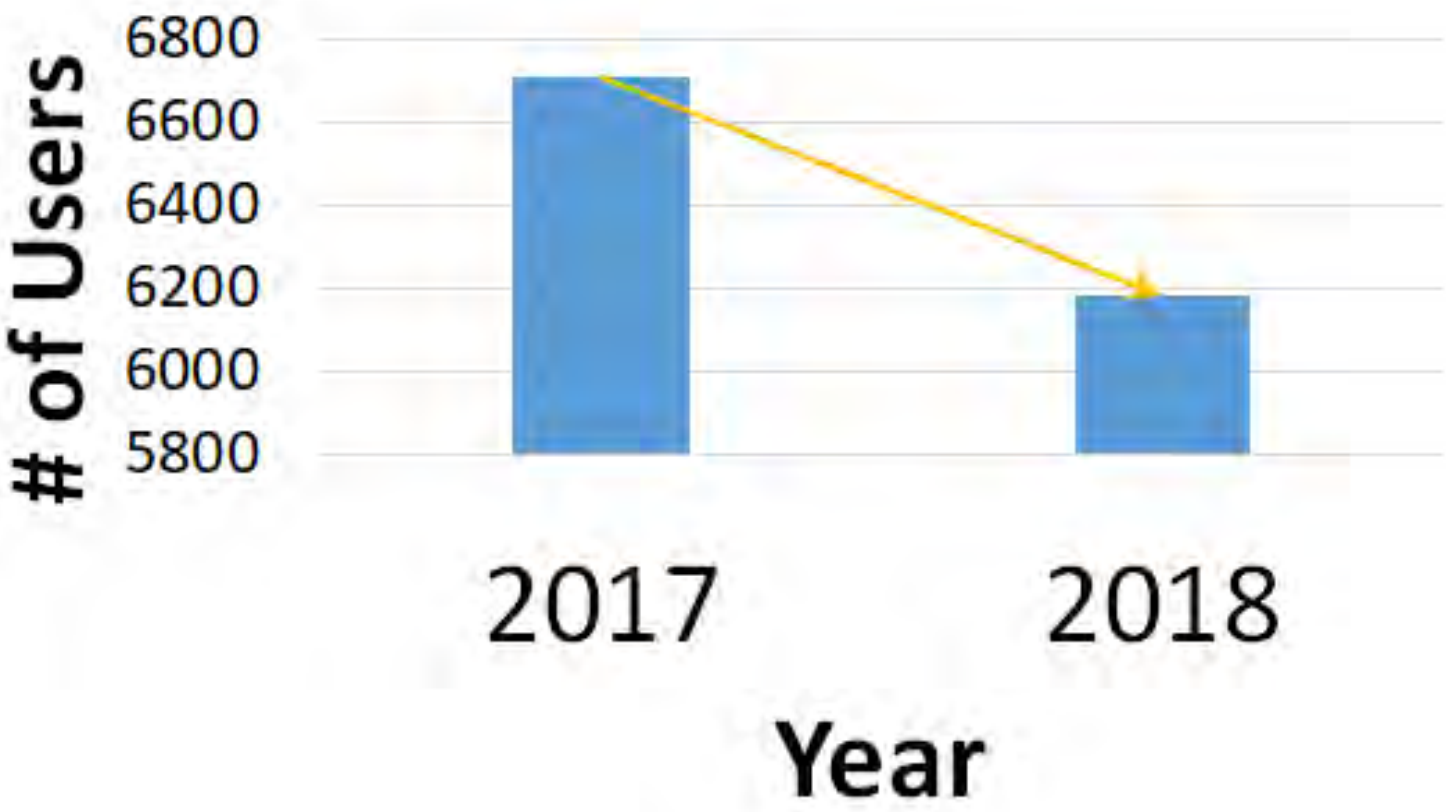
StopBMSB.org – Unique Visitors

80,663 unique visitors in 2018



As in previous years, we saw a bump in traffic starting around October 1 when stink bugs enter homes and there is more media coverage of the topic.

Users of www.stopbmsb.org in New York



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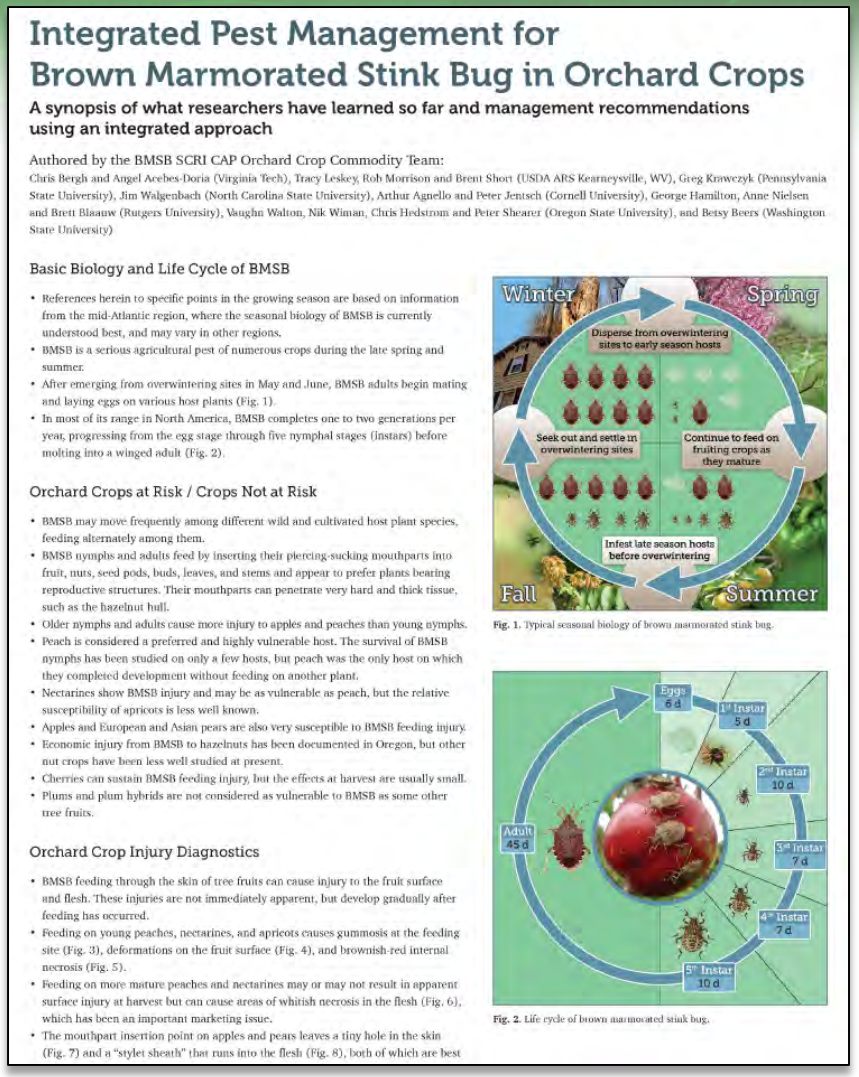
Management Documents

Four sets of management documents completed August 2016.

Total downloads: 2,390

Download Totals		
	English	Spanish
Orchard Crops	767	22
Vegetables	761	27
Grapes	414	19
Small Fruit	363	17



Integrated Pest Management for Brown Marmorated Stink Bug in Orchard Crops

A synopsis of what researchers have learned so far and management recommendations using an integrated approach

Authored by the BMSB SCRI CAP Orchard Crop Commodity Team:
Chris Bergh and Angel Acebes-Doria (Virginia Tech), Tracy Leskey, Rob Morrison and Brent Short (USDA ARS Kearneysville, WV), Greg Krawczyk (Pennsylvania State University), Jim Walgenbach (North Carolina State University), Arthur Agnello and Peter Jentsch (Cornell University), George Hamilton, Anne Nielsen and Brett Blaauw (Rutgers University), Vaughn Walton, Nik Wiman, Chris Hedstrom and Peter Shearer (Oregon State University), and Betsy Beers (Washington State University)

Basic Biology and Life Cycle of BMSB

- References herein to specific points in the growing season are based on information from the mid-Atlantic region, where the seasonal biology of BMSB is currently understood best, and may vary in other regions.
- BMSB is a serious agricultural pest of numerous crops during the late spring and summer.
- After emerging from overwintering sites in May and June, BMSB adults begin mating and laying eggs on various host plants (Fig. 1).
- In most of its range in North America, BMSB completes one to two generations per year, progressing from the egg stage through five nymphal stages (instars) before molting into a winged adult (Fig. 2).

Orchard Crops at Risk / Crops Not at Risk

- BMSB may move frequently among different wild and cultivated host plant species, feeding alternately among them.
- BMSB nymphs and adults feed by inserting their piercing-sucking mouthparts into fruit, nuts, seed pods, buds, leaves, and stems and appear to prefer plants bearing reproductive structures. Their mouthparts can penetrate very hard and thick tissue, such as the hazelnut hull.
- Older nymphs and adults cause more injury to apples and peaches than young nymphs.
- Peach is considered a preferred and highly vulnerable host. The survival of BMSB nymphs has been studied on only a few hosts, but peach was the only host on which they completed development without feeding on another plant.
- Nectarines show BMSB injury and may be as vulnerable as peach, but the relative susceptibility of apricots is less well known.
- Apples and European and Asian pears are also very susceptible to BMSB feeding injury.
- Economic injury from BMSB to hazelnuts has been documented in Oregon, but other nut crops have been less well studied at present.
- Cherries can sustain BMSB feeding injury, but the effects at harvest are usually small.
- Plums and plum hybrids are not considered as vulnerable to BMSB as some other tree fruits.

Orchard Crop Injury Diagnostics

- BMSB feeding through the skin of tree fruits can cause injury to the fruit surface and flesh. These injuries are not immediately apparent, but develop gradually after feeding has occurred.
- Feeding on young peaches, nectarines, and apricots causes gummosis at the feeding site (Fig. 3), deformations on the fruit surface (Fig. 4), and brownish-red internal necrosis (Fig. 5).
- Feeding on more mature peaches and nectarines may or may not result in apparent surface injury at harvest but can cause areas of whitish necrosis in the flesh (Fig. 6), which has been an important marketing issue.
- The mouthpart insertion point on apples and pears leaves a tiny hole in the skin (Fig. 7) and a "stylet sheath" that runs into the flesh (Fig. 8), both of which are best

Fig. 1. Typical seasonal biology of brown marmorated stink bug.

Fig. 2. Life cycle of brown marmorated stink bug.

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Videos

"Tracking the Brown Marmorated Stink Bug"

10-part video series, plus
4 Research Update videos

Lifetime Views	
Total (all videos combined)	**70,602**
Pt. 1: History and Identification	29,143
Pt. 10: Biological Control	10,398
Pt. 6: Host Plants & Damage in Vegetables	7,209
Pt. 2: Overwintering and Spread	4,470
Pt. 3: Monitoring and Mapping	4,366
Pt. 9: Management	2,813
Pt. 4: Host Plants & Damage in Orchard Crops	1,788
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Stink Bug Kits

Includes: stink bug guide, specimen in bottle, video postcard, article, factsheet, “Crops at Risk” flier

Kits distributed in 2018:

279 kits sent to 9 states,
1 Canadian province & 5 countries

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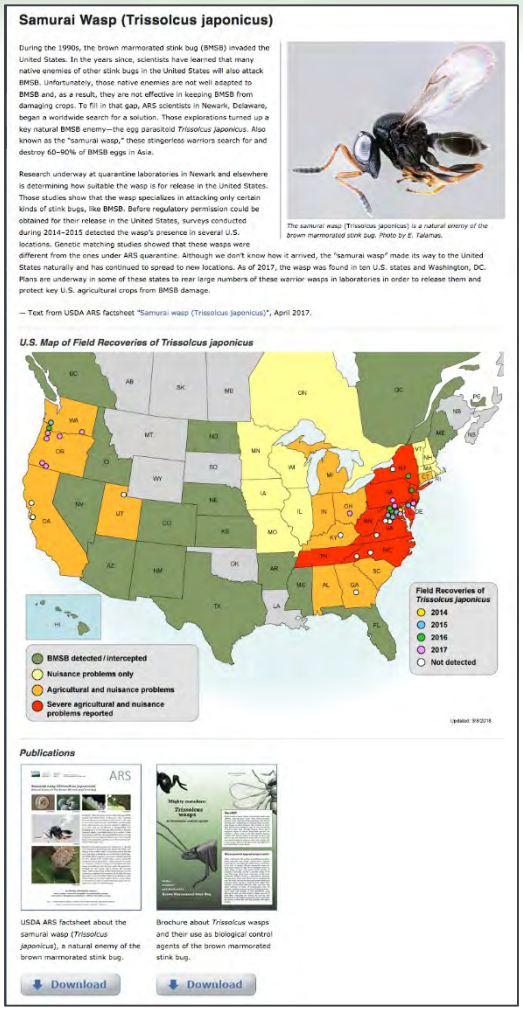
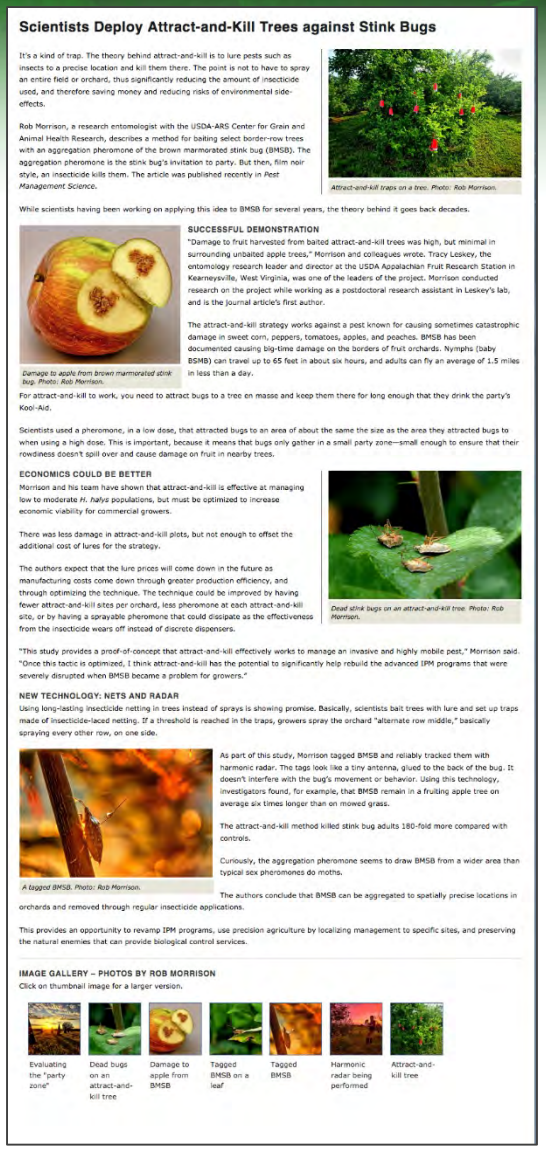
2018 Website Updates

New and updated articles on the website:

- Scientists Deploy Attract-and-Kill Trees against Stink Bugs
- Samurai Wasp (*Trissolcus japonicus*) – field recoveries map
- Behavioral- and Landscape-Based Management: IPM Crop Perimeter Restructuring





Search engines

- Searching on BMSB brings up StopBMSB.org
- Searching on stinkbug or brown marmorated stinkbug does NOT bring up StopBMSB.org
  - Wikipedia article, using one of our images without attribution
  - Kevin added attribution
- We are thinking about keywords and making sure that brown marmorated stinkbug or stinkbug shows up in as many articles, publications, etc., as possible
- More people searching on various terms and choosing StopBMSB.org will help

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Going Forward – 2019

- Microsporidia article (Carrie Preston, Ann Hajek)
- Researcher bios: template/sample has been developed and is being circulated as a model
- Working with extension committee to determine areas where updates or additional content are needed
- More emphasis on visual information instead of text-heavy pages
- Mobile friendliness
- Tracking location of visitors by state

Questions?

- Contacts:
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  - Northeastipm.org
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  - Nancy Cusumano: nec2@cornell.edu
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