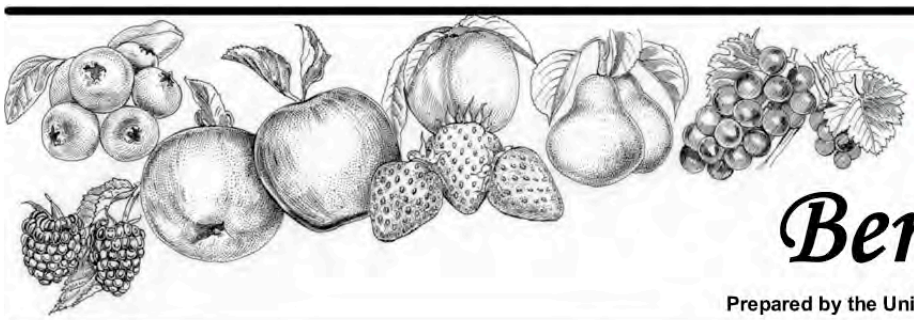

UMassAmherst EXTENSION

Berry Notes

Prepared by the University of Massachusetts Fruit Team

June 2008 Vol. 20, No. 8

www.umass.edu/fruitadvisor/berrynotes/index.html

Massachusetts Berry Notes Underwriters:

NOURSE Growers of the Finest Small Fruit Plants

Berry Notes is edited by Sonia Schloemann with articles written by other contributors with attribution; sources are cited. Publication is funded in part by the UMass Extension Agriculture & Landscape Program, subscription fees and corporate underwriting. Questions can be directed to Sonia Schloemann at 413-545-4347, sgs@umext.umass.edu. Please cite this source if reprinting information that originates here.

IN THIS ISSUE:

Current Conditions:

Strawberries – row-covered fields have begun harvesting. Other fields are progressing toward harvest which may begin within 5-7 days. Clipper damage is past in most areas, but tarnished plant bug is still active. Two-spotted spider mite may also begin to build up following high temps earlier this week. Also keep an eye out for strawberry sap beetle and slugs as fruit ripens. ***Raspberries*** – summer bearers are in pre-bloom to bloom. Tarnished plant bug may be active in raspberries at this time. Avoid insecticide applications during bloom to protect pollinators; pre-bloom or immediate post-bloom applications can be made. Be ready for fungicide applications to control botrytis gray mold during bloom. Also, scout for symptoms of orange rust. ***Blueberries*** – are past bloom and progressing to 'berry touch'. Continue to scout for signs of cranberry fruit worm. First sprays for this pest are guided by declining trap catches, which happens around the time of berry-touch. Get ready to set out traps for blueberry maggot (more on this next time). Winter Moth continues to threaten blueberries in some areas. Caterpillars are too large for B.t. products to be effective. See the Winter Moth fact sheet for control options ***Ribes*** – fruitset appears to be excellent. Watch for Imported Currant Worm and Currant Borers at this time. Also watch for powdery mildew infections. Hot weather can cause significant fruit drop; overhead irrigation for evaporative cooling may be needed as fruit ripens. ***Grapes*** - are in pre-bloom but early varieties may reach bloom in some areas very soon. This is the most important stage for disease management in grapes. Grape berry moth has not yet been found in vineyard traps, but is expected to show up soon. Also scout vineyards for grape cane girdler, flea beetle larvae and European red mite at this time.

2008 New England Small Fruit Pest Management Guide now available – This guide has been extensively updated and is now available for purchase for $12 plus $4 shipping and handling. Orders (including credit card purchases) can be placed via the UMass Fruit Team website at www.umass.edu/fruitadvisor.

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for a one-week period, June 4, 2008 through June 10, 2008. Soil temperature and phenological indicators were observed on June 10, 2008. Accumulated GDDs represent the heating units above a 50° F baseline temperature collected via our instruments from the beginning of the current 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	2008 GROWING DEGREE DAYS		Soil Temp (°F at 4" depth)	Precipitation (1-Week Gain)
	1-Week Gain	*Total accumulation for 2008*		
Cape Cod	126	435	70˚F	0.80"
Southeast	103	454	89˚F	0.78"
East	130	530	n/a˚F	n/a"
Metro West (Waltham)	143	441	77˚F	0.56"
Metro West (Hopkinton)	112	452	78˚F	0.92"
Central	133	459	62˚F	0.85"
Pioneer Valley	130	530	70˚F	1.61"
Berkshires	144	508	83˚F	1.28”
AVERAGE	160	476	76˚F	0.97"

n/a = information not available

(***Source**: UMass Extension 2007 Landscape Message #15, June 12, 2008*)

STRAWBERRY

Using Fungicides to Control Strawberry Fruit Rots in Matted Row Production in Ohio 2008

Michael Ellis, Ohio State University

The most common fruit rots on strawberry in Ohio are: Botrytis fruit rot (gray mold), caused by *Botrytis cinerea*; anthracnose fruit rot, caused by *Colletotrichum acutatum*; and leather rot caused by *Phytophthora cactorum*. Especially in wet growing seasons, successful strawberry production may depend on the simultaneous control of all of these diseases. Generally, all three diseases do not occur simultaneously in the same planting, but this can occur. Botrytis fruit rot or gray mold is the most common disease and generally requires some level of fungicide for control each year. Anthracnose is a problem in years with warm to hot temperatures combined with prolonged rainfall prior to and during harvest. Anthracnose is generally not a problem in most plantings; however, when it does develop, it can be devastating. New fungicide chemistry with good to excellent activity against anthracnose has recently been registered for use on strawberry and should be helpful in providing effective control. Leather rot is a problem in years with excessive rainfall or in fields with poor drainage that have standing water (all of these diseases are a problem in situations such as this). Many growers do a good job of controlling leather rot by planting on sites with good soil drainage and maintaining a layer of straw mulch to prevent contact of berries with soil. In years with excessively wet weather or on sites with problem soil drainage, fungicides may be beneficial for leather rot control.

As previously mentioned, Botrytis or gray mold is the most common disease and is probably the easiest to control with effective fungicide use. Most fruit infections by Botrytis occur only during bloom. Therefore, most growers that apply fungicide during bloom generally do a good job of controlling Botrytis and do not need to apply fungicides pre-bloom or during harvest. If anthracnose and leather rot **are not a problem**, fungicide sprays during bloom only are generally all that is required. Obviously this is an ideal situation in relation to reducing costs and overall fungicide use.

In plantings and in growing seasons (warm and wet) where anthracnose or leather rot are problems, the need for a more intensive fungicide program is greatly increased. The following information provides guidelines for developing an effective fungicide program for control of the major fruit rots in matted row production systems in Ohio.

Prebloom

In most years, there is generally little or no need for fungicides prior to bloom for control of Botrytis. If weather is exceptionally wet from rain or overhead irrigation from frost protection, some early season fungicide may be required prior to bloom. If anthacnose is a concern, especially in plastic culture berries, prebloom applications of fungicide may be beneficial in reducing the buildup of

inoculum in the planting. This is especially true if prebloom temperatures are abnormally warm and conditions are wet. Applications of Captan or Thiram alone at the highest rate (Captan 50WP, 6 lb/A; Captan 80WDG, 3.75 lb/A; Captec 4L, 3 qts/A, Thiram 75WDG, 4.4 lb/A) should be effective in reducing inoculum buildup of all three diseases. A seven day application interval should be sufficient.

During Bloom

This is the critical period for control of Botrytis. In addition, in fields infested with Colletotrichum (anthracnose), the fungus may be able to build up inoculum on symptomless (apparently healthy) foliage during warm, wet weather. Increased inoculum could result in increased fruit infections if weather remains favorable for disease development. The main fungicides for control of Botrytis are Topsin-M 70WSB, Elevate 50WG, Captivate 68WDG, Switch 62.5WG, Scala SC and Pristine 38WG. Captivate is a package mix of Captan and Elevate. All of these materials have excellent efficacy for control of Botrytis, but only Switch and Pritine have efficacy against anthracnose. This is an important point to remember if anthracnose is a problem in the planting. I also recommend that all of these materials be tank-mixed with Captan or Thiram during bloom. Captan and Thiram are protectant fungicides that provide some additional control against Botrytis (gray mold), anthracnose fruit rot, and leather rot. In addition, mixing the materials should also aid in reducing the risk of fungicide resistance development.

Topsin, Elevate, Scala, Switch, and Pristine are all at high risk for development of fungicide resistance in Botrytis. None of these fungicides should be used alone in a season long program for Botrytis control. They all have different chemistry so they can be alternated with each other as a fungicide resistance management strategy. It is wise not to apply any of these fungicides in more than two sequential sprays without alternating to a different fungicide.

For successful Botrytis control, it is important to provide fungicide protection throughout bloom. Remember that early blooms (king bloom) may be your largest and best quality fruit, so protection needs to be started early (at least 10% bloom). The number of bloom sprays required depends upon the weather. If it is hot and dry, no fungicides are required. All of the fruit rot diseases discussed here require water on the flowers and fruit in order to infect. If it is very dry and overhead irrigation is used for supplemental water, irrigation can be applied in early morning so that plants dry as fast as possible. Keeping plants dry reduces the need for fungicide application. Fortunately, most years are not this dry and fungicides are generally applied on at least a 7-day schedule through bloom. If it is extremely wet, a shorter interval (4-5 days) may be required in order to protect new flowers as they open. Although Botrytis is the primary pathogen we are trying to control during bloom, the selection of the proper fungicides should also aid in reducing the buildup of anthracnose as well. This is important to remember in plantings where anthracnose is a problem or threat.

Post Bloom Through Harvest

As bloom ends and green fruit are present, the threat from Botrytis infection is generally over. Green fruit are resistant to Botrytis. If you got fruit infection by Botrytis during bloom, the symptoms (fruit rot) will not show up until harvest as fruit start to mature. At this point, it is too late to control it. As new fruit form through harvest, the threat of anthracnose fruit infection increases. In many plantings, anthracnose is not present or is not a problem. In these plantings no additional fungicide should be required after bloom through harvest. Unfortunately, you cannot determine if anthracnose is a problem until you see it. Often, this is too late to control it. In plantings with a history of anthracnose fruit rot, or if the disease is identified in the planting, fungicides with efficacy for anthracnose control may be required from the end of bloom through harvest. Remember, anthracnose is favored by warm to hot wet weather. In addition, anthracnose appears to be a greater problem in plastic culture plantings.

Abound 2.08F, Cabrio 20EG, and Pristine 38WG are strobilurin fungicides and are the most effective fungicides currently registered on strawberry for control of anthracnose fruit rot. These fungicides are also registered for control of powdery mildew and leaf spots and they also provide good suppression of Botrytis fruit rot (gray mold).Pristine provides excellent control of Botrytis. All of these fungicides are at high risk for fungicide resistance development in the anthracnose fungus. In addition, they are all in the same class of chemistry; therefore, they cannot be alternated with each other as a fungicide resistance management strategy. In order to delay the development of fungicide resistance, the label states that no more than four applications of Abound or five applications of Cabrio or Pristine can be made per season. In addition, the label states that no more than two sequential sprays of each fungicide can be made without switching to a fungicide with a different type of chemistry. For anthracnose control, the only fungicides that currently can be used in such a rotation with these fungicides are Captan, Thiram, or Switch. Switch 62.5 WG has been reported to provide good to excellent control of anthracnose fruit rot, and would be the fungicide of choice in an alternating program with Abound, Cabrio or Pristine.

The following are suggestions for developing a fungicide program for simultaneous control of strawberry fruit rots.

Fungicide and (rate/A)	Comments
Prebloom	
Captan 50 WP (6 lb) or Captan 80WDG (3.75 lb) or Captec 4L, 3 qt or Thiram 75WDG (4.4 lb)	Prebloom applications should be required only if excessive water from rain or irrigation is a problem early in the season. Fungicides here could help reduce build-up of Botrytis and Colletotrichum inoculum. In dry or more "normal" seasons, fungicide is probably not required until bloom starts.
During bloom	
Switch 62.5WG (11-14 oz) or Scala SC (18 fl. oz) or Elevate 50WG (1-1.5 lb) or Topsin-M 70WSB (1 lb) **PLUS** Captan 50WP (4-6 lb) or Captan 80WDG (3.75 lb) or Captec 4L (2-3 qt) or Thiram 75WDG (4.4 lb) **OR** Captevate 68WDG (3.5-5.25 lb) **OR** Pristine (18.5 - 23 oz)	This is the main time to control Botrytis and if temperatures are high, Colletotrichum could build up in the planting. Pristine is highly effective for both Botrytis, Anthracnose and leather rot. Switch is excellent for control of Botrytis and has been reported to have some activity for control of anthracnose. Obviously, this is ideal. The addition of Captan or Thiram provides additional protection against all the fruit rot diseases and may aid in reducing fungicide resistance development. Topsin-M , Scala and Elevate are all excellent for control of Botrytis, but have no activity against anthracnose. Where anthracnose is not a threat, these fungicides will provide excellent Botrytis control. When Elevate, Scala or Topsin-M are combined with the high rate of Captan or Thiram, the combination should provide some level of anthracnose control. Captevate is a package-mix combination of Elevate plus Captan. If anthracnose is a concern, Pristine or Switch would be the fungicide of choice. None of the fungicides (Pristine, Switch, Scala,Elevate or Topsin-M) should be applied more than twice before alternating with a fungicide of different chemistry. This is to aid in reducing fungicide resistance development. Abound, Cabrio, and Pristine are the fungicides of choice for anthracnose control, and all of them provide some control of Botrytis. Although they could be used during bloom, I prefer to use them after bloom when the threat of anthracnose fruit infection is greatest.
Post bloom Through Harvest	
Abound 2.08F (6.2-15.4 fl oz) or Cabrio 20EG (12-14 oz) or Pristine 38WG (18.5 - 23 oz) or Switch 62.5WG (11-14 oz) tank-mixed or alternated with Captan 50WP (3-6 lb) or Captan 80WDG (3.75 lb) or Captec 4L (1.5-3 qt)	If more than two applications of Abound, Cabrio, or Pristine are required, Switch can be considered as an alternating fungicide. As green fruit develop the threat of anthracnose infection increases, especially under warm, wet conditions. Abound, Cabrio, or Pristine are the most effective materials for anthracnose control. If anthracnose is a problem, the highest label rate should be used. This may be the best time to use Abound, Cabrio, or Pristine. Switch also has some activity for control of anthracnose. If the risk of anthracnose is high or the disease has been observed in the planting, Quadris, Cabrio, or Pristine plus Captan should be applied 7 days after the last bloom spray for Botrytis. If anthracnose remains a threat, sprays should probably be repeated on a 7 day interval through harvest. As harvest approaches, Captan should be removed from the program. Captan applied close to harvest could result in visible residues on fruit and this can be a big problem. Abound, Cabrio, Pristine or Switch applied alone should result in minimal visible residues on fruit and can be applied on the day of harvest (0-day PHI). Remember, **these preharvest sprays are required only if anthracnose is a threat or problem.**

The extensive use of Captan in this program could result in problems with visible residues on fruit. This needs to be considered, but under heavy disease pressure for anthracnose a high level of Captan usage may be required.

The Captec 4L (flowable) should result in less visible residue than the Captan 50W (wettable powder) or Captan 80WDG formulation. The use of Abound, Cabrio, Pristine or Switch alone in the last spray or two before harvest should aid greatly in reducing visible residues.

Leather Rot

As mentioned previously, leather rot should be controlled by good soil drainage (no standing water) and a good layer of straw mulch to prevent berries from soil contact. If leather rot is a threat or a problem, fungicides may be required. Abound, Cabrio, and Pristine have excellent activity against Phytophthora diseases on other crops. Although leather rot is not on the label, studies in Ohio have shown that Abound, Cabrio, and Pristine all have very good activity for control of leather rot in addition to anthracnose and Botrytis gray mold. Pristine would be the fungicide of choice because it provides excellent control of all the major fruit rot diseases (Botrytis gray mold, anthracnose, and leather rot). If applied at the time suggested above (green fruit through harvest) for anthracnose, Abound, Cabrio, and Pristine should be beneficial for control of leather rot as well. Recent research at Ohio State indicated that these materials have good to excellent activity against leather rot.

Fungicides for Leather Rot Control

As previously mentioned, emphasis for leather rot control should be placed on the use of cultural practices such as planting on well drained sites or improving water drainage in the planting and a good layer of straw mulch to prevent berry contact with the soil. When needed, the following fungicides are labeled specifically for control of leather rot.

Ridomil Gold is labeled for control of Red Stele (caused by *Phytophthora fragarieae*) and Leather Rot (caused by *Phytophthora cactorum*). The label for perennial strawberries reads as follows: "Established Plantings: Apply Ridomil Gold EC at 1 pt. per treated acre in sufficient water to move the fungicide into the root zone of the plants. Make one application in the spring after the ground thaws and before first bloom. A second application may be applied after harvest in the fall. **Note:** Although not labeled for leather rot control, the early spring application for red stele control should provide some control of leather rot. **For supplemental control of leather rot**, an application may be made during the growing season at fruit set. This application at fruit set (as green fruit are present) has been very effective for leather rot control.

Aliette 80WDG is labeled for control of Red Stele and Leather Rot. For Leather Rot, apply 2.5 to 5 lb/A. Apply as a foliar spray between 10% bloom and early fruit set, and continue on a 7-14 day interval as long as conditions are favorable for disease development. Applications can be made the same day as harvest (PHI=0 days). Do no exceed 30 lb product per acre per season.

Phosphorous Acid (Agri-Fos) is labeled for control a Red Stele and Leather Rot on strawberries. This material has essentially the same active ingredient as Aliette and the use recommendations for red stele and leather rot are very similar to those of Aliette; however, Aliette is a wettable powder and Agri-Fos is a liquid. Agri-Fos is recommended at the rate of 1.25 quarts per acre in 90 gallons of water or 2.5 gallons per acre in 200 gallons of water. For leather rot, apply at 10% bloom and early fruit set, then at 1 to 2 week intervals as needed. Several Phosphorous acid fungicides are currently being registered for use on several crops in the U.S. and others will probably be registered for use on strawberry in the near future.

Remember these are only suggested guidelines for a fruit rot control program. It is always the growers responsibility to read and understand the label. For the most current pesticide recommendations in Ohio, growers are referred to Bulletin 506-B "Ohio Commercial Small Fruit and Grape Spray Guide". (***Source**: Ohio Fruit ICM News, Volume 12 (14), June 6, 2008*)

Warm, Wet Conditions Promote Anthracnose Fruit Rot in Strawberries

Annemiek Schilder, Michigan State University

The warm, wet conditions of the past week promote fungal disease development in strawberries, in particular anthracnose fruit rot. Foliar fungal diseases, such as Phomopsis leaf blight, scorch, and leaf spot also develop more rapidly in response to lots of rain and leaf wetness. Since we are currently at harvest, it is important to scout for fruit rots. Most people are aware of Botrytis gray mold, which is also a risk, but fewer may be familiar with anthracnose fruit rot. Anthracnose fruit rot is characterized by dark, circular sunken areas on fruit. This disease is usually caused by the fungus *Colletotrichum acutatum,* but other *Colletotrichum* species may also be involved. The fungus may also cause petiole and runner infections, flower blight, and anthracnose crown rot. Flowers and ripening fruit are very susceptible to anthracnose fruit rot. The pathogen can spread rapidly through fruiting fields during rainy, warm periods. Irrigation to help cool down the berries may also contribute to spread and infection.

The first symptoms of anthracnose fruit rot are light brown, water-soaked spots on ripening fruit. The spots quickly develop into firm, round lesions, which usually turn dark brown to black and become slightly sunken. Under humid conditions, salmon-colored spore masses cover the lesions. Spore production, spore germination, and infection of

strawberry fruit are favored by warm, humid weather. This explains why we often see anthracnose fruit rot appearing later in the picking season. Conidia are produced in a slimy matrix and are easily dispersed by splashing rain or by insects, animals or people moving through the field. Infected berries eventually dry up and mummify and can become a source of inoculum for the following season. *C. acutatum* is known to survive in infected plant material for up to nine months.

Anthracnose fruit rot is very difficult to control when environmental conditions are favorable for infection during harvest. Therefore, control measures must begin early in the season. When planting a new field, start out with disease-free planting material. However, it is very difficult to detect the fungus in planting material because it causes latent (invisible) infections. The best approach at this point is to choose a reputable source of planting material. The spread of inoculum in the field can be reduced by mulching row middles with straw and using drip irrigation rather than overhead irrigation. Fruit with anthracnose lesions should be promptly removed from the field to reduce inoculum levels, especially early in the harvest season. Anthracnose fruit rot can be controlled by applying fungicides like Captan, Cabrio, Abound, Pristine, Switch, or Captevate. Of these, Pristine, Switch, and Captevate also provide good to excellent control of Botrytis gray mold. Furthermore, Cabrio, Abound, and Pristine provide broad-spectrum control of foliar diseases. If you have angular leaf spot caused by *Xanthomonas fragariae* (a bacterium), this can only be controlled with copper products. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 23, No. 10, June 10, 2008*)

RASPBERRY

Fireblight in Raspberries

Adapted from M. Heimann and S. Jeffers, University of Wisconsin

A serious disease of apple and pear trees in New England, fire blight also affects many other members of the Rosaceae, including brambles. Raspberries are the most susceptible of the bramble fruits to infection by the fireblight bacterium (*Erwinia amylovora*) but other bramble can also be infected.

Symptoms

The most obvious symptom results from infection of the cane tips, which become blackened and curl over as they die and dry out. This 'shepherd's crook' appearance is typical of fire blight symptoms on other host plants. As the disease progresses down infected canes, the leaf petioles and veins and surrounding tissue turn black. Discolored veins may be more apparent from the underside of leaves. Entire leaves may turn black, wither, and die. Typically, dicoloration and dieback are limited to tender young growth at shoot tips.

Raspberry cane tip bent in 'shepherd's crook' from fire blight. Photo from Wisconsin Cooperative Extension fact sheet A3499

The disease can affect fruit clusters as well. Infected fruit stems turn black and the young developing fruit becomes hard an dry.

Cause

Fire blight is cause by the bacterium *Erwinia amylovora*. Raspberry infections are caused by a different strain of the bacterium that what causes apple/pear infections and so infections can not travel from one to the other. Infections are most likely spread from plant to plant by insects, wind and splashing rain. Wet conditions in the canopy from rain, high humidity, overhead irrigation combined with warm temperatures favor disease development.

Disease Management

Cultural controls are very important in managing this disease. The following practices

Discoloration of leaf tissue along veins showing spread of bacteria in the plant. Photo from Wisconsin Cooperative Extension fact sheet A3499

offer effective methods for limiting the spread of this disease in commercial raspberries:

1. Only plant with certified disease-free nursery material purchased from a reputable source
2. Use good sanitation practices in the field by removing and destroying all diseased and infested plant material as soon as it is found in the field and cleaning tools, especially pruning clippers, before using them in another field.
3. Manage insect pests to avoid transmission of diseases from one planting to another. Do this by regularly scouting the field to determine need rather than preventative spraying.
4. Do not overfertilize with nitrogen which stimulated excessive vegetative growth resulting in a dense and we interior canopy.
5. Plant and prune with an eye toward optimizing air circulation within the rows to help create good drying conditions as well as good spray penetration and coverage when sprays are applied.
6. Remove any wild brambles from surrounding areas which can be reservoirs of insect pests and pathogens than move into commercial plantings.

Cultivar Resistance

Fire blight infects red and black raspberries and blackberries. There are not truly resistant cultivars available, but some are more susceptible than others. Boyne, K81-6, and Encore are identified as more susceptible to this disease.

Chemical Control

No chemical controls are specifically registered for fire blight in raspberry. A delayed dormant copper application for other target diseases may help reduce inoculum, but may result in tissue damage in some copper-sensitive varieties. Following good cultural practices outlined above is recommended over relying on any spray applications.

BLUEBERRY

Post-bloom Management of Fruitworms in Blueberry

Rufus Isaacs and John Wise, Michigan State University

With blueberry bloom complete in much of Michigan and beekeepers removing colonies from fields, grower insecticide options for fruitworm control expand. Blueberries are at risk from infestation by cherry and cranberry fruitworm, two moth pests whose larvae have the potential to infest fruit at harvest and which can cause reduced yield if populations are high.

During the past week, monitoring traps have detected increasing catches of cranberry fruitworm across southwest Michigan and cherry fruitworm moths continue to be trapped. Scouting of bushes has revealed fresh cherry fruitworm and cranberry fruitworm eggs on clusters in Van Buren, Allegan, and Ottawa counties, and the first entry holes of larvae into fruit have been found. This emphasizes the need to maintain active management of these pests and continue monitoring in the coming weeks after bloom, because fruitworm activity typically extends throughout June. Once bees are removed from the fields, broad spectrum insecticides become an option that growers can consider for protecting their berries from fruitworm infestation.

Guthion, Imidan, Lannate, Asana, Danitol, and Sevin are effective broad-spectrum insecticide options available to blueberry growers. With all these products, maintaining good coverage of the clusters is still important, to get residue to the parts of the berry where fruitworms are found such as in the calyx cup where eggs are laid. The larvae of the two species chew into the berries in this location with cranberry fruitworm larvae preferring to enter berries at the stem end. Because these insects move over such a small distance, it is important to use sufficient water and to consider spray additives (spreader-stickers) that will help spread the material across the berry surface.

EPA's phase-out of Guthion will remove this insecticide from blueberry production by the end of 2012. Given the current reliance on this chemical for fruitworm control, it would be wise for growers to test alternative programs on a few fields this season, so that an effective fruitworm control program is in place when Guthion is completely restricted. There are many options for chemical control of fruitworms,

including some recently-registered products such as Assail that has performed well in our recent trials and Delegate which we are testing this season for the first time. See our earlier article in the *Fruit CAT Alert* from **May 20** for a description of these options and their performance characteristics .

Research trials in Michigan have demonstrated that Confirm applied at 16 oz/acre after bloom to fields with low or moderate fruitworm pressure can also achieve control of these pests. This insecticide has the benefit of minimal negative impact on natural enemies such as parasitic wasps, ladybeetles and lacewings, plus long residual activity because of resistance to wash-off and ultraviolet breakdown. We expect similar performance from the recently-registered Intrepid at 12 oz/acre. In trials conducted at commercial blueberry farms over the past few years, a program that used Confirm during bloom followed by Asana post-bloom was effective against fruitworms. We are also testing a Confirm, then Delegate, then Assail program this season. For organic growers, formulations of B.t. such as Dipel, Javelin, etc. and the spinosyn insecticide Entrust provide good control, but they must be reapplied every four to five days and they are not resistant to wash-off.

In fields with a history of high infestation by fruitworms and where traps continue to trap, an additional application of insecticide may be required to protect fruit. The residual activity of the previous insecticide and the amount of rain since the last spray will be critical determinants of the need for reapplication. Residual control under dry conditions ranges from a few days for B.t. up to a few weeks for Guthion, Confirm, and Intrepid. Few insecticide residues can withstand an inch of rain, although Confirm and Intrepid are the most rain-resistant of the current options. While decision-making during this wet time of year can be very challenging, it is important to maintain regular checking of fruitworm monitoring traps, to check the bushes in hot-spots for eggs or larval entry-holes into berries, and to think about the amount of rain since your last spray to protect the fruit. (***Source**: Michigan State Fruit Crop Advisory Team Alert, Vol. 23, No. 10, June 10, 2008*)

GRAPE

Disease Control in Grapes Critical During and After Bloom

Annemiek Schilder, Michigan State University

As bloom is approaching in grapes, we should remember that this period as well as the post-bloom period is critical for disease control in grapes. During these growth stages, the young clusters are highly susceptible to diseases, including black rot, downy mildew, powdery mildew, and Phomopsis and most of the fungi are active at this time of year (they are no dummies!). The risk is especially great if we have a lot of rain and moderate to warm temperatures during this time. Prolonged wet conditions during bloom can also allow Botrytis to get a foothold in the clusters of susceptible varieties by promoting growth on senescing flower parts.

The main aim for fungicide sprays at this time is to protect the clusters from infection by these pathogens while simultaneously protecting the foliage as well. Some infections that occur during this period may remain dormant (invisible) until the berries are close to veraison (black rot) or ripen (Phomopsis, Botrytis). As the berries grow and mature, they become naturally resistant to black rot, downy mildew, and powdery mildew infections and the need for protection diminishes. This happens quite rapidly (two to three weeks after bloom) for downy mildew, three to four weeks after bloom for powdery mildew and four to five weeks after bloom for black rot in Concord grapes. Some wine grape varieties may remain susceptible to black rot for up to eight weeks, however.

However, be aware that the cluster stem (rachis) and berry stems can remain susceptible longer than the berries in most cases. The only disease to which berries remain susceptible throughout their development is Phomopsis, but the risk of infection diminishes after bunch closing because inoculum levels drop off then. Botrytis is just the opposite in that berries actually become more susceptible as they get closer to harvest, especially in tight-clustered varieties. In general, aim to protect the clusters from the major diseases from immediate pre-bloom until four to five weeks after bloom. If cluster development is variable (e.g., as the result of a spring freeze or variable weather conditions), make sure that the slowest-developing clusters have caught up before easing up on the spray program.

Black rot

Temperatures in the high 70s and low 80s are perfect for black rot. At these temperatures, only six to seven hours of wetness are needed for infection. Black rot is a tricky disease in that infections can remain latent (dormant) for a long period of time, so you won't know that you have the disease until is it too late to do anything about it. However, one can scout for leaf lesions – a lot of black rot leaf lesions indicate high disease pressure from ascospore inoculum and also contribute to fruit infections. In a field with a history of black rot, old fruit cluster remnants left hanging in the trellis are major contributors to infection. Fruit infections can take place anytime from bloom onwards, but only become apparent

sometime between bunch closure and veraison. As mentioned above, grape berries are highly susceptible to black rot infection for the first two to three weeks after bloom. Then they become progressively less susceptible as they develop. In general, Concord berries become resistant to infection about four to five weeks after bloom, while some *V. vinifera* cultivars don't become fully resistant until eight weeks after bloom. Thus, the period from immediate pre-bloom through early fruit development is crucial to protect grapes against black rot infection.

In five years of trials in New York, good black rot control was achieved with one immediate pre-bloom and one to two post-bloom fungicide sprays. The second post-bloom application is strongly advised if black rot has been a problem in the vineyard the previous year, and should be considered prudent if wet weather is anticipated. During three years of fungicide trials in a 'Concord' vineyard in Fennville, Michigan, just two post-bloom applications of SI fungicides have provided very good control under high black rot pressure. An immediate pre-bloom application is advised only if black rot was severe in the vineyard in question in previous years.

Sterol-inhibitor fungicides (e.g., Nova and Elite) continue to provide outstanding control of black rot, and provide several days of post-infection activity. Currently, there are various "generic" tebuconazole products on the market, e.g., Orius and Tebuzol, that may be more cost-effective. When using SI fungicides on a post-infection schedule, use the highest label rates, because post-infection activity is strongly rate-dependent, particularly when extended "kickback" activity is required. The strobilurin fungicides (Abound, Flint, Sovran, Pristine) are excellent protectants, but provide only limited post-infection activity (probably <24 h). Flint and Pristine should not be used on Concord grapes because of potential phytotoxicity.

Phomopsis

Cane and leaf lesions have been showing up in vineyards. Each rainfall event now will lead to spore dispersal and can also lead to successful infection if the tissue remains wet for a sufficient amount of time. The optimum temperature for infection is 59-68ºF, at which time about six to10 hours of wetness are needed for infection. The longer the tissue stays wet, the more severe the symptoms will be. Since rachis and flower clusters are now fully exposed, we should be concerned with preventing Phomopsis infection of the rachis and fruit, especially in mechanically pruned vineyards and vineyards with a history of the disease. Rachis infections are most closely correlated with yield losses at harvest.

If at this time you find a lot of lesions on the leaves and canes, infection pressure will be high for the fruit also. Best fungicide options for control of Phomopsis during and after bloom will be Abound, Sovran or Pristine (do not use Pristine on Concord grapes). Phosphorous acid fungicides such as ProPhyt and Phostrol area also good and cost-effective alternatives. These are systemic and will most likely provide some kick-back activity. In trials done in Michigan, ProPhyt provided very good control of Phomopsis when sprayed on a 14-day schedule. Tighten the schedule and increase the rate if disease pressure is high. Ziram is a moderate to good protectant against Phomopsis and can be a tank-mix partner with any of the phosphorous acid fungicides. EBDC fungicides are good protectants but cannot be applied after bloom has started in grapes grown for the National Grape Cooperative. EBDC's have a 66-day pre-harvest interval.

Powdery mildew

No powdery mildew has been sighted in vineyards yet. However, we have had several occasions for primary ascospore release this spring. Ascospore discharge is initiated in the spring if 0.10-inch or rain occurs at an average temperature of 50ºF or more. This results in thorough wetting of the bark where the cleistothecia have overwintered. When the cleistothecia are sufficiently wetted, infectious ascospores are discharged within four to eight hours and are carried by wind to susceptible plant tissues. They can infect any green surface on the developing vine and do not need water for infection. The fungus then grows on the plant surface and produces a second type of spore (conidia) which are windborne and cause secondary infections. Under optimal conditions, the disease can spread rapidly, as the time from infection to production of conidia can be as short as seven days. Although infections can occur at temperatures from 59 to 90ºF, temperatures between 68ºF and 77ºF are optimal for disease development. Temperatures above 95ºF inhibit spore germination, and the fungus may be killed at temperatures above 104ºF.

Berry age has a marked effect on susceptibility to powdery mildew. Researchers in New York showed that when clusters of 'Chardonnay', 'Riesling', 'Gewürtztraminer', and 'Pinot noir' were inoculated from pre-bloom to six weeks post-bloom, only fruit inoculated within two weeks of bloom developed severe powdery mildew. Berries became substantially resistant to infection by three to four weeks after bloom, resulting in diffuse, non-sporulating colonies on berries, and were virtually immune at six to eight weeks after bloom. Therefore, early sprays (from immediate pre-bloom until three to four weeks after bloom) are critical for preventing powdery mildew on the clusters. This usually coincides with critical sprays for black rot. For wine

grapes, control of diffuse infections is also important as these can predispose the grapes Botrytis bunch rot and sour rot later in the season.

Sulfur remains an effective and inexpensive protectant fungicide for powdery mildew control in non-sulfur-sensitive grape varieties. The most effective systemic fungicides for powdery mildew control are the sterol inhibitors (Nova, Elite, Vintage, etc.) and the strobilurin fungicides (Pristine, Sovran, Abound and Flint). Luckily, we do not have any reports of fungicide resistance to strobilurins in the powdery mildew fungus in Michigan, but in some vineyards where sterol inhibitors have been heavily used for many years, they appear to be less effective than they used to be. New fungicide options that provide excellent control of powdery mildew are Quintec and Endura. Therefore it would be best to not entirely rely on SI's during the most critical period for fruit infection (immediate pre-bloom until three weeks after bloom) but alternate or tank mix with other effective fungicides. Last year, we did notice that Ziram as a tank-mix partner did improve control of powdery mildew in a spray program.

Downy mildew

Downy mildew primary infections start if rains occur (at least 0.4 inches) and temperatures are above 50ºF over a 24-hour period. Check the recent weather conditions at or near your location on the Enviro-weather website (**www.enviroweather.msu.edu/**). It takes seven to 12 days for the lesions to form after infection has taken place, so keep an eye out for downy mildew. Early in the season, downy mildew lesions may be confused with low-concentration Gramoxone and possibly Chateau herbicide injury, which also cause yellow spots on leaves. However, if no herbicide was used and no herbicide spots are present on lower leaves, the spots may be downy mildew. To confirm that you can enclose a leaf with lesion in a ziplock bag with a moist paper towel and leave it out in the dark overnight. If white sporulation appears on the underside of the leaf, it is downy mildew.

A spray for downy mildew before or just after bloom is recommended for susceptible varieties, especially in vineyards with a history of disease. Early infections can lead to severe downy mildew infection and premature defoliation of the vine. Ridomil Gold MZ and Ridomil Gold Copper have excellent curative and protectant activity against downy mildew. Under moderate infection pressure, they will provide three to four weeks of protection. Of the strobilurins, Pristine, Abound, and Sovran are good choices. Other effective fungicides are mancozeb, ziram, and fixed coppers. ProPhyt and Phostrol are also good alternatives: they provide excellent curative and about seven to 10 days of protective activity. Under high disease pressure or when spraying after an infection period, use higher rates. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 23, No. 9, June 3, 2008*)

Canopy Management – Shoot Thinning and Positioning

Joe Fiola, University of Maryland Cooperative Extension

Vigor so far this season has been high even with less than normal rainfall, especially compared to last year. Many vigorous varieties and variety/rootstock combinations are continuing to increase in shoot length. This is a critical time to do some basic canopy management chores, shoot thinning and positioning especially in vertical shoot positioned (VSP) trellises with movable or static catch wires. Critical timing of positioning canes for Smart Dyson and Scott

Henry is also close depending on the variety and location. You should have already thinned out your shoots when they were about 6 inches, but most canopies experience regrowth and this is the critical time to get in there again to verify your density.

- Some sites (e.g., heavy, fertile soils) and varieties (e.g. Cabernet Sauvignon) are prone to high vegetative vigor and the risk of overcrowded canopies.
- Overcrowded/dense canopies are more prone to disease due to lack of air movement, resulting in high humidity and increased canopy drying time in the morning or after precipitation, as well as poor pesticide penetration.
- Overcrowded/dense canopies are more prone to shaded cluster which may result in decreased varietal character and delayed ripening.
- To maintain good vegetative/reproductive balance in the vineyard, you are typically pruning for a baseline of about four to six shoots per linear foot of trellis for VSP.
- This is also a good time to thin out weak and unwanted primary and secondary shoots to get to your final density. These can typically still be snapped off by hand without needing pruning shears or causing damage to the spur or cane.
- Position the shoots within the catch wire before the tendrils start to attach as this will make the job much

more difficult and greatly increases the possibility of breaking the shoots while moving.

- Timing of positioning the shoots downward for Smart-Dyson and Scott-Henry usually occurs within a short window for individual varieties – before the shoots may break off –after the shoots may not move. You need to work with each variety/location combination to get the timing correct.
- Delaying until later to conduct these operations will greatly increase the time that will be necessary to achieve the same result.
- There have been some questions regarding the importance or necessity to shoot thin. Some are concerned that they might not have large enough crop if they thin down to the suggested level of shoots. **I cannot over-emphasize the importance of shoot thinning down to the recommended four to six shoots per linear foot of trellis for VSP for both pest management and fruit quality reasons.**
- Leaving more than the recommended range will result in overcrowded, very dense canopies.
  - Crowded canopies are more prone to disease because they do not dry out as quickly in the morning or after precipitation due to lack of air movement.
  - Crowded canopies maintain high humidity in the canopy micro-climate that exacerbates disease problems.
  - Crowded canopies limit pesticide penetration that will reduce efficiency and exacerbate disease problems.
  - You will see much high incidence of downy and powdery mildew in crowded canopies.
  - Botrytis and other late season fruit rots will also be more difficult to control.
- As for crop volume (yield), the recommended shoot density has been shown to give yield within the recommended range. Most of the shoots have multiple clusters and the vine has the potential to compensate when shoots are removed.
  - In almost all cases you will still have to drop additional clusters later to get down to the level of crop level that you can fully ripen. You can estimate and adjust your crop later in the season.
- As for fruit quality, again I cannot over-emphasize the importance of shoot thinning to allow adequate sunlight into the canopy and especially the clusters.
  - The next "Timely Vit" will discuss leaf pulling to expose the clusters to reduce herbaceouness in red grapes.
- There is lots of evidence that shows that an open canopy with good light penetration to clusters results in more uniformly ripened fruit with higher levels of secondary products and varietal character.
- NOW is the best time to get this done, as the longer you wait:
  - the more difficult it is to physically get into the canopy
  - the more time it will take to decide which shoots to cut
  - the more difficult it is to make the cuts (young shoot easily snap off with your hand - older shoot need to be cut with pruning shears to avoid damage to the cordon)
  - the tendrils will attach and make it difficult to remove the shots.
  - the tendrils will attach and make it more difficult to move the catch wires.
  - disease will get established in the canopy making it more difficult if not impossible to control later.
- If your goal is ripe, disease free, high quality, fruit, this is a critical management practice that needs to be accomplished very soon.

(***Source**: Maryland Timely Viticulture, Mid June 2008*)

General

The Challenges of Disease Control During Rainy Spells

Annemiek Schilder, Michigan State University

Extended periods of wet weather spell feast for fungal plant pathogens, since they are highly dependent on moisture for spore dispersal and plant infection. While dry spells earlier this spring might have threatened to create a "famine" year for fungi, the tables have indeed turned. Repeated or continuous wetting of infected tissues over several days is particularly conducive to spore production as it allows thorough wetting of infected canes or other overwintering plant parts and promotes spore release. In addition, heavy rains assist rain-splash-dispersed pathogens in getting the spores to susceptible plant tissues. Furthermore, extended wetness periods (12-48 hours) provide ample moisture for spore germination and infection of plant tissues. Diseases in small fruit crops that are promoted by warm wet weather include Phomopsis diseases; black rot, downy mildew, and anthracnose of grapes; leaf spot, spur blight, and anthracnose of raspberries; common leaf spot, Phomopsis leaf blight, scorch, and fruit rots in strawberry; and rusts in raspberries and blueberries. While powdery mildew generally thrives under warm-dry conditions, it does need rainfall in the spring and early summer to release ascospores

from overwintered cleistothecia. So, rainfall at this time will increase powdery mildew disease risk later this season.

The challenge is to apply sprays before rainfall events – with as much rain as we've had it is likely that most protectant fungicides have been washed off. A study by Xu et al. (2008) showed that when Captan was applied to apple leaves, Captan loss was primarily due to wash-off by rain. In fact, as little as one mm of rain washed off about 50 percent of Captan. Subsequent rainfall did not result in much more loss of the fungicide. The results may be explained by the fact that most of the Captan on fruit/leaf surfaces following an application can be washed off easily, but the remaining deposit is more tenacious. This has to be taken into account and the application rate may be adjusted accordingly. During periods like these, especially when followed or accompanied by windy conditions, it is very difficult to get the fungicides on at the right time, e.g., before an infection. This may be further complicated by fields being flooded preventing access with sprayers. Systemic fungicides should be used to get: 1) better coverage, 2) better rain-fastness, and 3) kick-back (curative) activity. They generally provide better disease control during or after extended rainy periods. Products are usually rain-fast within a couple of hours of drying, although longer drying periods may be better. The **table** (pdf format) shows which fungicides for small fruit crops are systemic or have systemic components. If relying on post-infection activity, use them at the highest labeled rate for the crop. Do consider that even systemic fungicides work better when thorough coverage is strived for by increasing spray volume and spraying every row or every other row. The pre-harvest interval and re-entry interval should also be considered as we are at or approaching.

Table 1. Characteristics of fungicides for disease control in small fruit crops (grapes and berry crops).

Fungicide	Active ingredient	Chemical group	FRAC group*	Risk of resistance	Mode of action	PHI (days)**	REI (hours)**
Abound	azoxystrobin	Strobilurins	11	High	Systemic	0-14	4
Aliette	fosetyl-Al	Ethylphosphonates	33	Low	Systemic	0-60	12
Armicarb	potassium bicarbonate	Salts/Inorganics	–	Low	Protectant	0	4
Bravo	chlorothalonil	Chloronitriles	M5	Low	Protectant	42	24
Cabrio	pyraclostrobin	Strobilurins	11	High	Systemic	0	12
Captan	captan	Phthalimides	M4	Low	Protectant	0-3	24-96
Captevate	fenhexamid + captan	Hydroxyanilides + Phthalimides	17, M4	Low to medium	Syst. + Prot.	0-3	24
Copper	copper	Inorganics	M1	Low	Protectant	0	24
Dithane/Penncozeb	mancozeb	Dithiocarbamates	M3	Low	Protectant	66	24
Elevate	fenhexamid	Hydroxyanalides	17	Low to medium	Systemic	0	12
Elite/Orius	tebuconazole	Sterol inhibitors	3	Medium	Systemic	14	12
Endura	boscalid	Carboxamides	11	Medium	Systemic	14	12
Flint	trifoloxystrobin	Strobilurins	11	High	Systemic	14	12
Gavel	zoxamide and mancozeb	Benzamides	22	Low to medium	Syst. + Prot.	66	24
Kaligreen	potassium bicarbonate	Salts/inorganics	–	Low	Protectant	1	4
Nova/Rally	myclobutanil	Sterol inhibitors	3	Medium	Systemic	0-14	24
Orbit/PropiMax	propiconazole	Sterol inhibitors	3	Medium	Systemic	0-30	24
Oxidate	hydrogen peroxide	Inorganics	–	Low	Protectant	0	4
Pristine	pyraclostrobin + boscalid	Strobilurins + carboxamides	7, 11	Medium to high	Systemic	0-14	12
Procure	triflumizole	Sterol inhibitors	3	Medium	Systemic	1-7	12
ProPhyt/Phostrol	phosphorous acid	Phosphonates	33	Low	Systemic	0	4
Quintec	quinoxifen	Quinolines	13	Medium	Systemic	1-14	12
Ridomil Gold	mefenoxam	Phenylamides	4	High	Systemic	0-45	48
Ridiomil Gold MZ/Cu	Mef. + mancozeb/ copper	Phen. + dithiocabamates/ inorganics	4, M3/ M1	Medium to High	Syst. + Prot.	66/42	48
Rovral	iprodione	Dicarboximides	2	Medium to high	Protectant	0-7,a***	24-48
Rubigan/Vintage	fenarimol	Sterol inhibitors	3	Medium	Systemic	30	12
Scala	pyrimethanil	Anilinopyrimidines	9	Medium	Systemic	1-7	12
Serenade/Sonata	*Bacillus subtilis/B. pumilus*	Biological	–	Low	Protectant	0	4
Sovran	kresoxym methyl	Strobilurins	11	High	Systemic	14	12
Sulfur	sulfur	Inorganics	M2	Low	Protectant	0	12-24
Switch	cyprodinil + fludioxinil	Anilinopyrimidines + Phenylpyrroles	9, 12	Low to medium	Syst. + Prot.	0	12
Thiram	thiram	Dithiocarbamates	M3	Low	Protectant	3	24
Topsin-M	thiophanate methyl	Methyl benzimidazole carbamates	1	High	Systemic	1-14	12
Vangard	cyprodinil	Anilinopyrimidines	9	Medium	Systemic	7	12
Ziram	Ziram	Dithiocarbamates	M3	Low	Protectant	14-21	48

*FRAC = Fungicide Resistance Action Committee; – = no group assigned. If fungicides are in the same group, fungi may display or develop cross resistance., ** PHI and REI depend on the crop, ***Rovral may not be applied after first fruiting flower on strawberries.

Upcoming Meetings:

June 17, 2008 **UMass Fruit Program Twilight Meeting, Kosinski Farms, 420 Russelville Rd., Westfield, MA**
5:30 PM Farm tour including update on phenology and current pest status
6:30 PM Speaking program will include updates on current cultural practices and integrated pest management approaches
Pesticide license re-certification credit (2 hours) will be offered at all meetings. You must be there on time to receive credit(s). $20 per person registration fee. Light refreshments or dinner are typically served.
Directions: From Mass. Turnpike Exit 3; left @ light on Rte. 10 & 202; left @ 2nd light onto North Rd.; left at stop sign (farm stand is at this intersection), then app. 1/4 mile to Kosinski Farms driveway on right.
www.kosinskifarms.com, map it

June 18, 2008 **UMass Fruit Program Twilight Meeting, Shelburne Farm, 106 West Acton Rd, Stow, MA**
5:30 PM Farm tour including update on phenology and current pest status
6:30 PM Speaking program will include updates on current cultural practices and integrated pest management approaches
Pesticide license re-certification credit (2 hours) will be offered at all meetings. You must be there on time to receive credit(s). $20 per person registration fee. Light refreshments or dinner are typically served.
Directions: Take I-495 to the exit for Route 117 East (Stow, Bolton). Turn left at the end of the exit ramp onto Route 117 East. Proceed on 117 East about 5 miles to Stow Town Hall. There is a fork in the road immediately in front of the Stow Town Hall. Bear Left at the fork (off of 117 East, you will cross the 117 Westbound lane) and proceed to the four-way stop in front of the Stow Fire Department. Proceed straight through the 4-way stop and continue about one-half mile, following the yellow signs straight ahead to Shelburne Farm. The farm will be on the left hand (Southbound) side of West Acton Road. (Map it.) www.shelburnefarm.com

June 19, 2008 **UMass Fruit Program Twilight Meeting, Sweet Berry Farm, 19 Third Beach Rd., Middleton, RI**
5:30 PM Farm tour including update on phenology and current pest status
6:30 PM Speaking program will include updates on current cultural practices and integrated pest management approaches
Pesticide license re-certification credit (2 hours) will be offered at all meetings. You must be there on time to receive credit(s). $20 per person registration fee. Light refreshments or dinner are typically served.

Directions: From NORTH & EAST: Take 138 south. At Mitchell's Lane (on the Portsmouth/Middletown line) TURN LEFT. We are 1.8 miles on the right. From SOUTH & WEST: From 138 NORTH to Newport/Pell Bridge, follow FALL RIVER - CAPE COD Exit. At light (across from Newport Grand) TURN LEFT. Travel approx. 3 miles. (Do not take any turns - road changes name to Green End Ave). At Third Beach Road TURN LEFT, take NEXT LEFT onto Mitchell's Lane. We are on the left. (Map it.) www.sweetberryfarmri.com

July 9, 2008. **New Hampshire Tree Fruit Twilight Meeting.** 5:30 - 8:00 pm. This meeting was scheduled in response to a request made by Tracy Leskey. Dr. Leskey will have research projects going on at both Poverty Lane Orchard (West Lebanon), and Apple Hill Farm (Concord). We will be finalizing which site for the meeting later. Speakers: Dr. Tracy Leskey, Research Entomologist at the USDA-ARS Appalachian Fruit Research Station in Kearneysville, WV and Dr. Starker Wright, Support Scientist at the USDA-ARS Appalachian Fruit Research Station in Kearneysville, WV. For more information, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.

July 23, 2008 - **The Great Ideas Summer Conference, The Crane Estate, Ipswich, MA 8:00 AM – 3:30 PM**.
Sponsored by: Massachusetts Flower Growers Assoc. (MFGA) and Massachusetts Nursery Landscape Assoc. (MNLA)
Educational program, tours, trade show and great food! Featuring – Judy Sharpton, Growing Places Marketing, Atlanta, Georgia. Judy has over 20 years experience in advertising and promotion specializing in store design and renovation, development of product-based promotion plants and development of customer communication programs. Judy will present a two-part Store School. She will cover consumer trends and how you can respond to trends at your store level and store layout from entrance to cash wrap. *Total 3-1/2 pesticide credits*. For more information go to **www.mnla.com**.

Aug. 20-21, 2008 **NASGA Summer Tour** Columbus, Ohio. See http://www.nasga.org/ for more information

September 18, 2008, ***On Your Way to Growing Greener*: Using Biological Control in Greenhouses 9:15 AM – 3:45 PM Sturbridge Host Hotel and Conference Center, Sturbridge, MA** *Sponsored by: University of Massachusetts, University of Connecticut, University of Rhode Island and Northeast SARE* ***Featuring Stanton Gill, (University of Maryland) and Suzanne Wainwright-Evans, (Buglady Consulting).***
Topics will include: Why Should Growers and Retailers Consider Biological Control in Their Greenhouses, Practical Steps in Starting a Biological Control Program: Is it for you? What crops should you start with? Sources and Quality Control of Natural Enemies, Which Natural Enemies are Best for Fungus gnats, Spider mites, Thrips and Aphids: How to use them, Compatibility, Where and how to release them, What rates to use, *Examples of Live Specimens!,* Using Banker Plants, "Future" New Products, Case Studies: Real Experiences of Greenhouse Growers, Panel of Wholesale Growers and Grower Retailers Cost: $35 (includes Handouts, Refreshments, Lunch) Four pesticide recertification credits for attendees from CT, MA, RI, ME, NH and VT

Nov. 6-8, 2008 **Southeast Strawberry Expo**, at the Hilton Charlotte University Place, Charlotte, NC. Includes Strawberry Plasticulture Workshop for New Growers, farm tour, educational sessions, and trade show. For more information, email info@ncstrawberry.com

Dec. 8-10, 2008, **North American Raspberry & Blackberry Conference** in Grand Rapids, MI, as part of the Great Lakes Expo. For more information, email info@raspberryblackberry.com.

Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program, which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements of products mentioned in this newsletter over like products are intended or implied. UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800.