



Berry Notes

Prepared by the University of Massachusetts Fruit Team

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Massachusetts Berry Notes Underwriters:



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UPCOMING MEETINGS

Current Conditions:

Strawberries: Harvest is progressing. Continuous wetting periods have caused ideal conditions for fruit rot. Prompt and regular harvesting will help reduce fruit rot pressure but some fungicide applications to stop spread may be needed. Root weevil adults will begin emerging soon. Watch for marginal notching of leaves from nocturnal feeding. Control measures may be needed in fields that will be carried over for another fruiting season. Renovate or plow down fields as soon as possible after harvest is complete. This will help suppress insect and disease populations that may have built up this season. **Blueberries** are approaching harvest. Blueberry Scorch has been found in Massachusetts. Be sure to check for aphids and promptly control aphids in blueberries as they can vector the blueberry scorch virus from infected to healthy plants. See more on this in the Blueberry section of this newsletter. Be sure to check blueberry maggot traps regularly. Early control measures will target both male and female flies before they mate and can help reduce the need for later sprays when berries are closer to harvest. Late varieties may still benefit from fungicide applications to control anthracnose and alternaria fruit rots. Blueberry plants with fruit and few or no leaves indicates that there is *most likely* a root problem caused by insects, diseases, or rodents. Bushes have to be dug up to determine the exact cause and determine the correct remedy. **Raspberries** are also approaching harvest. Some sites may have already started picking early varieties like 'Revielle' and 'Prelude'. Primocanes may show flagging from infestation by cane borers. These should be cut out below any sign of tunneling. Watch for twospotted spider mites and potato leafhopper, especially in fall fruiting varieties. Powdery mildew may be a significant

problem this year. **Grapes** are past bloom into fruitset. This is a key period for controlling diseases that can cause trouble later in the season, after bunch closure. A vigorous disease management program should be continued. Insects that will need attention now are Potato Leafhopper, rose chafer/Japanese beetle and Grape Berry Moth. Cluster thinning and shoot positioning should be underway. **Currants and Gooseberries** harvest is beginning. Powdery mildew is a significant problem in this crop. Also, watch for two-spotted spider mite, potato leaf hopper, currant borer and gooseberry fruitworm. Severe heat may result in fruit drop, especially in gooseberries.

– 2008 New England Small Fruit Pest Management Guide –

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 11, 2008 through June 17, 2008. Soil temperature and phenological indicators were observed on June 17, 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	131	566	70°F	0.90"
Southeast	165	619	72°F	1.40"
East	122	652	65°F	0.80"
Metro West (Waltham)	141	582	70°F	0.90"
Metro West (Hopkinton)	174	626	70°F	1.25"
Central	105	564	60°F	1.18"
Pioneer Valley	127	657	69°F	0.99"
Berkshires	159	667	68°F	2.60"
AVERAGE	141	617	68°F	1.25"

n/a = information not available

(Source: UMass Extension 2007 Landscape Message #16, June 19, 2008)

STRAWBERRY

Strawberry Harvest and Storage/Shipping Considerations

Craig Kahlke, Cornell University Cooperative Extension of Niagara County

Strawberries are among the most perishable of all fruits, and thus it is critical that marketing channels are open before harvest starts. Strawberries are extremely susceptible to bruising, and rough handling at harvest and during any time thereafter will encourage fungal growth and decay. It is critical that personnel be trained in the careful picking and handling of fruit. In addition, fruit quality declines as the season progresses, so the highest quality fruit will be earliest in the season. With varying degrees of ripeness in single plantings, it is also extremely important that the fruit is harvested as near peak ripeness as possible.

Strawberries Destined for Direct Markets

Since most strawberry markets in the Northeast are consumed very close to the farms in which they are produced, many growers lack and may not need the cold storage facilities used by long-distance shippers such as those employed by the production areas in California and Florida. Direct market channels are ideal

for many growers in the Northeast, as fruit loss is further accentuated from shipping from the farm to wholesalers, and from the wholesalers to retail markets. By bypassing wholesale shipping, fruit loss due to bruising and fungal decay can be reduced by 20%. For optimum quality, it is critical that direct market fruit is harvested at or very near peak ripeness. Top quality strawberries should be fully ripe, with a uniform red color, be firm, flavorful, and show no signs of decay or disease.

Temperature is the single most important factor affecting shelf life of strawberries.

If cooling down to the recommended 32 F is an issue for growers, research shows that strawberries held at 50F storage at high humidity will benefit storage life greatly as compared to room temperature storage. In addition, strawberries at 50F tend to retain their color and glossy appearance better than berries stored at 32F. Many direct-market local growers claim approximately 90% of their strawberries are consumed the day they are harvested, thus

in these cases, it is very critical that the berries be at peak ripeness. The berries are most often harvested in morning only when field heat is low, are usually then shipped out to markets on refrigerated trucks the same morning, reach the retail shelves by afternoon, and are bought and consumed within a day or two.

Strawberries Destined for Long-Distance Markets

For strawberries that are being transported beyond local markets, there are two factors that impact on maximum shelf life potential. First, the fruit will hold up better if they are harvested at the white tip stage, rather than fully ripe. Second, cooling is critical. As soon as harvest occurs, it is imperative that field heat is removed from the fruit. It is recommended that cooling is started within an hour of harvest. Ideally, 32F forced-air cooling with high humidity (85-95% RH) is recommended. Refrigeration without forced air can also be used, however, shelf-life will be shortened. Proper forced-air cooling removes field heat from fruit in around 90 minutes, while simple refrigeration without forced air can take about 9 hours. Proper ventilation around, below, and above the fruit is essential for removing field heat quickly.

Covering containers with plastic prior to cooling, and not removing plastic until berries are at room temperature for several hours after reaching market shelves will prevent condensation buildup on the inside of the bag and delay fungal growth. It is estimated that an hour delay in cooling the fruit results in reducing shelf life of fruit by one day. Following field heat removal, shipping on refrigerated trucks to market destinations is essential. If cold storage will be limited at market destination, as stated in the section on direct

marketing, research shows 50F storage at high humidity will benefit storage life greatly as compared to room temperature storage. In addition, strawberries at 50F tend to retain their color and glossy appearance better than berries stored at 32F. Shelf life from harvest to market and on the consumer's table is about 14 days maximum.

For growers interested in exploring the potential of longer distance markets, including a demonstration of forced-air cooling and its applications for other produce, see the "Handling Berries and other Perishable Produce for Quality" twilight workshops information elsewhere in this issue.

Acknowledgments – I wish to thank Jim Coulter, Marvin Pritts and Chris Watkins for their help in providing information for this article.

Resources:

1. Strawberry Production Guide for the Northeast, Midwest, and Eastern /Canada, NRAES-88.
2. 2008 Pest Management Guidelines for Berry Crops, Cornell University, Cooperative Extension.
3. Shin, YJ, Liu, R.H., and Watkins, C.B. Temperature and relative humidity effects on quality, total ascorbic acid, phenolics and flavonoid concentrations, and antioxidant activity of strawberry. *Postharvest Biology and Technology* 45: 349-357, 2007 (Online 5/3/07).
4. USDA, ARS Agriculture Handbook Number 66, The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks.

(Source: NY Berry News, Vol. 7, No. 5, June 2008)

RASPBERRY

Raspberry -- Fruit Rot and Cane Botrytis

Sonia Schloemann, UMass Extension

The fungus *Botrytis cinerea*, causes blossom blight, preharvest rot, postharvest rot, and cane infections in raspberries. It overwinters on canes, in dead leaves and as mummified fruit. Spores are produced in spring and begin a new infection cycle. A moist, humid environment is ideal for spore production and spread. All flower parts except sepals are very susceptible to infection by spores that land on flowers although these infections are latent; or dormant, until fruit ripens. In other words, no symptoms are visible at first. Because of this, growers must be aware of when their fields are in a susceptible growth stage and take measures to protect them from infection during that time. Other plant parts, as mentioned above, are also susceptible to infection and can cause cane leaf blights.

Wet weather or a lot of overhead irrigation is also necessary for high levels of infection to occur. Therefore, air circulation within the canopy, especially in the fruit

zone, is very important. This is accomplished through good pruning practices in the dormant season. If significant wetting periods occur during bloom, the likelihood of infection by Botrytis is very high, and control measures may be needed.

Symptoms: Rotted fruit, usually with tufts of gray fungus growing on surface. Pale brown lesions may appear on primocane leaves in mid- to late summer. Cane infections appear as tan to brown lesions often encompassing more than one node. These lesions can girdle the cane causing eventual cane collapse. Cane lesions exhibit typical concentric "watermark" patterns from fall through late winter.

Cultural control

1. Create an open plant canopy to promote optimal air circulation and drying conditions by using good pruning practices.

2. Avoid excessive nitrogen fertilization, which can promote excessive vegetative growth, and control weeds. These practices also improve air circulation, increase light penetration, and speed drying of plant surfaces after irrigation and rain.

3. Pick fruit in the coolest part of the day. Keep harvested fruit in shade while in the field, then move to cold storage as soon as possible.

4. Irrigate in early morning whenever possible so plants dry quickly. Switch from overhead to drip/trickle irrigation.

Chemical control Spray first at 5% bloom and then again 7 to 10 days later. More applications during the growing season aid control in wet weather. Thorough coverage and canopy penetration are essential.

Fungicide options are listed below (alphabetically, not in order of efficacy).

1. **Captan 80 WDG** at 2.5 lb/A. Do not apply within 3 days of harvest. 72-hr reentry.

2. **Elevate 50 WDG** at 1.5 lb/A. Do not use more than 6 lb/A/season. Can be used up to and including the day of harvest. 12-hr reentry.

3. **Pristine** at 18.5 to 23 oz/A. Do not use more than 2 consecutive applications or more than 4 times/year. Can be used day of harvest. 24-hr reentry.

4. **Rovral 4 Flowable** at 1 to 2 pint/A plus another fungicide with a different mode of activity. Can apply the day of harvest. Fungal pathogens have shown resistance to the action of Rovral when used exclusively. Alternate or tank-mix with other registered fungicides. Also limit to two applications per year. 24-hr reentry.

5. **Switch 62.5 WG** at 11 to 14 oz/A. May be used up to and including the day of harvest. Do not apply more than twice sequentially or use more than 56 oz/A/season. 12-hr reentry.

Raspberry Fruitworm

With the raspberry fruitworm, it is the worms or larvae that usually cause the most damage. However, the adult beetles are also capable of causing considerable injury to unopened buds and unfolding leaves and open flowers. The raspberry fruitworm prefers red and purple raspberries.

Symptoms

To the unsuspecting, the first evidence of a problem may be the presence of small yellowishwhite worms adhering to harvested fruit. However, there are actually numerous signs earlier in the season that can lead to detection. Infestations in early season are to be suspected if longitudinal holes in the foliage give leaves a tattered appearance. Such foliage injury is caused by adults (Figure 24) feeding on unfolding leaves, often skeletonizing them. As blossom buds appear, they are attacked by the adult beetles feeding on the inside. Numerous beetles may destroy the entire cluster of buds.

Fruitworms attack raspberry receptacles (Figure 25) and, at times, the carpels of the berry. In tunneling through the receptacles, the larvae cause extensive damage, often loosening berries to the extent that they may fall off. In some plantings, more than half of the berries are infested with larvae. With such heavy infestations, some of the wormy berries arrive at the market or processing plant with noticeable presence of worms, leading to rejection of fruit.

Seasonal History and Habits

Adult beetles emerge from the soil during late April and early May, about the time the first leaves of raspberries

are beginning to unfold. They begin to feed along the midrib of partially folded leaves and are found on the midrib of young leaves. Beetles later seek protection between the blossom buds where they attack the soft tissues of the supporting pedicles. As buds begin to separate, the insects attack the blossom buds, making large entrance holes to feed on floral parts. The females deposit their eggs most commonly on swollen, unopened blossom buds. However, at times eggs may be laid inside buds or on developing fruit. The grayishwhite eggs (about 1 mm [1/25- inch] long) hatch after a few days, and the larvae commonly bore through the bud and enter the receptacle where they begin to tunnel. As the larvae increase in size, the tunnels are made larger, ultimately becoming grooves in the receptacle adjacent to the berry. When infested fruit is picked, the larvae may become displaced and remain attached to the cuplike interior and thus are transferred to the harvesting basket. Those that remain on the receptacle soon drop to the ground where they pupate and remain over winter.

Description

The fully grown worm is slender, 5.75 to 6 mm (1/4 inch) in length, 0.53 mm (1/50 inch) wide, nearly cylindrical, tapering towards either end. Each segment has two transverse rows of sparse, lightcolored stiff hairs.

Control

It is helpful to maintain good weed control. Time chemical control applications to when fruiting buds first form and just before blossoms open. SpinTor, carbaryl, malathion and Pyrellin may be recommended. (*Source: Brambles - Production Management and Marketing, Bulletin 782-99*)

BLUEBERRY

NOTICE TO BLUEBERRY GROWERS: Blueberry Scorch (aka Sheep Pen Hill Disease or BBScV)

Sonia Schloemann and Frank Caruso, UMass

The presence of the Blueberry Scorch virus (aka Sheep Pen Hill Disease) has been confirmed an additional location in Massachusetts. In 2001 it was found in Barnstable County and in Berkshire County. It has recently been confirmed in Norfolk County. It is possible that this virus is present in other blueberry fields across the state.

Diseased plants can be recognized by some distinctive symptoms, but these symptoms vary with different varieties. This makes diagnosing the virus complicated. In the table below there is an outline of cultivars and the type of symptom expressed. For example, the blossom blight/twig blight condition is most pronounced in 'Berkeley', 'Weymouth',

'Pemberton' or 'Dixi'. 'Blueray' appears to exhibit different symptoms wherein a dramatic leaf yellowing is found. 'Bluecrop' may not exhibit very noticeable symptoms, but may suffer lower yields. Look at pictures of scorch in the NRAES Blueberry Production Guide or in the Blueberry Disease Compendium. For readers with Internet access, Washington State University has a very good fact sheet on Blueberry Scorch. It can be found at http://www.geocities.com/martinrr_97330/BISVweb/Pestalert.htm. In addition, Michigan State University has an excellent website with a page on Blueberry Scorch at: <http://www.blueberries.msu.edu/scorch.htm>.

Cultivar	Symptoms
<i>Chanticleer, Duke, Elliott, Berkeley, Weymouth</i>	Blossoms blighted, tip dieback evident, leaves stunted and chlorotic. This is considered the most severe expression of the disease
<i>Coville, Sierra</i>	Tip dieback evident with some blossom blighting. The bushes will set a crop although yields are reduced.
<i>Bluecrop</i>	Some blossom blighting and reduced fruit set, leaves chlorotic. Tip dieback is infrequent. Typically bushes show increasing symptom development over a period of years.
<i>Bluetta, Early Blue, Blueray</i>	No symptoms observed. Infections may be masked by other virus diseases such as red ringspot.
<i>Jersey</i>	Plants slightly chlorotic and berry load may be slightly reduced, no flower blighting or tip dieback

It is very important to note the symptoms described above in order to determine if you may have this virus at your farm. It is also very important to determine if you have aphids feeding on your bushes, since they are the vectors that will transmit the virus from one plant to another. Growers should take some time now to inspect their blueberry plants for aphids by looking at the underside of the leaves on newer growth. If you notice aphids on your plants, an insecticide application is needed to prevent the spread of this virus. If you suspect that you may have this virus in your blueberries you can have a diagnostic test conducted on plant tissue. A private testing laboratory in Indiana, Agdia, Inc. (<http://www.agdia.com/testing/> , Phone: 574-264-2014) can run this test. The cost is approximately \$60 per sample, but the cost goes down if you submit multiple samples (different fields should

be sampled separately, different varieties should be sampled separately). Infected plants should be removed now or flagged for removal later to limit the spread of this virus to uninfected plants. Do not remove symptomatic bushes until an insecticide has been applied for aphid control.

Key points for Blueberry Scorch Management

- **Identification, diagnosis.** Identify the causal organism (scorch symptoms are similar to several fungal diseases and abiotic damage). The most reliable method is via ELISA testing at a reputable laboratory.
- **Vector management.** Viruses must be transmitted by a vector such as an insect (aphids, leaf hoppers, beetles, white flies etc.), a nematode (such as the sting or dagger nematodes), pollen or mechanically by grafting, abrasion and pruning. For the scorch virus, aphids are considered the

primary insect vector and growers should follow current recommendations for aphid management. See the New England Small Fruit Pest Management Guide for recommendations.

• **Sanitation.** This refers to developing or maintaining a virus-free farm. Although proven successful, sanitation practices represent a serious time commitment and require significant effort. Removal of infected plants should be conducted yearly, as the virus remains latent

in the plant after its introduction into the plant and symptoms may take 2-3 years to develop. Symptom expression is greatest between bloom and fruit ripening, therefore scouting for diseased plants should be underway. If plants cannot be removed now they should be flagged for removal later because symptoms will decrease. For planting or propagating the grower should be certain that only healthy mother plants and certified planting material be used.

Mid-season Weed Control Options for Blueberries

Eric Hanson and Bernard Zandstra, Michigan State University

Spring-applied herbicides do not always provide adequate weed control through the harvest season. Summer flushes of annual grasses (crabgrass, fall panicum) or broadleaves such as pigweed often are problems. Some Michigan blueberry areas received large amounts of rain in early June, and this may reduce the effectiveness of preemergent herbicides by leaching materials below the weed seed germination zone. Easily leached herbicides are soluble materials that are held less tightly to soil particles. The leaching potential is hard to predict exactly for all soils, but common blueberry materials might be ranked as follows:

This means that weed control from Sinbar and Velpar is more likely to be reduced by heavy rains than perhaps Solicam. Unfortunately, herbicide options for use in mid-season are limited by label restrictions, primarily pre-harvest intervals. The label restrictions for preemergent materials are:

- Solicam: 60 days PHI.
- Karmex DF: Before germination and growth of weeds.
- Princep Cal-90: Not when fruit are present.
- Sinbar: During early seedling stage of weed growth.
- Velpar: Before budbreak.
- Chateau: Do not apply after bud break through final harvest.
- Callisto: Do not apply after onset of the bloom stage.

Several post-emergent herbicides can potentially be used in the summer. Some can still be used before harvest, but others cannot be applied until after harvest. Each herbicide has different characteristics that need to be considered when making choices.

Aim, Gramoxone, and Rely are burn-down materials. Pre-harvest intervals are listed on the labels for Aim (one day) and Rely (14 days), but the Gramoxone label indicates it should not be applied after growth begins. These herbicides kill treated plant parts, but do not move within the plant. As a result, perennial weeds are usually not killed because the chemical does not move to the roots. Rely may move slightly in plants, because it often provides a slightly better control of some herbaceous perennials, such as dandelion. Aim is relatively inexpensive, but does not control grasses. Rely is much more expensive, but controls broadleaves and grasses. All three herbicides kill green bark and leaves of blueberries, so take care to keep spray off blueberries.

Fusilade and Poast are selective grass killers; they have no effect on broadleaf weeds or blueberries. Poast has a PHI of 30 days, and Fusilade is only for non-bearing plantings. These products would not be effective if applied in the summer because the grasses are too old. Grasses must be treated when they are four to eight inches tall in the spring. If grass is taller, the control is poor.

Glyphosate (Roundup) products have a PHI of 14 days, so they can still be applied to most fields. Glyphosate is the most effective postemergent herbicide for blueberries, but also the most hazardous because it is absorbed by green tissues and moves throughout the plant. Perennial weeds are killed because the chemical moves to below-ground plant parts. Translocation is a two-edged sword. Glyphosate applied to blueberry branches moves within the bush, and can kill large canes or whole bushes. The most effective time to treat perennial weeds is late in the summer because absorbed glyphosate tends to move down to the roots. This timing is also most hazardous for blueberries. Use extreme care to avoid contact with blueberry tissues. (**Source:** *Michigan Fruit Crop Advisory Team Alert, Vol. 23, No. 11, June 17 2008*)

Bloom Botrytis Treatment

Alice Wise, Wayne Wilcox, Cornell University

All varieties are in bloom and with wet, humid weather, the merits of a bloom botrycide should be contemplated. Treatments targeted at the leaf-pulled cluster zone are ideal though a) it is not always possible to leaf this early; and b) a separate cluster treatment can be difficult with busy schedules.

From *Grape Disease Control, 2008* by Cornell grape pathologist Wayne Wilcox: “The Botrytis fungus is a ‘weak’ pathogen that primarily attacks highly succulent, dead, injured (e.g. grape berry moth, powdery mildew) or senescing (expiring) tissue such as wilting blossom parts and ripening fruit. The fungus thrives in high humidity and still air [opt temp range is 59-77°F], hence the utility of cultural practices such as leaf pulling and canopy management to minimize these conditions within the fruit zone. Although the fungus does not grow well in berries until they start to ripen, it can gain entrance into young fruit through wilting blossom parts, old blossom ‘trash’ sticking to berries, and scars left by the fallen caps. Such infections remain latent (dormant) all the way through harvest, but some may become active as the berries start to ripen. Latent infections can be common following a wet bloom period, the vast majority remain inactive through harvest and never rot the fruit. Factors that cause latent infections to activate (cause disease) are incompletely understood. The perfect recipe for Botrytis – a wet bloom period (to establish latent infections) followed by a wet preharvest period to activate and spread infections.

There is no single ‘correct’ timing for fungicide applications in a Botrytis management program. In some years, early sprays (bloom and bunch close) have been more effective than later sprays (veraison and preharvest). In more years, the opposite has been true. In some years, two early spray OR two late sprays provided the same control as all four; in a majority of years, all four provided the best results.” Wilcox goes on to say that botrycides at bloom may help limit latent infections but Botrytis is a difficult disease if conditions are conducive, even with fungicides. It is absolutely critical to address shoot thinning, leaf pulling in the cluster zone and thinning big clumps of clusters to promote air circulation and spray penetration. Highly susceptible varieties include Chardonnay, Pinot Noir, Sauvignon Blanc, and Gewurztraminer. Merlot is susceptible if harvest is wet. Note that most cluster rots in the northeast include Botrytis but there are actually a number of fungi that cause other bunch rots and sour rots. These will be addressed in a future newsletter.

Materials – choices are Vanguard, Scala (chemically similar to Vanguard), Elevate, Rovral. An alternate Botrytis strategy is to use a strobilurin (Flint or Pristine) with activity against Botrytis. See labels for details. With any of these strategies, leaf pull if possible prior to application. With the cost of materials, they must be used wisely. (*Source: Long Island Fruit & Vegetable Update, No. 15, June 20, 2008*)

General

New Herbicides

Rob Crassweller, Penn State University

Since the publication of the new Commercial Tree Fruit Production Guide a number of new herbicides have been registered for use in tree fruit. The following describes the materials and their use.

Matrix® FNV is a new herbicide from DuPont for use in all tree fruit and grapes. The active ingredient rimsulfuron is a sulfonylurea, which is a totally new chemistry from any other weed control product we have had for orchards. The active ingredient acts within the plant to inhibit amino acid synthesis. There are two products under the trade name of Matrix and only the FNV formulation is labeled for tree fruit. The material provides selective control of broadleaves and grasses

and can be tank mixed with other pre-emergent materials to expand the control spectrum. While it is primarily a pre-emergent it does have some postemergent activity on small weed seedlings. Orchards and vineyards must be at least 1 year old. The material works best on weed free soil and when applied under cool moist conditions. The preharvest interval is 7 days for pome fruit and 14 days for stone fruit and grapes. Primary weeds controlled are dandelion (from seed), mallow, marestail, fleabane and grasses. Yellow nutsedge can be suppressed with 2 timed applications.

Aim® is a new burndown material from FMC Corporation. The active ingredient is carfentrazone-ethyl and is a triazoline that inhibits photosynthesis. It is labeled for all

tree fruit and grapes. If the branches or vines extend down to the ground then the material must be applied with a hooded sprayer. If the branches or vines do not extend down to the ground then application can be done as a directed spray. The material can also be used to control root suckers. Application for sucker control must be made while the suckers are still green and growing. Use a non-ionic surfactant or crop oil concentrate with Aim. Use extreme caution that spray mist does not contact green fruit or foliage as spotting can occur. Adjust your sprayer so that droplet size is large to reduce the possibility of drift onto green foliage. There is a preharvest interval of 3 days between last application and harvest.

Reglone® is burndown material from Syngenta with the active ingredient diquat bromide. It is labeled for all tree fruit, grapes and many small fruit. The pre-harvest interval limits its use to non-bearing plantings (365 days PHI). Do not allow the spray to contact any green tissue including the trunks.

Parazone™ 3SL is a burndown material from Makhteshim with the active ingredient paraquat dichloride. The product has 3 lb paraquat cation per gallon versus the other products that have 2lb per gallon. Three to five applications can be made during the growing season depending upon the crop being treated. Preharvest interval is 14 to 28 days depending upon the crop. Do not allow spray to contact green foliage.

Venue™ is a non-selective burndown material produced by Nichino America for use in all nonbearing tree fruit and vine crops. The active ingredient is pyraflufen ethyl. It should be applied during the dormant to prebloom period as a burn down material. If applied later during the growing season it must only

be to nonbearing trees. Venue can be tank mixed with 2,4 - D or glyphosate for broader spectrum control.

Scythe® is from Dow AgroSciences which has as the active ingredient of pelargonic acid. It is a fatty acid based, non-selective contact herbicide. The disruption of the cell membrane results in cell leakage and death of all contacted tissues. Weed response is very rapid. Scythe applied alone should be as a 3 to 10% solution depending upon weeds present and level of burn down desired. Use a 3 to 5% solution for annual weeds and vegetation. Use a 5 to 7% solution for perennial herbaceous and late stage annuals. Use a 7 to 10% solution for maximum vegetation burn down. Scythe can be tank mixed with glyphosate for added effectiveness on perennials. Scythe can also be tank mixed with for burning down of green rootsuckers. Care must be exercised to avoid all contact with green tissue or bark of fruit trees. The REI is 12 hours and a PHI of 24 hours.

XL 2G is an herbicide for non-bearing tree fruit. Helena has recently labeled a proprietary granular mixture of oryzalin plus benefin. Application rates are 200 to 300 lb per treated acre (4.6 to 6.9 lb per 1000 sq ft) It is a preemergent material and will not control established weeds. The REI is 24 hours and PHI is 365 days. It is labeled for all non-bearing tree fruit and vineyards.

Glyphosate for Control of Certain Perennial Weeds. Application of glyphosate products during certain growth stages can help control thistle, milkweed and bindweed. For thistle and milkweed, applying glyphosate just as the plants are about to bloom or in early flower bud can help reduce the population. Treatment of bindweed with glyphosate when it is in full flower is recommended. Refer to the table on glyphosate formulations on pages 163 – 164 in the new Tree Fruit Production Guide when choosing a product with the most glyphosate acid. (*Source: Pennsylvania Fruit Times, Vol. 27, No. 6, JULY, 2008*)

June Berry Barometer

HELPING TO KEEP YOU UP TO THE MARK!

Cathy Heidenreich, Cornell University

After three nights this past weeks with temperatures in the upper 20's to low 30's in some regions hopefully our frost danger is over for this season. Now if we only had a little rain...most regions of the state and running 1-3" below normal for rainfall, so besure to irrigate, especially with a full crop load just before and during harvest.

ALL BERRY CROPS:

1. **Fertilization** – Now would be the time to make those second split applications for established blueberries, currants, gooseberries, and raspberries.
2. **Weed management** – Hand-weeding or spot applications to control weeds. Get out that wick

wiper, flame thrower, 2-gallon garden sprayer and walk those plantings- spot treatments now can prevent major problems later!

3. **Pest management** –Scout! If you see problems developing, check out the berry diagnostic key for help in identifying the culprits (<http://www.hort.cornell.edu/diagnostic/>). Check out the berry pest management guidelines for control strategies (<http://ipmguidelines.org/BerryCrops/>).
4. **Irrigation** – Keep water on berry crops, especially during fruit development and harvest. Strawberries and blueberries typically need 1-2 inches of water per week either in the form of rain or irrigation.

5. **Harvest Post Harvest** –Getting ready now can save headaches later. Are all of the aisles easily accessible to equipment and/or customers? Scheduled delivery for portapotties and handwashing units yet? Sufficient harvest supplies on hand? Directional/informational signs in place? Temporary labor trained and ready to go?

STRAWBERRIES:

Established plantings:

1. **Diseases** – The forecast for hot humid weather continues. See berry disease update by Kerik Cox at <http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett/nybn76a.pdf> for more info.
2. **Insects** – Reports of strawberry root weevil problems are coming in. Scout weak areas of the field for root damage and/or grubs at the base of plants. Watch leaves for notching by weevil adults. Other reported pests include strawberry root worm – watch for feeding damage by adults. You may not see the beetles themselves as they are nocturnal feeders.
3. **Slugs and Snails** – Recent rains may bring population explosions just now as berries are starting to be harvested. Options for control may be found in the berry pest management guidelines for control strategies. Sluggo (iron phosphate), one of the products listed, is an OMRI approved product labeled for organic use.
4. **Harvest/Post harvest** – Got your market lined up? Your pickers? Plenty of harvest-related supplies in stock? Cold room fired up and ready to go? See article by Craig Kahlke in this issue for more details on maintaining strawberry fruit quality after harvest.

New plantings:

1. **Plant establishment** – More of the same for this month! Runners need good soil contact to root. Keep the 18” planting strip weed free by hand weeding or using cultivation equipment for good runner establishment. Direct runner plants from aisles back into planting row area. Remove blossoms as they open to encourage good plant establishment and growth.

BLUEBERRIES:

Established plantings:

1. **Diseases** – The forecast for hot humid weather provides ideal conditions for anthracnose. See berry disease update by Kerik Cox at <http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett/nybn76a.pdf> for more info.
2. **Insects** – Insects of concern for the petal fall/post bloom period include fruitworms, leafrollers,

Blueberry tip borer, and Plum curculio. Blueberry maggot is a concern as fruit begins to turn blue.

3. **Harvest** – Birds may be a concern again this year due to early season lack of rainfall. Be sure to get your bird control tactics in place before fruit starts to ripen. Article follows on bird management strategies.

New plantings: – More of the same for this month!

1. **Plant establishment** – Remove emerging flower buds between the palms of the hands to promote good plant growth and establishment.
2. **Critter Patrol** – Watch for deer browse on new plants. Take immediate steps to deter feeding.

RASPBERRIES AND BLACKBERRIES:

Established plantings:

1. **Pollination** – Honey bee colonies are usually not needed for brambles as the flowers produced large quantities of nectar, attracting both wild and domesticated bees.
2. **Diseases** – Remember that first gray mold spray should go on at 5-10% bloom if the weather continues to be wet, warm and humid. Signs of infection include gray fuzzy masses on blossoms or ripening fruit. Hot humid weather may also bring out powdery mildew on brambles. Watch undersides of leaves, flower buds, and developing fruit for white powdery mycelium (fungal growth).
3. **Insects** – Insects of concern during late pre-bloom to bloom include Raspberry fruitworm, raspberry sawfly, Tarnished plant bug and Japanese beetle.
4. **Irrigation** – Did you know a raspberry plant in summer can use up to 1/4” of water per day? Available moisture can be depleted in just a few days after a heavy rainfall. Brambles need a continuous (but not excessive) supply of water throughout the growing season – about 1-2” per week.

New plantings: – More of the same for this month!

1. **Plant establishment** – Avoid cultivation or herbicides until plants are well-established. Apply a dilute liquid fertilizer once new growth appears.
2. **Irrigation** - same as for established plantings.

CURRENTS AND GOOSEBERRIES:

New and Established plantings

1. **Diseases** – Watch for leaf diseases such as white pine blister rust (yellow-orange powdery spots), powdery mildew (white powdery spots), or leaf spots (black necrotic spots) on leaves. Be sure to check both upper and lower leaf surfaces.
2. **Insects** – Preharvest insects of concern include Gooseberry fruitworm, Currant borer, Imported Currant worm (already reported in the Hudson Valley region), Japanese beetles, and Two-spotted spider mites. Irrigation - Ribes require less water than many other

small fruit crops – about 1/2 -1” per week. On drought-susceptible soils more irrigation may be needed.

(Source: NY Berry News, Vol. 7, No. 5, June 2008)

Bird Management Strategies for Fruit Crops

Cathy Heidenreich, Cornell University

Tree fruits and small fruits are a good food source for birds, especially in dry years when other food sources may be in short supply (Could one of those years be 2007?). Damage to commercial fruit crops by birds during these years may be a serious problem. Some studies estimate up to 30% of blueberry crops may be lost under such conditions.

Three types of bird damage may occur in small fruit plantings – whole berry removal, fruit knocked off bushes by foraging birds, or punctures/pecking damage. Whole berries may be stripped from bushes or canes or holes pecked in attached fruit in the case of brambles and blueberries. Larger fruits are most often slashed or partially consumed such as cherries, strawberries, apples, plums etc. However, most birds prefer a fruit size of 1/2-inch or less in diameter so that they can swallow the fruit whole. Smaller birds may puncture fruit, leaving them open to infection by fruit rots. Punctured fruit are difficult to detect during harvest and sorting. Fruit developing post-harvest fruit rots from pecking injuries jeopardize pack quality.

On many farms bird damage is minimal. Growers may choose to ignore the problem or consider small losses incurred as part of the costs of small fruit production. Other growers may experience substantial losses with large portions of the crop being consumed or damaged.

If you have experienced serious bird damage in the past, there is definitely cause for continued concern. If bird damage in your plantings has been minimal, you may only need to address bird management in years when damage is likely to increase significantly.

How to decide if bird management is warranted? A study done in New Zealand suggests a simple pretreatment cost-benefit analysis of the bird control technique(s) under consideration should be used to make bird management decisions. In this instance, the bird control technique under review was repellents. Cost effectiveness was calculated based on the cost and effectiveness of each repellent, the value of the crop, and the loss to birds if the crop was not protected (Table 1). Total cost was calculated based on cost of raw materials + labor to make an application x the number of applications needed.

So, for example, if your fruit crop is worth \$10,000/acre, the expected loss to birds without treatment is 20%, and the bird repellent under consideration is 50% effective, then the repellent should cost less than \$1,000/acre to be cost effective. The same sort of simple cost benefit analysis would also be applicable to other bird management techniques. In the case of netting or other durable equipment such as distress callers or canons, however, the duration of the technique (i.e. life of the netting) would need to be factored in as well.

Table 1. Maximum total cost per acre allowable for a bird repellent treatment to be cost-effective on a fruit crop yielding \$10,000/acre¹. (Source: Spurr and Coleman, 2005 with some revision by the author)

Loss to Birds	Effectiveness of treatment (i.e. reduction in loss to birds)			
	25%	50%	75%	100%
5%	<\$125	<\$250	<\$375	<\$500
10%	<\$250	<\$500	<\$750	<\$1,000
20%	<\$500	<\$1,000	<\$1,500	<\$2,000
30%	<\$750	<\$1,500	<\$2,250	<\$3,000

¹For fruit crops of differing values, simply multiply the values in the table by the value of the fruit crop divided by \$10,000 i.e. for fruit crops valuing \$25,000/acre, multiply the corresponding table value by 2.5. For a fruit crop valuing \$5,000/acre multiply the corresponding value by 0.5.

In the event a bird problem develops, how to determine who is the culprit? Fire up those binoculars and do a little investigative birding. Early morning and evenings before dusk are times when birds are most active. Refer

to table one for the most probable miscreants (bold type). While these may be the most frequent/numerous visitors to your fruit plantings, other birds may visit as well.

Table 1. Common fruit-feeding birds.

<i>Most of diet is fruits and berries</i>			
Gray Catbird	Cedar Waxwing		
<i>Some of diet is fruits and berries</i>			
Eastern Bluebird	Common Grackle	American Robin	Eastern Towhee

Red-winged Blackbird	Rose-breasted Grosbeak	Pine Siskin	Red-eyed Vireo
Eastern Bluebird	Gulls	Yellow-bellied Sapsucker	White-eyed Vireo
Northern Bobwhite	Blue Jay	Song Sparrow	Yellow-throated Vireo
Indigo Bunting	Eastern Kingbird	White-throated Sparrow	Palm Warbler
Northern Cardinal	Gray Kingbird	European Starling	Yellow-rumped Warbler
American Crow	Ruby-crowned Kinglet	Tree Swallow	Downy Woodpecker
Mourning Dove	Eastern Meadowlark	Summer Tanager	Hairy Woodpecker
House Finch	Northern Mockingbird	Brown Thrasher	Pileated Woodpecker
Purple Finch	Baltimore Oriole	Hermit Thrush	Red-bellied Woodpecker
Northern Flicker	Orchard Oriole	Wood Thrush	
Great Crested Flycatcher	Eastern Phoebe	Tufted Titmouse	

(Source: *NSIS: Florida's Fruit- and Berry-Eating Birds*. Names in bold indicate the most common species found in small fruit plantings.)

Whatever the tactics employed, decisions on bird management need to be pro-active. Discouraging bird feeding becomes difficult, if not impossible, once a feeding pattern has been established and birds recognize your planting as a food source.

Is a somewhat peaceful co-existence possible? Yes, if you take a long-term approach to bird management and have your annual tactics in place and employed well before fruit begins to ripen. Use several tactics simultaneously, and vary the types and locations of tactics frequently for best results.

Remember to keep good records from year to year on amounts of bird damage occurring, control tactics used, and their success (or lack thereof) , along with environmental conditions of years when bird damage increased. Be vigilant in observation and scouting, and always begin tactics before fruit begin to ripen and feeding habits become established. What bird management tactics should you include in your arsenal? Everything but the kitchen sink! Birds, like other animals, become accustomed to various scare tactics over time. Unfortunately, no one single tactic is effective as a stand alone method of bird control, with the exception of bird netting. Tactics to consider include the following: cultural practices, exclusion, sensory deterrents, scare devices, and protection/development of predator habitat.

Cultural management begins with site selection. The site where your planting is located may be a critical factor in bird problems later. Plantings located closer to urban environments where robins and starlings are more abundant may have greater damage. Isolated plantings may receive more damage. Smaller plantings tend to exhibit more damage than larger plantings. So much fruit is available in larger plantings that damage on any one site is generally low. Locate new plantings away from convenient cover or perch sites such as woods, hedgerows, power lines, and brushy fields. Control grass and weeds in and around plantings to limit numbers of seed-eating birds. Bird damage to small fruit is often greatest on early ripening varieties,

as they mature when other fruits may not be available. Netting on these varieties may be cost effective.

Various methods of exclusion may be used, including row covers, netting, and other types of physical barriers. These barriers simply prevent birds from reaching fruit. Netting continues to be the most complete and effective way to reduce bird damage in small fruit plantings. In some cases, netting is placed directly over plants or bushes. In other instances, a framework is constructed over the planting and netting is suspended on the frame. That said, it is relatively expensive compared to other methods and probably the most labor intensive. However, it is also the most durable. Netting materials, with proper care, may last 3 to 10 years.

Several commercial small fruit growers in the northeast use netting on frames, supported by wire. The netting support structure is 6 to 10 feet above the ground and allows for routine agricultural activities to be carried on under the netting, such as spraying, mowing, and fruit harvest. Netting is removed and stored each season to prolong netting life.

Nylon, polyethylene, cotton, plastic-coated wire and other netting materials are available. Select netting with a 3/4" mesh to exclude small birds. Support posts that are pounded rather than augured give stronger support. Augered posts should be set in concrete for additional stability. Tops of poles are generally covered with some type of smooth covering (rubber inner tubes, plastic bottles etc.) to protect netting as it is applied and removed, and as it moves in the wind. Pounded anchor posts need to be set outside netted areas to serve as additional support for outside posts.

Bird netting cost varies considerably with type, manufacturer, and quality (available from many sources, see list at end of article). The initial installation costs may be quite high but costs may be pro-rated over the 3 to 10 year life of the material. One estimate indicates material and labor to erect a 1 acre bird netting system 7-8 ft in height is approximately \$2,280 (Dellamano, 2006). Additional annual costs involved application, removal and winter storage of netting; these costs were estimated to be approx. \$619/acre for the same system.

Sensory deterrents are those which assault the senses. They may target a single sense, such as a repellent applied to fruit

to discourage feeding or more than one sense such as motion activated lights/sprinklers, or owl models which emit predator calls followed by bird distress calls.

Bird repellents are often portrayed as an effective, “clean, green” method of bird management. There are currently 2 bird repellents labeled for use in NY State. They are the methyl anthranilate-based products Bird Shield and Rejex-It Crop Guardian. Research here and in other states (Michigan, Oregon, Washington, Florida) indicates these products have both positive and negative aspects.

The active ingredient methyl anthranilate is similar to the chemical responsible for the major flavor component of Concord grapes. It is manufactured in large quantities by food processors and is considered safe for human consumption by the FDA. However, it is a volatile compound and has a short residual on exposed fruit giving good repellency for approx. 3 days, then gradually losing effectiveness. In addition, a large amount of product needs to be consumed in one bite in order for it to be most effective. Application technologies for small fruit such as air blast sprayers are designed to apply small amounts of product uniformly over larger areas, thus reducing product efficacy.

Applications of sucrose syrups have been demonstrated to repel birds from blueberry plantings. The exact method of repellency is not well documented, but it is thought birds such as European Starlings and American Robins are unable to digest the disaccharides in sugar. Most birds are able to digest simple monosaccharide sugars found in fruits. Sugar solutions in New York were applied to blueberry plantings when fruit began to turn blue. In this trial 230 lbs of sugar was dissolved in 21 gallons of hot water, for a total of 40 gallons of sugar solution. Olympic Spreader Sticker was also added at 310 PPM. The treatment cost \$40-\$50/acre and was applied 4 times during the season for a total control cost of \$160. Bird damage was reduced 50% where sugar solution was applied versus untreated adjacent plots. The total expense was far less than losses to birds experienced in the non-treated plot. An increase in Japanese beetles and yellow jackets was observed, however, in year 2 in treated plots.

Sound may be used as bird repellent, causing fear, pain, disorientation, communication jamming, audiogenic seizures or internal thermal effects. The sounds most frequently used fall into 2 categories: distress calls, and noise makers (pyrotechnics).

Distress call repellents have been used successfully to drive birds from fields or roosts. However, these calls are species specific, so a grower must be able to identify the bird causing damage for them to be successful. Units are also available that incorporate predator calls as well as distress calls. Most units are

programmable as to time between calls, species of bird, randomized calls, etc. Units are battery, solar, or electrically powered and cover 1 to 8 acres. They range in price from \$250 to \$3,500 depending on the size of the area to be protected and accessories needed. Some auditory units come packaged in the form of visual deterrents. One unit available is called the “Screech Owl” (Birdbusters), and pivots on a bearing with the wind, providing both auditory and visual deterrent in one unit.

New York studies have shown distress call devices to be effective for 7-10 days in plantings with high bird pressure. Use of predator models in conjunction with distress call units gave further reduction in feeding. Best results were obtained when units were moved regularly and used in conjunction with visual scare devices. Distress calls have a tendency to have more long-term effects than noise makers.

Pyrotechnics, or noise makers, such as bangers, poppers, and sirens provide short term control of birds. They may include Bird Bombs, Bird Whistlers, and Shell Crackers (Sutton Ag). However, these products are often as annoying to neighbors and customers as they are to the birds! In fact, a group of concerned (annoyed) citizens in British Columbia has even developed a web site called, appropriately, Ban the Canon, located at: <http://bancannons.tripod.com/devices.html>. This web site provides information on all sorts of bird control alternatives to pyrotechnics in an effort to reduce noise pollution caused by propane canons and the like in their province.

The “Zon Gun” is a lightweight portable propane-fired cannon emits automatic thunderclaps that deter pest birds and other nuisance wildlife. The intervals between detonations can be adjusted from 2-30 minutes. The standard model is fully automatic, ground mounted, and rotates a full 360 degrees for wide coverage. Cost for this unit, plus timer and tripod is \$650.

Many types of visual scare devices are available from simple holographic tapes to large predator kites. Terror eyes are an inflatable visual scare device that confuses birds with lifelike reflective predator eyes and markings. They come in 3 colors (black, orange and yellow) and cost approximately \$5 - \$45 each.

Another visual scare device is flash tape, or holographic ribbon. These come in various length rolls, materials and colors and repel birds by producing an optical, audible discomfort zone.

Position the length of ribbon where nuisance birds will see and hear it. Make sure the length of ribbon can move freely with the wind.

Approximate cost of this type of material ranges from \$4-\$88 a roll depending on roll length and material.

Other Devices

Other bird scare devices utilize various techniques such as lights, sprinklers, and motion. “Scarecrow” is one such device which uses an infrared sensor that detects birds when

they are present, and releases an immediate shot of water to startle them and keep them away.

Another device, “ScareWyndmill” uses motion to frighten birds, along with blades painted with special uv light reflecting paint. They have been found effective on small birds, and tested in blueberry plantings.

Encouraging Natural Predators

Owls and Hawks are natural predators of birds that may be a problem in small fruit plantings. One method of bird management to consider then is how best to encourage these birds to live in the vicinity of fruit plantings. An easy way to encourage owls is to install nest boxes the size that owls would use. The Sharp-shinned Hawk is a regular visitor to bird feeders, where it eats birds, not seed. The great majority of this hawk's prey is small birds, especially various songbirds such as sparrows, wood-warblers and American Robins.

There are also companies who will visit your property and bring trained hawks or falcons with them to attack your bird situation.

Usually hawk silhouettes or heli-kytes that simulate hawks in flight are flown simultaneously, and the problem birds will stay away for a good while thinking that the silhouettes are the real thing.

A Word About Wildlife Conservation and Protection

The following birds, for various reasons, may be permanently removed from plantings: European Starling (introduced species not protected by state or federal law), , Red-winged Blackbird (protected by State and Federal law-- but a depredation order allows you to take these birds *when they are committing or about to commit damage to crops.*) and American Crow (protected by State and Federal law-- but a depredation order allows you to take these birds *when they are committing or about to commit damage to crops.*)

All other species listed in Table 1 are protected by State and Federal law and would require special permits from the Federal government (US Fish and Wildlife Service) and the State (New York Department of Environmental Protection) to live trap and relocate or kill these birds to protect crops. Be sure to check with state and local authorities in your area regarding local bird control ordinances. (*Source: NY Berry News, Vol. 7, No. 5, June 2008*)

Upcoming Meetings:

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 9-10, 2008. **Handling Berries and Other Perishable Produce for Quality.** Gro-Moore Farms, Rush, NY and Schoharie Valley Farms, Schoharie, NY, respectively. More details follow.

July 16, 2008. **Strawberry Weed Management demonstration trial** at Cornell Orchard, followed by **High Tunnel Raspberry and Blackberry Tour**, 1:30 to 3:45 PM, Ithaca NY. Directions and registration information follow.

July 14-16, 2008. **The 9th International Vaccinium Symposium** will be held at Oregon State University in Corvallis. For more information: <http://oregonstate.edu/conferences/vaccinium2008/>.

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.

July 23, 2008. **Day Neutral Strawberry Workshop** held in conjunction with the Pennsylvania Vegetable Growers' Association's Vegetable and Small Fruit Field Day at Rock Springs, PA. For more information: Kathy Demchak, 102 Tyson Building, University Park, PA 16802 or email kdemchak@psu.edu.

August 6, 2008. **Currant Growing Workshop.** More details follow.

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

September 23, 30, October 7, 14, and 21. **Building a Successful Small Farm Operation** in Orleans County, NY. Contact Paul Lehman of Niagara County CCE or Lynn O'Brien of Allegany/Cattaraugus County CCE for more information.

Nov. 6-8, 2008 **Southeast Strawberry Expo**, at the Hilton Charlotte University Place, Charlotte, NC. Includes Strawberry Plastics 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.

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