Here is the newest issue of Massachusetts Berry Notes from the UMass Extension Fruit Team.

Massachusetts IPM Berry Blast

July 3 2013

See New UMass Extension Spotted Wing Drosophila Information Site at https://extension.umass.edu/fruitadvisor/spotted-wing-drosophila

STRAWBERRY

Renovation is underway in some areas. If possible, evaluate fields before renovating for infestations of Black Vine Weevil or other root weevils by checking leaves for marginal leaf notching (see below) or general patchiness of the field that might indicate root feeding injury. See more below:

Black Vine Weevil and other root weevils

ID/Life Cycle: There are several root-feeding weevils that are damaging to strawberries; black vine weevil, strawberry root weevil, and the rough strawberry root weevil are the best known. Additionally, green leaf weevils, have also been found feeding on strawberries in Massachusetts and Connecticut.

Black vine weevil adults are black weevils with short, broad snouts. Adults cannot fly because their wing covers are fused together and so they disperse chiefly by walking. The weevils feed at night and hide under leaf litter or in the soil during the day. The grubs are small, whitish and crescent shaped. They have no legs. There is one generation every year.

The black vine weevil overwinters in the soil as a partly grown larva, or "pre-pupa". Larvae resume feeding on roots in the early spring, causing the heaviest damage. Larvae pupate in late May and June for about 10 days. Adults begin emerging in June (600 GDD) and continue through July. Adults feed at night and hide around the base of the plant during the day. After two to three weeks of feeding, egg laying begins, usually in late July (approximately 1400 GDD). Larvae hatch in August (Approximately 1700 GDD) and begin feeding on roots. They continue to feed and grow until winter

Damage: Larvae feed on roots and crowns, which can weaken the plants or lead to root rots. Adult weevils feed on leaves from May through August, causing notching of the leaf margins, which rarely leads to significant weakening of the plants. Under heavy infestation by root weevils, the plants decline, appear stunted and bear poorly. Infestations are generally in patches in the field.

Management:

Monitoring: Degree-day models can predict emergence and development. This can help guide scouting and management activities. Symptoms of adult feeding can be seen on leaf margins beginning in June. The nocturnal adults can be spotted at night with a flashlight. Traps can also be made by placing fold of burlap around the base of the plant, or by creating a pitfall trap by burying a paper cup at soil level. Traps should be checked at least twice a week. It is important to determine when the first adults are emerging so that control measures can be taken before they begin to lay eggs (2-3 weeks after emergence). Emergence is usually toward the end of harvest making chemical control difficult.

Control Strategies: **See** New England Small Fruit Management Guide **for more information on recommended materials and rates**

Cultural/Biological: follow recommended practices in table below.

Chemical:

• Apply recommended insecticides after harvest to suppress adults before they lay eggs. (Controlling root weevil adults requires the highest allowed rate of labeled insecticides, and is best applied at night when adults are active.)

Conventional	Organic OMRI listed	Cultural Practices

Conventional (PHI)	Organic OMRI listed (PHI)	Cultural Practices
Actara (3) *Bifenture 10DF (0) *Brigade WSB (0) *Danitol 2.4 EC Exhibitline SC (0) Platinum (50)	Heterorhabditis spp., 1/2 - 1 billion/A (0) Mycotrol O (0) Steinernema spp., 3 billion/A (0)	• Rotate strawberry fields to non-susceptible crops for at least 3 years before replanting to strawberries to reduce the buildup of root weevils. • Plow down heavily infested fields as soon as possible after harvest to avoid migration of weevils to nearby fields. • Avoid locating new strawberry plantings near old ones, especially if infested with root weevils. • Create a deep trench between an old field and a new planting to capture black vine weevil adults as they migrate to the new field. • Apply insect pathogenic nematodes in early May or late August if grubs are found in the soil. • Be sure to keep the field irrigated during periods of active growth to avoid stress on the plants.

**= Restricted Use Material -- Read labels thoroughly for application rates and restrictions (REI, PHI, etc.)*

RASPBERRY

Raspberry Cane Borers

ID/Life Cycle: Raspberries are attacked by two types of cane borers.

The **raspberry cane borer** is a slender black beetle with an orange band just below the head and has long antennae. The red necked cane borer is a smaller, slender, black beetle with a "coppery" neck. Unlike the raspberry cane borer, it has short antennae. The larvae are white and legless, with a flattened head (the family is often called flatheaded borers).

Raspberry cane borer has a two-year life cycle. Adults emerge in June and females lay eggs in the pith of new raspberry growth, about six inches from the tip of the cane. The female beetle then makes two rows of punctures around the cane, one just above and one just below the egg-laying point. This causes the tip of the new cane to wilt. The egg hatches in early July and the larva burrows slowly down the cane, passing the first winter within an inch or two of the girdle. During the second year the larva burrows down to the crown and passes the second winter at or below ground level. It completes its development the following spring and pupates in the soil.

Red-necked cane borers are active in June and July. Females lay eggs on the surface of canes. Larvae hatch and burrow directly into the plant.

Young larvae tunnel around in a close spiral, girdling canes and producing gall-like swellings. Larvae overwinter in the cane, pupating there in early spring. Adults leave the pupal skin and remains in the tunnel for about 10 days before emerging from canes repeating the cycle. There is one generation annually.

Damage:

Raspberry Cane Borer– Damage results from the girdling of cane tips and burrowing into crowns. Heavy infestations can reduce yield and ultimately destroy sections of a planting.

Red Necked Cane Borer–Damage results from weakened canes that easily break and have reduced yield. Heavy infestations can lead to areas of dieback in rows.

Management:

Monitoring: Scout fields for flagging cane tips in early to mid-summer and for galls near the base during dormant pruning.

Control Strategies: See New England Small Fruit Management Guide for more information on recommended materials and rates

Cultural/Biological: follow recommended practices in table below.

Chemical:

• Apply recommended insecticides to control adults before egg laying occurs at late prebloom.

• DO NOT APPLY INSECTICIDES DURING BLOOM.

Conventional (PHI)	Organic OMRI listed (PHI)	Cultural Practices
*Admire Pro (soil applied)	None listed	• Eliminate any wild brambles near the field that may be harboring these pests. • Remove and destroy wilted tips infested with raspberry cane borer as soon as they appear. • Remove and destroy any canes with galls during dormant pruning

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Potato Leaf Hopper

ID/Life Cycle: Leafhoppers are small, green, bullet-shaped insects which take flight quickly if disturbed. The nymphs are lighter colored and do not fly. They are easily identified by their habit of moving sideways when disturbed.
Potato leafhoppers don't overwinter in New England but are blown up every year from the south on storm fronts. There are multiple generations every year.

Damage: The potato leafhopper feeds on the underside of leaves leaving small chlorotic areas and causing a downward cupping of the leaves. Most feeding is the upper, more succulent leaves on primocanes and often causes a stunting of those canes.

Management:
Monitoring: Scouting is especially important in new raspberry/blackberry plantings and on primocane fruiting varieties. Scout by brushing the leaves with the hand and looking for small adult leafhoppers flying off. Examine the underside of injured leaves to see if nymphs are present. There are no thresholds established for potato leafhoppers. Consider control if there are one or two nymphs per leaf and leaf curl is evident.

Control strategies: **See** New England Small Fruit Management Guide **for more information on recommended materials and rates**
Cultural/Biological: follow recommended practices in table below.
Chemical:

- Apply recommended insecticides when large populations of nymphs are noted on the leaves or symptoms become apparent.
- If repeat applications are needed, rotate insecticides from different IRAC groups to reduce the chance of resistance development in the pest.

Conventional(PHI)	Organic OMRI listed (PHI)	Cultural Practices
Assail 30SG (1) **Actara 25WDG (3)** **Admire Pro (3)** **Malathion 57EC (1)** **Malathion 8F (1)** **Sevin XLR Plus (7)**	**Aza-Direct (0)** **AzaGuard (0)** **Neemix (0)** **Safer Brand #567 (0)**	• **Avoid proximity to alfalfa plantings, which provide a major source of potato leafhopper population build-up.**

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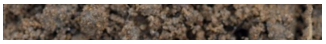
BLUEBERRY

Japanese Beetle

ID/Life Cycle: Japanese beetle adults are large metallic green or greenish bronze with reddish wing covers and several white spots near the abdomen tip and along the sides. Larvae are large C-shaped grubs that live in the soil. Asiatic garden beetles are small and a velvety cinnamon brown color, showing a faint green iridescence in the sunlight. Rose Chafers and smaller olive colored with long antennae.
The larvae (or grubs) of these insects look quite similar to one another and are called white grubs. They are c-shaped, have 3 pairs of legs, grow up to 1" long. They are easily distinguished from the larvae of root weevils, which have no legs.
Grubs overwinter deep in the soil. As spring temperatures increase, the grubs move up in the soil to feed on grass and other small roots. They pupate in late May to June and adults start emerging in late June to mid-July. Adults feed through late summer or early fall. Females lay eggs during July and August, and grubs hatch in 10 to 12 days. Grubs first feed on decaying matter but soon feed on roots as they move deeper to an overwintering site. There is one generation per year.

Damage: The adults of some species feed on the foliage, flowers and fruits of many plants. Japanese beetle and rose chafer adults can be significant pests of blueberry during harvest when they contaminate the berries. For many years white grubs were



a rare problem in blueberry fields, but recently they have become serious pests in some fields, with populations as high as 30 grubs per bush. The grubs consume feeder roots and may also girdle or clip off larger roots. Infested plants may not show any outward signs of injury until a period of drought stress, when the reduced root system cannot provide enough water to the plant. Damaged bushes show low vigor and reduced production. Adults, especially the Japanese beetle and rose chafer, sometimes become serious pests by consuming leaves and scarring the berries.

Control strategies: **See** New England Small Fruit Management Guide **for more information on recommended materials and rates**

Cultural/Biological: follow recommended practices in table below.

Chemical:

• Apply recommended insecticides if scouting reveals a high population.

• If repeat applications are needed, rotate insecticides from different IRAC groups to reduce the chance of resistance development in the pest.

Conventional(PHI)	Organic OMRI listed (PHI)	Cultural Practices
Actara (3) **Admire Pro (3)** ***Asana XL (14)** **Assail SG (1)** ***Danitol 2.4EC (3)** **Imidan 70W (3)** **Pyrenone 0.5EC (0)** **Sevin XLR Plus (7)**	⊗ **Aza-Direct (0)** ⊗ **Surround WP (0)**	• **Avoid planting on newly turned sod land. Rather, plow the field, let it lie fallow or in a rotational cover crop such as Sudan, buckwheat, or a salable crop such as pumpkins or squash for at least one season prior to planting with blueberries.** **• Avoid locating blueberries next to large grassy fields, which would be a source of these beetles.** **• Do not use traps as they are more likely to increase the overall population of beetles in the vicinity of the traps.**

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Blueberry Maggot

ID/Life Cycle: The adult fly, similar in size to a house fly, is black in color, with a pattern of dark and clear bands on its wings. The maggots are small, white, legless, and are found inside infested fruit.
This insect overwinters as pupae in the soil beneath the blueberry bushes. Emergence of overwintering adults coincides with the ripening of blueberry fruit and spans several weeks, which extends their period of activity in the field. Females lay their eggs singly beneath the surface of a ripening berry. The emerging larva feeds inside the berries for a two-week period. When full grown, the larva drops to the ground, if the berry has not already fallen. It pupates in the soil, where it will remain for the winter. There is one generation per year.

Damage: Flies lay eggs under the fruit skin just as the fruit begins to turn blue and larvae feed within the fruit. Maggots are later found in ripening and harvested fruit. Maggots feeding within developing fruits render fruit unmarketable. Berries become soft and mushy. Undetected infested berries contaminate pack-out.

Management

Monitoring: Yellow sticky rectangle traps can be used to monitor blueberry maggot populations in the planting. Traps are placed in the upper third of 4-8 bushes around the perimeter of the planting and another 2-4 traps on interior bushes. Bushes with traps should be marked with flagging tape so they can be easily found. Traps should be set out prior to any fruit ripening and checked every few days to determine when Blueberry Maggot flies are becoming active. Sustained catch of the blueberry maggot fly in traps indicates that it is an optimal time to make an insecticide treatment; sustained catch means not just the first one or two flies, but consistent catch of several flies per week.

Control strategies: **See** New England Small Fruit Management Guide **for more information on recommended materials and rates**

Cultural/Biological: follow recommended practices in table below.

Chemical:

- Apply recommended insecticides when trap catches indicate a sustained population.
- If repeat applications are needed, rotate insecticides from different IRAC groups to reduce the chance of resistance development in the pest.
- Be aware of pre-harvest intervals for materials applied close to harvest.
- Be aware of application restrictions on any materials you also hope to use for SWD once fruit begin to ripen (e.g., Malathion).

Conventional (PHI)	Organic OMRI listed (PHI)	Cultural Practices
***Asana XL (14)** **Assail 30SG (1)** ***Brigade WSB (1)** ***Danitol 2.4EC (3)** **Imidan 70 W (3)** ***Lannate SP (3)** **Malathion 5EC (1)** **Pyrenone 0.5EC (0)** **Sevin 4F (7)**	**GT-120 NF Naturalyte Fruit Fly Bait (0)** **Pyganic EC (0)** **Surround (0)**	• **Preserve natural enemies whenever possible by selecting spray materials that are less toxic to beneficials.** • **Prune to achieve small, open bushes with good sunlight penetration through the canopy, reducing shading on the soil surface to generate a less favorable habitat for build-up of this pest.** • **Set out a high density of traps (1 trap per bush) in small plantings to trap-out this insect.**

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Archived IPM Berry Blasts are available at the UMass Extension Fruitadvisor website.

We thank Nourse Farms for their underwriting of this newsletter which allows us to keep subscription rates low.
