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Prepared by the University of Massachusetts Fruit Team

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IN THIS ISSUE:

MESSAGE FROM THE EDITOR:

Strawberry fields remain quiet at this time of year. Dayneutral varieties are still fruiting. Some annual production fields are being planted now. Late summer and early fall is a good time to fertilize both new and established strawberry fields. Typically strawberries will need 20 – 50 pounds of nitrogen at this time of year. Amounts depend on how much was applied at renovation and the organic matter content of the soil. Evaluate established fields for the foliar diseases or other problems that could carry over to next year. Also scout fields for weed problems that can be addressed in the fall. **Highbush Blueberry** harvest is about done. A few late varieties may still be active. Survey fields for weak bushes and determine whether or not Blueberry Stunt or Scorch may be the cause. Only non- nitrogen fertilizer applications should be made this late in the season if leaf tissue tests indicate deficiency. Also, be sure to keep your blueberries watered during the coming weeks to avoid drought stress as they go into dormancy. Scout fields for weeds to prepare for late season management strategies. **Summer raspberry** harvest is done. Be on the lookout for Orange Rust on black raspberries and blackberries. **Fall raspberries** is in full swing. Botrytis fruit rot is still a threat, especially if wet weather returns. Be sure to provide irrigation (drip preferred) so the canes can size up the fruit. Also check for mites and leafhopper damage. **Grapes** are approaching harvest. Scouting for disease and insect levels and taking corrective action are still important activities now. Prepare for wine grape harvest by checking fruit ripening parameters regularly. Mite infestations can build up quickly at this time of year. Be sure to check the underside of your leaves.

New publication available: "Bird Damage Prevention for Northern New England Fruit Growers: by Dr. Alan Eaton, UNH. View at http://extension.unh.edu/resources/files/Resource001797_Rep2514.pdf or contact me for a copy.

Don't forget the NASGA summer tour in our back yard: The 2011 NASGA Summer Tour will be held out of the Boston, Massachusetts area. Massachusetts has the highest sales of produce at the farm gate in the country so we will be sure to see some fabulous farms and markets. See http://www.nasga.org/ for details.

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for an approximately two-week period, July 21 through August 3, 2011. Soil temperature and phenological indicators were observed on or about August 3, 2011. Total accumulated GDDs represent the heating units above a 50° F baseline temperature collected via our instruments for the 2011 calendar year. This information is intended for use as a guide for monitoring the developmental stages of pests in your location and planning management strategies accordingly.

Region/Location	2011 Growing Degree Days		Soil Temp (˚F at 4" depth)	Precipitation (1-week gain)
	2-week gain	Total accumulation for 2011		
Cape Cod	365	1,661	75˚	1.55"
Southeast	330	1,605	80˚	3.20"
East	395	1,799	74˚	1.65"
Metro West	364	1,731	70˚	1.66"
Central	n/a	n/a	n/a	n/a
Pioneer Valley	373	1,697	72˚	1.58"
Berkshires	313	1,388	76˚	3.12"
Average	357	1,647	75˚	2.12"

(***Source**: UMass Extension Landscape Message #17 June 24, 2011*)

STRAWBERRY

Late Season Strawberry Care – Including Foliar Disease Management

Kathy Demchack, Penn State Univ.

This is the time of year when your strawberry plants are initiating flower buds for next year's crop. So, anything you can do take care of your plants now will help to increase next year's yields. Failure to take care of them now could set the stage for poor yields next year. So, what do we need to do? 1) Make sure the plants have adequate water (1-2" per week). 2) Make sure the plants have sufficient nitrogen (20 to 30 pounds applied during the mid-August to mid- September time frame, or slightly more on sandy soils). If you've experienced a lot of rain since renovation, you may want to apply the nitrogen a bit earlier than usual, especially if plants are light green and are not growing as fast as usual. Nitrogen you applied at renovation may have been washed through the soil, especially if it was in a nitrate form. 3) Keep an eye out for foliar diseases (as you've probably noticed, there are a lot of them out there this year), and apply an effective fungicide for any fungal diseases. Injured leaves = less photosynthesis = less food for flower buds and healthy root growth, and a lot of inoculum overwintering can damage your plants, including fruit, next year. The trick is correctly identifying which leaf disease(s) you have, and knowing whether any the symptoms you are seeing are caused by fungus or a bacteria. Fungicides only work on diseases caused by fungi. So... here's a description of leaf diseases I'm seeing most frequently this year, in order from most common to least common, at least for 2009.

Leaf scorch: Spots on leaves start our circular and dark red to purple. Eventually the center may turn brown, spots may coalesce, and entire leaves and become affected and die, given the whole plant a scorched appearance. Some common fungicides are effective against this disease, which can be easily confused which angular leaf spot, on which fungicides will have no effect.

Leaf scorch (left) and angular leaf spot (right) when viewed with light shining down on the leaves.

Angular leaf spot: At first, light green "windowpanes" between the veins show up on the leaf when it is held up to the light. From the top, these areas may have a blackened appearance at first. Later on, as affected areas enlarge and coalesce, the leaves may develop a reddish

tinge, with leaf tissue eventually dying and turning brown. This disease (along with gray mold) was responsible for a lot of caps on the fruit turning brown or black this past spring. Fungicides don't affect this disease, but copper can help (see cautions below). Since leaf scorch and angular leaf spot are easily confused, here are some photos to help tell the difference. These photos are of the same two leaves, held differently so sunlight either shines down on them, or through them. The primary disease affecting the leaf on the left is leaf scorch, and the one on the right, angular leaf spot. In the first one, where sunlight is shining down on the leaves, the leaves appear very similar. In the second photo, where leaves are held up so that sunlight shines through the leaf, you can see that light does not shine through the leaves with leaf scorch on the left, but the "windowpane" effect of angular leaf spot can be clearly seen in the leaf on the right. Note that in these two leaves, there is some of each disease present on each leaf, but the disease causing most of the spots is different.

Leaf scorch (left) and angular leaf spot (right) when held up to the light. The same two leaves appear in each photo.

Powdery mildew: Usually the first symptom noticed is leaf curling, where leaves fold inward along their length. There may be a purple tinge to the leaves. White powdery growth on the upper leaf surface may or may not be seen, but if you look at the leaves under magnification, as with a 16x hand lens, you may be able to see the growth of fungal mycelia on either leaf surface. On the leaf undersides, be careful not to confuse strawberry leaf hairs (they're straighter and thicker) with the mycelia.

Phomopsis leaf blight: As lesions grow, they form a V-shape, with the wide portion of the "V" at the leaf's edge.

Common leaf spot: I'm seeing less of this all the time - most of today's common strawberry varieties have resistance. Spots are small (1/8 to 1/4 inch across), and develop white to gray centers, which may fall out.

Once you've figured out which disease(s) you have, how do you treat them? First, any cultural controls that improve air circulation will help greatly. Keep rows narrowed, and keep plantings weeded. As a general rule of thumb, Nova and Pristine work well on any of the above diseases except for angular leaf spot – just be sure to tank-mix or alternate chemistries, such as with Captan, as both are susceptible to resistance development. Captan or Captevate work quite well on leaf scorch, common leaf spot, and phomopsis leaf blight, but not powdery mildew or angular leaf spot. Copper helps with angular leaf spot, but phytotoxicity is a concern, so follow precautions on the package and discontinue use if phytotoxicity appears. For more info on these diseases and their biology, efficacy ratings, and management options, see the most recent version of the Mid-Atlantic Berry Guide [or 2010 New England Small Fruit Pest Management Guide]. (***Source**: Pennsylvania Fruit Times Vol. 28, No. 7*)

Strawberry Bud Development

Bruce Bordelon, Pudue University

Late summer is the time to fertilize strawberry fields to stimulate flower bud initiation during the fall months. Applications of 20 to 50 pounds of nitrogen per acre in mid August to September are recommended. Nitrogen rates depend upon amount supplied at renovation and plant vigor. New fields with high vigor may not need additional nitrogen now, but most older fields should benefit. Irrigation during this time is also extremely important, if rainfall has not been sufficient. We suggest about 1 inch per week. Continue to irrigate strawberries at this time to assure a good crop next year. (***Source**: Facts for Fancy Fruit, Vol. 10, Issue 9, August 20, 2010*)

Fall Herbicide Applications for Strawberries

Bruce Bordelon, Purdue University

A number of herbicides can be used on strawberries during late summer and fall to prevent weed germination, kill emerged weeds, and provide residue control until the following spring. The key set of weeds you need to

control during this period are fall germinating winter annuals such as chickweed, henbit, and shepherds purse. You may also need to prevent germination of wheat, oats, or rye seeds that come in the straw mulch you apply for winter protection.

Devrinol (napropamide) is a preemergence herbicide that can inhibit rooting of daughter plants so it should be applied after early forming daughter plants have rooted. Late forming (after late August) daughter plants do not contribute to yield and Devrinol can be applied before these plants root. Devrinol must be applied before winter annuals and small grains emerge. Devrinol provides excellent control of small grains and some winter annuals such as chickweed. Devrinol must be moved into the soil by cultivation or water after application.

Dacthal (DCPA) is a preemergent herbicide that can be used in new plantings or immediately after renovation. It provides good control of many grasses and some broadleafs such as purslane and lambsquarter. Like Devrinol, it must be applied before weeds emerge.

Sinbar (terbacil) is primarily a preemergent herbicide but it has some postemergence activity against small susceptible weeds. Fall applications of Sinbar should only be applied after the strawberries are completely dormant. If Sinbar is applied to actively growing strawberries, injury can occur. Cultivars differ in tolerance to Sinbar. In general, less vigorous cultivars have greater injury. Applications are most effective when applied to the soil and activated by rainfall or irrigation. Sinbar provides excellent control of many winter annual weeds. Fall applications of both Devrinol and Sinbar will persist to the following spring.

Chateau (flumioxazin) is primarily a preemergent herbicide but has some postemergent activity against small susceptible weeds. Fall applications of Chateau should only be applied after the strawberries are completely dormant. If Chateau is applied to actively growing strawberries, injury can occur. Add 1% crop oil or 0.25% nonionic surfactant to improve postemergence control of small weeds.

Prowl$_{H20}$ (pendimethalin) is a preemergent herbicide that can be applied in fall after strawberries are completely dormant. Rainfall or irrigation following application provides best results.

Poast (sethoxydim) is a postemergent, grass specific herbicide. The grasses must be actively growing. Thus Poast should be applied in late summer or early fall before plants become dormant. Summer annual grasses, such as foxtails and crabgrass, will be killed by fall frosts, and do not require Poast applications for control. Poast is more effective against annual than perennial grasses. Poast can be used in the fall to suppress perennial grasses such as quackgrass, control early emerging small grains, and kill winter annual grasses such as wild oats and downy brome.

2,4-D amine, a systemic, postemergence broadleaf herbicide, can be applied when strawberries are dormant to control some winter annuals. 2,4-D provides good control of many mustards and shepherdspurse, but is not very effective against chickweed. The herbicide should be applied to actively growing weeds. Be careful of 2,4-D drift causing injury to non-target plants. Check the label as only a few formulations are labeled for strawberries.

Gramoxone Extra (paraquat) can be applied as a directed spray between strawberry rows, using shields to prevent contact with strawberry plants. Gramoxone is a nonselective herbicide, so it will kill or severely injure strawberries it contacts. Gramoxone is a restricted use pesticide and is extremely toxic to animals including humans. It provides excellent control of annual grass and broadleaf weeds. Gramoxone does not extensively translocate in plants so it does not control perennial weeds. Weeds should be actively growing when Gramoxone is applied.

Ultra Blazer (acifluorfen) is a post emergent herbicide that provides good control of annual grasses and broadleaves. It can be applied when plants are dormant during fall or early spring.

[The New England Small Fruit Pest Management Guide has a weed management section with more detailed information at http://www.umass.edu/fruitadvisor/pdf/2010NESmallFruitGuide.pdf] (***Source**: Facts for Fancy Fruit, Vol. 10, Issue 9, August 20, 2010*)

RASPBERRIES/BLACKBERRIES

Management of Botrytis Gray Mold in Fall Raspberries

Annemiek Schilder, Michigan State University

Gray mold, caused by the fungus *Botrytis cinerea*, is one of the most important diseases affecting fall raspberries. Fall raspberries are usually at greater risk of infection than summer raspberries because of the prevailing weather conditions, such as lower temperatures, heavy dews and frequent precipitation. Cool, wet weather and heavy rains in the late summer and fall that keep the plants wet for extended periods are conducive to development of the fungus and infection of the fruit. Typical symptoms include a brown discoloration of the

fruit and the presence of a gray fuzzy mold, which can rapidly develop and spread to neighboring healthy berries. Symptoms tend to be more severe inside the canopy and on clusters that are closer to the ground. Even if berries look perfectly healthy at harvest, they can change to a moldy mass within 24 to 48 hours. To know how much disease pressure you have and assess the efficacy of your spray program, pick 10 or 20 random ripe berries and place them in a covered dish on moist paper towel at room temperature. If berries stay 90 percent free of visible mold for three days, they are in good shape.

Botrytis cinerea is a ubiquitous fungus that is able to grow and sporulate profusely on dead organic matter. It overwinters in old infected canes and plant debris. The spores are airborne and can travel long distances on the wind. When the spores land on plant surfaces, they germinate and can invade the plant tissues directly or through wounds. Overripe berries and bruised berries are particularly susceptible to infection. Latent flower infections, even though they do occur, are not as important in raspberries as they are in strawberries.

Cultural methods are very important for control of Botrytis gray mold. Choosing a site with good air flow

can reduce humidity in the canopy considerably. Low-density plantings, narrow rows and trellising can also reduce a buildup of humidity. Good weed control and moderate fertilizer use to avoid lush growth are also important. Selecting a resistant cultivar or, at the minimum, avoiding highly susceptible cultivars will help to reduce the need for control measures. During picking, avoid handling infected berries, since spores can be transferred on hands to healthy berries. Timely harvesting and rapid post-harvest cooling can also help to reduce losses to Botrytis gray mold.

Several fungicides are labeled for control of Botrytis in raspberries. Sprays close to harvest help to reduce post-harvest rots. **Switch** (cyprodinil + fludioxonil) is a reduced-risk fungicide with excellent systemic and protectant activity against gray mold. It has a zero-day pre-harvest interval (PHI). Another good option is **Elevate** (fenhexamid), which is a reduced-risk, locally systemic fungicide with a zero-day PHI. Since these fungicides are in different chemical classes, they can be alternated for fungicide resistance management. My recommendation is to save Switch and Elevate for critical sprays, e.g., during wet periods and for sprays closer to harvest. Other fungicides that may be used in the spray program are **Pristine** (pyraclostrobin + boscalid: zero-day PHI), **Captevate** (captan + fenhexamid: three-day PHI), **Captan** (captan: three-day PHI), **Rovral** (iprodione: zero-day PHI) and **Nova** (myclobutanil: zero-day PHI). To improve the efficacy of Rovral, an adjuvant should be added. Pristine and Nova also provide excellent control of late leaf rust, which sometimes infects the leaves and fruit of fall raspberries. (***Source**: Michigan Fruit Crop Advisory Team Alert: Vol. 24, No. 16, August 25, 2009*)

BLUEBERRY

How to Recognize Phytophthora Root Rot

Annemiek Schilder, Michigan State University

Phytophthora root rot in blueberry is usually caused by the oomycete pathogen *Phytophthora cinnamomi*. Oomycetes are fungal-like organisms. They used to be considered fungi but research has shown that they are more closely related to brown algae. This probably explains why they like wet soils and are also called “water molds”. Phytophthora root rot is not very common in Michigan but was diagnosed in several locations last year. Heavy rainfall and standing water can contribute to Phytophthora root rot this year as well. Use of weed cloth and black plastic mulch may also increase conditions for this disease. Phytophthora root rot usually occurs at poorly drained sites or low-lying areas.

Early symptoms are yellowing or reddening of leaves and lack of new growth. Below-ground symptoms vary from slight necrosis of young rootlets to extensive necrosis with (partial) reddish-brown discoloration of crowns and main roots. Infected bushes are stunted and may die eventually.The pathogen lives in the soil and produces swimming spores (zoospores) that infect the roots. Abundant soil moisture and temperatures between 20 and 32˚C promote disease development. Thick- walled chlamydospores are the primary overwintering structures and are released into the soil as the roots break down. To diagnose Phytophthora root rot, select roots that are partially diseased, partially healthy and send to MSU Diagnostic Services. A quick test will be done that can diagnose *Phytophthora* in the roots.

If you receive a positive diagnosis for Phytophthora root rot, you can manage the disease by avoiding planting blueberries in poorly drained sites, particularly if the disease has occurred there previously. Also, improve drainage by tiling or grow plants on raised beds. Use effective fungicides, such as Ridomil or phosphorous acids (e.g., ProPhyt or Phostrol). Applications are usually made in the spring and fall when the pathogen is most active. However, if symptoms show up at this time and Phytophthora has been diagnosed, immediate treatment is

advised to ameliorate the symptoms. Advanced symptoms will not be cured. Ridomil is applied as a soil drench, but phosphorous acids can be applied both to the foliage and as a soil drench. Research in other crops, e.g., soybean, has shown that applications of calcium (particularly calcium formate) can reduce severity of Phytophthora root rot. This has not been confirmed in blueberries, however. (***Source**: Michigan Blueberry Newsletter, Vol. 4, Issue 16, August 3, 2010*)

Late-season Weed Management Chores

Eric Hanson, Michigan State University

As harvest winds down in the late summer and fall, there are a couple weed management chores that will pay off in the future.

1. Scout your fields.
Spend some time walking your fields and recording weed pressure and determine how successful your preemergent herbicide program was. Note where control was good and poor, and record which weeds are present. Is weed pressure related to the soil type or herbicides used last spring? This information will help in formulating your herbicide programs for next spring. Also note where perennial weeds have become established.

2. Treat tough perennial weeds.
Late summer and fall is a good time to work on tough to control perennial weeds such as virginia creeper vine, grapevine, milkweed, goldenrod, poison ivy, and brambles. These perennials generally do not respond to soil applied herbicides, but can be managed by careful applications of glyphosate (e.g Roundup) late in the summer. Glyphosate is effective on these weeds, but can also kill blueberries. Perennial weeds are killed because the chemical moves to below-ground plant parts. Translocation is a two-edged sword. Glyphosate absorbed by blueberry leaves and green bark also moves in the bush, and can kill whole canes or bushes. Use extreme care to avoid contact with green blueberry tissues (stems and leaves). For spot spraying perennials:

- use 2% glyphosate solutions

- add ammonium sulfate to improve absorption

- avoid all green blueberry tissues -apply when weeds are still green

Weeds such as blackberry, Virginia creek, and grapevine may need to be pulled down out of bushes to treat

safely. This takes time and costs money, but consider what these weeds are costing you in lost income. If a bush is covered by Virginia creeper vine, yield will be reduced by 80%. This easily equates to a $ 6-10 loss in income. The loss is incurred each year and grows as the vines spread to affect neighboring bushes. Investing 15 minutes to carefully pull vines out of that bush and safely treat them on the ground is money well spent.

3. Fall application of preemergent herbicides.
April/May is the most common time to apply preemergent herbicides in Michigan blueberries, but fall applications can be effective also. October/November is usually less busy than the spring, and rainy periods in the spring can hamper timely applications. We recently compared spring and fall applications of several standard herbicides; most provided comparable control. Fall may be better than the spring for control of some weeds. Marestail, for example, can emerge in the fall, so spring applications are too late for control. Consider experimenting with fall applications. Chateau is a good candidate material for the fall, as are combinations of Chateau with older materials such as Karmex or Princep. (***Source**: Michigan Blueberry Newsletter, Vol. 4, Issue 17. Auguast 24, 2010*)

GRAPE

Controlling Botrytis Bunch Rot in Grapes

Annemiek Schilder, Michigan State University

Early symptoms of Botrytis bunch rot (gray mold), caused by the fungus *Botrytis cinerea,* have been showing up in grape clusters in some locations. However, in some cases, it was associated with grape berry moth infestation. The entry point and tunnels created by the larva also allow entry of Botrytis into the berry. So check the affected berries and look for the tell- tale entry hole and webbing. You may see a larva upon opening up the frass and berries. However, frequent precipitation and high humidity do enhance Botrytis and growers should be prepared, particularly if it rains heavily in the weeks before harvest. Tight- clustered varieties, such as Pinot noir, Pinot Gris, Vignoles, etc. are most seriously affected. Botrytis bunch rot may be confused with sour rot, which is caused by bacteria and yeasts. The main difference is that clusters with sour rot smell distinctly like vinegar and do not support the gray sporulation typical of *Botrytis*.

Botrytis biology. *Botrytis cinerea* is a "weak" pathogen that primarily attacks highly succulent, dead, injured, or senescent tissues such as wilting blossom parts and ripening fruit. The fungus thrives in high humidity and still air (optimum temperature: 59-77°F). Grape berries are most susceptible to infection after veraison. However,

if *Botrytis* spores are available and wet conditions prevail, berries can become infected anytime after bloom. Infection occurs through scars left by the fallen caps or by contact with sporulating floral debris. Infections often remain latent (dormant) until the fruit ripens or may not progress at all. However, the few that do activate can lead to rapid disease spread within the cluster as berries become highly susceptible upon ripening. Controlling infections at bloom provides no benefit if post- veraison weather is dry and doesn't support further disease development, but can pay significant dividends if the weather turns wet before harvest. In most years, fungicide applications at veraison and pre-harvest are more beneficial than earlier applications.

Factors that favor the disease. Factors that cause latent infections to activate are poorly understood, although high humidity and tissues with elevated nitrogen levels appear to promote this process. Cluster compactness also has a pronounced effect on disease development, due largely to rapid berry-to-berry spread. In addition, berries in tight clusters often crack due to pressure within the cluster, providing moisture and nutrients for growth as well as an entry point for the fungus. Insect or other injury, e.g., grape berry moth holes, can also lead to Botrytis as well as sour rot infection. Research in New York has shown that late powdery mildew infections (barely visible with the naked eye) of the berries can also predispose them to rots.

Control options. Promoting good air circulation by canopy management and leaf pulling is an important cultural option for managing Botrytis bunch rot. Avoid excessive leaf pulling, as berries may suffer from sun scald when suddenly exposed to sunlight and high temperatures. Sun scalding is usually restricted to the sides of the berries exposed to the sun and will appear like browning and collapsing (flattening) of the affected berry surface. Sun- scalded berries tend to dry up rather than rot. There are some products available that apparently reduce sunscalding (Purshade and Surround ([kaolin clay]), but they have not been tested in Michigan as far as I know. There are currently some excellent fungicides available for control of Botrytis bunch rot.

Elevate (Hydroxyanilides; locally systemic; 0-day PHI): good to excellent preventive and limited post-infection activity.

Vangard (Anilinopyrimidines; systemic, 7-day PHI): good to excellent preventive and post-infection activity.

Scala (Analinopyrimidines; systemic; 7- day PHI): good to excellent preventive and post-infection activity.

Endura (Carboxamides; systemic; 14- day PHI): good to excellent preventive and post-infection activity. Use at 8-oz rate for Botrytis control.

Rovral (Dicarboximides; locally systemic; 7-day PHI): moderate to good preventive activity; activity is improved by addition of oil or non-ionic spray adjuvant. Some vineyards may have resistant strains if Rovral was used a lot in the past.

Pristine (strobilurins: systemic, 14-day PHI; good preventive and post-infection activity but only at the high rate (18.5-23 ox/acre).

Topsin M (Benzimidazoles; systemic; 14-day PHI): moderate preventive and post-infection activity.

Serenade (Biological control agent; protectant; 0-day PHI): fair to moderate preventive activity. Organic formulation can be used in organic vineyards. (***Source**: Michigan Grape and Wine Newsletter, August 4, 2010*)

GENERAL INFORMATION

Temperatures, Pesticides, and Phytotoxicity

Tom Butzler, Penn State Extension

It is important to pay attention to the weather for a variety of reasons. Most growers pay attention to rain events to better time pesticide sprays. Some herbicides need a rain event to activate the product in the soil. At other times, an upcoming rain event may delay a spray as fungicides or insecticides can wash off. An equally important factor to take into consideration is temperature.

As always, the label is chock full of information and will give a warning to the applicator on temperature issues. For example, sulfur products are often utilized to control powdery mildew on a variety of vine crops such as pumpkins and cucumbers. Pesticide products that contain sulfur usually include a statement that alerts the applicator that the product should not be applied when temperatures are over 90˚F. As of the time of writing this article (July 29, 2011), there have been 14 days since June 1 where temperatures reached 90 degrees F or above in central Pennsylvania.

Certain insecticides are also at the mercy of hot temperatures. Insecticidal soaps also have warnings about hot temperatures and the potential injury with use of product.

Some herbicides are also affected by hot temperatures. Probably the most common phytotoxicity problem seen in vegetable fields/high tunnels is 2,4-D damage. Not that growers are using 2,4-D directly on the vegetable crop but that the grower or grower's neighbor may have used this product nearby. Certain formulations of 2,4-D can volatilize (go from a liquid to vapor state) and move off site.

2-4, D labels will mention the importance of temperature on the label. For example, the Riverdale 2,4-D L.V. 4 Ester label has the phrase "Although this product is a low volatile formulation, at temperatures above 90°F vapors may damage susceptible crops growing nearby."

There are times when cool temperatures are just as bad as hot temperatures. Copper is used to control a variety of organisms in both fruit and vegetable production. In Penn State's *Pennsylvania Tree Fruit Production Guide2010-2011*, it states that "Because copper has the ability to kill all types of plant tissue, the use of copper fungicides carries with it the risk of causing injury to fruit plants." It goes on to say "Factors that can promote injury include: failure to use enough lime; cold, wet weather conditions that apparently increase copper's solubility, allowing more into the plant and resulting in toxicity…"

Although not an exciting read, take the time to become familiar with all aspects of a pesticide label. Not only can it prevent human harm but also plant death. (***Source**: Pensylvania Vegetable & Small Fruit Gazette, Vol. 15, Issue 8 | August 2011*)

New Fruit Pest Found in Pennsylvania

Staff writers, Penn State University

As Penn State researchers warned earlier this year, a new pest of grapes, berries, and tree fruit has made its way into Pennsylvania fruit orchards.

Spotted Wing Drosophila (SWD) was confirmed last month in Adams County by researchers from Penn State and the Pennsylvania Department of Agriculture. SWD is a small vinegar fly with the potential to damage many fruit crops, reports Dr. David Biddinger, entomologist at the Penn State Fruit Research and Extension Center. "The greatest potential for damage is probably to the many types of berry crops. "

Spotted Wing Drosophila (bugguide.net)

SWD has also been found in New Jersey as well as several states to the south and west of Pennsylvania. Late season fruit crops such as blackberries, fall raspberries, blueberries and grapes are the crops of most concern in Pennsylvania, though any thin-skinned fruit can be affected.

Native to Southeast Asia, the fly was first detected in the western United States in 2008 and discovered on the east coast in Florida on strawberries in spring of 2010. "Unlike other vinegar flies that target damaged or overripe fruit, SWD females will attack any soft-skinned healthy fruit to lay its eggs," Biddinger explains.

Biddinger says that because the flies are only a few millimeters long and cannot fly very far, human-assisted transport is the most likely cause of the recent rapid spread. "It is important for growers to be able to identify the pest and to learn about monitoring and management of SWD," says Biddinger. Identification of the adults is difficult because of their small size and several similar characteristics of other vinegar flies in our region, including *Scaptomyza sp*., which are common in commercial plantings in Pennsylvania. The SWD is approximately two to three mm long with yellow-brown bodies and red eyes. Adult males have two distinctive dots on the wings and brown bands on the abdomen. The females look similar but do not have the wing dots or bands and have large, saw-like ovipositor for inserting eggs into fruit. SWD larvae are white, without a distinctive head and easier to detect against darker fruit, such as cherries.

Identification of SWD should be confirmed by experts. Sven Spichiger, entomology program manager at the Pennsylvania Department of Agriculture, and his staff will be able to assist with proper identifications. Adults thrive at cool temperatures in the spring and fall, but growth and reproduction are greatly slowed during hot summer weather. Females live two to nine weeks, lay two to three eggs per fruit and can lay more than 300 eggs total, showing high potential for large-spread fruit infestation if not controlled.

During egg-laying, rot and fungal diseases can also affect the fruit, further contaminating the fruit at harvest.

Infected fruit are difficult for growers to detect, since the only symptoms at first seem to be a small pin-prick from egg-laying, turning into small scars and indented soft spots and bruises before the fruit eventually collapses from the internal feeding of the larvae or disease.

Dr. Greg Krawczyk, Penn State Extension Tree Fruit Entomologist and Kathy Demchak, Penn State Senior Extension Associate in Horticulture, suggest growers use integrated pest management (IPM) methods of monitoring using baits and traps suggested at http://extension.psu.edu/ipm/agriculture/fruits/spotted-wing-drosophila. Control methods are crop specific. Recommendations can be found in newsletter articles appearing in Penn State's "Fruit Times Newsletter" (http://extension.psu.edu/fruit-times) and "Vegetable and Small Fruit Gazette" (http://extension.psu.edu/vegetable-fruit/newsletter), and will be incorporated into other print and online guides.

It is not expected that the current level of infestation will require a special treatment(s) against SWD, although if needed, effective tools are available for the control of this pest. Regardless of the crop, control of this pest will be dependent controlling the flies before they lay eggs and sanitation of infested or left over fruit on the crop. Insecticides labeled for use on specific crops may list fruit flies as pests they control, but generally these will mean fruit flies of another family such as apple maggot, cherry fruit flies and blueberry maggot. Many of the currently registered insecticides labeled for these other fruit flies should also control SWD, but care must be taken to stay within the pre-harvest limitations of the pesticide used.

For more information on SWD, visit http://extension.psu.edu/ipm/agriculture/fruits/spotted-wing-drosophila or http://sites.google.com/site/spottedwingdrosophila/. Growers can also contact their local horticultural extension agent or entomologist for further information. (***Source**: Pennsylvania IPM news release, August 1, 2011*)

Measuring Insecticide or Fungicide For Backpack Sprayers

Ruth Hazzard, UMass Extension

Growers with diverse crops and small plantings often need to be able to apply pesticides to beds or plots of several hundred square feet. It can be difficult to figure out how to calibrate a backpack sprayer for spraying a small area. Some labels give rates for backpack sprayers (ie amount per gallon of water), but most only provide rates per acre (ie amount per land area treated). Rates may have to be calculated by converting from the rate per acre (ie, per 43,560 sq ft) to rates for a few hundred square feet. Careful division gives you the amount you need. However, it is also critical to properly calibrate your sprayer by determining how much water you use to cover a given area.

For some products, spraying small areas may mean that you need to measure extremely small amounts. Some labels provide conversions of volume to weight, but many do not. For example, if you are using spinosad (Entrust formulation, a dry powder) you may need to weigh product in grams. If a gram scale is unavailable, then it is possible to measure Entrust by volume. Based on repeated samples, we found that, on average, the volume was 1.7 gm per teaspoon (shaved level and tamped slightly) of Entrust powder. One ounce (dry weight) equals 28.45 grams.

Liquid measured in (fluid) ounces is already a volume so it is easier to measure. One fluid ounce equals 29.6 milliliters (ml). Some pesticides call for very low rates per acre and may need to be measured in ml when treating small areas. Nicotinoid insecticides are an example. An inexpensive measuring device for ml can be found in the children's medicine section of drug stores.

Even if you are using pesticide products that are relatively safe, always store in a safe place, handle carefully, follow the directions on the label, and use the required protective gear for mixing, spraying, and cleaning your sprayer. Mix in a designated area that is away from workers and the public.

When calibrating and using your sprayer, be consistent. The amount of spray you apply to an area will depend on four variables: your walking speed, the pressure you select, your spray swath width, and the nozzle tip you've chosen. If you change any one of these, you change the amount of spray you apply.

Walking speed. This constant walking speed should be one that you can comfortably maintain over the entire time you intend to spray. It also must be the same speed at which you calibrate the sprayer. If you double your walking speed while maintaining pressure and swath width, you'll apply half as much spray. You would then require twice as much pesticide per gallon (that is, a greater concentration) to apply the same amount of pesticide per acre.

Pressure. If you change the pressure while you spray, you change output. Increased pressure results in higher output; the exact relationship depends on your nozzle type.

Nozzle tip selection. The proper tip will depend on the situation. Tips are available that cover a wide range of output volumes, spray widths, and pressures. Most

backpack sprayers come with a single flat fan nozzle, but a cone tip may be more appropriate for coving foliage.

Swath width/nozzle height. Tips are designed for use within certain heights and pressures. Within these ranges, some tips deliver narrow bands; others, like flooding tips, provide swath widths up to 7 feet. The wider each swath width, the less time the operator spends walking up and down fields. The height at which you hold the spray tip above the target influences the swath width. Spraying as close to the target as is practical minimizes drift and operator contact.

Below are examples of two different ways to calibrate and mix backpack sprayers.

First, check your sprayer coverage and operation. Select the spray tip or boom setup that provides the desired coverage. Add water, and spray the ground or dry pavement as if you were spraying your field. Check the spray pattern for uniformity (and proper spray pattern overlap if you're using a boom). You can also check it over the crop to see if you are getting good coverage. Adjust nozzle spacing and/or height until you achieve the desired pattern. Be certain you're getting uniform coverage before you proceed! Check fittings and hoses for leaks.

Method 1. Concentration: using the labeled rate per gallon for a backpack sprayer.

Pesticide labels for agricultural crops generally give the rate to use per acre. Some labels also provide a rate of product to use per gallon, or concentration, for backpack sprayers. If this is given, add that amount of insecticide to each gallon of water. Spray to cover the crop foliage, but not to runoff on the ground. Mix the amount you need to cover your crop area.

The following rates for two commonly used organic insecticides are listed on the product label:

Product	Amount/gallon	Amount/3 gal (1000 sq ft)	Rate/acre
Entrust	.43 gm (0.015 oz)	1.3 gm (0.046 oz or 3/4 tsp)	2 oz
Surround WP	1 1⁄2 -3 cups	4.5-9 cups	50 lb

If a gram scale is unavailable, then it is possible to measure Entrust by volume. Based on repeated samples, we have found that there is 1.7 gm per teaspoon (shaved level and tamped slightly) of Entrust powder. For Entrust, do not use more than 3 gallons of water per 1,000 sq ft.

Converting metric and English measures:
One ounce (dry weight) equals 28.45 grams. Liquid measure in (fluid) ounces is already a volume so it is easier to measure. One fluid ounce equals 29.6 milliliters (ml). An inexpensive measuring device for ml can be found in the children's medicine section of drug stores.

Method 2. Match the amount of pesticide to the amount of water needed to spray the crop area.

1. Calculate what portion of an acre is being sprayed. Determine sq ft of area to be sprayed (multiply bed or canopy width by row length by number of rows). Calculate how much of an acre this is (this may be a small fraction of an acre):

Acres to be sprayed = number of ft2 to spray / 43,560 ft2 per acre

2. Calculate how much pesticide to use. Multiply the rate per acre for the crop and pest (from the label) times the proportion of an acre to be sprayed.

Amount of pesticide needed = amount per acre X proportion of acre to be sprayed

3. Measure water needed per sq ft of crop. Add a known amount of water (eg 1 or 2 gallons) to the tank. Spray the water as if you were actually spraying your field. Remember, you must maintain constant pressure, constant walking speed, and consistent nozzle height and boom setup or wand motion to achieve the coverage you need. This amount will change with different crops and size of crop canopy. When the water is gone, stop and mark the spot. Measure the area you sprayed and calculate the square feet (length of swath x width). Calculate how many gallons needed per sq ft.:

Gallon per ft2= number of gallons used/ number of ft2 sprayed

4. Determine total water needed:

Gallons of water needed = gal./ft2 X number of sq ft to be sprayed.

5. Mix the required amount of pesticide in the required amount of water. It is best to add half the water, add the pesticide, agitate, then add the remaining water. Spray, using the walking speed, pressure, nozzle and boom setup or wand motion that you used for calibrating.

Sources include Calibrating and Using Back- pack Sprayers, C.G. Landgren, Oregon State University, Washington State University, University of Idaho. See http://extension.oregonstate.edu/catalog/html/pnw/pnw320/ for more details.

*(**Source**: UMass Vegetable Notes, Vol. 20, No. 9. July 2009)*

UPCOMING MEETINGS:

Aug 12-14, 2011 – *NOFA Summer Conference*, UMass Amherst MA. For a complete program see: http://www.nofasummerconference.org/index.php

Aug 16-17, 2011 - *NASGA Summer Tour*, The 2011 NASGA Summer Tour will be held out of the Boston, Massachusetts area. Massachusetts has the highest sales of produce at the farm gate in the country so we will be sure to see some fabulous farms and markets. Join farmers and agribusiness from across the United States and Canada as they visit innovative and successful growers and marketers as wells as some very popular public markets. For more information see: http://www.nasga.org/tours/nasga-summertour-2011.htm

Aug 26, 2011 - *NH Agricultural Experiment Station Field Day***.** Woodman Farm**,** Durham NH. 8:15am-Noon. Farm manager, faculty & student researchers, UNH Cooperative Extension staff, and others will present some of the research, teaching and extension activities at the farm. Beverages and light snacks will be provided from 7:15-8:15am, and the program will take place from 8:15am-noon. For flier and directions: http://extension.unh.edu/Agric/Docs/Research_Field_Days_2010.pdf

Aug 30, 2011 – *Irrigation Systems at Harlow Farm*. Harlow Farm,117 Deep Root Dr.*,* Westminster, VT. The Harlow Farm in Westminster is a 150 acre certified organic farm in its third generation of farming. In this workshop, you'll take a tour of Paul Harlow's operation, including his various fields of irrigation. He'll discuss his investment in irrigation equipment, his systems for laying the irrigation (both overhead and drip), timing, and labor and crops that require special attention such as carrots, parsnips, lettuce and strawberries. You'll also visit a neighboring greenhouse. For more information contact, see http://nofavt.org/events/irrigation-systems-harlow-farm

Sept. 7, 2011 – *Equipment for Small Scale Veg. Production at Foggy Meadow Farm*. Foggy Meadow Farm, 2494 Lake Rd., Benson, VT. Learn from experienced farmer Paul Horton in this workshop focused on equipment and tools for the small scale vegetable farm. Foggy Meadow produces 4 acres of naturally grown vegetables and herbs each season. Paul begins in February with greens harvested from his unheated field tunnels and grows a wide array of vegetables through the end of December each year. For more information see http://nofavt.org/events/equipment-and-tools-small-scale-vegetable-production

Sept 14, 2011 - *High Tunnel Construction with Ed Person***,** Ledgewood Farm Greenhouse Frames. Edgewater Farm, Plainfield NH. 5 pm. Edgewater Farm is a diversified farm growing fruits, vegetables and ornamentals. They now have over a dozen greenhouses and high tunnels. Owner Pooh Sprague will share what he has learned over the years about building these structures. Ed Person owns Ledgewood Farm Greenhouse Frames, and he has provided most of the green- house and high tunnel frames for this farm, as well as for many farms across New England. He will discuss the basics of high tunnel design and installation, and point out specific tips for optimizing their performance and for complying with NRCS EQUIP program requirements. With questions, contact Seth Wilner at 603-863-9200 or Vern Grubinger at 802-257-7967 ext.13. Full flier and directions: http://www.uvm.edu/vtvegandberry/meetings/edgewater9-14-10.html

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