Invasive Insect Update


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Utah State University
Utah State Horticultural Association
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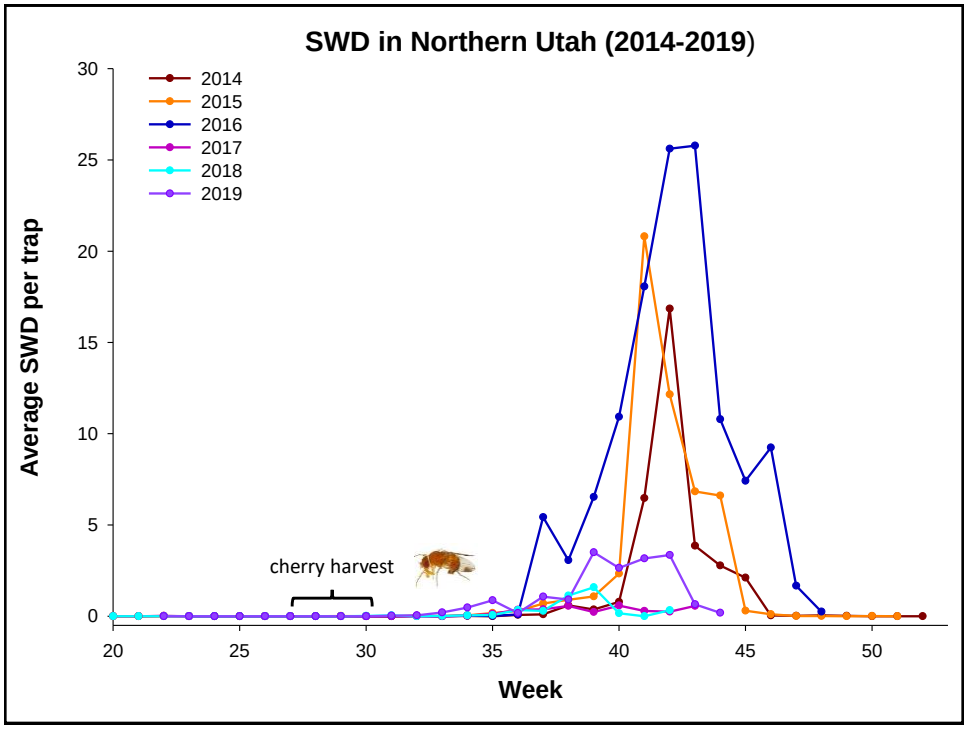
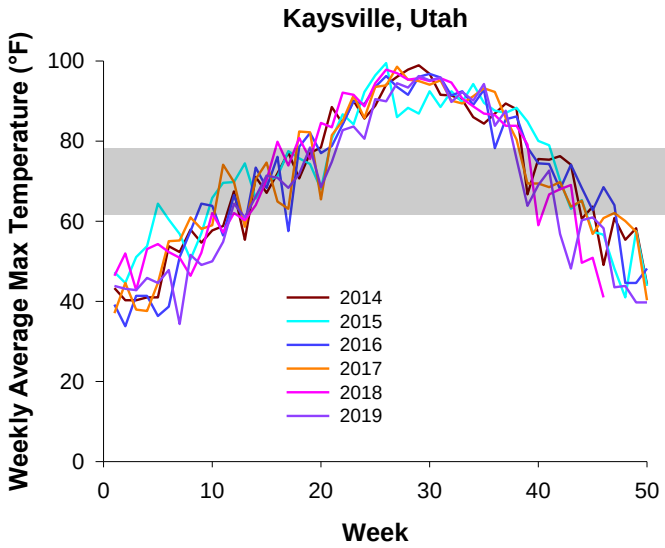
Spotted Wing Drosophila

- Native to southeast Asia
- Infests ripening and ripe fruit
- Detected in the U.S. in 2008
- First detected in Utah in 2010
- Abundant in wild habitats and backyard gardens
- No damage reports



SWD prefers moderate temperatures



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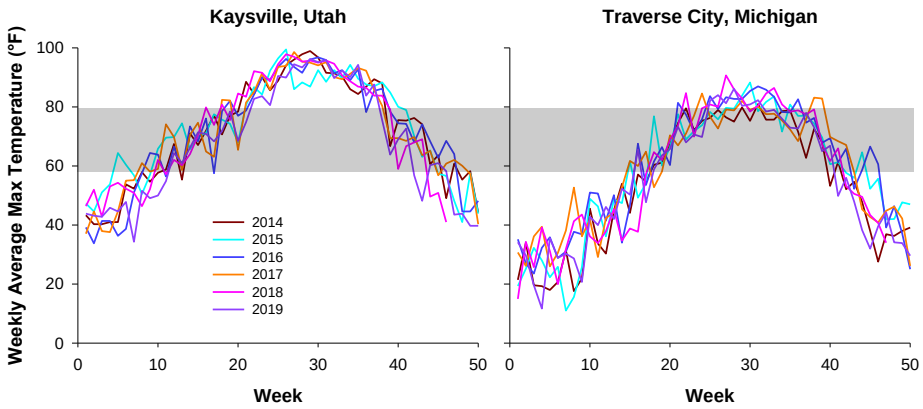
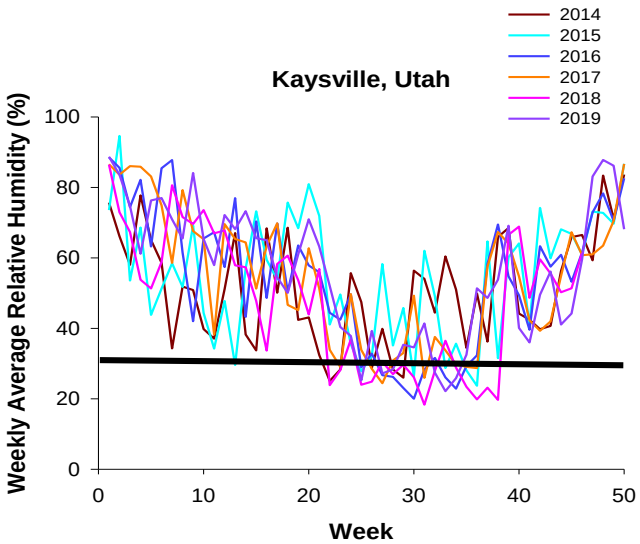


Adult survival decreases at RH below 33%



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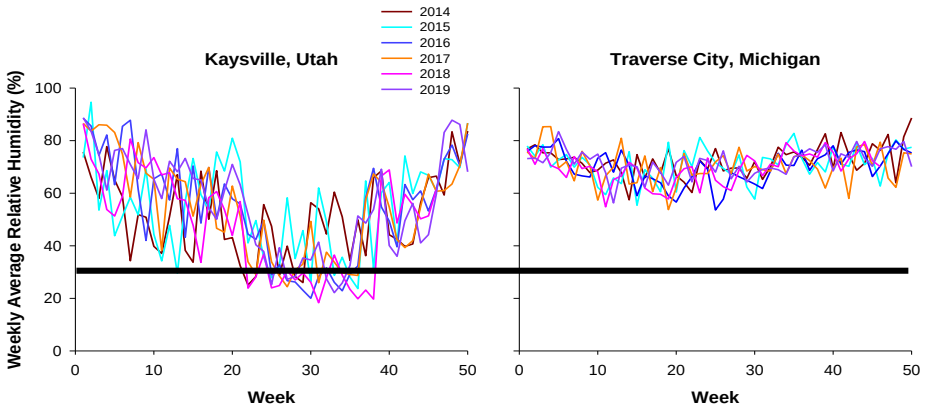


Monitoring for SWD

- Scentry lure; water + a few drops of unscented dish soap
- Begin monitoring as fruit ripens
- Place trap in cool, shaded area
- Service trap weekly

Low trap #s may not accurately indicate first fly activity

Cultural Control of SWD

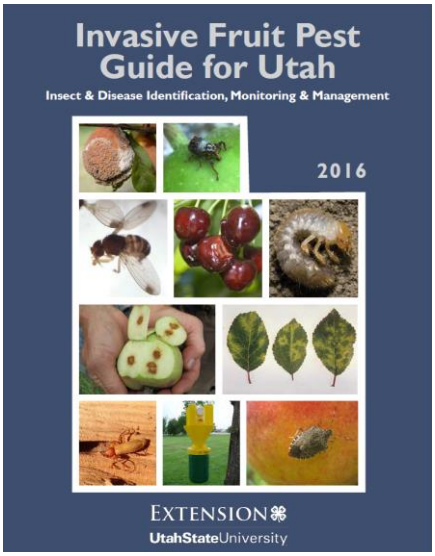
- Minimize overhead irrigation; repair leaking drip lines
- Early or timely harvest
- Chill fruit (34-38°F) (12-72 hrs.)
- Destroy unharvested fruit

Piles of fruit placed in the orchard row and then driven over by a golf cart. Photo: MSU Extension

With a prune here and a mow there…

- Pruning trees and mowing row centers resulted in 80% reduction of SWD larvae in fruit

Chemical Control of SWD



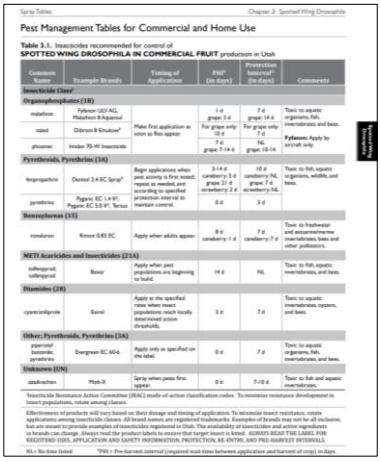

Pest Management Tables for Commercial and Home Use

Table 3.1. Insecticides recommended for control of SPOTTED WING DROSOPHILA IN COMMERCIAL FRUIT production in Utah

Common Name	Example Brands	Timing of Application	PHI* (in days)	Protection Interval* (in days)	Comments
Insecticide Class†					
Organophosphates (1B)					
malathion	Fyfanon ULV AG, Malathion 8 Aquamul	Make first application as soon as flies appear.	1 d grape; 3 d	7 d grape; 14 d	Toxic to aquatic organisms, fish, invertebrates and bees. **Fyfanon:** Apply by aircraft only.
naled	Dibrom 8 Emulsive*		For grape only 10 d	For grape only 7 d	
phosmet	Imidan 70-W Insecticide		7 d grape; 7-14 d	NL grape; 10-14	
Pyrethroids, Pyrethrins (3A)					
fenpropathrin	Danitol 2.4 EC Spray*	Begin applications when pest activity is first noted; repeat as needed, and according to specified protection interval to maintain control.	3-14 d cranberry 3 d grape; 21 d strawberry 2 d	10 d cranberry NL grape; 7 d strawberry NL	Toxic to fish, aquatic organisms, wildlife, and bees.
pyrethrins	Pyganic EC 1.4 II*, Pyganic EC 5.0 II*, Tersus		0 d	3 d	
Benzoylureas (15)					
novaluron	Rimon 0.83 EC	Apply when adults appear.	8 d cranberry 1 d	7 d cranberry 7 d	Toxic to freshwater and estuarine/marine invertebrates, bees and other pollinators.
METI Acaricides and Insecticides (21A)					
tolfenpyrad, tolfenpyrad	Bexar	Apply when pest populations are beginning to build.	14 d	NL	Toxic to fish, aquatic invertebrates, and bees.
Diamides (28)					
cyantraniliprole	Exirel	Apply at the specified rate when insect populations reach locally determined action thresholds.	3 d	7 d	Toxic to aquatic invertebrates, oysters, and bees.
Other; Pyrethroids, Pyrethrins (3A)					
piperonyl butoxide, pyrethrins	Evergreen EC 60-6	Apply only as specified on the label.	0 d	7 d	Toxic to aquatic organisms, fish, invertebrates, and bees.
Unknown (UN)					
azadirachtin	Mate-X	Spray when pests first appear.	0 d	7-10 d	Toxic to fish and aquatic invertebrates.

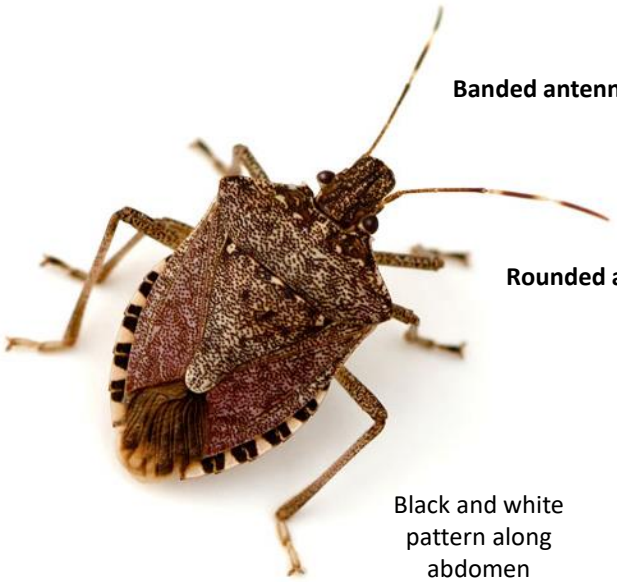
Insecticide Resistance Action Committee (IRAC) mode-of-action classification codes. To minimize resistance development in insect populations, rotate among classes.

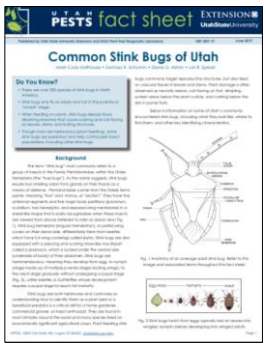
Effectiveness of products will vary based on their dosage and timing of application. To minimize insect resistance, rotate applications among insecticide classes. All brand names are registered trademarks. Examples of brands may not be all-inclusive, but are meant to provide examples of insecticides registered in Utah. The availability of insecticides and active ingredients in brands can change. Always read the product labels to ensure that target insect is listed. ALWAYS READ THE LABEL FOR REGISTERED USES, APPLICATION AND SAFETY INFORMATION, PROTECTION, RE-ENTRY, AND PRE-HARVEST INTERVALS.

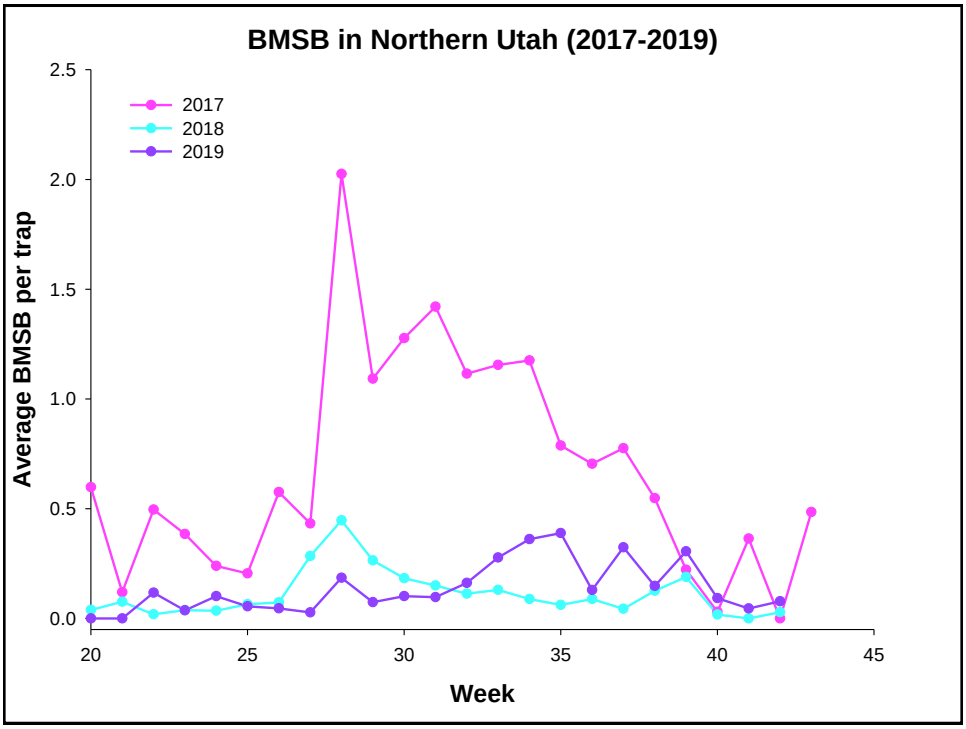
NL= No time listed *PHI = Pre-harvest interval (required wait-time between application and harvest of crop) in days.

Brown Marmorated Stink Bug

- Native to eastern Asia
- Detected in the U.S. in 1990s
- Detected in Utah in 2012; first crop damage reported in 2017
- Broad host range; poses significant risk to specialty crops
- Invades structures for overwintering
- Strong dispersal capacity

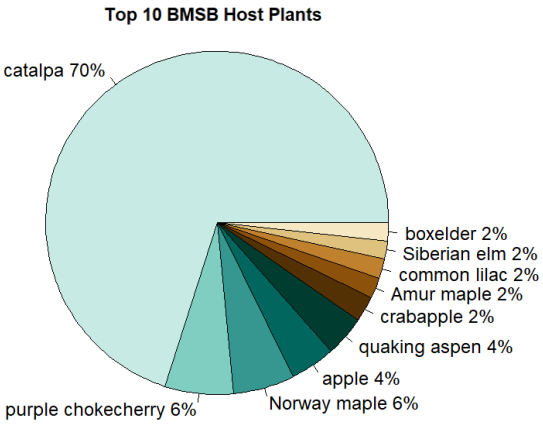

Banded antennae
Rounded and smooth shoulders
Black and white pattern along abdomen


UTAH PESTS fact sheet
EXTENSION
Common Stink Bugs of Utah
Do You Know?
Background


BMSB in Northern Utah (2017-2019)
2017
2018
2019
Average BMSB per trap
2.5
2.0
1.5
1.0
0.5
0.0
20
25
30
35
40
45
Week

BMSB has been recorded on 63 plant species from 21 plant families

Cody Holthouse
Graduate Student



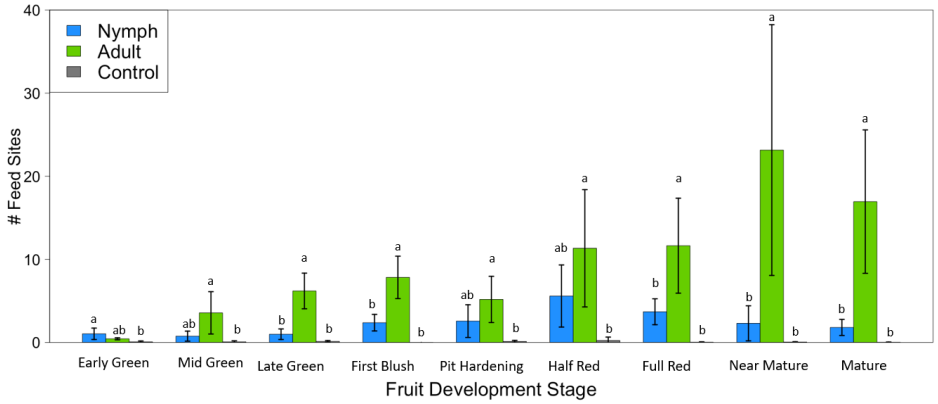
BMSB feeding on tart cherry quality and yield

Zach Schumm
Graduate Student

2018 Results

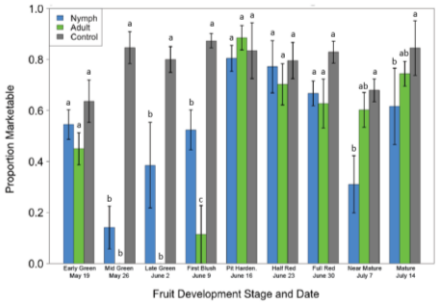
- BMSB will feed on all stages of tart cherry
- Feeding at the early fruit stage caused fruit abscission
- Complete timeline needs clarification

BMSB will feed on all stages of tart cherry



BMSB management on tart cherries should focus on the early fruit stages

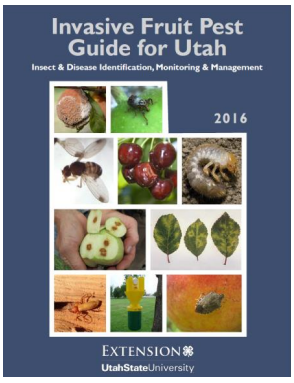
- Feeding can cause fruit abscission from the mid green to first blush stages
- Nymph feeding resulted in less marketable fruit at the near mature & mature stages
- Fruits with minor visible damage are still marketable



Successful BMSB management depends on a reliable pest detection and monitoring strategy

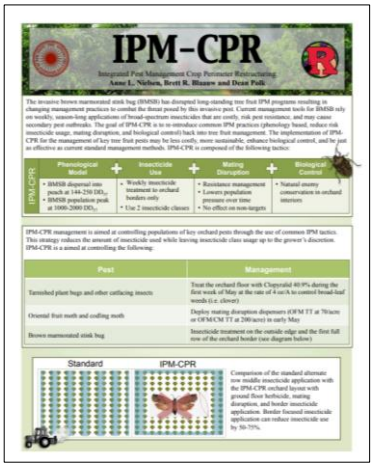
Acebes-Doria et al. 2018

BMSB can be a difficult pest to manage

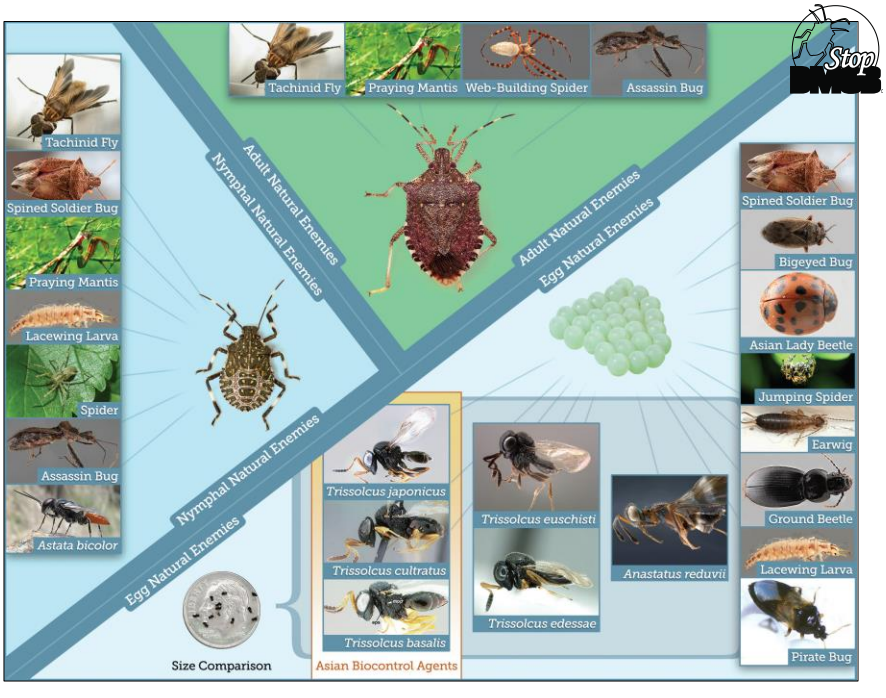


utahpests.usu.edu
stopbmsb.org

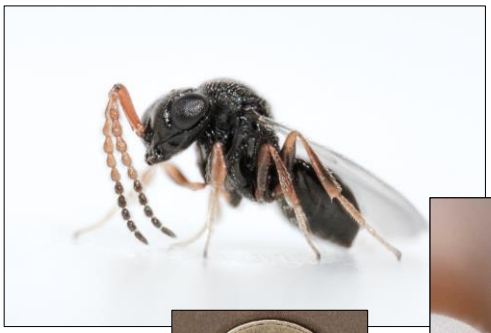
Integrated Pest Management Crop Perimeter Restructuring



- Comparable in price
- Reduces insecticide use
- Manages BMSB at levels equal to current grower standard practices
- Reduces cat-facing injury
- Increases biological control of BMSB eggs



USU can work with *Trissolcus japonicus* only after it has been detected in the state

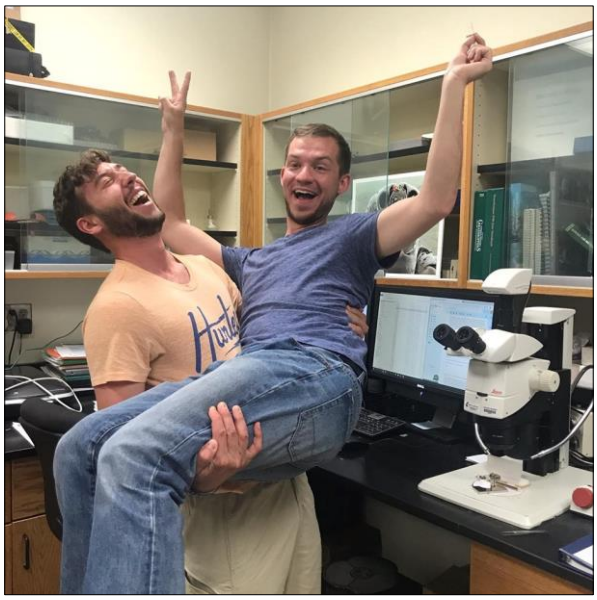


- Native to Asia
- >75% egg parasitism

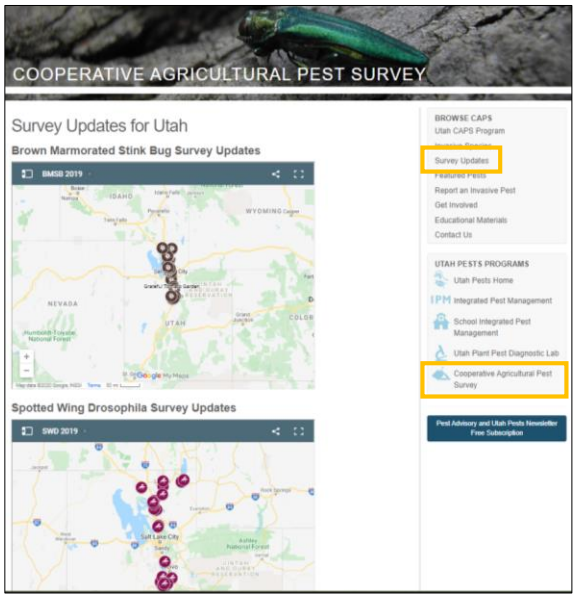
Monitoring Parasitoid Activity

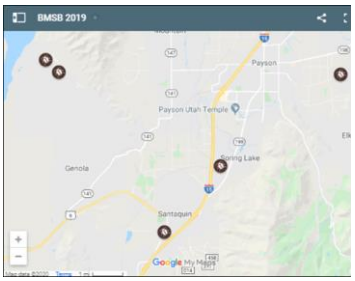
- Ornamental and specialty crop hosts
- Methods
  - Yellow sticky cards
  - Wild laid egg masses
  - Lab-reared egg masses

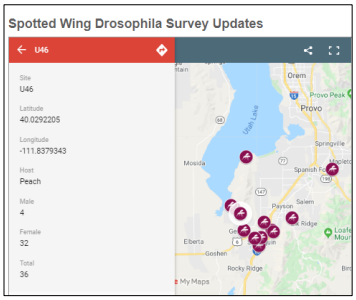
The samurai wasp was detected in Utah!



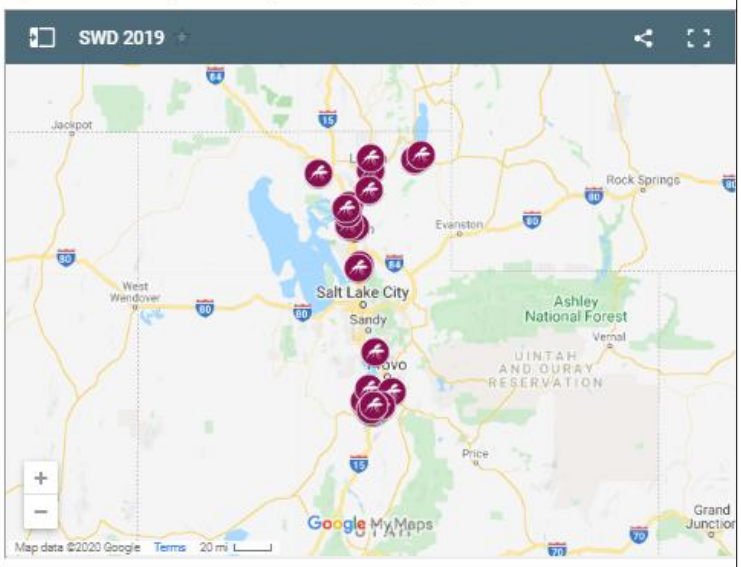
https://utahpests.usu.edu/caps/survey



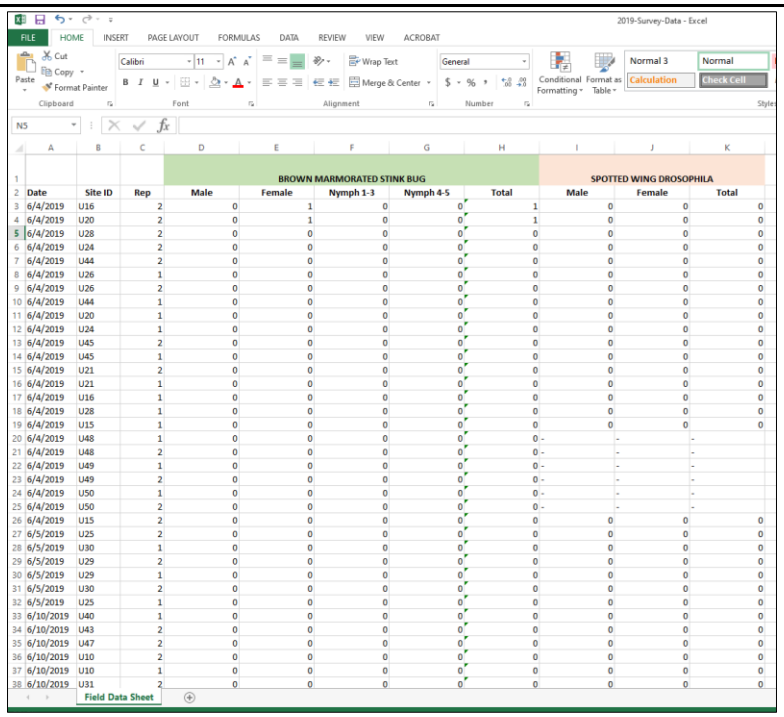




Spotted Wing Drosophila Survey Updates



Download weekly BMSB and SWD trap captures here.

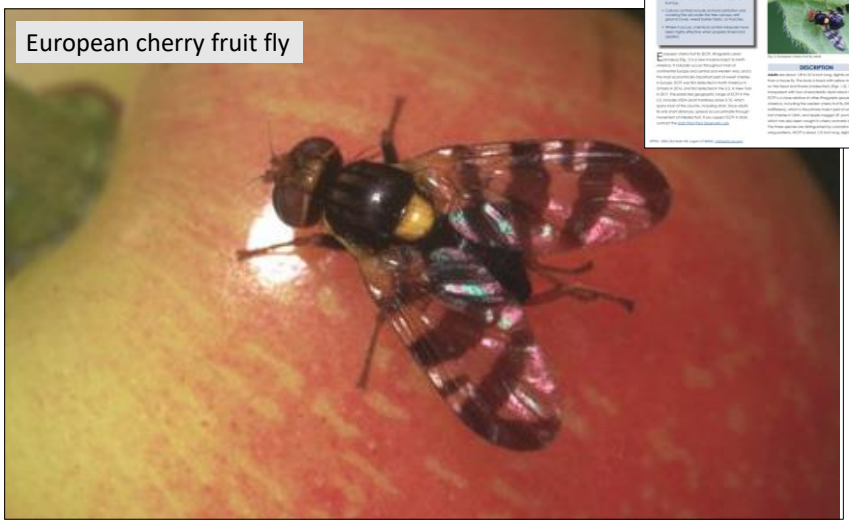


2019-Survey-Data - Excel

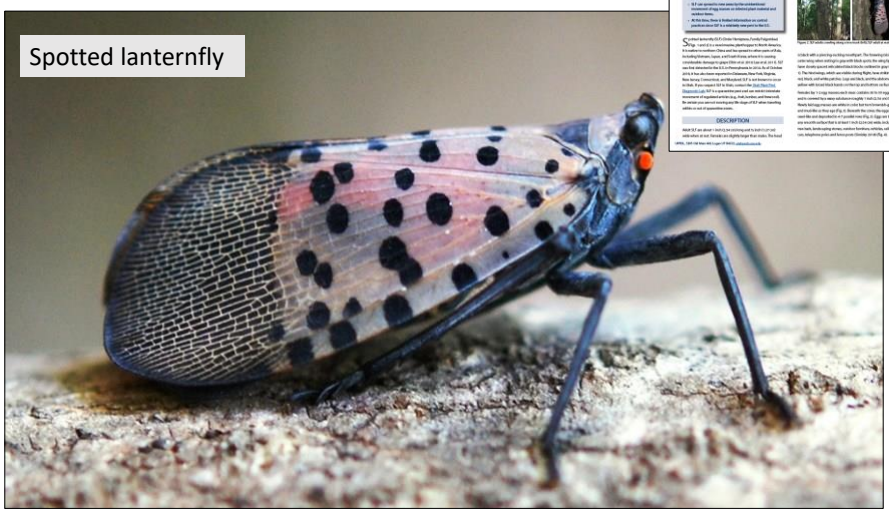
				BROWN MARMORATED STINK BUG					SPOTTED WING DROSOPHILA		
Date	Site ID	Rep	Male	Female	Nymph 1-3	Nymph 4-5	Total	Male	Female	Total
6/4/2019	U16	2	0	1	0	0	1	0	0	0
6/4/2019	U20	2	0	1	0	0	1	0	0	0
6/4/2019	U28	2	0	0	0	0	0	0	0	0
6/4/2019	U24	2	0	0	0	0	0	0	0	0
6/4/2019	U44	2	0	0	0	0	0	0	0	0
6/4/2019	U26	1	0	0	0	0	0	0	0	0
6/4/2019	U26	2	0	0	0	0	0	0	0	0
6/4/2019	U44	1	0	0	0	0	0	0	0	0
6/4/2019	U20	1	0	0	0	0	0	0	0	0
6/4/2019	U24	1	0	0	0	0	0	0	0	0
6/4/2019	U45	2	0	0	0	0	0	0	0	0
6/4/2019	U45	1	0	0	0	0	0	0	0	0
6/4/2019	U21	2	0	0	0	0	0	0	0	0
6/4/2019	U21	1	0	0	0	0	0	0	0	0
6/4/2019	U16	1	0	0	0	0	0	0	0	0
6/4/2019	U28	1	0	0	0	0	0	0	0	0
6/4/2019	U15	1	0	0	0	0	0	0	0	0
6/4/2019	U48	1	0	0	0	0	0	-	-	-
6/4/2019	U48	2	0	0	0	0	0	-	-	-
6/4/2019	U49	1	0	0	0	0	0	-	-	-
6/4/2019	U49	2	0	0	0	0	0	-	-	-
6/4/2019	U50	1	0	0	0	0	0	-	-	-
6/4/2019	U50	2	0	0	0	0	0	-	-	-
6/4/2019	U15	2	0	0	0	0	0	0	0	0
6/5/2019	U25	2	0	0	0	0	0	0	0	0
6/5/2019	U30	1	0	0	0	0	0	0	0	0
6/5/2019	U29	2	0	0	0	0	0	0	0	0
6/5/2019	U29	1	0	0	0	0	0	0	0	0
6/5/2019	U30	2	0	0	0	0	0	0	0	0
6/5/2019	U25	1	0	0	0	0	0	0	0	0
6/10/2019	U40	1	0	0	0	0	0	0	0	0
6/10/2019	U43	2	0	0	0	0	0	0	0	0
6/10/2019	U47	2	0	0	0	0	0	0	0	0
6/10/2019	U10	2	0	0	0	0	0	0	0	0
6/10/2019	U10	1	0	0	0	0	0	0	0	0
6/10/2019	U31	2	0	0	0	0	0	0	0	0

Field Data Sheet

Waiting in the wings…



Waiting in the wings…



Acknowledgments

Participating Growers

Payson Fruit Growers

USU Faculty, Staff, and Students

- Dr. Diane Alston
- Anna Fabiszak
- Cody Holthouse
- Zach Schumm
- Carson Wise

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- Western IPM Center Grant
- USU Extension
- WSARE / Utah IPM
- Utah Specialty Crop Block Grants
- Utah Department of Agriculture and Food
- Utah Agricultural Experiment Station

USHA

USDA

EXTENSION

UtahStateUniversity

Western IPM Center

Stop BMSB

WESTERN SARE
Sustainable Agriculture Research & Education

Table 1. Estimated dates for BMSB life stage activity during the past 5 years (2014-2018) using a biofix of 13.5 hour photoperiod (i.e., degree days begin to accumulate once day length reaches 13.5 hours) (Nielsen et al. 2016; Wilson et al. 2018). Day length was taken from the Astronomical Applications Department of the U.S. Naval Observatory website, and temperature data used for calculating degree days was taken from the Utah Climate Center/Utah Traps website. Degree days are calculated at base 57.2°F.

Event --->	1st overwintered adults expected	Egg laying begins	New (summer) generation adults expected
Environmental cue --->	**13.5-hr day (biofix)**	**170 DD**	**1134 DD**
River Heights (Cache County)	18-19 April	7-13 June	11-29 August
Kaysville (Davis County)	19-20 April	29 May - 7 June	25 July - 2 August
Payson (Utah County)	20-21 April	2-7 June	29 July - 4 August
Leeds (Washington County)	24-25 April	9-24 May	30 June - 6 July

Table 2. The following is a list of insecticides that have demonstrated efficacy against BMSB (Wilson et al. 2018). Note that this list is not exhaustive for every labeled product or active ingredient. Always follow the specific label restrictions for the target crop, including the pre-harvest interval (PHI) and re-entry interval (REI). Always read, understand, and follow label directions before using any pesticide.

Product Name(s)	Active Ingredient(s)	Mode of Action*	Relative efficacy against BMSB
Lannate[R], Nudrin[R]	methomyl	1A - Carbamate	Excellent
Danitol 2.4 EC[R]	fenpropathrin	3A - Pyrethroid	Excellent
Pounce 25 WP[R]	permethrin	3A - Pyrethroid	Excellent
Warrior II[R], Lambda-Cy[R], Silencer[R]	lamda-cyhalothrin	3A - Pyrethroid	Excellent
Actara	thiamethoxam	4A - Neonicotinoid	Excellent
Admire Pro, Alias, Wrangler	imidacloprid	4A - Neonicotinoid	Good
Assail	acetamiprid	4A - Neonicotinoid	Good
Scorpion 35 SL, Venom	dinotefuran	4A - Neonicotinoid	Excellent
Belay	clothianidin	4A - Neonicotinoid	Good
Endigo ZC[R]	lamda-cyhalothrin & thiamethoxam	3A - Pyrethroid, 4A - Neonicotinoid	Excellent
Leverage 360[R]	beta-cyfluthrin & imidacloprid	3A - Pyrethroid, 4A - Neonicotinoid	Excellent
Voliam Xpress[R]	lamda-cyhalothrin & chlorantraniliprole	3A - Pyrethroid, 8 - Diamide	Good
Aza-Direct[O] and others	botanical	Not classified	Good

*To minimize resistance development, insecticides should be rotated among different modes of action.

[O]OMRI (organic-certified) registered product.

[R]Restricted use products require an applicator's license to purchase.