

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 – fruiting fields are progressing into bloom. Be sure to keep an eye on weather forecast for frost warnings in your area. Bloom fungicide applications are important now to control fruit rots. Scout fields for clipper and two-spotted mite. Tarnished plant bug have been found in various locations, so field scouting should include TPB, too. Avoid insecticide applications during bloom. **Raspberries** – summer bearers are showing some fruit buds. This is still the pre-bloom period. Some foliage is showing raspberry fruitworm feeding injury. See article in last week’s issue for more information on this pest. Remember to avoid insecticide applications during bloom. But, be ready for fungicide applications to control botrytis gray mold during bloom, especially in light of the wet weather of late. Fertilizer applications made prior to heavy rain may have leached past roots and a repeat application may be required. Mature planting should receive 40-80 lbs N/acre on summer bearers and 70–100 lbs N/acre in fall bearers in a split application. Use higher rates on sandier soils or if excessive rain falls. **Blueberries** - bloom is underway especially in early varieties. Cranberry fruitworm traps should be set out at this time. Hold insecticide applications until after bloom is complete. Some sites may have suffered freeze damage to flowers. Be sure to have adequate pollinators for the bloom period. Gibberellic acid applications may aid in overcoming poor pollination. See article in the last issue on how to use GA. Scout fields for signs on mummyberry strikes and apply fungicide as needed. Also, be ready for bloom fungicide applications to control fruit rots. Apply fertilizer in a split application w/ 50-60 lbsN/acre in mature plantings. Make second application in 4-6 weeks. **Grapes** range from bud burst/1” shoot to 10” shoots depending on location and variety. Frost may have damaged some primary shoots. Growers will need to begin their spring fungicide program. Fertilizer and herbicide applications made before heavy rain may need to be repeated where material may have washed or leached away. **Currants** and **Gooseberries** are at fruit-set. Watch for Imported Currant Worm and

Currant Borers at this time. Also watch for powdery mildew infections. Fertilize now in a split application w/ same rates as blueberry.

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for a one-week period, May 10, 2007 through May 16, 2007. Soil temperature and phenological indicators were observed on or about May 16, 2007. 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	2007 GROWING DEGREE DAYS		Soil Temp (°F at 4" depth)	Precipitation (1-Week Gain)
	1-Week Gain	Total accumulation for 2007		
Cape Cod	82	201	65°F	0.00"
Southeast	82	231	71°F	0.01"
East	98	270	55°F	1.00"
Metro West	110	224	60°F	0.70"
Central	84	189	52°F	0.67"
Pioneer Valley	101	262	62°F	1.86"
Berkshires	84	153	63°F	0.63"
AVERAGE	80	211	61°F	0.70"

n/a = information not available

(Source: UMass Extension 2007 Landscape Message #12, May18, 2007)

STRAWBERRY

Insect and Mite Management on Strawberries

Greg Loeb, Cornell University

During the prebloom period the **strawberry bud weevil (clipper)** is the main arthropod pest to watch out for. Clipper often is a more severe problem along borders of plantings, near woods. The adults emerge from their overwintering sites (woods or weedy strawberry fields) when temperatures reach 60F and migrate to strawberry fields to feed on strawberry pollen by puncturing the unopened flower. In recent years we have learned that many strawberry cultivars, such as Jewel and Seneca, can tolerate a fair amount of bud loss from this pest, although at sufficient densities, it can still be a problem. As a rough rule of thumb, treat for clipper when you observe more than one clipped primary or secondary flower bud or more than 2 tertiary buds per truss, on more than one truss per foot of row. Note that once flowers are open they are no longer at risk from clipper. Lorsban (chlorpyrifos), Brigade (bifenthrin), and Danitol (fenpropathrin) are labeled for clipper in New York.

Also during the prebloom period (and extending through harvest and sometimes after renovation) **two-spotted spider mite** can be a problem in some plantings. Look for whitish or yellowish stippling on leaves. Current threshold is 5 mites per leaf or about 25% of leaflets have at least 1 mite. This is likely a conservative threshold for a healthy planting. There are several compounds labeled for mites on strawberries in New York: Kelthane [dicofol], Vendex [hexakis], Agri-mek [abamectin], Savey [hexthiazox], Acramite, Zeal

Miticide 1, Kanemite, Danitol [fenpropathrin] and Brigade. Acramite is only labeled for nonbearing plantings. Kelthane, Danitol and Brigade are hard on predatory mites. Agri-mek label calls for 2 applications, 2 weeks apart. For all these materials, coverage is very important, especially on the underside of leaves.

Tarnished plant bug (TPB) is the key insect pest of strawberries during bloom to near harvest. Both adult bugs and the nymphs cause injury (deformed fruit) but nymphs are probably of the greatest concern for June-bearing cultivars. The economic threshold is half a nymph per flower cluster (you sample by tapping cluster over a white plate and counting nymphs that fall off). It is worth sampling for this pest on a regular basis since it varies in population size from place to place and from one year to the next. Spraying a pesticide when nymph counts are below threshold costs you money and can kill beneficial arthropods unnecessarily. Insecticides labeled for control of TPB in strawberries in NY include malathion, Brigade, Danitol, and Pryenone [pyrethrin]. Good weed management can help reduce problems with TPB.

Cyclamen mite is a potentially serious pest that seems to cause problems some years and then not be very noticeable in others. The mites get active in the spring with populations peaking after bloom. The mites like to feed on young leaf tissue (just as the leaves are unfolding). The mites themselves are difficult to see without a good hand lens. Cyclamen-damaged leaves tend to be stunted and crinkled.

Prior to bloom or after renovation are good times to treat for this pest. Thionex [endosulfan] is labeled for use against cyclamen mites. Use lots of water for thorough coverage. Treatment should be carried out either prebloom or during bed renovation where it is easier to achieve coverage of the crown leaves.

Two more insect pests deserve mention at this time. The first is **Strawberry sap beetle (SSB)**. This small, brownish beetle seems to be increasing as a pest in New York strawberries. Both the adult beetles and the larvae feed on ripe and overripe fruit. We still are exploring the best ways to control SSB. Two pyrethroids are labeled in New York for its control:

Dantitol and Brigade. Note that Brigade does not have a preharvest interval while for Danitol it is 2 days. However, Brigade is more expensive. For both materials, good coverage is likely to be important for its control. Note that SSB probably does not move into strawberry fields in significant numbers until fruit begins to ripen.

Spittlebug starts appearing on leaves, stems, and flowering racemes about this time (bloom) and extending into harvest. They overwinter as eggs in the soil and hatch out as temperatures rise in the spring. The nymphs crawl up the plant and begin feeding on the xylem tissue (the water conducting vessels of the plant). There are not a lot of nutrients in xylem and therefore nymphs need to process a lot of sap, extracting the few nutrients out for their use and excreting the remaining water. This water is frothed

into white spittle, which helps protect the nymphs from desiccation and natural enemies. You can often find several nymphs within a spittle mass. Feeding by spittlebugs, if extensive, can stunt plants and reduce berry size. Perhaps more importantly, the spittle masses are a nuisance to pickers. Threshold for spittle bug masses is 1 mass per foot row. Thionex, Provado, Brigade and Danitol are labeled for use against spittlebugs. Weedy fields tend to have more problems with spittlebugs.

Root weevil (there are several species) is the last strawberry pest I want to discuss in this issue. The larvae feed on roots and crowns and when abundant can cause serious damage to plantings. Beds with heavy infestations show distinct patches or spots that appear stunted and have reduced yields. Drought stress aggravates the injury from larval feeding. Chemical control (Brigade) is targeted at the adults that emerge in mid- to late June. Look for characteristic adult feeding damage on leaves (notching from the edge) to help determine timing. Note that the adults are active at night rather than the day time. The adults feed for a few days before starting to lay eggs. Some growers have also had success controlling root weevil larvae using parasitic nematodes. These can be applied either in the spring (late April and early May) and/or in the fall.

Use sufficient water to get good penetration. Rotation out of strawberries is the best remedy for root weevils. They are wingless and do not move a great distance. However, new plantings should be placed 50 meters or more from an infested planting. (*Source: New York Berry News, Vol. 6, No. 5, May 2007*)

How To Monitor For Clipper Weevil In Strawberries

Pam Fisher, Ontario Ministry of Agriculture and Food

How to Monitor for Clipper Weevil

In a field 5 acres in size or less:

- 1) Check 5 locations near the edge of the field, near sheltered areas, woods or bush.
- 2) Mark a 2 ft square.
- 3) Check all the buds on all the plants in that section.

How to Evaluate Damage

There are two ways to evaluate damage:

- 1) Count the number of buds which have been clipped. If the average is 13 or more clipped buds per 2 foot square, then control is recommended.
- 2) Look at the whole flower cluster, rather than

individual buds. Decide if the cluster is highly damaged by clipper or not. A cluster is highly damaged if:

- the primary bud has been clipped
- two or more secondary buds have been clipped
- three or more tertiary buds have been clipped

Use a threshold of 3 or more highly damaged clusters per 2 foot square.

Other Monitoring Tips

Other monitoring tips:

- 1 Holes in petals or base of the bloom indicate clipper weevil adults have been feeding on pollen. Expect to see injury shortly.



Figure 1. Monitoring for strawberry clipper weevil in strawberry plants.

- 2 Clipper weevil adults are most active when temperatures, especially nighttime temperatures, exceed 16°C.
- 3 Clipped buds, which appear brown or dry, have been clipped for a few days or more. Clipped buds, which are green or fresh looking, indicate more recent injury.
- 4 Clipped buds often fall to the ground, leaving a stem with a black stubby end. Don't forget to include these in your count.
- 5 Clippers do not clip buds in bloom. Monitor twice a week until tertiary buds open.

(*Source: Ontario Berry Bulletin for May 11, 2006*)

RASPBERRY

Bramble Disease Management – an ounce of prevention is worth a pound of cure!

Cathy Heidenreich, Cornell University

What does it take to consistently produce high quality bramble fruit? Some would say sheer luck; others might cite things like favorable weather, excellent soil, the “proper” cultivars, a good fertilizer program, ample irrigation, excellent pest management, etc. And, in fact, all of these things in concert determine final fruit quality.

That said, let’s consider in particular disease management and the direct and indirect impact it has on fruit quality. Gray mold is a perennial problem in bramble fruit production, and is the number one cause of loss of fruit quality and yield. Cane diseases and root rots (spur and cane blights, Phytophthora root rot, Verticillium wilt) weaken brambles over time to such a degree yields are reduced or in some instances, lost. They may also make brambles more susceptible to winter injury and subsequent death. Other bramble pathogens such as powdery mildews, rusts and anthracnose may infect multiple plant parts including leaves, canes, flower buds, and fruit. Virus diseases such as Raspberry Mosaic Virus Complex or Crumbly Berry may reduce plant vigor and productivity and/or fruit quality.

What’s the secret, then, to good bramble disease management? It’s quite simple: Bramble disease management needs to be proactive to be successful!

While the concept itself is simple to understand, the implementation of it involves serious forethought and

energy. Successful bramble disease management requires a short-term commitment to get it started in your operation, and a longterm commitment to sustain it as part of your every day operation. Let’s take a look at the steps involved in setting up a proactive bramble disease management program. We will start at ground zero with a new planting and then work through disease control strategies for established plantings. We will finish up with a bramble disease management checklist by way of review. Ready? Set? Go!

Before You Grow

Whether you are a first time grower or have been in the business for an extended period, there are some basic things to consider in terms of disease management before you put in a new planting. There are 4 key items that you need to identify before you begin: your plant host, potential diseases, environmental conditions favoring their build up, and potential control strategies.

Know your hosts

There is, for the most part, some degree of host susceptibility/resistance to each of the bramble diseases previously discussed. That means the cultivar you select may determine in part what disease problems you face. Do your homework and determine to which diseases your host is most susceptible. Does the dollar return on sales substantiate the investment needed for disease control on a particularly susceptible variety? If not, consider selecting an alternate variety of comparable quality with greater host resistance. Does the planting site or some portion of it favor

development of a particular disease? If so, be sure to put your most resistant varieties in that area and locate more susceptible varieties on more favorable sites. A word of warning, in the case of root rot diseases, even the most resistant cultivars may fail under favorable environmental conditions and high disease pressure...

Identify potential diseases

Now that you have researched your hosts and know their relative susceptibilities to various diseases, you need to explore what diseases may pose a threat in your area. What bramble diseases are most common in your geographic region? Your locality? Are there other operations in the vicinity? What disease issues do they have?

Determine Environmental Conditions Favoring Disease Development

Take a good look at your planting site. Then look again. And again...Is there an air or water drainage issue that cannot be redressed? Is it located next to hedge rows or abandoned fields with high populations of wild brambles? Is it in a frost pocket that may result in cane injury? Perhaps it's an exposed site with a lot of strong winds. Or a site next to a hedgerow which is shaded a good part of the day. What were the crops previously grown on that site? Crop history in solanaceous plants such as potatoes, tomatoes, peppers etc. may have facilitated population buildup of *Verticillium*, which may persist in soil over periods of 10 years or longer. Even solanaceous weeds, such as nightshade serve as hosts for *Verticillium*. One or more of these factors may favor disease development in your new planting.

What time of year are diseases most likely to occur? How often do they occur during the season? What conditions favor their build up? Are they weather related? Related to host growth stage? At what point do you need to take action? Are there established action thresholds?

Explore short-term and long-term control options

What are your options to help prevent an outbreak? They are three-fold: cultural, biological, and chemical.

Cultural methods - Exclude, Inhibit or Limit, and Eradicate! Starting with disease free plants is important for all diseases, but particularly important for orange rust and viruses. Always check to see if disease resistant cultivars are available and use them if feasible.

Select sites, soils and planting designs carefully to maximize air and water drainage. Maintain plant health by properly managing soil nutrition and irrigation, and minimizing plant wounding. Use physical barriers such as distance, mulches, row covers etc. Remove and destroy debris from pruning and harvesting operations immediately. Harvest ripe fruit promptly.

And finally, remove infected plants as soon as they are identified; this is especially important in the case of orange rust or viruses.

Biological methods – Perhaps you have heard the saying “Little bugs have little bugs to bite ‘em, lesser bugs have lesser bugs, and ad infinitum!” More and more biological control organisms are now being produced on a commercial basis and may be available for use in disease suppression or prevention. For example, there is now a benign strain of the crown gall bacterium (K84) that maybe applied to bramble cuttings to help prevent infection by more virulent strains. Other pathogen predators, parasites or competitors may have been identified and made available commercially to help in the fight against bramble diseases.

Chemical methods - What disease control products, if any, are available to you as a commercial grower, as an organic grower? Check out these websites for more information:

Products labeled for use in NY State:

<http://www.pmep.cce.cornell.edu>

OMRI approved products (organic)

http://www.omri.org/OMRI_datatable.htm

When You Suspect a Disease

Like death and taxes, disease problems are inevitable. The steps above can often help delay or minimize the occurrence of diseases, but will not completely eliminate them. So, what to do if you suspect a disease? Now's the time to get out your hand lens and do a little detective work!

Sleuth out the Suspects

There are three prerequisites to disease detection- a keen eye, frequent observation, and good notes!

It's good to get out in the field early in the season and keep good notes about your plants' health.

Use notes on healthy growth and development as a “baseline EKG” to evaluate how plants are doing during the course of the current season or between seasons. This makes it easier to spot occurrences of an unusual nature: one section of field that is behind in growth compared to another, brown flecking on leaves, wilting, spots on canes, yellowing of green tissue, dead canes, swellings, stunted plants, etc.

Be sure to bring along the tools of the trade and do some CSI investigating of your own. These tools might include a field pack with the following: hand-lens, sample bags, trowel, pocket knife, pruner, permanent marker, note book, pencils or pens, and a map of each field to be scouted, pocket ID guides.

Record disease information on the maps during scouting; use maps to calculate areas for control measures, if needed.

Look for anything out of the ordinary. Record the specific plant part affected, and how it differs from a healthy plant (symptoms). Note the presence or absence of a pathogen (signs). Are there patterns of distribution on the plant, in the row, in the field? Does the appearance of damage

(symptoms) correlate with a specific event: weather, crop production procedure, chemical application, other...)?

Table 1. Bramble Development and Associated Diseases

Summer-Fruiting Raspberries/Blackberries	Primocane-Fruiting Raspberries
<ul style="list-style-type: none"> • <i>Bud break</i> <ul style="list-style-type: none"> o Anthracnose o Spur blight (red raspberries) o Cane blight • <i>Early bloom</i> <ul style="list-style-type: none"> o Gray mold o Powdery mildew • <i>Full bloom</i> <ul style="list-style-type: none"> o Gray mold o Powdery mildew 	<ul style="list-style-type: none"> • <i>From petal fall through the beginning of harvest</i> <ul style="list-style-type: none"> o Gray mold <p><u>Special Pests</u></p> <ul style="list-style-type: none"> • Raspberry leaf spot • Orange Rust • Verticillium wilt • Phytophthora root rot • Crumbly berry • Mosaic virus complex

Confirm Your Diagnosis

Have good diagnostic resources and/or references at your disposal on the farm or online to help in making your initial diagnosis. A list of suggested bramble resources is provided for you in the bibliography following this article.

Remember, not all disease is caused by a living organism such as a fungus, bacterium, virus, etc. Abiotic diseases often occur and may have symptoms similar to those caused by pathogens. Here is a short review of probable causes of abiotic disease:

- *Nutrient extremes*
 - o deficiencies, toxicities
- *Temperature extremes*
 - o winter/frost injury, ultraviolet radiation/heat
- *Moisture extremes*
 - o drought, flooding, relative humidity
- *Phytotoxicity*
 - o adverse reactions to chemicals
- *Environmental damage*
 - o wind, hail, lightning strikes
 - o air pollution, acid rain, wildlife
 - o mechanical injuries and wounds

Consult your local cooperative extension office or regional specialist if you are unable to identify the disease with resources at hand. Or alternatively, send a sample to a diagnostic lab for further testing or confirmation.

Apply Control Strategies

Carefully follow all label instructions when applying control products. (Note: Both the crop and pest must appear on the NY label!) Always apply products or biologicals at the label recommended rates. Use sufficient volume and pressure to get thorough coverage of plant material. Maintain and calibrate application equipment on a regular basis. Store any

remaining product according to manufacturer instructions.

A word to the wise on fungicide resistance development; because brambles are a relatively small market share for fungicide companies, fewer numbers of products are available for use on these crops as compared to other major fruit crops, such as apples or stone fruit. To maximize the efficacy and minimize fungicide resistance development for the limited products available, it is wise to alternate chemistries. See product label instructions for more specific information on managing fungicide resistance.

Once Disease Control Strategies are in Place

Continue to monitor disease-related information after control measures are in use. Was the control measure effective?

Has the occurrence or frequency of the disease been reduce to acceptable levels? Is there a need for future concern? Keep records to help determine the effectiveness of your control strategies, and provide information for next year’s disease scouting forays. Adjust strategies as needed until acceptable levels of control are achieved.

In Summary

The process described above may seem rather time consuming and involved at first, but will pay big dividends in return for your investment. Once you have implemented it fully, it takes only a small amount of time each week to keep it running smoothly. And by the way, many of the general pest management principals listed above may also be used for insects, weeds, and wildlife! How’s that for killing several birds with one stone (no pun intended...well, maybe!) Remember that checklist I promised earlier? Here it is!

Disease Control Strategies- Preplant

- o Preplant cover crops for suppression of weeds and soil-borne diseases.
- o Resistant cultivars.
- o Certified, disease-free planting stock.
- o Do not establish new plantings next to wild brambles.

- Select sites with good soil and air drainage.
- Orient crop rows with prevailing breezes.
- Space plants properly.

Disease Control Strategies- Established Plantings

- Maintain overall plant health.
- Thin to proper cane density.
- Maintain narrow rows.
- Avoid high rates of nitrogen; succulent growth encourages disease development.
- Prune out old fruiting canes.
- Remove dead and dying canes after harvest.
- Remove and destroy prunings, infected canes, fruit, and debris promptly.
- Consider dormant applications of lime sulfur.
- Scout weekly.

Bramble Disease Management Resources

PUBLICATIONS:

From Cornell CCE Press:

[Cornell Pest Management Guidelines for Berry Crops](#) (2006) by Pritts, Heidenreich, Carroll, English-Loeb, and Wilcox.

From NRAES Press:

[Bramble Production Guide](#) (NRAES-35) (1991) edited by Marvin Pritts and David Handley. NOTE: Second edition is getting ready to go to print.

From APS Press:

[Compendium of Raspberry and Blackberry Diseases and Insects](#) (1991) by M. Ellis, R. Williams and B. Williamson.

From Cornell University Press:

[Weeds of the Northeast](#) (1997) by Richard Uva, Joseph Neal and Joseph DiTomaso.

USEFUL WEBSITES:

Cornell Pest Management Guidelines for Berry Crops
www.fruit.cornell.edu/Berries/pestman/index.html

Cornell Fruit Website
www.fruit.cornell.edu

Nursery Guide
www.hort.cornell.edu/nursery

Berry Diagnostic Tool
www.hort.cornell.edu/diagnostic

The Tree Fruit and Berry Pathology Website
www.nysaes.cornell.edu/pp/extension/tfabp/

New York State IPM Program
www.nysipm.cornell.edu/

IPM Fact Sheets for Berry Crops
nysipm.cornell.edu/factsheets/berries/default.asp

New York Berry News
www.nysaes.cornell.edu/pp/extension/tfabp/newslett.shtml

Food Safety
www.gaps.cornell.edu/

National Clonal Germplasm Repository for Berry Crops
www.ars-grin.gov/cor/

New York State Berry Growers Association
www.nybga.org

Wildlife Management Information
wildlifecontrol.info

(Reprinted with permission from the North American Bramble Growers Association 2006 Conference Proceedings, p30-35.)

(Source: *New York Berry News*, Vol. 5, No. 4, April 2006)

BLUEBERRY

Fruitworm Management in Blueberries

John Wise and Rufus Isaacs, Michigan State University

Pheromone traps should already be out in Michigan blueberry fields for monitoring of adult cherry fruitworm (CFW) and cranberry fruitworm (CBFW). CFW flight is well underway in most areas of southwest Michigan and yesterday, May 14, we received the first report of CFW larvae entering fruit in a Bluejay field. We have also trapped the first CBFW moths in the past few days, one in Grand Junction, and one in Fennville. These were only single moths, but this does indicate the fruitworm management season is upon us. Once a consistent number of moths of either species is caught in monitoring traps and blueberries reach the early fruit set stage (as some of the earliest varieties are now doing), these fields should be considered for protection against fruitworm larvae. Scouting for the

presence of fruitworm eggs on fruit is the best way to determine when control actions should begin.

Growers typically can manage both fruitworm pests together, but in recent years when there has been a cool period during blueberry bloom, the timing of CBFW and CFW have not overlapped. Instead, the earlier cherry fruitworm went unnoticed and the larvae were already inside fruit when CBFW control programs started. Monitoring for both insects in hotspots on the farm is a good idea, especially in early varieties where it is more likely that CFW infested fruit could be harvested.

There is an array of insecticides available for control of fruitworms, but their performance characteristics are not all the same, and only some of them can be used during bloom. It is important to refrain from using compounds that are

toxic to pollinators when these insects are in your fields. Two products registered for use during bloom or in the presence of pollinators have provided consistent control of fruitworms in trials at the Trevor Nichols Research Complex and in grower fields. These are the *B.t.* products such as Dipel® and Javelin®, and the insect growth regulator Confirm®. These products must be consumed by fruitworm larvae to be effective, so they are best applied over the top of fruitworm eggs, so they are eaten as the larvae emerge. *B.t.* products have short residual activity, typically around five days, so are best applied when daily temperatures reach 70°F. Confirm is more resistant to breakdown, giving between seven and 14 days activity, and it is quite rainfast, which can be a useful property in Michigan spring weather. Another option for control of cranberry fruitworm, is the growth regulator Esteem®. This insecticide disrupts the adult moth's ability to make eggs and disrupts hatching of eggs and molting of larvae. Because of its activity, it is most effective when applied just before egg-laying, so timing is critical. When thinking about application timing during bloom, getting the most out of your insecticides will require close scouting of fields with high fruitworm pressure. As with all fruitworm control applications, excellent coverage of fruit clusters is required to ensure that eggs or larvae come in contact with the insecticide.

After 100 percent petal fall, the range of options for fruitworm control increases, with Guthion®, Imidan®, Asana®, Danitol®, Lannate® and Sevin® being the most effective of the broad-spectrum insecticides available. With all these products, maintaining good coverage is still important to get residue to the parts of the berry, where fruitworms are found. Recent research trials in Michigan, have demonstrated that Confirm® and SpinTor™ applied after petal fall to fields with low or moderate fruitworm pressure can also achieve control of fruitworms, with minimal negative impact on natural enemies such as parasitic wasps, ladybeetles and lacewings. Correct timing and coverage are critically important, so regular scouting of fields, use of sufficient spray volume to get good fruit coverage and selecting appropriate spreader-stickers can increase activity of most insecticides applied for fruitworm control.

The table and figure are designed to summarize several key factors that can help you select an insecticide for your integrated pest management program for fruitworm control in blueberries.

(Source: Michigan Fruit Crop Advisory Team Alert, Vol. 22, No. 6, May 15, 2007)

Table 1. Details of insecticide options and timing for fruitworm control in blueberry				
Compound trade name	Chemical class	Life-stage activity	Optimal spray timing	Pollinator/Parasitoid Toxicity rating *
Guthion/Imidan	Organophosphate	Eggs, Larvae, Adults	100% Petal Fall	H
Lannate/Sevin	Carbamate	Eggs, Larvae, Adults	100% Petal Fall	H
Asana/Danitol	Pyrethroid	Eggs, Larvae, Adults	100% Petal Fall	H
SpinTor/Entrust	Naturalyte	Eggs, Larvae	Early fruit set over/under eggs	M
Dipel	<i>B.t.</i>	Larvae	Early fruit set over eggs	S
Confirm	Growth regulator	Eggs, Larvae	Early fruit set over eggs	S
Esteem	Growth regulator	Eggs, Larvae	Early fruit set under eggs	S

* Pollinator/Parasitoid Toxicity rating: S – relatively safe, M – moderate toxicity, H – Highly Toxic

USHBC – Your National Blueberry Grower Organization

Kathy Heidenreich, Cornell University

The U.S. Highbush Blueberry Council (USHBC) is a national research and promotion program for the highbush (cultivated) blueberry industry established by a vote of the industry and formally titled “Blueberry Promotion, Research and Information Order (7CRF

1218). A final rule established the program on August 16, 2000; Council members were elected in 2001 and approved by the Secretary of Agriculture. This order authorizes the USHBC to conduct a coordinated program of promotion, research and consumer and industry information in order to

maintain and expand the market for cultivated blueberries. This effort is funded through the collection production assessments.

These funds are then being used by USHBC to increase U.S. blueberry demand through market promotion activity (consumer/ food service publicity campaigns, magazine advertising, food manufacturer publicity, export market development) as well as to support continued blueberry research, with particular interest in blueberry/health research.

Under this program, all highbush blueberry growers (producing more than 2,000 ponds per year) are assessed at a rate of \$12 per ton. This includes blueberry growers who market their produce directly (including those marketed through U-pick operations, road side stands, etc.) and those who sell their blueberries to a blueberry first handler. In the case where a grower sold blueberries to a first handler, the handler is responsible for collecting the assessment.

A grower report is mailed to all growers annually. Production reporting, payment calculation and payment instructions, as well as report due date and late payment fees are detailed in the instructions section on the reverse side of the grower report. A completed grower report for the current year and any assessment checks that may be due are sent by all growers in the return envelope that is included. Assessments were collected beginning with the 2001 crop. (Program details are found in Federal Register Vol. 65 No. 137, July 17, 2000 pages 43961 to 43969).

Other grower benefits include:

- Funding of health related research for age-related diseases such as diabetes, etc.
- USHBC website featuring blueberry resources: promotional materials: brochures, recipes, posters etc
- On line blueberry supplier locator listing, searchable by state, company name, contact, product.
- Monthly newsletter USHBC Bluespaper
- Research reports to growers on project completion.
- Development of overseas markets such as Asia and United Kingdom.
- Trade leads.

The fourteen-member U.S. Highbush Blueberry Council (USHBC) administers the program under the supervision of the U.S. Secretary of Agriculture. The USHBC is represented by one member and alternate from each of the following regions:

There is also one member and alternate from each of the top six blueberry producing states: Michigan, New Jersey, Oregon, North Carolina, Georgia and

Washington (currently). Other members and alternates include: importer, exporter, first handler, and public. Producers are nominated by State commissions or producers. All other members are nominated by USHBC council members.

<u>Western</u>	<u>Midwest</u>	<u>Northeast**</u>	<u>Southern</u>
Alaska	Illinois	Connecticut	Alabama
Arizona	Indiana	Delaware	Arkansas
California	Iowa	New York	Florida
Colorado	Kansas	Maine	Georgia
Hawaii	Kentucky	Maryland	Louisiana
Idaho	Michigan	Massachusetts	Mississippi
Montana	Minnesota	New Hampshire	North Carolina
Nevada	Missouri	New Jersey	Oklahoma
New Mexico	Nebraska	Pennsylvania	Puerto Rico
Oregon	North Dakota	Rhode Island	South Carolina
Utah	Ohio	Virginia	Tennessee
Wyoming	South Dakota	Vermont	Texas
Washington	Wisconsin	Washington D.C.	West Virginia

Duties of the USHBC include the following:

1. Develop annual budgets
2. Appoint members of USHBC to serve on committees
3. Develop and evaluate projects of promotion, research, and information and pay costs of such projects
4. Collect assessments; receive investigate, and report to Secretary complaints of violations off the order
5. Recommend amendments to order
6. Employ staff to administer program
7. Prepare and submit to Secretary financial reports
8. Cause books of USHBC to be audited
9. Recommends to Secretary regulations to carry out the terms of the order

Every five years, the U.S. Secretary of Agriculture will hold a referendum to determine whether producers and importers of cultivated blueberries favor the continuation of the order. The Order will continue if it is favored by a majority of producers and importers voting for approval who also represent the majority of the volume of blueberries represented by the referendum. In addition, the Secretary may hold a referendum at any time after the effective date of the program.

Additional referenda may be requested by the USHBC or 10 percent of all cultivated blueberry producers and importers. The most recent referendum was held August 1-22, 2006 and a continuance was approved (89.6%) through 2011. Additional information concerning the USHBC and its activities can be found at their website at <http://www.blueberry.org/>. (Source: New York Berry News, Vol. 6, No. 5, May 2007)

GRAPE

Disease Notes for New England

Dan Cooley, UMass

The Spray Schedule

1-3" shoot - *Phomopsis* cane and leaf spot. An important spray during wet weather, where *Phomopsis* was a problem last year.

Powdery mildew. A spray this early is probably not needed unless powdery mildew was heavy last fall, as it was in some vineyards.

4-8" shoot - *Phomopsis* cane and leaf spot. If rain is predicted, then an application should be made. However, it looks to be relatively dry for the next week.

Powdery mildew. Apply a fungicide in those areas where mildew was present last year.

Black rot. Sprays not needed yet unless disease was heavy last year.

10-16" shoot - *Phomopsis* cane and leaf spot. A key spray, particularly if no applications have been made for *Phomopsis* to this point.

Powdery mildew. A critical spray for all susceptible varieties.

Black rot. Useful spray for susceptible varieties.

Background Info

Phomopsis. With a long, wet period last week, and some varieties showing new rachises and clusters, conditions were ideal for early *Phomopsis* infections. *Phomopsis* inoculum comes from old wood and dead tissue that wasn't taken out of the vineyard. Captan or a mancozeb (Dithane, Manzate or Penncozeb) are effective fungicides.

Powdery mildew. At Cold Spring Orchard, the last infection period was severe. Last week's rains undoubtedly released early-season powdery mildew ascospores, but this was significant only in vineyards that had a lot of powdery mildew last fall. Fungicide sprays following during early shoot growth for those

"high inoculum" vineyards will keep PM from getting an early start. Since PM is a "compound interest" disease, this is important. A single infection early can generate thousands of new spores, each of which can cause new infections, each of which can produce thousands of spores, each of ... well, you get the picture. By the time grapes are showing 10 to 12 inches of new shoot growth, all PM-sensitive varieties should be treated.

For vineyards with little if any PM last fall, then applying a fungicide during the first few weeks after bud break is less important. However, if a fungicide is being put on anyway for *Phomopsis*, sulfur is cheap insurance against early powdery mildew infections. Check for varietal sensitivity to sulfur before applying it! A DMI fungicide (Nova, Elite, Rubigan or Procure) can also be applied against powdery mildew. Kaligreen, (potassium bicarbonate) or Nutrol (monopotassium phosphate) or JMS stilet oil also can be used for PM. If using stilet oil, don't mix it with captan or apply soon after captan as it will damage foliage. Strobilurines (Abound, Flint, Pristine, Sovran) are NOT recommended at this time, due to resistance management issues and the fact that the limited number of sprays permitted in a season are more useful later.

Black rot. It's still a little early for major black rot infections to start, unless the vineyard had a lot of black rot last year, leading to a lot of inoculum this spring. Mancozeb, or mancozeb plus a DMI fungicide will be effective against black rot at this time.

For these three major diseases, the mancozeb plus a DMI application made at 3 to 5 inches of shoot growth where disease was heavy last year, or at 10 to 12 inches in other areas, should be effective. (*Source: New England Grape Notes, Vol. 2, No. 2, May 22, 2007*)

Grape Leafhoppers

Mark Longstroth, Mira Danilovich, Duke Elsner, MSU Extension

In vinifera varieties of grapes, we have many species of leafhoppers that feed on the foliage of the plants. The primary leafhopper of concern in our region is potato leafhopper (PLH). This pest typically does not show up in the northwest vineyards until late May and early June. However, these pests do not overwinter in our area--they actually 'migrate' northward on southern winds and are dropped



down into vineyards during spring rains. Because spring thunderstorms are unpredictable, we have no good method for predicting when PLH will turn up in the vineyard, but typical timing for PLH in vineyards is when shoots are at 8-12" in length. The Mother's Day (13 May) thunderstorm could have been a likely candidate for bringing PLH north, but no PLH were detected in

our weekly scouting.

If growers/vineyard managers are interested in monitoring for PLH, we recommend the standard yellow sticky traps. Traps should be placed into vineyards at or prior to 8-12" shoots, which may come quickly with warm temperatures. Yellow sticky traps should be placed on the highest wire and secured in such a way that they do not move on the wire. When we have foliage in the canopy, leaves should be removed from the trap area. PLH are attracted to these traps and the 'stuck' PLH will provide an early indication if the leafhoppers have arrived into the vineyard.

On a random note, we have spotted a few lecanium scale in the vineyard. These insects are 'curiosities' and there is no need for control. (*Source: Michigan State*

University Weekly Vineyard IPM Scouting Summary Report for the week of May 17 2007)



General Information

Harvesting Small Fruit.... Points to Ponder

Cathy Heidenreich, Cornell University

This is the second in a series of three small fruit articles on marketing, harvesting, and postharvest handling/storage, of small fruit. Whether you wholesale, retail, or U-pick, it is important to do your homework before berry harvest. Although harvest here in New York is still some weeks away, its not too soon to begin getting ready. A little time now can save a lot of headaches and profit losses later. Below are some points to ponder in putting together your harvest game plan.

I. Harvest Labor

Small fruits, in general, are highly perishable and have shorter shelf lives than other fruits. Untimely delays in small fruit harvest may result in overripe fruit in storage or complete crop loss! Be sure to secure sufficient harvest labor well in advance of the harvest period: pickers, field supervisors, cashiers, truck drivers, tractor drivers, parking lot attendants, farmer's marker workers etc. You might also want to consider hiring one or more "floaters" whose job would be to fill in for absent employees or provide additional assistance during peak harvest periods.

Don't shortchange yourself during the hiring process! Ask for a written application from each potential employee which includes things like contact information, education and background, and work experience, emergency contact etc. Be sure to ask for 3-5 references. Spending a few minutes checking references before interviewing and hiring is one of the keys to getting good workers! Keep a file for each employee with this information. Add any other employment records to this file over the course of the season. In a larger operation this helps in deciding who gets a return job offer for next year.



The second key to having good workers is communication. Clearly communicate to your employees what it is you are asking them to do. Provide each worker or each type of worker with a specific job description *prior* to the interview process. This job description might be as simple as a list of duties and responsibilities, and expected work ethics (i.e. punctuality, attendance, dress code, politeness to customers, use of cell phone during work hours, etc.) Be sure to include information on lunch periods and breaks, length and terms of employment, compensation information, and other worker expectations.



After the interview process or at hiring, ask workers to sign a copy of the job description indicating they have received it and understand what the job will require. Provide tours and training as needed to help workers be successful in getting the job done. Set reasonable and documentable job expectations. After workers are hired and on the job, give regular feedback on whether or not they are meeting expectations. Consider rewarding those who consistently meet or exceed expectations in some way – ex. half day off with pay, gift certificate to a local restaurant, end of season bonus, \$20 free produce from stand, etc. Provide specific feedback to those not meeting expectations. Start by giving them another copy of their job description and explain which expectations are not being met, and why. Then explain what steps they need to take to reach those expectations. *Do this when its needed, each time its needed, as soon the need arises!*

Encourage workers to share concerns or suggestions on how their job might be done more efficiently. Get everyone on the same page! Think about having short worker meetings at the beginning of each day or week to discuss the goals for that time period and what each person’s part in meeting those goals will be. Its easier during peak work times for everyone to function together as a unit if each understands the role they play, and the role of others.

The third key to having good workers is creating an environment of worker safety and engaging workers to be a part of it. Instruct all workers in good agricultural practices such as hand washing each time before and after harvesting fruit or after using restroom facilities. Provide handwashing stations, adequate restroom facilities, and potable water on site.

Explain any farm- or equipment-related safety procedures. Provide additional safety training as needed. Pinpoint locations of pesticide central posting boards, first aid kits, fire extinguishers, and emergency phone access for all locations. Post signage indicating steps to be taken in case of an emergency.

II. Equipment and Supplies

Nothing can be more frustrating than to have equipment failures or problems on the 1st or 21st day of harvest. Minimize these problems by checking and servicing all needed equipment prior to use; tractors, wagons, ATV’s, golf carts, scales, coolers, refrigeration units etc. Maintain equipment on a regular basis during harvest and prior to storage for next year’s use.



Clean and disinfest harvest equipment and facilities before harvest begins: packing/sorting equipment, cold storages, in-store coolers, farm market areas, plastic pails, grape lugs, etc. Have in place specific procedures and assign responsibility for regular maintenance/cleaning of equipment and areas during harvest. Check cleanliness on a regular basis to keep those responsible on their toes. Repeat the same process at the end of harvest.

What could be worse than running out of fiber baskets during the peak week of harvest? Check inventory before the harvest begins. Obtain and keep on hand sufficient quantities of packaging materials and labeling: fiber baskets, clam shells, flats, pails, etc. Leftover materials are a head start on next year’s inventory. At the end of harvest, collect and return unused materials to a clean central storage area for next year.

“Where do I go from here?” Much time and effort can be saved by developing and using signage. Streamline harvest operations by designing and posting needed signage and instructions prior to harvest. These may include things like parking signs, arrows directing u-pick customers to specific fields, restroom cleaning instructions etc. Purchase and have on hand flagging tape, wire flags, and other needed marking materials as appropriate. Keep an inventory list of needed signage and determine what worked or didn’t work. Note any additional signage needs at the end of the season. Collect and store signage after harvest for next year’s use, to keep materials clean and in good condition.

If you have a retail operation, be sure to check that supply list as well: price tags, bags, produce containers, and so on. Don’t forget to print lots of copies of your business promotional piece or ads for your next harvest to tuck into the bag along with each purchase.

III. The Mechanics of Small Fruit Harvest

Small fruits are probably the most perishable of all fruits. Production of high quality small fruit requires special attention to a number of preharvest and postharvest factors, as well as the mechanics of harvest itself. Preharvest factors to consider include cultivar selection, growing site, plant health and nutrition, and disease and pest management. For more information on these important topics, see the references listed at the end of this

article.

Harvest conditions should also be considered for maximum berry quality. For example, avoid harvesting wet berries whenever possible. Waiting a few hours after rain or heavy dew to begin harvesting can significantly reduce post harvest diseases and improve fruit quality. Visible decay can develop in less than 12 hours on warm, wet berries.

Along the same lines, temperature can play a significant role in berry quality. Berries harvested early in the morning or in the evening when temperatures tend to be cooler have better shelf life. Harvested small fruit should never be left in the sun; their dark colors readily causes them to absorb heat. Berries also continue to respire after harvest, generating their own internal heat, and causing shrinkage and reduced sweetness. Low temperature is one factor that helps to slow the respiration process, which is much faster in berry fruit than oranges or apples, for example. Berries should be cooled no later than 4 hours after harvest; sooner if possible. You'll get a much better return on your investment by making several trips to the cooling facility, than by making only one or two trips per day! More on this important topic in the next month's article on postharvest handling and storage.

Harvesting Strawberries

Strawberries ripen quickly under field conditions (28-30 days after full bloom) and at an even more rapid pace after harvest. To maintain good strawberry fruit quality during harvest, attention must be paid to two key factors: 1) stage of berry ripeness at harvest and 2) handling.

Strawberries should be harvested before they are fully



ripe to extend shelf life and berry quality in storage. It is critical to harvest fields once every two days to minimize over ripened berries. Bright red berries harvested with a slight white tip will retain their firmness longer than fully ripe fruit; they also lose less water in storage. However, that intense strawberry flavor is not fully developed at this stage, and it becomes a compromise between flavor and storage potential. This may be minimized to some degree by selection of appropriate varieties.

Train workers in strawberry harvest, demonstrating the desired degree of ripeness and manner in which fruits should be harvested to minimize damage. Consider hiring pickers on hourly wages to harvest and remove over ripe and/or rotting berries to prevent other pickers from contaminating marketable berries during the

harvest process. Be sure to dispose of cull berries away from fields under harvest to prevent recontamination of ripening berries.

Because of the fragile nature of strawberry fruit, container choice is also critical to berry quality. Wider, shallower containers help to minimize berry damage and crushing. Berries should be picked directly into market containers, not into larger containers then transferred to market containers later.

Rules For Strawberry Pickers

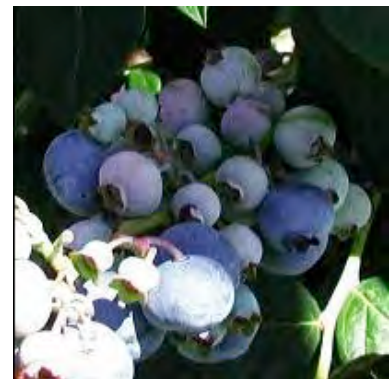
- ❑ **Keep your hands clean at all times. Wash hands after each visit to the restroom.**
- ❑ **Harvest only bright uniformly red berries. Be sure to keep berry caps intact while harvesting.**
- ❑ **Berries should be removed by snapping the stems between the thumb and forefinger, keeping the hand cupped under the berry to avoid dropping it.**
- ❑ **Select berries of uniform ripeness to fill containers. Do not mix berries of different ripenesses in containers.**
- ❑ **Place berries gently into containers to avoid bruising.**
- ❑ **Do not overfill containers.**
- ❑ **Do not put trash or cull berries into the container.**
- ❑ **Never allow harvested fruit to remain in the sun. Move harvested berries to cold room or cooler as soon as possible.**

Strawberries should be harvested in early morning after fruit have dried. Retain caps on harvested fruit for best shelf life.

Harvesting Blueberries

A mature blueberry bush will typically produce 7-10 lb of fruit per year. Blueberries, which do not ripen simultaneously, should be picked several times during the harvest period, generally at 7-10 day intervals. Blueberries continue to enlarge and ripen after they turn blue. Waiting 3-5 days after berries turn blue to harvest can significantly improve berry size and flavor. Temperature has an adverse effect on fruit quality; above average temperatures during harvest may call for shorter harvest intervals. Harvest intervals should also decrease as the season progresses. Late varieties tend to require fewer pickings.

Blueberries are highly perishable and are easily damaged by rough handling or adverse temperatures. Studies have shown most blueberry consumers (including wholesalers) associate appearance and firmness with blueberry freshness and quality. Efforts to maximize quality must begin in the field at harvest. Instruct workers in blueberry harvest,



demonstrating desired fruit ripeness and proper picking techniques.

Encourage workers to remove all damaged fruit during harvest to minimize fruit handling. Consider offering a premium to those workers whose flats are consistently free of damaged or poor quality fruit. Employ a responsible person to supervise pickers at all times. This person should randomly inspect one or two pints from each flat. Empty the pint into a shallow pan so each berry may be inspected individually. More than 6 to 8% poor quality fruit per pint should be considered unacceptable (and also not eligible for premiums). If pails are used in berry harvest, they should be of rigid construction and 5 qt or smaller in size to prevent crushing of fruit.

Rules For Blueberry Pickers

- ❑ Keep your hands clean at all times. Wash hands after each visit to the restroom.
- ❑ Harvest only ripe berries with completely uniform blue color, with no green or reddish color at the stem end. Leave immature fruit for the next harvest.
- ❑ Berries should be removed with the thumb and forefinger, keeping the hand cupped under the berry to avoid dropping it.
- ❑ Don't overfill your hands to avoid bruising or crushing fruit
- ❑ Do not squeeze or roll ripe fruit. Over handling the berries will remove the bloom (whitish, dusty appearance of the blueberry surface, considered a highly desirable quality by blueberry consumers).
- ❑ Do not put trash or cull berries into the container.
- ❑ Never allow harvested fruit to remain in the sun. Move harvested berries to cold room or cooler as soon as possible.

How many pickers will be needed? A general rule of thumb is 2 to 4 pickers per acre at the beginning and end of the season, and 8-10 pickers per acre during peak harvest periods.

Harvesting Brambles

Bramble fruits, raspberries and blackberries in particular, are very perishable. However, careful attention to harvest and post harvest handling and storage should provide reasonable shelf life for marketing and consumption.

Raspberries ripen quickly, but not uniformly over the



plant or planting. This necessitates harvest on as tight an interval as every other day. For best fruit quality, raspberries should be harvested before they are fully ripe. They should be picked when they are uniformly bright red in color, but before any darker color develops. Because of their highly perishable nature, brambles should always be picked directly into market containers. Half pint containers are preferable; containers should never hold more than 4 layers of berries to prevent crushing of fruit.

Rules For Raspberry Pickers

- ❑ Keep your hands clean at all times. Wash hands after each visit to the restroom.
- ❑ Do not touch berries before they are ready to harvest.
- ❑ Harvest only light colored berries. Leave immature fruit for the next harvest.
- ❑ Berries should be removed with the thumb and forefinger, keeping the hand cupped under the berry to avoid dropping it. Don't overfill your hands to avoid bruising or crushing fruit
- ❑ Do not put trash or cull berries into the container.
- ❑ Never allow harvested fruit to remain in the sun. Move harvested berries to cold room or cooler as soon as possible

Harvesting Currants and Gooseberries

Currants and gooseberries ripen over a 2-4 week period. Two to three harvests are usually sufficient to harvest fruit at peak ripeness.



Currants. Avoid mesh baskets for currants as individual berries become caught in the mesh, tear and leak. Damaged fruit should be discarded or used for processing as post harvest rots may quickly develop. Half pint or pink containers are good for fresh fruit; solid baskets and clear clam shells also work well.

Red and white currants. Yields for these vary greatly depending on cultivar, growing conditions etc. In general yields range from 3-10 lb/ plant. Fruit for storage should be picked firm and dry. To avoid damaging fruit during harvest, pick whole strigs (berry clusters) by stems and not individual berries. Pickers should be careful not to crush the top berry on each strig while harvesting. Red currants intended for fresh market fruit should be picked before skins change from bright to dull red in color. White currants should be harvested while skins remain bright and translucent.

Black currants. Unlike red and white currants, berries on strigs ripen at different times. Individual ripe berries should be harvested, not entire strigs. Average yield for European black currant varieties is about 10 lb/bush; for American varieties, slightly less. Berries should be uniformly black or

dark blue with no trace of green when harvested. Pick berries for storage while still firm and dry.

Gooseberries. Average yield for gooseberries is 8-10 lb/bush; for cordon trained plants (single stem) expected yields are 1-2 lb/plant. Gooseberries present some challenges during harvest because of thorns. Pickers should wear a leather glove on the hand holding branch up or steady while harvesting. Berries should be gingerly harvested with other ungloved hand, avoiding thorns as best as possible.

Rules for Currant and Gooseberry Pickers

- ❑ **Keep your hands clean at all times. Wash hands after each visit to the restroom.**
- ❑ **Pick and pack fruit only when dry; never harvest fruit wet.**
- ❑ **Red and white currants should be harvested as whole strigs. Avoid crushing the top berry of each strig while harvesting.**
- ❑ **Black currants should be harvested as individual ripe berries.**
- ❑ **Watch out for thorns when harvesting gooseberries!**
- ❑ **Damaged fruit becomes easily infected by post harvest fungi, and should be discarded or kept for processing.**
- ❑ **Do not put trash or cull berries into the container.**
- ❑ **Never allow harvested fruit to remain in the sun.**
- ❑ **Move harvested berries to cold room or cooler as soon as possible.**

In Conclusion

Avoid a fumble at the 2 yard line! After a season's

Upcoming Meetings:

June 1, 2007 – SETTING UP A DRIP IRRIGATION SYSTEM, [Brookdale Fruit Farm](#), 36 Broad St/Rt. 30, Hollis NH. 5:30 – 8:00 For more information contact George Hamilton at 603-641-6060 or george.hamilton@unh.edu

June 6, 2007 – SMALL FRUIT & VEGETABLE TWILIGHT MEETING, [McKenzie's Farm](#) 71 Northeast Pond Road, Milton 03851 5:30 – 7:45. Topics include greenhouse/tunnel tomatoes, plasticulture strawberries, summer-bearing raspberries. For more information contact Geoffrey Njue at 603-749-4445.

June 19, 2007 - 4-7 PM Warner Farm Sunderland, MA – UMASS VEGETABLE IPM FIELD SCHOOL. Cost \$20. For more information, go to http://www.umassvegetable.org/ed_programs/meetings/winter_meetings.html or call Ruth Hazzard at 413-545-3696 or email rhazzard@umext.umass.edu.

June 20, 2007 - UMASS TURF RESEARCH FIELD DAY - , [Joseph Troll Turf Research Center](#), South Deerfield, MA. Field Day 2007 will focus on the research currently taking place at the Joseph Troll Turf Research Center as well as on research being conducted at other locations by University of Massachusetts Turf Program faculty, staff, and graduate students. For attendee/exhibitor registration information, visit: www.umass turf.org/education/annual_events/field_day.html

July 12, 2007 - SUMMER MEETING OF THE MASSACHUSETTS FRUIT GROWERS' ASSOCIATION, INC. IN COOPERATION WITH THE UMASS FRUIT PROGRAM – Bolton Orchards, Bolton, MA For complete information, see <http://www.umass.edu/fruitadvisor> or <http://www.massfruitgrowers.org>.

worth of effort getting high quality berries ready for harvest, take them over the goal line for a touch down by having your harvest game plan in place and operating even before the 2007 berry season game begins.

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(*Source: New York Berry News, Vol. 6, No. 5, May 2007*)

July 18, 2007 - SUMMER MEETING & TRADE SHOW of the Massachusetts Nursery Landscape Association (MNLA) and Massachusetts Flower Growers Association (MFGA) in cooperation with the UMass Extension Floriculture, Landscape, Nursery and Urban Forestry Programs - Tower Hill Botanic Garden, Boylston, MA

To register go to www.mnla.com or call 413-369-4731.

July 24, 2007 - 4-7 PM Foppema's Farm Northbridge, MA UMASS VEGETABLE IPM FIELD SCHOOL. Cost \$20.

For more information, go to http://www.umassvegetable.org/ed_programs/meetings/winter_meetings.html or call Ruth Hazzard at 413-545-3696 or email rhazzard@umext.umass.edu

August 8, 2007 - 4-7 pm Golonka Farm Hatfield, MA UMASS VEGETABLE IPM FIELD SCHOOL. Cost \$20. For more information, go to http://www.umassvegetable.org/ed_programs/meetings/winter_meetings.html or call Ruth Hazzard at 413-545-3696 or email rhazzard@umext.umass.edu.

August 10-12, 2007 - NORTHEAST ORGANIC FARMING ASSOCIATION (NOFA) 33 rd ANNUAL SUMMER CONFERENCE – “A CELEBRATION OF SUSTAINABLE LIVING” at Hampshire College in Amherst, MA. For the full schedule of activities and further information go to www.nofamass.org, or contact Julie Rawson at (978) 355-2853 or julie@nofamass.org.

August 15, 2007 4-7 pm Paradise Hill Farm Westport, MA UMASS VEGETABLE IPM FIELD SCHOOL. Cost \$20.

For more information, go to http://www.umassvegetable.org/ed_programs/meetings/winter_meetings.html or call Ruth Hazzard at 413-545-3696 or email rhazzard@umext.umass.edu

August 21, 2007 - AGRICULTURE RESEARCH DAY - 4-7 pm UMass Crops Research and Education Center, South Deerfield, MA. Hear about the latest research on a wide range of topics in vegetable crops, cover crops and crops for fuel! Join us to celebrate the new equipment workshop being built by the College of Natural Resources & the Environment to support research at South Deerfield. Bring disease samples to a free onsite diagnostic clinic! Registration: \$20 per person (3 or more per farm, \$15 per person). Refreshments will be served. Pesticide recertification credit has been requested. For more information contact Ruth Hazzard (545-3696) rhazzard@umext.umass.edu or Steve Herbert (545-2250) sherbert@umext.umass.edu.

August 21, 2007 - ANNUAL MEETING of the CAPE COD GROWERS' CRANBERRY ASSOCIATION 9am - 1pm - UMass Cranberry Experiment Station, Wareham, MA. In addition to the business meeting, there will be a tradeshow, lunch, and a tour and ribbon-cutting ceremony for the newly renovated State Bog. Lunch tickets must be purchased in advance. For further information contact CCCGA at 508-759-1041 or e-mail info@cranberries.org.

September 18, 2007 - 3-6 pm Howden Farm Sheffield, MA UMASS VEGETABLE IPM FIELD SCHOOL. Cost \$20.

For more information, go to http://www.umassvegetable.org/ed_programs/meetings/winter_meetings.html or call Ruth Hazzard at 413-545-3696 or email rhazzard@umext.umass.edu

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