Insect Pest Management on Tomato



Celeste Welty October 2011

- Identification
- Management tactics
- Thresholds

	Fruit	Foliage
Кеу	None!	None!

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None!	None!
Stink bugsHornworms	Potato aphidHornworms
	Fruit None! •Stink bugs •Hornworms

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Кеу	None!	None!
Common	•Stink bugs •Hornworms	Potato aphidHornworms
Sporadic	 Variegated cutworm Tomato fruitworm Yellow-striped armyworm Fall armyworm Beet armyworm Grasshoppers 	 Spider mites Whiteflies Flea beetles Colorado potato beetle Stalk borer Blister beetles Cutworms



Stink Bugs

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

Stink Bug Damage on Tomato

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





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



Stink Bug Damage on Tomato

yellow blotch cloudy spot

 Diagnose by plugs of white tissue under the peel





Life History of the One-Spotted Stink Bug, *Euschistus variolarius*

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

Stink bug development in tomato field



Stink Bug Management

• Scout:

- -weekly in July, August
- -examine 10 fruit at 40 locations/field
- Threshold: 0.5 1% fruit damage
 - (2 4 damaged out of 400 fruit)
- Insecticides:
 - -Spinosad for nymphs
 - -Pyrethrins for adults (but weak)

A New Crop Pest: Brown Marmorated Stink Bug









Brown marmorated stink bug: injury on vegetables



Life Cycle of B. M. stink bug

5 instars within nymph stage 1 or 2 generations per year



Eggs & 1st instar nymphs



Natural enemies of brown marmorated stink bug



- Egg parasitoid, Trissolcus halyomorphae
 –Found in Asia
 - -Specific to BMSB
 - -Parasitizes up to 70% of eggs in China
- 4 Trissolcus species collected in Asia

 Quarantine & screening by USDA, Newark DE
 Test if also attack beneficials

Hornworms



- Tobacco hornworm
- Tomato hornworm

Hornworms



head end



- Tobacco hornworm (red horn)
- Tomato hornworm (black horn)

Hornworm damage



- Beware of camouflage
- Look for canopy top mowed off

Hornworm biocontrol



 Cotesia congregata





Hornworm damage



Easily killed by B.t. (e.g. Dipel)



Adult is a large hawk moth Pheromone trap not available Adults detected in blacklight traps

Potato Aphid





- Appearance: —Small, soft, 2 'tailpipes'
 - -Both winged & wingless forms
- Damage:
 - -Suck sap, cause leaf puckers
 - -Deposit honeydew
 - -Transmit viruses
- Many natural enemies

ladybugs



adult



midge Natural enemies of aphids



larva









lacewings



Aphid control



- Encourage natural enemies by avoiding use of broad-spectrum insecticides
- Suffocate with spray of insecticidal <u>soap</u>
- Reflective mulch to prevent colonization by winged aphids

Potato Aphid

tested on tomato leaves, 10/3/2006 3 replicates/treatment, 10 aphids/replicate



Melon Aphid

tested on pumpkin leaves, 10/5/05; 3 replicates/treatment, 10 aphids/replicate



Two-spotted spider mite





- Tiny, white with 2 black spots, <u>8</u> legs
- Suck sap from leaves
- Webbing usually present
- Thrive in hot dry weather
- Many natural predators —
- Control: soap or oil sprays



Two-spotted spider mite

tested on snap bean leaves, 10/26/05; 3 replicates/treatment, 30 mites/replicate



Variegated Cutworm





- A climbing cutworm
- Nocturnal
- Common species
- Many host plants
- Serious in tomatoes once every 20 years

Trap for variegated cutworm: pheromone attracts male moth



Variegated cutworm: Seasonal trends in pheromone traps, Columbus, 3 years



Variegated cutworm

 Scout for damage if adults caught in traps

 Nibbling on edge of leaves
 Holes in fruit
 Look for worm after sunset

or early morning

Tomato fruitworm = Corn earworm



- Does not overwinter in Ohio
- Migrates, usually > mid-August
- In fruit day & night
- Worm appearance:
 - -light brown head
 - -body with long stripes
 - covered with short microspines

Trap to Monitor Tomato Fruitworm (Corn Earworm)

- Pheromone lure
- Attracts male moths
- Highly effective







Tomato Fruitworm trapping study, 1998

Date (end wk)	Columbus	Miami Co.	Darke Co. (3 traps @ 3 farms)	Sandusky Co. (1 trap @ 3 farms)
6/10		-		0
6/17	4	-	-	0
6/24	6	-	-	1
7/1	3	11	5	2
7/8	4	1	-	0
7/15	0	-	2	0
7/22	5	1	0	0
7/29	1	-	0	0
8/5	1	11	2	0
8/12	6	-	3	1
8/19	11	-	8	2
8/26	49	-	45	22
9/2	52	-	-	62
9/9	14	-	100	102
9/16	65	-	39	38
9/23	275	-	-	175

Yellow striped armyworm



Also: fall armyworm, beet armyworm

Whiteflies





- Suck sap
- Produce honeydew
- Some transmit viruses

Whiteflies

Life stages:



Need magnifier to see eggs & nymphs!

Whiteflies



- Damage done by nymphs from leaf undersides
- Control by soap sprays





Whiteflies: i.d. of adults

• Greenhouse whitefly –Wings held flat



- Banded-winged whitefly
 - -Wings zig-zag pattern



Silverleaf (=sweetpotato) whitefly

-Wings held roof-like



Silverleaf whitefly (a.k.a. biotype B of sweetpotato whitefly)

- Key pest in Florida
- Suspected in Ohio (fields with Floridagrown transplants)
- Tomato:
 - -Irregular ripening
 - -Feeds on leaves
 - -Symptoms only on fruit







Banded-winged whitefly



- On many veg crops
- Common on velvetleaf, ragweed, beggarticks, Geranium, Petunia
- Not as harmful as silverleaf
- Not as difficult to control

Stalk Borer





Look for drooping branch tips
Control by pruning infested stems

Blister beetles



Defoliate

Avoid touching them!

Colorado potato beetle



Larvae of the Colorado potato beetle on tomato.

Colorado potato beetle







- Critical on plants < 8"
- Damage: chewed leaves
 - -By adults & larvae
- 2 generations/yr on potato
- 1 generation/yr on tomato
- Control:
 - -Hand removal (tapping)
 - -Spray larvae with spinosad

Flea beetles

- Chew small holes in leaves
- Damage critical to seedlings if plants growing slowly
- Management:
 - Hand removal (aspirate)
 - Row covers over seedlings





Tomato spotted wilt virus

- Vector: western flower thrips
- A "persistent" virus



- Acquire by feeding on infected plants
 - acquire virus as larvae
 - transmit virus as adults
- Virus can be passed from infected females through eggs to offspring
- Avoid growing tomato plug plants in same greenhouse as flowers

Monitoring Tomato Pests

- Moth trapping
 - -Variegated cutworm
 - -Tomato fruitworm
- Weekly scouting

Scouting Tomato Pests

Time	Sample (per field)	What to look for
Pre-fruiting (June)	40 <u>whole plants</u>	 Defoliation Wilted branches Aphids on young terminal leaflets
After fruit set (July-	40 sets of 10 <u>fruit</u>	Fruit damagePests present
Sept.)	40 leaflets	WebbingWhitefly, aphids
	40 canopy taps (onto tray or pan)	Stink bugsCaterpillars

Thresholds for tomato pests

Target pest	Threshold (in 40 samples)
stink bug	1 plant with fresh damage
variegated cutworm	1-4 plants with damage
tomato fruitworm	1 infested plant
hornworms	2 hornworm larvae
aphids	0.5 aphid per leaflet
Colorado potato beetle	0.5 adult per young plant
flea beetles	4 per young plant



the end