

Berry Notes

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Prepared by the University of Massachusetts Fruit Team

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IN THIS ISSUE:

CROP CONDITIONS

STRAWBERRY

- ❖ Strawberry Fruit Anthracnose in 2004
- ❖ Phytophthora Diseases of Strawberry
- ❖ Strawberry Insect and Slug Control Update

BRAMBLE

- ❖ Spider Mites on Red Raspberry

BLUEBERRIES

- ❖ Diverging Patterns of Fruitworm Activity in Blueberries
- ❖ Monitoring for Blueberry Maggot Flies
- ❖ Field Observations
- ❖ Pre-harvest Fungicides for Blueberries
- ❖ Anthracnose Mold in Blueberries

GRAPES

- ❖ Crop Load Adjustment in Grapes
- ❖ More on Crop Load Adjustment in Grapes
- ❖ Shoot Positioning and Canopy Management
- ❖ **Grape Update from Long Island**

GENERAL INFORMATION

- ❖ Small Fruit Arthropod Pest Management Update
- ❖ **Organic Controls for Potato Leafhopper**
- ❖ Skin Cancer: the sun is not the farmer's friend
- ❖ Tank Mixing Herbicides

UPCOMING MEETINGS

CROP CONDITIONS

Strawberries: Harvest is well underway. Slug populations are likely to be high this season following a relatively wet spring, especially in heavily mulched fields. See more below on slug management options. Also, some growers are finding very high two-spotted spider mite populations. Severe infestations may require pre-removal miticide applications. Registered materials include Vendex* 50WP (1), Kethane 35WP(3), Agri-Mek* (3), Savey 50DF (3). * indicates restricted use materials and the (#) indicates the preharvest interval. Watch for potato leaf hopper infestations in new plantings. Remember to keep up with blossom removal on new plantings. **Blueberries** are showing a variety of symptoms related to winter injury including tip dieback, inadequate foliage, high numbers of small fruit. See more on this below. Strip excessive fruit if bushes look weak. Cranberry Fruitworm moths will have laid eggs by now. Check for infestations by looking for individual fruit that turn prematurely blue accompanied by webbing and frass. Blueberry maggot yellow rectangle traps should be put in place this week. Sphere traps can be placed about 1 week after the rectangle traps. Keep an eye out for aphids. Control as soon as you find them because they can transmit blueberry scorch virus into your planting. Control options include Provado. See more on this in the last issue of BerryNotes Look for and prune out phomopsis or fusarium infections. Last chance to get N-fertilizer on now before July 4th cut-off. Late nitrogen applications can lead to greater susceptibility to winter injury. **Raspberries** are in fruitset. Many plantings are showing severe winter injury with a lot of tip dieback and also weak foliage (small, yellowing) and poor fruit-set. For plantings with harvestable fruit, Botrytis fruit rot management is still a primary issue. Tarnished plant bug can still cause some damage to later fruit. Watch for two-spotted spider mites and potato leafhopper, especially in fall fruiting varieties. As with blueberries, final N-fertilizer applications can be made now. **Grapes** are in varying stages of bloom. There is a wide

range in development from coastal to inland vineyards. Shoot growth has been rapid during the past week. Continue disease management programs. Insects that will need attention now are Potato Leafhopper, rose chafer/Japanese beetle and Grape Berry Moth. See more below on management of Potato Leafhopper. Cluster thinning and shoot positioning should be underway. **Currants and Gooseberries** are near harvest for early varieties. Watch for two-spotted spider

mite, potato leaf hopper, currant borer and gooseberry fruitworm. Powdery mildew can develop now, too. Time harvests before severe heat, if anticipated, to avoid fruit drop.

Weekly crop and weather report for New England available from USDA website: www.usda.gov/nass/pubs/staterpt.htm.

Strawberry

Strawberry Fruit Anthracnose in 2004

Kathy Demchak, PennState University

The warm temperatures and high humidity across the state have caused perfect conditions for anthracnose fruit rot development. So far, this disease has been found primarily on plantings of plasticulture Chandler, but has also been found on matted-row plants. Symptoms to watch for are brown sunken lesions, usually first noticed on the fruit. These lesions are usually dark brown on green berries, and start out dark brown on ripe berries, though a salmon-colored hue is often apparent in the center of the lesion as sporulation occurs. Sunken brown lesions are also usually found on the leaf petioles once they are examined more closely. Captan, Quadris, Pristine, Captevate and Cabrio are

labeled for anthracnose control and all work quite well. However, Quadris and Cabrio are in the strobilurin class of fungicides, as is one of the active ingredients in Pristine. Consequently, these materials cannot be alternated with each other for resistance management purposes. Captevate, a mixture of captan and the active ingredient in Elevate, probably will not be yet available in PA until after strawberry season. Switch, an excellent gray mold material, is not labeled for anthracnose control, but will have some activity against anthracnose when used for gray mold control. (*Source: PennState Vegetable and Small Fruit Gazette, Vol. 8, No. 6- June 2004*)

Phytophthora Diseases of Strawberry

Bill Turechek, Cornell University

Last year I encountered a few strawberry fields affected by red stele, caused by *Phytophthora fragariae*, or by Phytophthora crown rot, caused by *Phytophthora cactorum*. The abundance of rain combined with saturated soils this spring has again created conditions favorable for these two diseases. Below is a brief description of both diseases to help growers identify the problem in suspect plantings, followed by control recommendations.

Red stele

Symptoms: Affected plants appear stunted and off-color and eventually wilt and collapse during periods of rapid growth or when the weather turns warm and dry. Plants are usually affected in clusters within fields, generally in low-lying or wet areas of the field, rather than as isolated plants scattered throughout the planting. Unlike crown rot, the roots of affected plants have a “rat tail” appearance caused by the loss of the fine, branched feeder roots from the main roots (Fig. C). The main roots are generally rotted at the tips back towards the crown and dark lesions are often found along the roots. Scraping away the outer portion of the root just above the rotted portion usually reveals a reddish stripe down the center of the root (i.e., the stele)(Fig. D). This is diagnostic for red stele.

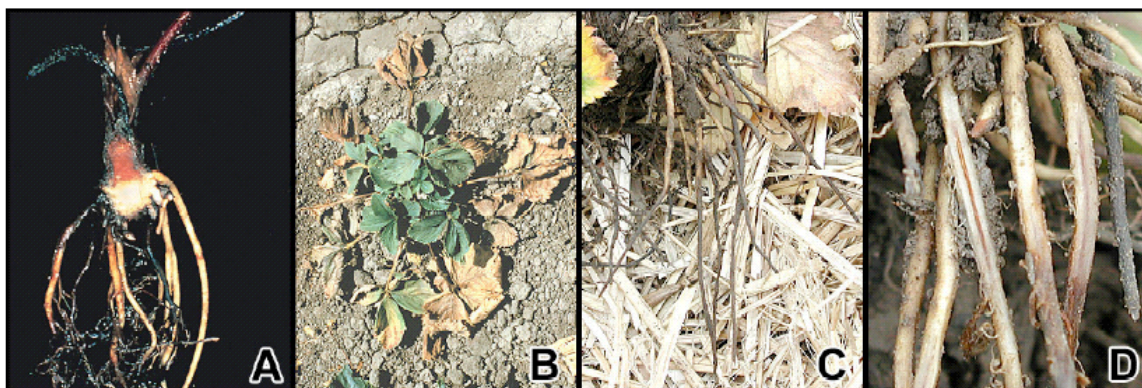
Phytophthora crown rot

Symptoms: This disease is much less common than red stele in New York. Affected plants are stunted and the leaves appear pale or bluish-green. During periods of

rapid growth, during fruit development or as the season becomes warmer and drier, the leaves quickly wilt, turn brown and the entire plant collapses (this is unlike symptoms caused Verticillium wilt where wilting occurs from the outer leaves towards the crown of the plant [Fig. B]). Plants are usually affected in clusters within fields, generally in low-lying or wet areas of the field, rather than as isolated plants scattered throughout the planting. Extensive reddish-brown to brown necrosis of the upper portion of the crown is typical for plants infected recently (Fig. A). This is seen by digging up and cutting the crown in half longitudinally. The main and feeder roots of affected plants tend not to be as discolored or damaged compared to those roots affected by red stele. As the infection progresses the entire crown rots and decays making diagnosis difficult. This fungus also affects the berries and causes the disease leather rot. Interestingly, the two symptoms may or may not occur together during the same year.

Control

There a number of varieties that are resistant or have some tolerance to red stele such as Earliglow, Allstar, Northeastern, Mohawk, Tristar, and Sparkle. If a planting was lost due to either of these diseases, strawberries should not be replanted to this site until it has undergone several years of rotation with non-host crops or, if you are gambler, you can try to plant a resistant variety if the site can be improved. In established plantings, excess water should be drained from fields when possible. New plantings should be



planted on a well-drained site and/or drainage tiles should be installed if standing water is a recurrent problem. Because splashing water helps to distribute both pathogens, a thick layer of straw mulch is recommended to reduce splashing. This will also protect berries from developing red stele where crown rot is a problem. Also, avoid walking or driving machinery through affected areas and then entering unaffected areas of the planting. The fungi are easily transported on soils stuck to the bottom of shoes or in tractor tires.

Ridomil Gold 4EC (1 pt/treated A) OR Aliette 80WDG (2.5-5 lbs/A) are effective against reducing the severity of these diseases. When infections are mild, it may be possible for plants to recover after chemical treatment. However, these fungicides will not offer very much protection if applied to susceptible varieties planted on a wet site. When treating for either of these two

diseases, you need to treat only in and a few rows around the affected area, i.e., you do not need to treat the entire planting. However, the choice to use either of these fungicides at this time of year is difficult one to make. First, the long preharvest interval of both of materials means that any strawberries treated now, can not be harvested and sold. But, if the soils sufficiently dry out and warm up, the fungus becomes inactive and no further infection is likely to occur until autumn. Thus any plants not infected at this point, should not be in danger of infection until fall. In my opinion, unless the soils are clearly saturated or you are dealing with a relatively large area of infection, I would hold off any sprays until after harvest. Lastly, it might be worth making the effort to section off the affected part of the field to limit the movement of invested soil to unaffected parts of your field via the soles of your customer's shoes. (Source: *New York Berry News*, Vol. 3, No. 6, June 6, 2004)

Strawberry Insect and Slug Control Update

Rufus Isaacs, Michigan State University

This season there are a few new insect control products registered for strawberry, and the recent wet weather is cause for concern when thinking about slugs and sap beetles. This article will update growers on these issues.

Slugs do well in damp, cool weather, and we have had plenty of that this year. As fruit ripens, slugs can damage the fruit making them unmarketable. In the past few years, the Small Fruit Entomology Program has compared the standard Deadline Bullets slug bait product with a new one called Sluggo that contains iron phosphate as the active ingredient. One of the potential benefits of Sluggo is that the bait is light brown in color making it less visible to pickers, and it is expected to have fewer side effects because of the different active ingredient. It is also biodegradable and safe to humans, animals, and natural enemies.

We compared the two products at a farm in Sutton's Bay, Michigan during 2002 in a replicated field trial.

Deadline Bullets at 25 lb per acre provided excellent control of slugs over the month-long period between application and harvest, and reduced damage to harvested fruit by 95 percent, compared to the untreated areas. Sluggo at 40 pounds per acre did not significantly reduce slug populations, but it did provide protection of berries from slug damage (79 percent control), that was not significantly different from Deadline Bullets. It seems that the Sluggo has a less rapid toxic effect, but it does stop the slugs from feeding, which eventually leads to their death.

Insecticide registrations have been received in the past few years for a few new products for use in strawberry. SpinTor 2SC is a new insecticide class (naturalyte) with activity on moth larvae. This product will provide control of strawberry leafroller, and applications need to be applied when larvae are beginning to develop.

Provado 1.6F received registration last year, and this insecticide (neonicotinoid class) is highly effective against

sucking insects, particularly aphids, spittlebugs, and whiteflies. Control of leafhoppers may also be possible on leaves that receive treatment, but new foliage that grows out after the spray will be untreated and a new influx of leafhoppers could become established on new growth. This product should be banded onto the strawberry plants to get the maximum effect from your investment. We are currently testing activity of Provado on potato leafhoppers in a Michigan planting.

While Provado is labeled for use on foliage, a soil-applied formulation of this insecticide called Admire 2F provides strawberry growers with a much-needed option for grub control, with potential benefits to the foliage too. Admire is labeled for use against white grubs in the soil and against aphids and whiteflies. To control white grubs, this product needs to be applied to a field just in advance of the start of egg-laying of the target pest and then irrigated in. As the eggs hatch in

the soil and young larvae (grubs) emerge, they will be killed by the insecticide as they start to feed on the roots. Because this product is systemic, treated plants will draw the insecticide into the leaves, thus protecting them from feeding by aphids and whiteflies. Trials are underway to evaluate Admire 2F against pests in Michigan strawberries.

Sap beetles continue to be a problem for some growers. While there are no new options for control of this pest, it is important to remember that field sanitation is the foundation of sap beetle control. Try to get unpicked berries out of the field wherever possible. With the wet weather we have had this year, this will be even more important as fruit may be more likely to rot in the field. There are still some insecticides registered for control of this pest, but once the beetles get established in fruit, it is difficult to get control because they are protected inside or under the berries. (*Source: Michigan Fruit Crop Advisory Team Alert, vol. 19, No. 3, June 15, 2004*)

Brambles

Spider Mites on Red Raspberry

L. K. Tanigoshi, T. A. Murray, and B.S. Gerdeman

For several decades, the twospotted spider mite, *Tetranychus urticae*, was the only economically important spider mite species reported on red raspberry in Washington state. Researchers in the Pacific Northwest have shown that serious economic levels of this species can occur when growers use certain insecticides against pests such as root weevils and worms before harvest. When using insecticides known to kill the spider mite destroyer, *Stethorus punctum picipes*, growers remove an important predator population.

Biology and Life History

Spider mites damage both leaf surfaces of red raspberry



Figure 2. Severe economic injury to red raspberry showing defoliation, dieback of fruiting canes, and injury to primocanes.

and hormone-like substances into the feeding puncture. Red raspberry responses to spider mite feeding include chlorotic (yellow or white) stippling on leaf surfaces,

by inserting their “piercing-sucking” mouthparts into foliage tissues and removing plant juices. They inject salivary toxins, enzymes,

and

reduced bud formation, reduced yields, dropping of leaves, and even death of the plant (Figures 2–3). Female mites lay eggs mostly on the underside of leaves. Larvae hatching from eggs look like small adults with three pair of legs. The larva is followed by two nymphal stages that look like smaller adults and possess four pair of legs. The rate of development increases with increasing temperature, decreasing the time from egg to adult. Hot dry conditions favor spider mite outbreaks.

Economic Importance

Twospotted spider mite. Mature females have a pale yellow-green or red oval body with pale legs. They have a dark green food spot on either side of the body, which gives the

mite its name (Figure 4). All life stages spin a continuous thread of silk called webbing over the foliage they have colonized (Figure 5). Spinning of the webbing plays a role in spider mite dispersal, migration, and deposition of eggs. The webbing protects the spider mites from predators, pesticides, and

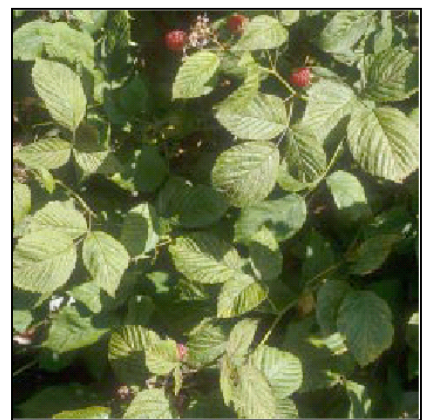


Figure 3. Buildup of late season yellow spider mite populations during harvest.

water loss. The twospotted spider mites overwinter as orange-colored adult females within the soil, in basal fruiting canes, and plant debris. They commonly emerge from April to May and begin to feed on older or mid-shoot leaves on fruiting canes before dispersing to the upper canopy in July to August. As these overwintering females feed they take on the species' normal yellow-green hue and two characteristic dark-colored food spots. The stylet shaped mouthparts



Figure 4. Adult female twospotted spider mite.

common to all spider mite species pierce and suck plant juices. This type of feeding activity produces small, yellowish spots on the upper leaf surface. Leaf margins appear dried and turn reddish brown. Generally five to six overlapping generations occur per year in western Washington. Summer females each lay about 130 eggs during a 30-day life span on red raspberry. Field populations increase rapidly after harvest through early September. They can cause extensive bronzing, drying, withering, and defoliation of primocane foliage by late August. Leaf quality declines in response to cooler fall temperatures, shorter day length, and spider mite feeding. Spider mite females change to orange overwintering forms and begin to migrate from the leaves to overwintering sites.



Figure 8. Adult female European red mite.

European red mite. Adult females are brick red colored. Distinct white tubercles are located at the base of several white bristles on their back (Figure 8). This species differs from the other three species because it overwinters in the egg stage, and the adults commonly

inhabit both leaf surfaces. Feeding symptoms by this mite appear uniformly distributed between secondary veins on the leaf's upper surface. The injured tissues remain whitish colored compared with the yellow-brown "bronzing" hues caused by the other spider mite species (Figure 9).

We assume they overwinter in red raspberry fields as eggs placed on roughened bark and at the base of primary buds of

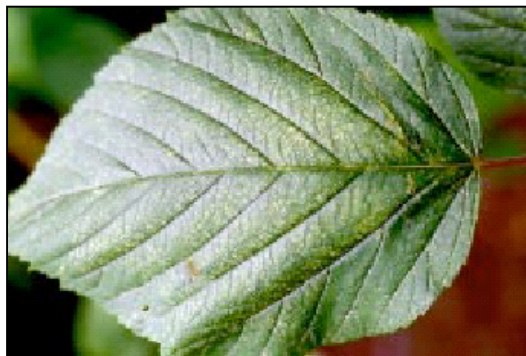


Figure 9. Uniformly distributed stippling injury caused by European red mite feeding on red raspberry foliage.

dormant fruiting canes. The occurrence of this species on red raspberry in northwestern Washington is not widespread. We know very little about the developmental biology and economic importance of European red mite on red raspberry, although its occurrence has been observed in Whatcom County for several years. Why this common tree fruit species is becoming more widespread is unclear.

Population Management

Reasons remain somewhat unclear for the dramatic species shift in recent years from the common twospotted spider mite to a complex of four species. Research and extension studies conducted in commercial red raspberry fields between 1987 and 1994 with organophosphate and pyrethroid insecticides, concluded the use of these broad-spectrum insecticides harm or kill important spider mite predators. Moreover, postharvest spider mite outbreaks and spider mite species shifts first reported in 1992 continue to cause problems. Current population trends for the twospotted spider mite and yellow spider mite in northwestern Washington indicate peak numerical increases after harvest in mid- to late August. By September, twospotted and McDaniel appear in response to short day length.

The variation in spider mite infestation peaks, cumulative feeding damage effects, and plant responses to foliage feeding has confounded efforts to define a common treatment threshold. The factors that cause spider mite dynamics to vary from field to field and from year to year are not well understood in red raspberry. Canadian research suggests "heavy" twospotted spider mite feeding during and

after harvest can reduce yield by 25% the following season. For years, 25 twospotted spider mites per leaflet has been proposed for a treatment threshold for small fruits. Red raspberry appears to tolerate significantly greater densities of yellow spider mite than of twospotted spider mite.

Good integrated mite management builds on cultural practices. Integrated management practices that reduce dust on foliage and fruit minimize harmful effects to arthropod predators and potential for severe spider mite outbreaks (Figure 13). Good farming practices improve the health and vigor of the plant to better withstand mite feeding impacts. Good practices do not guarantee supplemental chemical control will not be needed either before or after harvest. Newer miticides are more selective for the spider mite pests and safer to predatory mites. Good farming practices in orchard integrated control of spider mites can incrementally shift an orchard away from a miticide-based program. (Source: Excerpted from Washington State University Extension Bulletin 1959E)



Figure 12. Several predatory mites, such as *Neoseiulus fallacis*, are important natural enemies of spider mites on red raspberry.

Blueberries

Diverging Patterns of Fruitworm Activity in Blueberries

John Wise and Rufus Isaacs, Michigan State University

In most years the cranberry fruitworm (CBFW) and cherry fruitworm (CFW) have similar enough biology that they can be managed together. They both are Lepidopteran pests, they both have one generation per year; they both first emerge as moths in the spring and lay eggs on blueberry fruit; and the larvae of both species feed inside fruit. That is why in blueberries we typically refer to them as the fruitworm complex. In some years, however, the climatic conditions are such that the patterns of their life cycles diverge and they need to be managed separately to maintain adequate control. This year is an example of that phenomenon. CFW moths not only emerged several weeks earlier than CBFW moths, but in many locations CFW egg laying and egg hatch occurred long before the CBFW.



Figure 1. CBFW cluster infestation and pre-maturely ripened fruit.

What does that mean for management of these pests? Even though the primary period for control is over, there are several things to yet consider. First, even though they both infest blueberry fruit, the CFW generally spends its complete larval period within one

fruit. Therefore, once it is inside the fruit there is very little opportunity for control. This is not the case for CBFW. As the CBFW larva grows, it moves from the initially infested fruit to another and another, tying the cluster together into a messy mass of webbing, berries, and frass. Therefore, even if you could not prevent the initial infestation, every time the larva exits a berry there is additional chance for control. This opportunity diminishes as the cluster is further webbed, so persistent effort at control is important. It is this fully-webbed cluster that brings the greatest threat of a “load rejection” at the processing plant, or unhappiness by U-pick customers. Fruitworm infestation is of particular concern for early-ripening cultivars where infestation is likely to be present at harvest, whereas in late harvest varieties infested berries may drop off

the bush before harvest.

Special note: When considering insecticide options for fruitworm control, note that Guthion [is no longer labeled for this pest in New England State].. The most effective

alternatives to Guthion for fruitworm control include Imidan, Sevin, and Asana. (*Source: Michigan Fruit*

Crop Advisory Team Alert, vol. 19, No. 3, June 15, 2004)

Monitoring for Blueberry Maggot Flies

Rufus Isaacs, Michigan State University

The blueberry maggot fly is a primary pest of blueberry because its maggots develop inside the fruit, and there is zero tolerance for infestation. With the high soil moisture this spring and warm weather expected over the next few weeks, emergence of blueberry maggot flies is expected to start in the next two to three weeks. To ensure that the first flies are detected, blueberry growers should deploy monitoring traps before the middle of June to ensure detection of the start of this pest's emergence.

Yellow Pherocon AM sticky boards are recommended for monitoring flies early in their activity season. These traps should be hung in a V shape in the top of the blueberry bush, with the yellow side facing downwards. Twist ties can be used to hold the trap in this position, and leaves should be cleared from the area near the trap to prevent contamination and to allow flies easy access to the trap. Monitoring traps should be checked at least once per week. Any blueberry maggot fly caught on the trap should be counted, recorded and removed. These flies have an inverted W pattern on their wing, and this should be identified before counting so only the pest insects are being counted.

For maximum effectiveness, Pherocon AM yellow boards must be recoated or replaced after three weeks of exposure. To increase fly attraction to traps, they should be baited with ammonium acetate or ammonium carbonate baits. The traps can be purchased with bait

mixed into the sticky coating, or the regular yellow traps can have "superchargers" added to them (small yellow plastic containers) that release the odors to attract flies. A supercharger should be hung with each trap and should be replaced or refilled periodically to maintain their activity, according to the manufacturers' recommendations.

For effective monitoring in commercial highbush blueberry operations, a minimum of two Pherocon AM boards are needed for every five acres. One trap should be placed in the field adjacent to wild host plants, and the other trap should be placed in the center of the five-acre block. This will allow detection of fly populations that move into the field versus those resident in the field.

If flies are trapped immediately after they emerge from the soil, there is a 7 to 10-day period before egg-laying begins. Because of this, if flies are trapped the first insecticide treatments should be timed for within a week after the first fly captures. This maximizes the impact of the treatment against egg-laying flies to prevent fruit infestation.

Sticky green spheres may also be used for monitoring blueberry maggot fly. However, these traps are more effective later in the season when the majority of the flies have attained sexual maturity. Sticky spheres should be placed within the bush approximately six inches from the top of the bush and baited. (*Source: Michigan Fruit Crop Advisory Team Alert, vol. 19, No. 3, June 15, 2004)*

Field Observations

Gary Pavlis, Rutgers University

New Disease? Numerous visits to fields in Hammonton were made this week because growers have seen Duke blocks that look like they are in trouble. Fields show plants that are perfect next to plants with a reduced number of leaves, small leaves, new leaves are light green (similar to N deficiency), and the older leaves are reddish (similar to Mg deficiency). There is no sign of grub damage (I can't pull the plant out of the ground), and the crop is reduced (but it is not scorch). I have taken numerous leaf and soil samples and I am having them analyzed to help with the diagnosis. If your Duke field shows these symptoms I would ask that before growers start to apply fertilizer, micro nutrients, boron, or pull plants, give me a chance to come up with an answer. It may be a simple problem. Any reaction now is a guess and could more harm than good.

Phomopsis has been seen in some areas. All varieties show symptoms but Weymouth, Bluecrop, Blueray and Berkeley seem to be the most affected. Unfortunately dieback of twigs and canes may become more severe as warm weather occurs and as strain of producing a crop further weakens the wood. Most of the weak canes, which have leaf growth which is late and reduced, should recover but will not produce well. Twig blight symptoms usually consist of a tip dieback of about 2 to 6 inches on current-year wood. Small black pycnidia may also be produced upon the blighted twigs. As with other canker disease, the most conspicuous symptom is the "flagging," or wilting and death of individual stems during the summer. Under severe disease conditions, several individual canes may be affected on a single bush. When Phomopsis canker is responsible for this symptom, the actual infection site is much less noticeable than when fusarum canker is involved, and appears

primarily as an elongated flattened area, usually near the base of the cane. Small black dots that are the spore-containing bodies (pycnidia) of the *Phomopsis* fungus can sometimes be seen within this flattened area. Pruning the weakest canes to the ground may not seem practical from the standpoint of labor and costs but it is the best practice for the long-term production of the

bush. Winter injury, compounded by *Phomopsis*, often may cause poor production for two successive years if some radical pruning is not done early during the first growing season of the injury. Fungicide sprays are a help early but do little good at this time. (*Source: New Jersey Blueberry Bulletin, Vol. XX, No. 10, June 9, 2004*)

Pre-harvest Fungicides for Blueberries

Annemiek Schilder, Michigan State University

The main diseases of concern at this time of the year are fruit rots, such as anthracnose (orange wet spore blobs) and *Alternaria* fruit rot (green velvety layer of spores). *Botrytis* fruit rot (gray mold) is usually not a problem in Michigan, but can occur, especially in a year as wet as this. Anthracnose is often a problem in cultivars such as Bluecrop, Jersey, and Rubel, while *Alternaria* fruit rot is more common in Bluecrop. The cultivar Elliott is moderately resistant to anthracnose. While fruit rot is usually not visible until the berries ripen, it is prudent to assume you will have a fruit rot problem if you had problems last year. This year's rainfall also would have increased disease pressure, particularly of anthracnose fruit rot, as well as reduced the efficacy of fungicides due to wash-off and suboptimal spray timing. If the first blueberries are starting to show rot, fungicide sprays can limit the spread of the spores from the rotten berries to neighboring healthy berries. Often, these berries look healthy at harvest, but start to rot soon after in the lugs while awaiting processing. Rot may be slowed down by refrigerated storage, but will resume on the supermarket shelves, lowering fruit quality. Applications within several weeks of the first harvest can still be beneficial in preventing these late infections. In fact, an application between the first and second harvest may be recommended as well under high disease pressure.

Examples of fungicides that can be used during the pre-harvest period are discussed in the following text. A spray at first blue fruit is recommended. The strobilurins (Abound, Cabrio, Pristine) are all highly

effective against anthracnose with Pristine having the most broad-spectrum activity since it contains two different active ingredients. However, it probably is also the most expensive of the three. Pristine will also have excellent activity against *Phomopsis*, while Cabrio has good and Abound fair activity against this disease. All have moderate to good activity against *Alternaria* fruit rot and become quickly rainfast since they are locally systemic. Switch (cyprodinil and fludioxonil) also has some systemic properties and provides simultaneous control of anthracnose, *Alternaria*, and *Botrytis* fruit rots. Thus, it may be a good choice if several fruit rots are a concern, e.g., in 'Bluecrop.' Captivate (captan and fenhexamid) at the high rate will provide good control of anthracnose as well as *Botrytis* fruit rot, but this disease tends to be less common in Michigan. Aliette (fosetyl-Al) is a highly systemic fungicide that provides good control of anthracnose, *Alternaria* fruit rot, and *Phomopsis*. Of course Topsin + Captan can still be used, provided the 7-day PHI of Topsin is taken into consideration. While Topsin is very active against *Phomopsis*, Captan will do most of the work against anthracnose. Therefore, if anthracnose is the disease you wish to control, a Captan or Captec spray alone may suffice. Just remember that Captan is a protectant that can be washed off in heavy rain. This means that under rainy conditions, it will have to be applied more frequently than the other fungicides (e.g., every 7 days), while the strobilurins and Switch are rainfast and have at least 10 to 14 days of forward activity. (*Source: Michigan Fruit Crop Advisory Team Alert, vol. 19, No. 3, June 15, 2004*)

Anthracnose Mold in Blueberries

Dr. Gary Pavlis, Rutgers University

There are early indications that this season has the potential to be a bad year for this disease. The high humidity and abundant rain have made the conditions right. We have 5 fungicides to control this disease: 1) Bravo, which has a 42-day pre-harvest interval and is of no use to us at this time, 2) Ziram, which has a 14-day pre-harvest interval, 3) Captan, which has a 4-day re-entry time and is probably the most useful now, 4) Aliette, which has a 12 hour re-entry time and a 0-day

pre-harvest interval. Note that Aliette works differently than the other three. The first three protect the fruit from infection thus must be present when the infection period begins. Aliette appears to have curative ability and may be most effective if applied before the second or third picking of a variety. 5) Abound, which has a 4-hour re-entry time and a 0-day phi. Abound would be best used before the second and third picking. (*Source: New Jersey Blueberry Bulletin, Vol. XX, No. 11, June 16, 2004*)

Grapes

Crop Load Adjustment in Grapes

Bruce Bordelon, Purdue University

Annual pruning of grapes is necessary to balance the amount of fruit production with the amount of vegetative growth to insure economic yields of high quality fruit. Pruning severity is based on the strategy of 'balanced pruning,' which dictates the correct number of buds to retain, or 'crop load,' which determines the number of clusters to retain. Both methods are based on the vine's pruning weight or 'vine size', which is an indication of the vine's capacity to ripen the crop. Many growers prune vines lightly during the early spring to assure adequate bud number following this year's winter injury, and in case of damage by a late frost or freeze. Now that the danger of frost and freeze is over and grape shoots are growing rapidly, growers should go back through the vineyard and determine if crop load adjustment is needed. The crop load is adjusted by removing shoots and/or clusters. New shoots are easily broken off by hand without the need for pruners. Growers should pay close attention to the fruitfulness of

shoots. Shoots from primary buds have full fruiting potential, whereas secondary buds and latent buds on older wood produce shoots with little or no fruiting potential, depending on cultivar. Ordinarily, all secondary shoots and shoots from older wood should be removed. However, on varieties that may have suffered winter injury this year, the secondary shoots may be the only shoots available. Shoots should be spaced evenly along the trellis if possible and at a density of about four to six shoots per foot of row. Cluster thinning (removing one or more of the clusters on each shoot) done before bloom, results in the least yield reduction because the remaining cluster(s) generally set more berries. However, on tight clustered cultivars, cluster thinning after bloom can result in looser, less rot susceptible clusters. Keeping records of average cluster weights and vine yields can help determine the appropriate amount of fruit to retain now. (*Source: Facts for Fancy Fruit, Vol. 04, No. 5, May 25, 2004*)

More on Crop Load Adjustment in Grapes

Bruce Bordelon, Purdue University

I wrote about shoot and cluster thinning in the last issue. Since then we've gone through bloom and it is apparent that we have set a very large crop this year. Conditions during bloom have been ideal for full fruit set and most vineyards I've seen have three or more clusters per shoot on most varieties. While this may not be a problem on small-clustered varieties such as Foch and Vignoles, it can lead to serious over cropping on

large-clustered varieties like Chardonel and Chambourcin. Growers will want to carefully monitor potential yield and make adjustments. There will likely be a need to reduce the number of clusters on many varieties this year. (*Source: Facts for Fancy Fruit, Vol. 04, No. 6, June 6, 2004*)

Shoot Positioning and Canopy Management

Bruce Bordelon, Purdue University

Now that we are past fruit set and shoots have toughened-up, it's time to get serious about shoot positioning in grapes. Varieties differ in their need for shoot position due to their growth habit and vigor. Some varieties such Vignoles and Chancellor tend to have relatively short shoots that stand up well on their own, so shoot positioning is seldom needed. Other varieties such as Traminette, Foch and all the American varieties produce horizontally growing shoots that tend to run along the top of the trellis and cause significant shading of the fruit and renewal zone. Shoot positioning is very important with these varieties. The need for shoot positioning on other varieties will vary depending on vigor of the particular site. In high cordon-trained vines shoot positioning involves pulling lateral-growing shoots off the top of the trellis to hang vertically downward. In mid-wire cordon-trained vines, shoot positioning is done by tucking shoots between sets of catch wires, or pulling catch wires up into position so that the shoots grow vertically upward. Shoot positioning is critical to improving sunlight exposure of fruit and increasing fruit quality. Additionally, it improves fruitfulness of the basal nodes on the shoots for full fruiting potential next year. Shoot positioning may need to be repeated two or three times during the summer. . (*Source: Facts for Fancy Fruit, Vol. 04, No. 6, June 6, 2004*)

Grape Update from Long Island

Alice Wise and Daniel Gilrein, Cornell Cooperative Extension

Potato Leafhopper: Potato leafhopper (PLH) finally arrived and is at treatable levels in some vineyards. PLH nymphs are pale yellow-green and walk sideways like a crab. Currently in the research vineyard the more slender lime green adults predominate. This insect does not overwinter on Long Island, but rides warm air masses from the south. The constant migration means all stages may be present at any one time in early summer and repeat invasions in the vineyard may occur. In some seasons, PLH infestations have unfortunately persisted well into August.

PLH injects a toxin when feeding, causing chlorosis (yellowing) and even browning of the leaf edge, known as hopperburn. We were able to see early signs of damage on 6/17. Leaves are sometimes cupped, especially on shoot terminals which can also be stunted. In vineyards, it is notoriously difficult to scout for PL due to time constraints as well as the extremely high mobility of this pest. Many managers do an informal “trellis shake” to help gauge the severity of infestation. Thus, deciding on treatment is a judgement call as there are no hard and fast thresholds (in apples, a threshold of 1 nymph per leaf is used, out of 50 - 100 leaves counted per orchard block) and vines can tolerate some injury. Also factor in the degree of injury, general health of vines and need for control of grape berry moth and Japanese beetle. Note that young vines are potentially more affected by PLH so that intervention might be sooner vs. mature vines.

Options for treatment include the newly labeled Assail (12 hr reentry interval, 7 days to harvest), Danitol (24 hr, 21), Sevin (12 hr, 21), Imidan (24 hr, 14), Provado Solupak (12 hr, 0), Lannate (7 day reentry, 14) and azadirachtin, products based on a neem seed extract [Aza-Direct, Azatin XL Plus, Neemix 4.5 (all 4 hr, 0); Ecozin 3%EC (12 hr, 0)], horticultural oils such as JMS Stylet Oil (4 hr, 0), Ultrafine Oil and insecticidal soaps such as M-Pede and Olympic. Assail, a reduced risk product, is a neonicotinoid as is Provado. It is labeled for control of leafhoppers but not beetles, 2 applications per season only. Danitol and Lannate are

federally restricted-use and toxic to predator mites, although Danitol is also a miticide. Field observations suggest that mite resurgence following use of Danitol or Sevin is a concern. In a 2002 study on apple reported by Dr. Dick Straub at the Hudson Valley Lab a single application of Danitol (3.6 oz/100 gal) in late August did not lead to flare-up in European red mite populations. Valent recommends no more than two applications of Danitol/season due to concerns about the development of resistant PL and ERM populations, although more are allowed on the label depending on rate. Dr. Straub and Peter Jentsch also tested lower-than-label rates of Provado 1.6Fin apple (Provado Solupak is labeled for grape) for potato leafhopper control and found in this trial (www.nysaes.cornell.edu/ent/scaffolds/2001/6.25_insects.html) application frequency (3 applic @ 10 day int.) was more important than rate in controlling injury. Growers might experiment with reducing the rate (perhaps 0.5 oz/A; lower-than-label-rate applications in agriculture are permitted in NY) as long as re-application is made when leafhoppers again start to build. Note that Provado Solupak and Assail require at least 14 days between applications in grape, so use another material (e.g. Imidan) between treatments if necessary. Sevin is also toxic to some predator mites and there are concerns for flaring mites with use, so watch for infestations if using. We have no experience with azadirachtin materials (some of which qualify as organic), although they primarily act as insect growth regulators (for nymphs) they are sometimes reported repellent (for adults) as well. Grower experience has been that Stylet Oil will work moderately well against ERM if coverage is excellent and the infestation is low to moderate; Stylet Oil typically is not used specifically for PL control.

Grower experience with soaps against PL has been disappointing. Caution is advised with soaps and oils, phytotoxicity is a concern with temperatures $\geq 85^{\circ}\text{F}$. Also, there are a number of products that are not compatible with (either as tank mixes and/or sprayed in close proximity to) soaps and oils - see labels for details. References: *Scaffolds* newsletters vol. 10 No. 15, 6/10/01 and Vol 8 No. 15 6/28/99. (*Source: Long Island Fruit and Vegetable Update, No. 15, June 18, 2004*)

General Information

Small Fruit Arthropod Pest Management Update

Greg English-Loeb, Cornell University

We are getting to or moving beyond the early season pests (reviewed in the April and May editions of Small Fruit News) into summer time pests. Before

highlighting some of the key arthropod pests to be aware of, let me quickly pass on some new information on pesticide registration. There has been a label expansion for the

neonicotinoid insecticide imidacloprid (Bayer) to include strawberries, gooseberries, currants and elderberry. This insecticide is particularly effective against sucking insects like aphids, whiteflies, leafhoppers and spittlebugs but also has activity on some beetles and lepidoptera. It comes as a foliar material (Provado 1.6F) or as a systemic insecticide applied through the root system (Admire 2F). Check labels for insect pests included for specific crops.

Blueberries

Cranberry Fruitworm and **Cherry Fruitworm** are the main blueberry arthropod pests in the spring and early summer. These moths overwinter as fully-grown larvae. They pupate in the spring and begin flying in late May and early June (around the time of flowering). Egg laying begins at around petal fall with eggs being placed at the base of newly set fruit. We are probably getting past the optimum time to treat for these pests (petal fall and 10 days later). For sites with moderate pressure, a single insecticide (Confirm or Guthion), timed at 5 days post petal fall, can be effective. Other pests to keep an eye out for at this time are **plum curculio** (notice crescent-shaped scar created from egg-laying on young fruit), leafrollers (larvae make shelters by silking together terminal leaves), and blueberry tip borer (larvae bore into stem causing shoot tips to die back).

There are several summer arthropod pests of blueberries to be on the lookout for as the season progresses. **Blueberry maggot** is probably the most important one, although it has not been as serious a problem in New York as other blueberry producing areas such as New Jersey. The blueberry maggot overwinters in the ground as a pupa (the immature stage before becoming an adult fly). Emergence begins around mid-June and continues through much of the summer. Even though the blueberry maggot only has 1 generation per season, adults appear over an extended time period (emergence is not very synchronized). Indeed, under some environmental conditions, pupae can stay in the soil for 2 or even 3 years before emergence. After emergence, adult females need to feed for 7 to 10 days before they start laying eggs. Eggs are inserted under the skin of ripening berries. Eggs hatch in a few days and the larvae feed and develop for around 20 days before dropping to the ground to pupate. During the early part of larval development there are no obvious external symptoms on the blueberry that it is infested. Later the berry may become soft and appear to ripen early. An important part of controlling blueberry maggot is learning when emergence begins. Yellow sticky cards, baited with a food source for the adult flies (protein hydrolysate and ammonium acetate) can be used to detect the first flies of the season. These traps are commercially available. Place traps along the edge of the planting or in woods

near wild blueberries to better estimate when activity begins. For problem fields, regular applications of pesticides, beginning after activity is detected and continuing until harvest, is necessary to adequately protect fruit.

Adult **Japanese beetles** can also present problems for blueberry growers during the summer, although this is less true for U-pick operations. The adults emerge at the end of June and into July and feed both on blueberry foliage and to some extent on fruit. The damage appears as skeletonized leaves or surface scarring of the fruit. During harvest beetles can also be dislodged from the plant and contaminate the packed berries. Several insecticides are available that provide moderate to good control of Japanese beetles. Note, though, that beetles are very mobile and will fly into fields from long distances.

Raspberries

We covered most of the relevant arthropod pests of raspberries in the last edition of the New York Berry News. **Tarnished plant bug** and **cane borers** continue to be a threat into the summer; tarnished plant bug nymphs and adults feed on developing fruit and cane borer larvae feed inside canes.

Potato leafhoppers (both adults and immatures) are also showing up in New York farms. This species overwinters as adults in the southeastern USA and then migrates north in spring and early summer. They feed on a lot of different crops including many small fruits like strawberries, raspberries, and grapes. They use their soda-straw like mouthparts to pierce the water conducting vessels of the plant (xylem) and suck out water and nutrients. If this is all they did, it probably would not cause much problem. But they also inject saliva into the plant and for some species this causes a strong reaction in the plant. Typical symptoms include yellowing of leaf margins and distorted and possibly stunted leaves. Different plant species respond differently and some are very sensitive while others are not. Raspberries, grapes, and strawberries are pretty sensitive. The adult potato leafhopper is iridescent green and wedge-shaped while the nymph is usually green and moves sideways in a unique manner when disturbed. If injury to foliage is moderate to severe, control may be necessary. Sevin [carbaryl] and Malathion 57 EC are labeled for potato leafhopper on raspberries but note there is a 7 days to harvest restriction for Sevin but only a 1 day restriction for Malathion.

I should also mention **two-spotted spider mite** (TSSM) as a potential pest. These tiny spider-like arthropods can become very numerous on foliage, causing white stippling on leaves. They seem to be most problematic in dry sites and/or in mild growing areas such as the Hudson Valley and Long Island. As of a few years ago there is now a miticide registered in New York for control of TSSM (Savey WP). Predatory mites can also provide control of TSSM. These beneficial mites are frequently naturally present in raspberry

fields, especially where few broad-spectrum insecticides are used, but can also be purchased from a supply house. For both Savay and predatory mites, it's important to start control actions early before you see lots of severe injury to foliage (bronzing).

As fruit ripens **picnic beetles** can become a problem. The adult beetles are attracted to damaged or over ripe fruit where they feed and also may spread fruit rots. **Japanese beetles** can also cause injury to raspberry foliage and fruit during July and early August. August is the time that the adult **raspberry crown borer** makes its appearance. The adult is a very attractive moth that superficially resembles a yellow jacket. You may notice the adults resting on foliage during the day. It's the larvae, though, that cause the major problem. Reddish-brown eggs are placed on foliage in August and September. After hatching the larvae find a protected place near the base of the cane to spend the winter. The next spring the larvae enter the crown and roots where they spend the next year. In the second year the larvae continue to feed until early summer, at which time they form pupae and then emerge as adults in late summer to start the cycle over again. During the growing season look for withering, wilting and dying canes, often with half-grown fruit. Destroying these canes (including the crown area) may help reduce crown borer populations. Guthion is currently labeled for control of crown borer on raspberries (applied to control larvae in spring) but that this registration will be lost next year. [If you think you have a problem with raspberry crown borer, let me know (gme1@cornell.edu or 315-787-2345). There is a student at University of Arkansas working on this pest and who is interested in getting specimens for our area.]

Strawberries

Flowering is pretty much complete and fruit is quickly ripening (we harvested our first Earliglow from research plots on June 4). For later maturing cultivars **tarnished plant bug** (TPB) can still cause injury to fruit so keep on monitoring for nymphs (see article in May issue of Small Fruit News). For day-neutral cultivars, TPB becomes an increasing problem for the August harvest.

Spittlebug can still be a problem leading up to harvest. You can see the frothy spittle on leaves, stems, and flowering racemes starting about bloom and extending into harvest. They overwinter as eggs in the soil and hatch out as temperatures rise in the spring. The nymphs crawl up the plant and begin feeding on the xylem tissue (the water conducting vessels of the plant). There are not a lot of nutrients in xylem and therefore nymphs need to process a lot of sap, extracting the few nutrients out for their use and excreting the remaining water. This water is frothed into white spittle, which helps protect the nymphs from desiccation and natural

enemies. Feeding by spittlebugs, if extensive, can stunt plants and reduce berry size. Perhaps more importantly, the spittle masses are a nuisance to pickers. Threshold for spittlebug masses is 1 mass per foot row.

As fruit ripens **strawberry sap beetles** will become more active. Recent research indicates that the adult beetles spend the winter in surrounding woods and then move into strawberry fields as fruit begins to ripen. Look for evidence of feeding damage on the underside of ripe fruit that is touching the ground (small shot holes; you usually don't see the beetle itself). Both the adult beetles and the larvae feed on ripe and overripe fruit. We still are exploring the best ways to control SSB. Two pyrethroids are labeled in New York for its control: Dantitol and Brigade. Note that Brigade does not have a preharvest interval while for Danitol it is 2 days. For both materials, good coverage is likely to be important for its control.

It is also worth mentioning **root weevil** at this time. The larvae have been busy feeding on roots and crowns since last summer and are getting close to completing development and pupating to adults. If you have questions about whether you have root weevils, this is a good time to look since the larvae will be large and easy to see. Dig out the crown and roots of a couple of plants in different sections (especially look near weak-looking sections) and sift through the soil for small (eighth to quarter inch), legless, C-shaped, pale white grubs. After emerging around harvest time, the adults feed for a few days before starting to lay eggs. Chemical control (Brigade) is targeted at the adults. Look for characteristic adult feeding damage on leaves (notching from the edge) to help determine timing. Some growers have also had success controlling root weevil larvae using parasitic nematodes. These can be applied either in the spring (late April and early May) and/or in the fall. Use sufficient water to get good penetration. Rotation out of strawberries is the best remedy for root weevils.

Currants and Gooseberries

Imported Currant Worm (ICW) has completed its first generation and is getting started on the second. Larvae are greenish in color with yellowish ends, a black head region, and covered with black spots. Full-grown, they can get to be close to 3 inches long. They initially feed in colonies but as they become larger, feed singly. Malathion is labeled for use against ICW. Other currant and gooseberry pests to be on the look out for in the spring and early summer include the **currant borer** and **gooseberry fruitworm**. The currant borer, as an adult, is an attractive moth with clear wings, blue-black body with yellow markings resembling a wasp. The adult emerges in the spring, mates and begins laying brownish eggs on the bark of canes. After hatching, larvae burrow into canes and begin feeding within the pith. No insecticides are labeled for currant borer although removal of weak canes in the spring and fall will help keep populations down. The gooseberry fruitworm is also in the moth group. Larvae feed inside young fruit, sometimes

weaving portions of stems together with silk. Finally, **twospotted spider mite** also feeds on currants and gooseberries and in some years, can cause considerable damage. Look on the underside of leaves for the mites

and their webbing. Keep an eye out for reduced plant vigor, bronzing of foliage, and webbing on leaves and shoot tips. (*Source: New York Berry News, Vol. 3, No. 6, June 6, 2004*)

Organic Controls for Potato Leaf-hopper

Brian Schulz, Hampshire College

Last year at Hampshire College we tried some organic insecticides against potato leafhopper (PLH) in our CSA potatoes. Even though these were very preliminary tests (mainly seeking materials for future use in experiments), we found that some products had dramatic effects, especially those with pyrethrins.

We tried PyGanic EC 5.0, Diatect V, and a mixture of Surround + BioNEEM, all compared to unsprayed controls. PyGanic contains pyrethrins (www.pyganic.com) and Diatect is a mixture of pyrethrins and diatomaceous earth (www.diatect.com). Surround is made of kaolin clay (www.surround.engelhard.com) and BioNEEM is derived from the neem tree (www.victorpest.com ; sold also at local garden supply stores).

All sprays were applied with backpack sprayers to 9 small (4 rows x 6m) plots for each insecticide; we had 15 unsprayed control plots, for a total of 42 plots in this experiment. Adult PLH were counted in 10 sweeps with an insect net in each small plot; nymphs were counted by examining 10 compound leaves in each plot.

We just sprayed once, and it was late (20 July) and PLH numbers were already high (on average more than 12 adults and 3 nymphs per plot sample; well above economic thresholds) and all products were used at the highest labeled rates (PyGanic at 18oz/ac, Diatect at 6lbs/ac, Surround at 1/2lb/ac mixed with BioNeem at 3oz/gal).

PyGanic really suppressed PLH, often much more than the other products, though they also showed reductions. In counts on the day after spraying, PyGanic had reduced the

number of adult PLH by 96% compared to unsprayed plots (an average of 11.5 adults per unsprayed plot vs. 0.4 adults in the PyGanic plots), while Diatect reduced adult PLH by 82% and Surround+BioNEEM by 37%.

When we counted PLH nymphs 3 days after spraying, Pyganic and Diatect both showed strong effects, with nymphs reduced by 95% compared to the controls, while Surround+BioNEEM had reduced the nymphs by only 18%.

We counted adults and nymphs again 9 days after spraying, and PyGanic showed the longest lasting effects on PLH adults, with numbers that were still 48% lower than the unsprayed plots. Diatect plots now had essentially the same number of adult PLH as unsprayed plots (1% more actually); Surround+BioNEEM adult PLH numbers were only 11% lower than in unsprayed plots. Nymphs, however were also still almost as low in Diatect plots (39% lower than unsprayed) as in the PyGanic plots (35% lower than unsprayed).

In short, PyGanic had the greatest and longest lasting effects on PLH adults, while PyGanic and Diatect both had similarly large effects on nymphs. Surround and BioNEEM together were a relatively distant third (we would also note that the clay makes Surround more messy to use, at least in small sprayers; even tiny spills evaporate to leave residues that are hard to clean up).

Of course, these products need to be tried at different doses over the whole season (they also differ in cost), but even these preliminary comparisons show that the pyrethrin products can have large effects (*Source: Massachusetts Vegetable Notes, Vol. 15, No. 8, June 17, 2004*)

Skin Cancer: the sun is not the farmer's friend

Exposure to ultraviolet radiation from the sun is the main cause of skin cancer. Skin damage from the sun is cumulative - the longer the skin is exposed to the sun, the greater the risk of skin cancers, regardless of your tan or skin pigment. Rural workers have a high risk of getting skin cancers, as their work can expose them to long periods of ultraviolet radiation.

Spot the hazard

To help you spot skin cancer hazards, consider:

- Lack of shade in outdoor work areas.
- Reflective surfaces, eg water, cement, shiny metal or white painted buildings, cement surfaces.
- What jobs are done in sunlight, and how long they take.
- What are the peak sun hours.
- The day's ultraviolet exposure forecast.
- What body surfaces are exposed to sunlight.
- Whether sun blockout is provided or used.
- Whether protective clothing is available and worn.

Assess the risk

To assess the risk of skin cancer from identified hazards:

- Work out approximately how long is spent working outdoors each day.
- Identify what jobs are normally done in peak sun - between 10am and 4pm.
- Check whether shade is available for outdoor jobs.
- Check whether hats, protective clothing and sunscreens are adequate.
- Check whether SPF15+ sunscreen is applied to all exposed skin areas.
- Ensure sunscreen is re-applied during outdoor work.

Learn to identify various types of skin cancer, and check your skin for sunspots and unusual pigmentation.

Basal Cell Carcinoma

Starts as a small lump that flattens out as it grows. One of the two most common growths, it can be easily treated and cured.

Squamous Cell Carcinoma

The other most common growth; however it is more likely to spread to other parts of the body.

Malignant Melanoma

The most dangerous type of skin cancer. Often starts as a dark mole. This type is responsible for over 1000 deaths in Australia each year.

Sunspot (Keratosis)

A small, scaly patch of skin occurring on the arms, face, nose and ears. They are not strictly a form of cancer, but indicate excessive exposure to solar UV radiation.

Be aware of short term injury risks:

- reddened skin, blistering, swelling, and later, peeling of the skin.
- photosensitisation - acute skin reaction to UV with certain drugs, ointments, creams, and chemicals, resulting in increased sunburn and skin damage.
- photoconjunctivitis and photokeratitis - sore, red, gritty swollen eyes, with sensitivity to strong lights.

Long term effects include:

- Prematurely ageing - wrinkling, wasting skin tissues, excessive pigmentation, spots marked by clusters of tiny blood vessels.
- Cataracts of the eye.

Make the changes

- Wear cool, protective clothing, i.e. a shady hat, shirt with collar and long sleeves, and long trousers.
- Use a sunscreen with a high sun protection factor (SPF +15) before you go into the sun.
- Noses, lips, ears, bald heads, necks and backs of hands need extra protection.
- Reapply sunscreen regularly, especially if you are sweating.
- Make use of shade areas wherever possible in the high risk hours.
- Use a tractor with shade protection fitted.
- To safeguard against cataracts, sunglasses that conform to with applicable standards are recommended.

Early signs

Check your skin for early signs of skin cancer:

- any unusual skin conditions that don't heal in four weeks;
- any sore, ulcer or scaly patch on the skin;
- a white patch on the lips that doesn't heal;
- any mole that seems to grow quickly;
- any mole that changes shape or colour;
- any mole that bleeds or repeatedly itches.

If you find any of these signs, see your doctor.

Remember

Over-exposure to the sun's rays increases the skin cancer risk both now and in the future.

Adapted from: http://www.saftek.net/worksafe/farm_09.htm

Tank Mixing Herbicides

Rich Bonanno, UMass Extension

Based on a few problems encountered over the last month or so, here are a few suggestions regarding tank mixes.

Some labels will list specific tank mixes that are registered. These have generally been tried and proven and the label will list precautions or special instructions that apply. If the label does not specifically preclude a tank mix, the applicator has the option of tank mixing.

Extension recommendations and other publications are not allowed to suggest or recommend these possible mixes. In these cases, it makes sense to try them on a small scale first to see if the pesticides and other additives are compatible and to see if the tank mix causes any crop injury. The proper mixing order of the chemicals is as follows: First fill the spray tank 1/2 full of water and adjust pH if needed. Start agitation and add chemicals in the following order:

1. Wettable powders go in first and must be mixed thoroughly. A slurry can be made and added to the spray tank to help dissolve the powder.
2. Dry Flowables or water-dispersible granules.
3. Water-dispersible liquids.
4. Emulsifiable concentrates.
5. Water-soluble liquids. Agitate well after each addition and before adding the next chemical. Finish filling the spray tank with water.

I agree that it may not always be easy to tell what the formulation is; just ask the dealer or Extension specialist for clarification. A specific case recently involved the use of Sandea, Strategy, and Gramoxone. Sandea is a dry flowable, Strategy is an emulsifiable concentrate, and Gramoxone is a soluble formulation. Based on the above, the proper mixing order for this tank mix is Sandea, Strategy, and then Gramoxone. A surfactant can be added last. (*Source: Massachusetts Vegetable Notes, Vol. 15, No. 8, June 17, 2004*)

Upcoming Meetings

June 23, 2004 - UMass Extension Vegetable Twilight Meeting

Dumas Farm- Oxford, MA

Blueberry and Tomatoes

For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

July 1, 2004 Pinecroft Farm, Somers CT - Vegetable Growers Twilight Meeting, The tour will start at the packing house where we'll enjoy a quick bite to eat and get to see the cold storage facilities, hydro-cooler, vegetable sorters, loading dock, 4-row sweet corn picker, irrigation reels, conveyor belt harvesting aids, high-crop sprayers, bed-makers, etc. We will then head out to view the plasticulture systems for most of their cucurbit and solanaceous crops.

This year, instead of using floating row covers on their early sweet corn, they planted in double-row trenches under clear plastic mulch. Pinecroft also does a great job of water management, critical to control Phytophthora blight. Jude Boucher will describe production and pest management practices used on various crops.

Directions to Connecticut twilight meeting: Take I-91 to Exit 47 for Route 190 (east). Take Route 190 east for approximately 5 miles and watch for the Knights of Columbus Hall (blue roof) on the right. Directly across from the KC Hall, take a left onto Hulbert Road. Proceed to the stop sign at the end of the road and take a right onto Four Bridges Road. Pinecroft's packing facilities are about 1/4 mile up on the left.

July 14, 2004 Czajkowski Farms, Hadley, MA. - Vegetable Growers Twilight Meeting, Come and see a well-managed, forward-looking, successful farm in the heart of the Connecticut Valley. Joe and Wally will host this tour of their 170-acre farm in Hadley where they are the third generation to grow vegetables, berries and tobacco. Most of their product is shipped wholesale but they also grow pick-your-own strawberries and brambles.

They have been growing organic butternut (13A) and machine-picked green beans for several years. We will start at their brand new butternut storage facility and see their washing, peeling and packing line. Butternut is peeled from October through March and carrots are peeled year-round. We will hear about a new marketing effort to sell directly to schools. Then we will carpool on a circuit of fields where the Czajkowski's are working with UMass to test perimeter trap

cropping in butternut and pumpkin, and to compare no-till and conventional tillage in pumpkins. We'll see a new PYO field of brambles and other small fruits.

Refreshments served at 5-5:30 courtesy of MARS.

Pesticide recertification credits: 1 hour.

Directions: From Vermont: Take I-91 south to Exit 24 in Massachusetts, turn left back over the highway, then turn right onto Route 116, toward Amherst. Go over the river, go straight thru the first set of lights in Sunderland center, continue to the next sets of lights, then turn right onto Meadow St. Go about a mile, then turn right opposite the UMass Horse Farm onto Mt. Warner Rd, Go ? mile, turn left into driveway, storage barn is at the end of the driveway.

From the south: Turn off I-91 at Rte 9/Northampton exit, turn right (east) across the bridge. Follow Rte 9 east to North Maple St (across from the malls). Turn left. At the stoplight go straight. Opposite the UMass Horse farm, turn left on Mt. Warner Rd. Go ? mile, turn left into driveway, storage barn is at the end of the driveway. For more information, contact the UMass Vegetable Program (413) 545-3696

July 16-17,2004 Cold Climate Viticulture Workshop. Plattsburgh NY and New Haven VT. The July 16th event at the Clinton County Community College will be an interactive, seminar-type workshop that will allow ample time for questions and responses. The meetings intended for potential and current commercial fruit growers interested in sharing the exploration for commercial cold-hardy wine grape production in northeastern NY, and VT.

A vineyard tour will take place on July 17 in New Haven, VT which is growing several of the MN vines that we will be learning about on the 16th.

An introductory overview session will introduce the audience to unique considerations critical to vineyard site selection in the north: local climatic data; critical growth points relative to frost; heat accumulation for growth, fruit maturation, and wood hardening; topography; soils; etc.

Our Keynote speaker will be Dr. Peter Hemstad, who leads the University of Minnesota Grape Breeding Research Program. The Program has released several very cold hardy grape varieties suited to northern climates such as ours.

Peter will lead several sessions. These will deal with:

An overview of U of MN's Grape Breeding Program

Candidate grapevines for northern winemaking

Particular vine and fruit growth characteristics and vineyard production issues

A review of wines being developed from these grapes

There will be a complimentary panel session comprised of regional growers (persons from NY, VT, and Que.) who will be speaking of their particular circumstances and production challenges in both grape growing and winemaking. These will address site selection issues, vines being grown, cultural practices, and winemaking experiences.

Sponsors: CCE's Northeastern NY Commercial Fruit Program is the lead co-sponsor of this day's event in coordination with several other sponsors, these being the VT Grape Growers Association, the Seaway Wine and Grape Growers Association, and the Champlain West Shore Wine and Grape Association.

The program charge will be \$50 which will include tuition, educational packets, lunch (both days), and wine tastings.

For more information, contact Kevin Iungerman, CCE Northeast NY Commercial Fruit Program, at kai3@cornell.edu

July 20, 2004 Large Scale Gourmet Salad Mix Production. Millerton, NY, Chris Regan grows 11 acres of gourmet salad mix including over 30 varieties of greens herbs, edible flowers, and "wild" plants. In peak season he produces over 800 lbs/week which he direct-markets to over 50 restaurants in the surrounding area. Chris will share his detailed crop planning schedule which includes intensive use of cover crops for fertility and weed management. He will also discuss salad mix composition and its seasonality and explain how he maintains quality throughout the growing season.

Directions: The farm is located 30 miles northwest of Poughkeepsie, NY. From Route 22 in Millerton, travel north for approx. 5 miles and turn right (east) onto White House Crossing Road. Follow for 0.25 miles down to end and turn right onto Boston Corners Road. Farm is 0.25 miles down on right.

Please contact the Regional Farm & Food Project at (518) 271-0744 or farmfood@capital.net (Subject: Farm Tours) for more details or to reserve your place.

July 25, 2004 Growing Cut Flowers for a Retail Market. Malta, NY. Over the past decade, Balet Flowers and Design has become known as a premier grower of cut flowers in the Saratoga Region. Suzanne Balet grows over 100 varieties of cut flowers which she markets through the Saratoga Farmers' Market, for special events such as weddings, and at a rapidly expanding farm store. On this tour, learn about the tricks of the trade growing a diverse and productive cut flower garden. Topics will include growing requirements, variety selection, adding perennials and shrubs, and basic bouquet design.

Directions: Balet Flowers is located 6 miles south of Saratoga Springs. Take exit 13 South off the Northway (Interstate 87). At end of ramp turn onto Route 9 south and follow to first left, Malta Avenue Extension. Turn left onto Malta Ave.

Ext. and travel for about 1 mile to the second left, Nelson Avenue Extension (County Route 64). Turn left onto Nelson Ave. Ext. Look for the greenhouse approx. 1.5 miles on the right.
Please contact the Regional Farm & Food Project at (518) 271-0744 or farmfood@capital.net (Subject: Farm Tours) for more details or to reserve your place.

July 27, 2004 NOFA-VT and VT Vegetable and Berry Meeting, Luna Bleu Farm, S. Royalton VT. Co-sponsored by NOFA-VT and VT Vegetable and Berry Growers Association
This workshop is free to NOFA members and VV&BGA members. Nominal fee charged on-site to others. **Call 802-434-4122 for more info.**

Ann Hazzelrigg, of the UVM Plant Diagnostic Clinic, and Jon Turmel, VT Agency of Agriculture State Entomologist, give this twilight meeting farm tour and scouting session. They will tour the fields of this diversified vegetable and cut flower farm scouting for various diseases and pests. Take advantage of these expert eyes as they work together to teach you identification tips for the most common and uncommon garden pests and diseases.

Directions: From the north: Take exit 3 off I-89. Take a left off the ramp, onto Rt 107. Follow ? mile to take a right onto Rt 14. Go through Royalton to S. Royalton, to the junction of Rt 14 and Rt 110. Take a left onto Rt 110. In 1/3 mile, take a left onto Mill Rd. In .3 mile take a left over bridge. Go 1.1 miles, take a left onto Rix Rd. Luna Bleu Farm is the 2nd drive on the right.

From the south: Take exit 2 off I-89. Take a left off ramp onto Rt 132. Follow until you reach Rt 14. Take a right onto Rt 14 (heading north). Travel 6 miles to S. Royalton. At the junction of Rt 14 and Rt 110, take a right onto Rt 110. Follow directions from above.

Aug. 3, 2004 Organic Research Farm Twilight Meeting, Freeville NY. Cornell University researchers will host their first annual twilight meeting at the Freeville Organic Research Farm in Freeville, New York, on Tuesday, August 3rd from 5PM to 8PM. Visitors will tour the research plots and hear about current research projects.

Directions: The farm is located in Freeville, New York, about 10 miles northeast of Cornell's Ithaca campus. Follow Route 366 North from campus to approximately 1 mile beyond the village of Freeville.

Cornell University established the Freeville Organic Research Farm in 2001 to serve as a site for interdisciplinary research aimed at optimizing organic vegetable production systems for the Northeast. It is managed by the University's Department of Horticulture. The farm comprises 30 acres adjacent to the Homer C. Thompson Vegetable Research Farm. Now in its fourth year of organic management, the farm's first formal research projects are beginning this season. They include a potato trial, rotation study, tomato trial with different potting mixes, cover crop demo, and buffer planting.

For more information on the twilight meeting contact Jeremy Biazzo at (607) 255-2041, jb262@cornell.edu. To learn more about the Freeville Organic Research Farm visit: <http://www.hort.cornell.edu/organicfarm/about.html>

Aug. 5, 2004 Cover Crop Demonstration, and Youth Horticulture Project, Brattleboro VT. The Brattleboro Extension office is located on a former dairy farm just outside of town. The fields are home to a 3/4 acre demonstration of 20 different summer cover crops, and to the greenhouse and 1 acre market garden of the Extension Youth Horticulture Project that works with local schools, the VT Department of Employment and Training, and Americorps to engage teens in growing and marketing organic produce.

Directions: Take Exit 1 off I-91. Turn east toward Brattleboro, under the highway. At the first light turn right. Go about 1/2 mile, pass by the high school, then bear right onto South Main st., the office is another 1/2 mile up on right. Take the second drive, go around the big barn, and park by the greenhouse. **questions? vernon.grubinger@uvm.edu or steve.hed@uvm.edu Call 257-7967 x13**

Sept. 16, 2004 Organic Vegetable Production for NY City Greenmarket. Westtown NY. Keith's Farm, 2630 County Route 1, Westtown, NY (Orange County) Co-sponsored by the Pennsylvania Association for Sustainable Agriculture. Keith Stewart grows 13 acres of certified organic herbs and vegetables which he markets exclusively through the Union Square Greenmarket in Manhattan. Relying on one marketing outlet as the sole source of farm revenue has made Keith very conscious of the sales dynamics there. On this tour, he will describe his marketing strategy and how he has made a 17 hour market day schedule work year after year. We will also learn about his organic vegetable production practices and his apprentice labor force, which he recruits through the Northeast Workers On Organic Farms (NEWOOF) and ATTRA programs.

Keith is the farm columnist for The Valley Table magazine.

Directions: The farm is located 15 miles southeast of Middletown, NY. From Interstate 84, take exit 2 in New York for Mountain Rd./Greenville. Make left onto Mountain Road (Route 35) and proceed to first light. Make left at light onto Route 6 east. Follow for approx. 1 mile, past sign for Pine Island/Warwick, and make right onto County Route 1. Farm is approx. 1 mile down on left.

Please contact the Regional Farm & Food Project at (518) 271-0744 or farmfood@capital.net (Subject: Farm Tours) for more details or to reserve your place.

Sept. 18-19, 2004 Small Farms Expo, New Paltz NY. For more information go to <http://www.smallfarmexpo.org/> or call 845-677-8223

October 10, 2004 Potential of Old and New Fruit Crops. New Paltz NY (Ulster County). Lee Reich, grower, researcher, and author of six books on gardening and fruit growing, will lead a tour of his home orchard and discuss the commercial potential of the unusual and up-and-coming fruits he is studying. Hardy Kiwi, Paw Paw, Gooseberry, and Serviceberry are a few examples of the multitude of species and varieties his orchard contains. This far ranging exploration will include taste tests of some of these unusual fruits as well as observations on their growing requirements and marketability. More common fruit crops like grapes and blueberries will also be part of the presentation.

Directions: Farm is located 12 miles south of Kingston, NY. From Interstate 87, take exit 19 for Kingston. Travel east on Route 28 to rotary and turn right onto Washington Avenue. Take Washington Ave. approx. 2 miles to Route 32. Turn right onto Route 32 south and follow for approx. 10 miles to Rosendale. After passing Postage Inn on right, turn left onto Tillson Road. Follow to first stop sign and turn left onto Springtown Road (County Route 7). Travel for approx. 2 miles to house and orchard on right.

Please contact the Regional Farm & Food Project at (518) 271-0744 or farmfood@capital.net (Subject: Farm Tours) for more details or to reserve your place.

October 12, 2004 - UMass Extension Vegetable Twilight Meeting

Seeds of Solidarity- Orange, MA

Sustainable Production Methods, Farm Energy Saving, Farm to School Program Speakers

For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements over like products are intended or implied.