ONvegetables

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"In This Issue"

INSECT PESTS OF PEPPER FRUIT

Janice LeBoeuf, Vegetable Crop Specialist, OMAFRA, Ridgetown

There is a long list of insects that can damage field pepper fruit in Ontario. Many cause significant damage on their own, but they also provide a means of entry for rot organisms. For more on pepper rots, see Pepper fruit rots.

European corn borer

- eggs laid on underside of pepper leaves
- newly-hatched larvae feed on leaves for a short time, then enter fruit under calyx or occasionally on the side of the fruit, leaving sawdust-like residue around hole; larvae may also enter stems
- larvae pupate inside fruit or stalks
- if a fruit becomes too rotten for feeding, the larvae will leave that fruit and enter another, spreading soft rot to multiple fruit
- present from mid-July through September; enters pepper fruit that are approximately walnut-sized or larger
- can be monitored with pheromone traps – also look for entry/exit holes, rotting fruit
- read more on identification, biology, management

INSECT PESTS OF PEPPER FRUIT…CON'T

Stink bug (brown, one-spotted, green)

- adults and nymphs pierce fruit to feed, causing cloudy yellow blotches beneath the skin
- most common in pepper fields from July to harvest; movement into pepper fields may peak as they move out of ripening or harvested wheat or as hay is cut
- it is not unusual to see extensive fruit damage even though no stink bugs have been seen
- read more on identification, biology, management

Stink bug (brown marmorated)

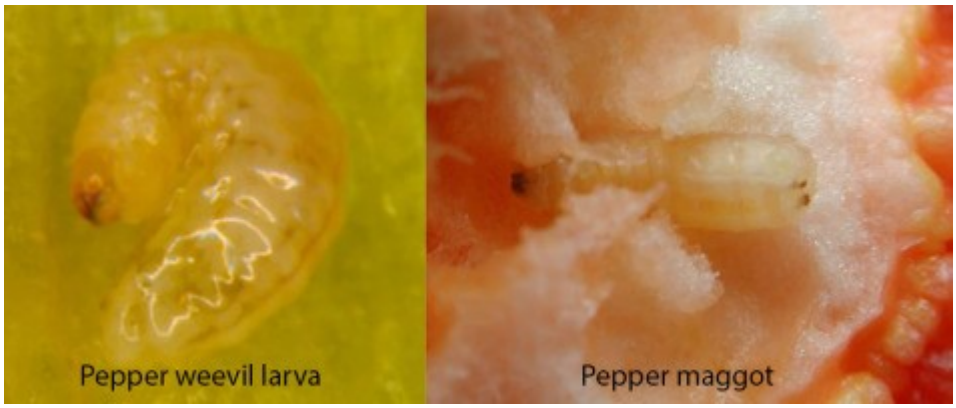
- an invasive pest that is now present in Ontario, but so far more commonly found in structures than in agricultural crops
- aggressive feeder; adults and nymphs pierce fruit to feed, causing cloudy yellow blotches beneath the skin
- multiple life stages are present through most of the growing season
- read more on identification, biology, management
- read updates from OMAFRA

Tarnished plant bug

- feeds on stems and flowers, causing flower drop
- pierces fruit to feed, causing indentations or holes, corkiness of the flesh, or malformations
- three to five generations per year
- like stink bugs, they may move into pepper fields when surrounding vegetation dries up or after nearby cereal or forage harvest
- read more on identification, biology, management

Pepper maggot

- adults emerge in mid-summer to mate and lay eggs in the wall of the pepper fruit
- the larvae feed within the fruit, usually on the placenta, but also on the interior of the fruit wall
- when ready to pupate, they create an exit hole in the pepper fruit and drop to the soil
- only one generation per year
- scouting is difficult – monitoring traps need to be high in nearby trees – egg-laying scars and exit holes are the only external signs of infestation
- control needs to target the adults as larvae develop inside the fruit
- read more on identification, biology, management



INSECT PESTS OF PEPPER FRUIT…CON'T

Pepper weevil

- not thought to overwinter in Ontario, but has been seen in pepper fields in late summer
- adults lay eggs in the wall of the pepper fruit
- larvae emerge and move directly into the fruit
- adults may feed on fruit, flowers, stems and leaves, but the biggest concern is the presence of larvae in the fruit and premature fruit drop due to adult and larval activity
- pheromone traps are available for monitoring – necessary for early detection
- when scouting, look for egg-laying scars, exit holes, fallen peppers with yellow calyx – adults are difficult to find unless populations are high
- control needs to target the adults as larvae develop inside the fruit

Other insects

- pepper fruit may occasionally be attacked by corn earworm or fall armyworm – they can also introduce rot organisms to the fruit
- millipedes and wireworms may feed on fruit touching the soil
- spider mites, thrips, and slugs may feed on pepper fruit
- insects like vinegar flies (more commonly, although incorrectly, known as fruit flies) are attracted to rotted fruit and can spread rot organisms around where they can wait for an opportunity to enter a wound or crack
- other insects in the field — whether pest, beneficial, or incidental — can also move disease organisms from plant to plant, so once there's a rot problem, it's easy for it to get worse

Links:

Pepper Fruit Rots - https://onvegetables.com/2017/04/03/pepper-fruit-rots/

European Corn Borer - http://www.omafra.gov.on.ca/IPM/english/peppers/insects/eurpean-corn-borer.html#advanced

Stink bug (brown, one-spotted, green) identification - http://www.omafra.gov.on.ca/IPM/english/peppers/insects/stink-bug.html#advanced

Stink bug (brown marmorated) identification - http://www.omafra.gov.on.ca/IPM/english/peppers/insects/bmsb.html#advanced

Stink bug (brown marmorated) updates from OMAFRA - http://www.omafra.gov.on.ca/english/crops/insects/bmsb-resources.html

Tarnished plant bug identification - http://www.omafra.gov.on.ca/IPM/english/peppers/insects/tarnished-plant-bug.html#advanced

Pepper maggot identification - http://www.omafra.gov.on.ca/IPM/english/peppers/insects/pepper-maggot.html#advanced

MAKING LEMONADE OUT OF LEMONS – A TOMATO FUNGICIDE STEWARDSHIP TIP AMIDST CHANGING REGULATIONS

Cheryl Trueman, Ridgetown Campus, University of Guelph & Janice LeBoeuf, OMAFRA

It seems like recently there have been a rash of proposed or pending pesticide regulation changes that affect field growers, and tomato growers are no exception. There are re-evaluations ongoing for a number of products used in tomatoes, including mancozeb, neonicotinoids, and Lannate, as well as Ethrel, but the big one that comes to mind for field tomato growers is the proposed changes to the use of chlorothalonil (Bravo, Echo). The final outcome of this review is not yet known, but it's likely that significant changes to the chlorothalonil labels are coming.

Chlorothalonil is a go-to fungicide for tomato growers. Data from trials at Ridgetown Campus demonstrate its value. Chlorothalonil is often just as good at controlling early blight, Septoria leaf spot, and anthracnose fruit rot as alternative fungicides, and it also provides protection from late blight, which many targeted fungicides do not. It's a good value active ingredient for tomato disease management and has a low risk of resistance development. But, if proposed changes go through, the number of chlorothalonil applications you can use will be drastically cut.

So, have you thought about how you are going to adapt? Being forced to change our practices through regulation and enforcement can cause a range of reactions from annoyance and frustration to rage. But after the initial shock, maybe you can make lemonade from lemons and use your energy to re-evaluate your fungicide program.

One simple change to consider for this growing season is use of early season fungicide applications. With the high value nature of field tomatoes, it's tempting to protect your investment at any cost and apply protectant fungicides well before canopy closure and fruit set. But, if we go back to basics and consider the disease triangle (Figure 1) and the environmental conditions required for successful infection by fungal disease pathogens (Table 1), it's apparent that the risk from fungal diseases and late blight in the first weeks of the growing season is quite low. In June, our dew periods are relatively short and it's not *that* wet or humid in the developing tomato canopy.

If you've been applying chlorothalonil early season (i.e. before early fruit set) it might be time to reconsider this practice. At Ridgetown Campus, we've achieved very good anthracnose control when fungicide applications begin at early fruit set, and do not see early blight, Septoria leaf spot, or late blight develop until there is a closed canopy. Our observations are consistent with the science on the environmental conditions required for pathogen development.

Ending the practice of very early protectant fungicide applications could save you time and money, and you'll be one step closer to adapting to the anticipated new regulations that limit the number of chlorothalonil applications to field tomatoes.

MAKING LEMONADE OUT OF LEMONS – A TOMATO FUNGICIDE STEWARDSHIP TIP AMIDST CHANGING REGULATIONS…CON'T

Figure 1. The disease triangle – plant disease results from the interactions among a susceptible host, a virulent pathogen, and a favourable environment.

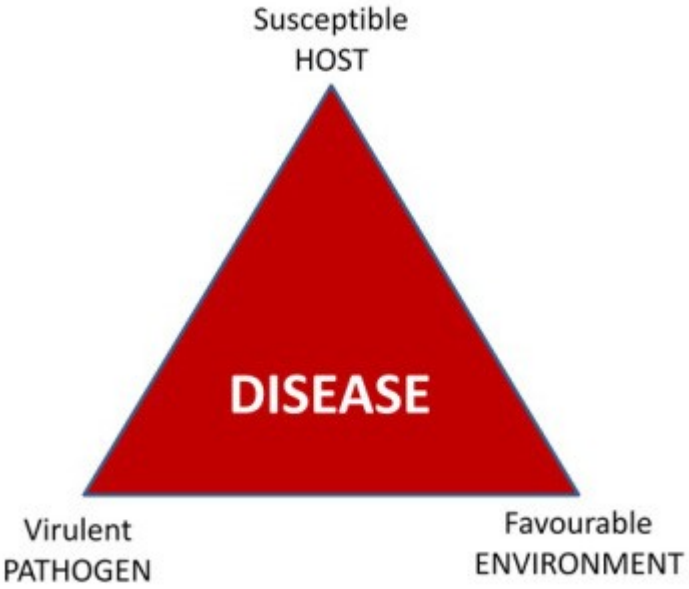


Table 1. Common foliar and fruit diseases of field tomatoes in Ontario and the environmental conditions that favour their development (adapted from the Compendium of Tomato Diseases & Pests, 2nd Edition, APS Press).

Disease	**Causal Agent**	**Environmental conditions that favour development**
Early blight	*Alternaria solani* *Alternaria tomatophila*	Optimum temperature 24-29°C + rainy weather or heavy, long dew periods
Septoria leaf spot	*Septoria lycopersici*	Optimum temperature 20-25°C + high relative humidity and long dew periods
Anthracnose fruit rot	*Colletotrichum coccodes* Other *Colletotrichum* species	Optimum temperature 20-24°C + free moisture
Late blight	*Phytophthora infestans*	Optimum temperature 18-24°C + high relative humidity, rainy weather, fog, or long dew periods

INSECT PEST AND CROP DEGREE DAY UPDATE – JUNE 13, 2017

Dennis Van Dyk, Vegetable Crop Specialist, OMAFRA, Guelph

Insect Degree Days

Weather Station Location	Onion Maggot (base 4°C)	Seedcorn Maggot (base 4°C)	Cabbage Maggot (base 6°C)	Carrot Weevil (base 7°C)	Carrot Rust Fly (base 3°C)	Aster Leafhopper (base 9°C)
Harrow	716	**716**	556	**481**	800	351
Ridgetown	629	**629**	474	407	712	290
Delhi	618	**618**	464	399	700	284
Goderich	500	500	365	305	573	215
Guelph	463	463	332	274	538	182
Bradford*	523	523	388	329	593	227
Kemptville	502	502	381	326	571	232
Sudbury	353	353	257	216	**412**	147

*Bradford weather, degree day data and information courtesy of the University of Guelph – Muck Crops Research Station

Summary

Onion maggot flies are active in most areas of the province.

Cabbage maggot has reached the DD threshold for emergence in all areas of the province except up North.

The 2nd generation of seedcorn maggot flies have reached the DD threshold for emergence in Harrow. In most other areas of the province, we are just getting over the 1st generation or are currently between generations.

Carrot weevil adults are currently laying eggs, if they are present. In Harrow we have past the degree day threshold for 90% oviposition. This means if carrot weevils are present then almost all of the egg-laying has been completed.

The 1st generation of carrot rust fly is emerging or has emerged in the province.

All areas of the province have reached the DD threshold for overwintering Aster Leafhopper eggs to hatch. Harrow is nearing adult emergence of the local population of Aster Leafhopper adults.

IPM Update

Onion: Earliest direct seeded onions are at the fifth leaf stage while the majority are the third leaf stage. There is a low risk for Botrytis leaf blight. When scouting, check the underside of the outer leaves and look for small, light green to yellow lesions surrounded by white halos. Herbicide injury will be often more white than green but can be mistaken for Botrytis leaf blight. Thrips have been detected in most onion growing areas; pull the leaves apart and look down into the leaf base for 2mm-long grey adults or very small yellow nymphs ~1mm in length. Onion fields next to hay or overwintering rye are at a greater risk as thrips move once the hay or rye is cut.

INSECT PEST AND CROP DEGREE DAY UPDATE – JUNE 13, 2017…CON'T

Garlic: Continue to scout for symptoms of rot in the basal plate which may be due to bulb and stem nematode, Fusarium basal rot or white rot. Look for plants that have yellowing of foliage or tip dieback and dig carefully around the plant and look for fungal growth or rot on the stem. Onion thrips and onion maggot flies have been detected.

Brassica: First generation of cabbage maggots are active. Continue to scout for diamondback moth, cabbageworm, aphids, thrips and tarnished plant bugs.

Celery: Scout for tarnished plant bugs as they are emerging and are typical found first around field borders.

Below are the various insect DD thresholds for reference.

Thresholds
Use these thresholds as a guide, always confirm insect activity with actual field scouting and trap counts.

	Degree Days		
	1st generation	**2nd generation**	**3rd generation**
Onion Maggot	210	1025	1772
Seedcorn Maggot	200	600	1000
Cabbage Maggot	314-398	847-960	1446-1604
Carrot Rust Fly	329 – 395	1399-1711	n/a

Carrot Weevil	138 – 156	Egg laying (oviposition) begins
	455	90% of the egg-laying (oviposition) is complete
Aster Leafhopper	128	Overwintering eggs hatch
	390	Local adult emergence