Stink Bug on Tomato



Celeste Welty Extension Entomologist March 2015





THE OHIO STATE UNIVERSITY

Stink bug work in Ohio

- Native stink bugs, 1996-2000
- New invasive, brown marmorated stink bug, 2011-2015





Stink Bug as a Tomato Pest

- Bugs suck on fruit
- Damage seen more often than <u>bug</u> itself
- Damage often not noticed until harvest
- Problem on whole-pack
 & fresh market varieties

Obvious yellow blotch:



- Obvious yellow blotch:
 - Develops after fruit ripens if bugs fed on green fruit –





- Obvious yellow blotch:
 - Develops after fruit ripens if bugs fed on green fruit _

- Subtle white cloudy-spot:
 - Seen after bugs fed on red fruit







 Diagnose by plugs of white tissue under the peel

yellow blotch cloudy spot

 Diagnose by plugs of white tissue under the peel



yellow blotch cloudy spot

 Diagnose by plugs of white tissue under the peel





Most common species in tomato fields: the one-spotted stink bug (Euschistus variolarius)



adult





The spot (underside of abdomen) on male No spot on female



Do they prefer red or green fruit? How do nymphs compare with adults?

- Lab study, 1996
- Start with hatching egg, end with new adult
- One bug per dish with:
 - 1 green fruit
 - 1 red fruit
 - 1 leaf
- Fresh set-up every 4 days



Stink bug behavior on tomato: Location in observation arena



% of tomato fruit surface damaged by stink bugs during 4-day periods from egg hatch to adult eclosion



Depth of feeding damage by stink bugs on tomato during 4-day periods from egg hatch to adult eclosion Green fruit **Damage depth rating Red fruit** 3 2 4 5 6 7 2 3 8 9 **Time period** Corresponding instar: I-II II-III II-III III-IV III-V IV-V V-Ad V-Ad V-Ad

Similar 2-week test with addition of tarnished plant bug, 1997



Stink Bug Feeding Behavior: conclusions

• Fruit preference:

Bugs prefer green fruit over red fruit

• Life stages:

- Adults & all nymph stages feed on fruit
- Older nymphs and new adults feed more than younger nymphs and older adults
- Tarnished plant bug: rarely feeds on tomato fruit even if starved

Stink bug in tomato fields

- when does it enter tomato fields?
- where does it come from?

Stink Bug Scouting

First damage (1998) Site **Central Ohio:** Columbus 7/2 7/16 Miami Co. 7/15 Darke-D 7/15 Darke-K 8/12 (latest) Darke -H **Northern Ohio:** Sandusky-H 6/22 (earliest) Sandusky-B 7/8 7/6

Sandusky-V

One-Spotted Stink Bug: the wheat connection

1998 observations in wheat, Fremont:

- 15 29 May: Stink bug adults (old)
- 14 24 June: Stink bug nymphs
- 29 Jun.-1 Jul.: Nymphs & adults (new)
- 1-2 July: Adults in combined wheat

Stink Bug Dispersal from Wheat to Tomato

Tomatoes			<u>Soybean</u>		
Bed	Bed	Bed	Bed	Bed	
<u>#1</u>	#5	#10	#20	#37	
	Bed #1	Tom Bed Bed #1 #5	TomatoesBedBed#1#5#10	TomatoesBedBedBed#1#5#10#20	TomatoesBedBedBedBed#1#5#10#20#37

Stink Bug Dispersal from Wheat to Tomato

Fremont, 1998: % of samples damaged (10 samples/ bed)

Wheat		Tomatoes				<u>Soybean</u>	
		Bed	Bed	Bed	Bed	Bed	
		<u>#1</u>	#5	#10	#20	#37	
6/22		0	0	0	0	0	
7/1		0	0	0	0	0	
7/2-3	harve	st					
7/6		20%	10%	10%	0	10%	
7/15		0	0	0	0	0	
7/20		20%	50%	20%	0	10%	
7/29		80%	70%	40%	50%	70%	
8/3		30%	50%	40%	30%	90%	
8/14		10%	50%	60%	30%	50%	

Life History of the One-Spotted Stink Bug

• overwinter in alfalfa?

- one generation in wheat, May-June
- move to tomatoes (or soybeans) in July, August

Stink bug control with insecticide

Scouting procedure?

• Action threshold?

• Which products?

Scouting for stink bug

• Weekly

June, July: shake canopy over tray

- Early: 1 whole plant
- Later: 1 foot of row
- 40 samples per field
- July, August: examine fruit
 - 10 fruit @ 40 locations/field
- attention to fields by wheat
- early morning or evening best

Stink bug development in tomato research field

Fremont Ohio, 1999



Thresholds for stink bug?

- Trial in 1999 compared 2 thresholds
 - Low: 0.5% (2 sprays)
 - High: 1.0% (1 spray)
- Field scouting vs harvest ratings:
 - Untreated check plots (year 2000)
 - 22% injury on 8 Sep in field
 - 44% injury on 11 Sep in harvest rating
 - By experienced scout
- Field threshold: 0.75 % fruit damage (3 damaged out of 400 fruit)

Stink bug insecticide trials

• 5 trials:

- 1996 & 1997, Hillsboro
- 1998, Columbus
- 1999 & 2000, Fremont
- Products tested:
 - methyl parathion (Penncap-M) [lost '99]
 - Iambda-cyhalothrin (Warrior/Matador)
 - endosulfan (Thionex)
 - cyfluthrin (Baythroid)
 - thiamethoxam (Actara)
- All products equally effective

Stink Bug Insecticide Trial, 2000

Fremont, Ohio variety = Peto 696 Treated 11 & 24 August **Harvested 11 September 50** Warrior 3.2 oz **40** Actara 5 oz Actara 4 oz **Baythroid 2.4 oz** Avaunt 3.5 oz 10 **Untreated check** 0 Breaker Green Total Red

fruit

fruit

fruit

fruit

Stink bug control on tomato

	Product	Rate	Limit (@ max rate)	PHI
	Warrior (Matador)	1.28-1.92 fl oz/A	12 aps	5 days
	Actara 25WDG	3.0-5.5 oz/A	2 aps	0 days
	Baythroid XL	1.6-2.8 fl oz/A	6 aps	0 days
	Thionex 3EC	1-1.3 qt/A	2 aps	4 days
	Lannate LV	1.5-3 pt/A	7 aps	1 day
k	Venom 70WP	1-4 oz/A	1 ap	1 day
K	Scorpion 35SL	2-7 fl oz/A	1 ap	1 day
¥	Brigade 2EC	2.1-5.2 fl oz/A	4 aps	1 day
	Mustang Max	3.2-4 fl oz/A	6 aps	1 day
	Belay 2.13SC	3-4 fl oz/A	3 aps	7 days

Which species?



Which species?



Most common in Ohio tomato fields, 1996-2000

Which species?



The new invasive species, in Ohio since 2007

Brown marmorated stink bug



- New exotic invasive species
- Attacks fruits & seed pods
- Also nuisance: invades homes



Their favorite foods: study in Maryland

Relative Attractancy to Stink Bugs - 2012 Results						
Host plant (planted 17-21 May)	Date of first sustained activity	mean #SB per m²	Weeks of sustained activity			
Sweet corn	26-Jun	1.08	7			
Eggplant	17-Jul	0.52	7			
Green beans	17-Jul	0.06 low	42			
Okra	3-Jul	0.57	9			
Bell pepper	24-Jul	1.37 high	6			
Sunflower	3-Jul	1.24	7			
Edamame*	17-Jul	1.05	4			
Sweet sorghum	7-Aug	0.42	2			
Tomato	24-Jul	0.07	6			

BMSB monitoring by blacklight trap, 2013



Trap availability

- Trap from AgBio:
 4-foot pyramid, black
 corrugated plastic, \$30
- Lures:
 - @ \$ 3 8 (30-day)
 - AgBio
 - Trécé
 - Alpha Scents
 - Sterling



Alternative Trap: PVC pipe topped by small yellow Dead Inn trap: black vs yellow; plain vs netted



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the end

Questions?

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