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IN THIS ISSUE:

CROP CONDITIONS:

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.

Spotted Wing Drosophila: SWD has been found in all areas of the state and should be considered a serious pest management concern for the remainder of the season. For crops where harvest is complete, be sure to clean up or incorporate any fallen fruit left on the ground that might be a place where SWD can build up. For crops that are still being harvested (late blueberries, fall raspberries, day neutral strawberries, grapes, elderberries, aronia, peaches, nectarines, ...) keep a tight spray rotation, harvest frequently and thoroughly, and get fruit into the cooler as quickly as possible. See http://extension.umass.edu/fruitadvisor/ for updated information as it becomes available.

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for the two-week period, July 26 through August 8. Soil temperature and phenological indicators were observed on or about August 8. Total accumulated GDDs represent the heating units above a 50° F baseline temperature collected via our instruments for the 2012 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	2012 Growing Degree Days		Soil Temp (˚F at 4" depth)	Precipitation (1-week gain)
	2-week gain	Total accumulation for 2012		
Cape Cod	320	1,937	82˚	5.75"
Southeast	317	1,874	82˚	1.74"
East	338	2,033	79˚	2.33"
Metro West	298	1,836	75˚	1.83"
Central	322	1,974	70˚	1.38"
Pioneer Valley	334	2,027	72˚	1.22"
Berkshires	295	1,631	70˚	1.22"
Average	318	1,902	76˚	0.33"

(***Source***: *UMass Landscape Message #18, August 10, 2012*)

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*)

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*)

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, 2011*

GENERAL INFORMATION

Spotted Wing Drosophila, New Threat to Some Small Fruit Crops

Greg Loeb and Cathy Heidenreich, Cornell University

As many of you have probably learned, spotted wing drosophila (SWD) *Drosophila suzukii* has started showing up in New York and other Northeastern states. Recall this invasive insect fruit pest was first detected in the Northeast in late summer of 2011. It is particularly a threat to soft-skinned fruit crops such as raspberries, blackberries, blueberries, and day-neutral strawberries (so far June-bearing strawberries in the Northeast have mostly escaped infestation). Since the spring of 2012 a number of us have been monitoring traps for adult SWD at fruit farms throughout New York. In addition, we have been examining ripe fruit for fruit fly larvae and if found, rearing the larvae out to determine species (remember there are several native species of fruit flies that will lay eggs in overripe fruit).

Starting in early July of 2012 we have been finding low numbers of adult SWD in our apple cider vinegar traps in upstate NY and Hudson Valley. Until very recently, we have not been finding fruit fly larvae in ripe and overripe fruit, although this is starting to change. Hence, NY growers are reviewing what control options are available. Note that an important cultural control practice is keeping fields as clean picked as possible. But if SWD shows up at your fruit farm, insecticides are likely to be necessary to keep susceptible fruit clean. The good news here is that adult SWD appear quite susceptible to a number of classes of insecticides (e.g. organophosphates such as malathion and pyrethroids such as bifenthrin). The not so good news for NY growers is that there are relatively few products that are legal to use because SWD, or fruit flies more generally, are not included on many pesticide labels. However, this is changing. We very recently received DEC approval 2(ee) label recommendations for several insecticides for use against SWD and hopefully we will have additional options soon. Below we summarize what is currently legal to use for suppression or control of SWD for bushberries, caneberries and strawberries.

Bushberries:

1. *Spinetoram* [Delegate WG) (EPA # 62719-541) with 2(ee) recommendation. Recommended rate is 3-6 oz/A. Restrictions: Preharvest interval = 3 d; Do not apply more than a total of 19.5 oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 6 applications per calendar year; Minimum treatment interval is 6 days. **IRAC group: 5**
2. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 3 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class; Do not make more than 6 applications per calendar year or more than 3 applications per crop; Minimum treatment interval is 6 d. **IRAC group: 5**
3. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**
4. *Bifenthrin* [specifically Triple Crown] (EPA NO 279-3440). This product is a mixture of three active ingredients including bifenthrin, zeta- cypermethrin and imidacloprid. Bifenthrin is a synthetic pyrethroid

and is the same active as is found in Brigade. Recommended rate is 6.4-10.6 fl oz/A. Restrictions: Triple Crown is a Restricted Use Pesticide; Preharvest interval is 3 d; Minimum application interval is 7 d; Maximum amount of Triple Crown allowed per crop season is 31.0 fl oz/A. See maximum usage table on label when applying more than one of these active ingredients. Minimum spray volume is 20 gal/A of water by ground or 5 gal/A by air. **IRAC groups: 3A,** (bifenthrin and zeta-cypermethrin) **and 4A** (imidacloprid).

5. *Bifenthrin* [specifically Brigade WSB] (EPA #279-3108) with 2(ee) recommendation. Recommended rate 5.3 to 16 oz/A. Restrictions: Brigade WSB is a restricted use pesticide. Preharvest interval is 1 d; Do not make applications less than 7 d apart. Do not apply more than 0.5 lb active ingredient per acre per season. **IRAC group: 3A**

6. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 3 d; No not exceed 32 fl oz/A per season. **IRAC group: 3A**

7. *Phosmet* [Imidan 70-W] (EPA # 10163-169). Recommended rate 1.33 lb/A. Preharvest interval = 3 d. Do not apply more than 7 1/8 lb/A per year. Do not make more than 5 applications per year. **IRAC group: 1B**

Caneberries:

1. *Spinetoram* [Delegate WG) (EPA # 62719-541) with 2(ee) recommendation. Recommended rate is 3-6 oz/A. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 19.5 oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 6 applications per calendar year; Minimum treatment interval is 4 d. **IRAC group: 5**

2. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications necessary, rotate to a different class; Do not make more than 6 applications per calendar year; Minimum treatment interval is 5 d. **IRAC group: 5**

3. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**

4. *Bifenthrin* [specifically Triple Crown] (EPA # 279-3440). This product is a mixture of three active ingredients including bifenthrin, zeta- cypermethrin and imidacloprid. Bifenthrin is a synthetic pyrethroid and is the same active as is found in Brigade. Recommended rate is 6.4 – 10.3 fl oz/A. Restrictions: Triple Crown is a Restricted Use Pesticide; Preharvest interval is 3 d; Minimum application interval is 7 d; Maximum amount of Triple Crown allowed per season is 10.3 fl oz/A. See maximum usage table on label when applying more than one of these active ingredients. Minimum spray volume is 50 gal/A by ground or 10 gal/A by air. **IRAC group: 3A**

5. *Bifenthrin* [specifically Brigade WSB, Brigade 2EC] (EPA #279-3108, EPA #279-3313) with 2(ee) recommendations. Recommended rate 8.0 to 16 oz/A for Brigade WSB and 3.2-6.4 fl oz per/A for Brigade 2EC. Restrictions: Brigade WSB and Brigade 2EC are restricted use pesticides. Preharvest interval is 3 d; Only one application may be made postbloom. Do not apply more than 0.2 lb active per acre per season. **IRAC groups: 3A,** (bifenthrin and zeta-cypermethrin) **and 4A** (imidacloprid)

6. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 3 d; No not exceed 32 fl oz/A per season. **IRAC group: 3A**

7. *Malathion* [Malathion 8 Aquamul] (EPA #34704-474) for raspberries, blackberries, boysenberries, dewberries, and loganberries only with 2(ee) recommendation. Recommended rate 2 pts/A. Restrictions: Preharvest interval is 1 d. **IRAC group: 1B**

Strawberries:

1. *Spinetoram* [Radiant SC) (EPA # 62719-545) with 2(ee) recommendation. Recommended rate is 6-10 fl oz/A. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 39 fl oz/A per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class of material; Do not make more than 5 applications per calendar year; Minimum treatment interval is 4 days. **IRAC group: 5**

2. *Azadirachtin* [AzaSol, Molt-X] (EPA # 81899-4, 68539-11). Recommended rate is 6 oz/A in 50 gallons of water/A for AzaSol and 10 fl oz/A for Molt-X. Restrictions: Preharvest interval 0 d. **IRAC group: UN (unknown)**

3. *Fenpropathrin* [Danitol 2.4EC] (EPA #59639-35). Recommended rate 16 – 21.33 fl oz/A. Restrictions: Danitol is a restricted use Pesticide; Preharvest interval is 2 d; No not make more than 2 applications totaling 42.67 fl oz/A to the same planting in 12 consecutive months. **IRAC group: 3A**

4. *Bifenthrin* [specifically Brigade WSB] (EPA #279-3108) with 2(ee) recommendation. Recommended rate 8.0 to 16 oz/A. Restrictions: Brigade WSB is a restricted use pesticide. Preharvest interval is 0 d; Do not apply more than 0.5 lb active per acre per season. For ground application, apply full cover spray in minimum of 50 gallons of finished spray per acre. **IRAC group: 3A**

5. *Spinosad* [Entrust, Entrust SC] (EPA # 62719-282, 62719-621) with 2(ee) recommendations. OMRI listed. Recommended rate 1.25-2 oz/A for Entrust and 4-6 fl oz/A for Entrust SC. Restrictions: Preharvest interval = 1 d; Do not apply more than a total of 9 oz/A of Entrust or 29 fl oz/A Entrust SC per year; Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram, spinosad). If additional applications are necessary, rotate to a different class; Do not make more than 5 applications per calendar year; Minimum treatment interval is 5 d. **IRAC group: 5**

6. *Malathion* [Malathion 8 Aquamul] (EPA #34704-474) only with 2(ee) recommendation. Recommended rate 2 pts/A. Restrictions: Preharvest interval is 3 d. **IRAC group: 1B**

Where to go for more SWD information

Cornell Fruit Resources Spotted Wing Drosophila page: http://www.fruit.cornell.edu/berry/pestalerts/drosophilapestalert.html **Where to go for information on other invasive berry pests**

Cornell Fruit Resources Pest Alert page: http://www.fruit.cornell.edu/berry/pestalerts/index.html

(***Source**: New York Berry News, Vol 11, No. 8a, August 8, 2012*)

Resistance Management in Insect Populations – Why is it Important to My Berry Operation? –

Cathy Heidenreich, Cornell University

The arsenal of pest management products for berry crops in the US (and New York in particular) is relatively small compared to other large acreage crops such as wheat, corn, soybeans, potatoes, etc. Chemical companies looking to capture markets for these commodities are often reluctant to go through the extra effort and expense to develop additional product labels for berry crops even though the products often have efficacy against pests for both the larger commodities and berries.

Given the smaller compliment of products available for best insect management, it is imperative for growers to use them wisely to prevent development of resistance in berry insect and mite populations.

What is Resistance?

Resistance to insecticides may be defined as '*a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve expected level of pest control when used according to the label recommendation for that pest species.*' Resistance occurs when an insecticide or acaricide (miticide) is over- or miss-used against a particular pest species. These improper usages lead to selection of resistant forms of the pest which then dominate the population over time, shifting it from susceptible to resistant. Not only does resistance develop to the specific product that has been over or miss-used; it also develops for other products with the same mode of action (effect on the pest species).

Insecticide Resistance Management and the IRAC MoA Classification

The IRAC Mode of Action (MoA) classification system is an international insecticide classification system used in resistance management. It was developed by the International Resistance Action Committee (IRAC). This classification system was developed to provide growers, advisors, extension staff, consultants and crop protection professionals with a guide to the selection of insecticides or acaricides (miticides) for use in an effective and sustainable insecticide or acaricide resistance management strategy.

To prevent or delay the development of resistance in pest populations it is advisable to use alternations, sequences or rotations of products from different IRAC MoA groups. In all cases, be sure to follow label instructions.

Insect Resistance Management (IRM) Principles Recommended and Endorsed by IRAC

• Consult a local agricultural advisor or extension services in the area for up-to-date recommendations and advice on IPM and IRM programs.

• Consider options for minimizing insecticide use by selecting early-maturing or pest-tolerant varieties of crop plants.

• Include effective cultural and biological control practices that work in harmony with effective IRM programs. Adopt all non-chemical techniques known to control or suppress pest populations, including biological sprays such as Bt's, resistant varieties, within-field refugia (untreated areas) and crop rotation.

• Where possible select insecticides and other pest management tools, which preserve beneficial insects.

• Use products at their full, recommended doses. Reduced (sub-lethal) doses quickly select populations with average levels of tolerance, whilst doses that are too high may impose excessive selection pressures.

• Appropriate, well-maintained equipment should be used to apply insecticides. Recommended water volumes, spray pressures and optimal temperatures should be used to obtain optimal coverage.

• Where larval stages are being controlled, target younger larval instars where possible because these are usually much more susceptible and therefore much more effectively controlled by insecticides than older stages.

• Use appropriate local economic thresholds and spray intervals.

• Follow label recommendations or local expert advice for use of alternations or sequences of different classes of insecticide with differing modes of action as part of an IRM strategy.

• Where there are multiple applications per year or growing season, alternate products of different MoA classes.

• In the event of a control failure, do not reapply the same insecticide but change the class of insecticides to one having a different MoA and to which there is no [locally] known cross-resistance.

• Mixtures may offer a short-term solution to resistance problems, but it is essential to ensure that each component of a mixture belongs to a different insecticide MoA class, and that each component is used at its full rate.

• Consideration should be given to monitoring for the incidence of resistance in the most commercially important situations and gauge levels of control obtained.

• Withholding use of a product to which resistance has developed until susceptibility returns may be a valid tactic if sufficient alternative chemical classes remain to provide effective control.

References:

IRAC MoA Classification Scheme Version 7.2 April 2012: http://www.irac-online.org/content/uploads/MoA-classification.pdf)

(***Source**: New York Berry News, Vol 11, No. 8a, August 8, 2012*)

Late Summer Weed Control Options for Berry Crops

Laura McDermott, Cornell Cooperative Extension

If you are an organic grower or trying to reduce your herbicide usage, late summer is a good time to consider going through the berry plantings with a crew to hand weed or use a flamethrower in plantings. Cultivation is an option for strawberries and materials like vinegar could also be very helpful for weed control. Cleaning up a patch, then applying mulch where it is appropriate will save time next season. Do not ignore late season weed control because you don't use herbicides.

Strawberry Weed Control: Controlling fall germinating winter annuals such as chick- weed and shepherds purse is critical at this time of year.

Devrinol (napropamide) is a preemergent herbicide that can cause problems with rooting of daughter plants so this material should be used after early forming daughter plants have rooted. Because daughter plants that form after late August don't usually contribute as much to the yield, Devrinol can be applied without much effect at that time, but BEFORE winter annuals emerge. Devrinol must be moved into the soil by cultivation or water after application.

Sinbar (terbacil) is a preemergent herbicide with some postemergence activity. Usually Sinbar is applied after renovation or after the berries have gone dormant in the fall. If leaves are present during application, immediately apply 0.5-1 inch of water to wash the chemical off the strawberry foliage. Otherwise severe injury many result. Do not use Sinbar on soils with less than 2% organic matter and do not use on 'Guardian', 'Darrow', 'Micmac', 'Tribute', or 'Tristar' as these cultivars have shown extreme sensitivity. Some growers have reported sensitivity in 'Honeoye' and less vigorous cultivars and

an increase in root rot following use has been reported. Sinbar is limited to 8 oz/A per growing season.

Poast (sethoxydim) is a postemergent, grass herbicide. This material works well applied in late summer or early fall to actively growing grasses. Don't waste your time and the product on summer annual grasses like foxtails and crabgrass that will be killed by frost. 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. Poast must be applied with a crop oil.

Highbush Blueberry Weed Control: August is an excellent time to focus on problem weeds, especially woody perennial plants that frequently gain a foothold in blueberry rows. As these weeds begin to move carbon stores to their roots for the winter, they will also move systemic herbicide to the root zone very efficiently. The key thing to remember is, so will blueberry plants! Be very careful with your application. A shielded sprayer is a must, better yet would be a wick applicator. A 2% Round-Up solution – 41% a.i./gallon will kill most of your problem herbaceous weeds, but if you have large woody material, you might want to use a higher solution. The Round- Up Pro label gives mixing instructions for many concentrations up to a 50% solution. The cut-stem application method is also listed for problem woody plants. Using a 50-100% solution of Round-Up, apply the material directly to the woody stem using a wick applicator immediately after cutting. Many growers use a roller/ wiper application to the edges of their mulched row to keep grass from encroaching. Be sure that your mulch is nice and thick and that no blueberry roots are obvious. Again, great care should be made to prevent any drift onto the blueberry plants during these applications.

For pre-emergent control of fall annuals there are several choices. Sinbar can be used after harvest in all but 1-year old plantings. Devrinol should be cultivated or watered in within 24 hours of application. Solicam is also a good choice at this time of year, IF you did not apply this material in the spring.

Bramble Weed Control: Late summer and fall is an excellent time to control troublesome perennial weeds like thistle, dock, smartweed, and morning glory by spot spraying with Round-Up, but take EXTREME caution to avoid getting herbicide on bramble canes. Be EXTREMELY CAREFUL when spot treating to avoid any contact with desirable plants. For grass control, now is the time to apply the second Poast application. This should be done soon, while grasses are actively growing. The further you get in August, the poorer the control. To suppress winter annual germination, both Sinbar and Devrinol can be used. Solicam, if not applied in spring, is a good choice unless you have a new planting or light soils. Also, certain varieties are sensitive to Solicam. Surflan and Princep can also be used in early September, but make sure that you read the label as these herbicides have caveats re: soil organic matter content and rates. (***Source**: New York Berry Notes, Vol. 10, No. 7, August 22, 2011*)

Potato Leafhoppers and Berries in 2012

Kathy Demchak, Penn State Universtiy

Potato leafhoppers cause varying levels of damage to small fruit crops in different years, and this year we are seeing a fair amount of leafhopper damage to both strawberries and raspberries.

In many cases where leafhopper feeding injury is severe, dry conditions cause plant growth to slow down, and damage from the leafhoppers then accrues and symptoms become more severe. This is evidenced in the photo shown to the right, where the strawberry leaf curling is a sign of drought stress in addition to "hopperburn," the characteristic leaf yellowing and distortion that the leafhoppers cause. In some cases, people have confused the symptoms of leafhopper damage with either herbicide injury or a nutrient deficiency, rather than the real cause. Damage from potato leafhoppers can severely stunt plant growth, especially in newly-established plantings.

Strawberry leaf curling is a sign of drought stress in addition to "hopperburn," the characteristic leaf yellowing and distortion that the leafhoppers cause.

Similar symptoms from potato leafhopper damage are also often seen on raspberries. With raspberries, damage often appears in the middle of the cane. Potato leafhoppers overwinter in southern states, and move northward as the growing season progresses; thus they are not typically present when the raspberry canes are first growing, so symptoms aren't present until the plants are one or two feet tall. Potato leafhoppers have three to four generations in Pennsylvania

and are present for the remainder of the summer.

Leafhopper feeding results in a plugging of the portion of the leaves' vascular system that is used for moving photosynthates. Thus, symptoms are similar on different types of plants -- snapbeans and potatoes can be similarly affected. It should be noted, however, that there are large cultivar differences in amount of damage noted, and to some extent, in details of symptoms among different crops. Potato leafhoppers are light-green, wedge-shaped insects that are about 1/8-inch long, and are found primarily on the leaf undersides. The adults fly quickly when disturbed. Nymphs cannot fly, and tend to move diagonally when disturbed. Because potato leafhoppers move in from other areas, there are no effective cultural controls for avoiding their appearance. Alfalfa is a favored host, so leafhoppers frequently move into other host crops in large numbers when alfalfa is mowed. A number of insecticides, including Provado and Assail, will provide control. For organic growers, insecticidal soap may provide some control, but must be targeted against first generation nymphs. Additional information regarding control can be found in the Mid-Atlantic Berry Guide. Penn State's Department of Entomology has a detailed fact sheet on potato leafhopper life cycle and biology at < http://goo.gl/3fa2x >. (***Source**: Penn State Veg & Small Fruit Gazette, August 8, 2012*)

2012 Update on Giant Hogweed

MDAR's annual survey of known populations of the invasive plant known as giant hogweed (Heracleum mantegazzianum) is currently finishing up for the season. Each year, nursery inspectors check hogweed infestations in their assigned regions, in some cases assisting property owners with management by digging up plants or cutting flower heads to prevent seeds from spreading. So far, inspectors have visited over 30 sites, assisted with management at 10 of them, and were able to declare 11 sites "Eradicated" after 5 consecutive years with no new plants found.

Giant hogweed is a federally listed noxious weed that is prohibited from being sold in Massachusetts. As that common name suggests, hogweed plants are huge, with leaves reaching several feet wide and flowering stalks exceeding ten feet in height that are topped with wide heads of tiny white flowers. The plant is considered dangerous because it contains a poisonous sap that can cause painful blisters if it comes in contact with skin. To report a sighting (after looking at comparisons), visit **http://massnrc.org/pests/hogweedreport.aspx.**

UMass Sustainable Vegetable Production Course

October 31 - December 12; meets twice/week, 9 am to 3:30 pm daily. Holiday Inn, 265 Lakeside Ave., Marlboro. To assist new vegetable farmers, UMass Extension is conducting a Sustainable Vegetable Production course. This course is designed for beginning farmers wishing to gain an understanding of horticultural fundamentals and strategies and their relation to environmental quality. Attendees will learn about sustainable approaches to commercial vegetable production, making environmentally appropriate decisions related to plant selection, plant maintenance, and pest and nutrient management. Topics are based on current research and information emphasizing environmental stewardship, Best Management Practices (BMPs) and integrated pest management (IPM). Participants will develop an understanding of how proper management practices impact natural resources such as soil and water. This program focuses on the management of vegetable rotations as a whole, and is intended for first-time farmers. This 60 hour course is a comprehensive certificate short course taught by UMass Extension Specialists and University of Mass faculty. Cost: $675, includes all materials. Classes run 9:00 AM - 3:30 PM daily. Register early, as space is limited. Registration deadline: October 24, 2012. For a complete schedule and to register online, go to**http://extension.umass.edu/landscape/education/green-school-sustainable-vegetable-production-track** Certificate: Certificate is optional. For those wanting a certificate it will be awarded upon achieving a passing score based on an average of daily quizzes. It is not necessary to take the daily quizzes if receiving the certificate is not desired. For more information, contact UMass Extension at (413) 545-0895 or **eweeks@umext.umass.edu** or Dr. Frank Mangan **fmangan@umext.umass.edu**.

(***Source**: MDAR Farm & Market Report, Vol. 89, No. 4, August / September 2012*)

UPCOMING MEETINGS:

August 16, 2012 - *Aronia: A New Fruit Crop for the Northeast*. 1-5pm. UMaine Highmore Farm, 52 US Route 202, Monmouth ME 04259-0179. Registration required. To register or learn more, contact Lois Stack at lois.stack@maine.edu.

August 16, 2012 - *Orchard Health and Apple Intensive with Michael Phillips*. 1-5pm. Flag Hill Farm. 135 Ewing Rd. Vershire, VT, For more information see http://nofavt.org/events/orchard-health-and-apple-intensive-michael-phillips

August 20, 2012 – *UNH Vegetable and Small Fruit Twilight Meeting*, 6:00 – 8:00/. Homestead Farm - River Road, Walpole NH 03608. 1.5 pesticide recertification credits offered. For more information go to http://extension.unh.edu/events/index.cfm?e=app.event&event_id=25825 or contact Carl Majewski at 352-4550 or carl.majewski@unh.edu.

August 23, 2012 – *UVM Vineyard Field Day.* 2:00 – 4:30. UVM Horticulture Research Center, 65 Green Mountain Drive, South Burlington. For more information see: http://pss.uvm.edu/grape/2012FieldDayFlyerWithDirections.pdf

August 21, 2012 – *Spotted Winged Drosophila Workshop.* 1:00 -2:30 –CCE Rensselaer county office, 61 State Street, Troy, NY 12180. Cost is $10/person. You can pay at the door, but please call Laura at 518-746-2562 to register.

August 31, 2012 – *Cornell Small Fruit Open House*. 12:45 – 4:15. Cornell Orchards on route 366 in Ithaca, NY. For more information see: http://blogs.cornell.edu/fruit/2012/08/10/small-fruit-open-house-august-31/

September 12, 2012 - *Soil Testing, Management, and Cover Crop Strategies*. 4:00 – 6:00. Wellspring Farm, Marshfield, VT. $10 NOFA_VT members, $20 others. For more information and to register go to: http://nofavt.org/events/soil-testing-management-and-cover-crop-strategies-nofavore-social.

If you know of an event that would be suitable for this list, please forward to sgs@umext.umass.edu

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