



Berry Notes

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Prepared by the University of Massachusetts Fruit Team

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Massachusetts Berry Notes Underwriters:



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Message from the Editor:

Strawberries: Harvest is well underway. Some growers are finding very high two-spotted spider mite populations. Severe infestations may require pre-renovation miticide applications. Registered materials include Vendex* 50WP (1), Kethane 35WP(3), Agri-Mek* (3), Savey 50DF (3) and a new material, Zeal (1). * indicates restricted use materials and the (#) indicates the preharvest interval. Watch for potato leaf hopper infestations in new plantings. Remember to keep up with blossom removal on new plantings. **Blueberries** are showing a variety of symptoms related to winter injury including tip dieback, inadequate foliage, high numbers of small fruit. See more on this below. Strip excessive fruit if bushes look weak. Cranberry Fruitworm moths will have laid eggs by now. Check for infestations by looking for individual fruit that turn prematurely blue accompanied by webbing and frass. Blueberry maggot yellow rectangle traps should be put in place this week. Sphere traps can be placed about 1 week after the rectangle traps. Keep an eye out for aphids. Control as soon as you find them because they can transmit blueberry scorch virus into your planting. Control options include Provado. Look for and prune out phomopsis or fusarium infections. Last chance to get N-fertilizer on now before July 4th cutoff. Late nitrogen applications can lead to greater susceptibility to winter injury. **Raspberries** are in fruitset. Many plantings are showing severe winter injury with a lot of tip dieback and also weak foliage (small, yellowing) and poor fruit-set. For plantings with harvestable fruit, Botrytis fruit rot management is still a primary issue. Tarnished plant bug can still cause some damage to later fruit. Watch for twospotted spider mites and potato leafhopper, especially in fall fruiting varieties. As with blueberries, final N-fertilizer applications can be made now. **Grapes** are

in varying stages of bloom and fruitset. There is a wide range in development from coastal to inland vineyards. Shoot growth has been rapid during the past week. Continue disease management programs. 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** are near harvest for early varieties. Watch for two-spotted spider mite, potato leaf hopper, currant borer and gooseberry fruitworm. Powdery mildew can develop now, too. Time harvests before severe heat, if anticipated, to avoid fruit drop.

Environmental Data

The following growing degree day (GDD) and precipitation data was collected for the one-week period from June 16 through June 22, 2005. Soil temperature and phenological indicators were observed on June 22, 2005. Accumulated GDDs represent the heating units above the 50° F baseline temperature collected via our instruments since the beginning of the current growing season. 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	2005 GROWING DEGREE DAYS		Soil Temp (*) (°F at 4" depth)	Accum. Precip (*) (1-Week Gain)
	1-Week Gain (*)	Total accumulation for 2005 (*)		
Cape Cod	68 (122)	468 (624)	n/a° (70°)	n/a" (0.70")
Southeast	71 (122)	561 (675)	68° (75°)	0.50" (0.04")
East	58 (109)	533 (704)	65° (71°)	0.25" (0.00")
Central	74 (125)	548 (682)	58° (62°)	0.38" (0.00")
Pioneer Valley	85 (122)	673 (769)	68° (70°)	1.65" (0.45")
Berkshires	100 (112)	624 (733)	67° (66°)	1.12" (0.44")

*Data from same week in 2004. (Source: UMass Extension Landscape Message #17, June 25, 2004)

STRAWBERRY

Better Weather Increases Insect Pest Numbers

Wet Soils Encourage Fungus Diseases

David Handley, UMaine Extension

Situation: Suddenly warmer weather has come and plants and pests are really moving along. Fields in southern Maine are in full bloom to green fruit while fields in the northern region are just coming into bloom. Expect things to advance quickly under high temperatures and be ready to get fungicides on during the bloom period. Insects also move quickly in warm weather and can do a lot of damage in a short amount of time, so get out there and scout!

Strawberry bud weevil or "clipper" been very active in fields this week where plants still have lots of unopened flower buds. We have found significant clipper damage in most southern and mid-state fields, so northern growers should now be on alert. Once most of the flowers in a field have opened, clipper is no longer a threat to the crop and attention should focus on tarnished plant bug.

Raspberry Growers Take Note: Strawberry clipper is likely to move onto raspberry buds once strawberry buds have opened and no longer offer good egg-laying sites. Check raspberry flower clusters for clipped buds and live clippers. Insecticide sprays to control raspberry fruit worm adults, which are also active at this time, should provide some control of clipper as well. Products registered for clipper on raspberries include PyGanic, Sevin XLR Plus and Aza-Direct.

Tarnished plant bug nymphs are now becoming more prevalent in fields. This was anticipated because of the high numbers of adult bugs we had observed last week. Most of the injury caused by this pest is thought to

come from the immature or nymph stage. The nymphs are small, active, yellow-green insects. It is important to scout for them often because they may appear quickly in warm weather. The nymphs are feeding on strawberry flowers, and this will cause the berries to have seedy ends. To scout for this insect shake 30 flower clusters (six clusters in five different locations) over a plate. If four or more of the clusters out of the 30 sampled have any nymphs, control measures should be taken.

Two-spotted spider mites have been present in most fields this week, but remain mostly below the spray threshold. We expect that populations may soon rise, however, due to warm temperatures and the use of insecticides for other pests that also eliminate the natural predators of spider mites. To scout for mites collect 60 leaves from various locations in the field, and examine the undersides for the presence of mites. Mites are very small - you may need a hand lens to see them. Miticides presently labeled for use on strawberries include Vendex, Savey, Kelthane, Agri-mek and Zeal.

Spittlebugs: We are starting to see a few spittlebugs in strawberry fields this week. Although these insects usually pose no significant threat to the plants, the frothy spittle they cover themselves with for protection can create an annoyance for pickers. Adult spittlebugs are about 1/4 inch long and resemble leafhoppers. They are bright green when they first emerge but later turn dull yellow or brown. The spittlebug overwinters in the egg stage, and the nymphs emerge in late May. Spittlebugs may be present throughout the late spring and summer in the Northeast. You should

start to scout for spittlebugs during the bloom stage. Randomly inspect five one square foot areas per field every week. On hot, dry days the nymphs and their spittle masses may be at the base of the plants, so spread the leaves and inspect the crowns, leaf bases, leaf stems, and flower stems looking for the white, frothy spittle masses. The small, yellow-orange nymphs will be under the spittle. If the average number of spittle masses is more than two per square foot, a treatment may be warranted. Spittlebugs tend to be a greater problem in weedy fields. Pesticides currently registered for spittlebug control include Provado, Guthion, Danitol and Brigade.

Diseases: Most strawberry plantings are still at a critical stage to protect the fruit against gray mold. Two to three sprays of fungicide from early bloom through petal fall are usually needed to give good protection against this disease. The plentiful moisture still present in most fields will make good coverage essential. If you tank mix insecticides and fungicides, avoid spraying when bees are active. Be sure to rotate the fungicide materials you use for gray mold to prevent the development of resistance.

Leather rot, is still a concern with many fields having standing water present. Rain and irrigation will promote infection by splashing the fungus onto the flowers and fruit. Maturing fruit in contact with wet soil can also be

infected. Fruits may be affected at all stages from blossom to maturity. Clean straw mulch placed under plants and between rows keeps maturing fruit from getting rain-splashed soil on the surface. Ridomil Gold or Aliette fungicides are registered for control of leather rot. Sprays should be applied during bloom and fruit development.

Anthracnose fruit rot is also a concern now, because it is favored by warm, humid conditions and can spread rapidly during rains or frequent irrigation. Anthracnose fruit rot can be identified by black sunken lesions on the berries. It can become widespread very suddenly in a field. Fungicides that offer control of anthracnose include Abound, Cabrio and Switch.

Powdery Mildew: Periods of humid weather can often stimulate symptoms of powdery mildew on strawberry plants. The most obvious indication of this fungus is the upward curling of the leaves. Purple or reddish blotches, and/or white, powdery growth may be observed on the undersides of the leaves. Mildew infections weaken plants and can reduce yield the following year. Some varieties are more susceptible than others, for example Northeaster and Annapolis are thought to be susceptible, while Mira and Mesabe are thought to be resistant. Quadris, Captan, Pristine, Cabrio, Topsin-M and Stylet oil are presently registered to control powdery mildew. (*Source: Maine Strawberry IPM Newsletter, No. 3, June 10, 2005*)

Strawberry Renovation

Bruce Bordelon, Purdue University

Matted row strawberry plantings must be renovated after harvest to establish new crowns for next year's crop. For best results, renovation should be started immediately after the harvest is completed to promote early runner formation. The earlier a runner gets set, the higher its yield potential. Renovation should be completed by the end of July in normal years. Harvest is winding down across the state so growers should begin renovation as soon as the last marketable berries are harvested. The following steps describe renovation of commercial strawberry fields.

1. Weed control: Annual broadleaf weeds can be controlled with 2,4-D amine formulations. Check the label as only a few products are labeled for use on strawberries. (e.g. Amine 4 [Dimethylamine salt of 2,4-D (3.74 lb./gal.)] at 2 to 3 pts./acre in 25-50 gallons of water.) Apply immediately after final harvest. Be extremely careful to avoid drift when applying 2,4-D. Even though the amine formulation is not highly volatile, it can volatilize under hot, humid conditions and can cause damage to desirable plants a considerable distance from the site of application. Some damage to strawberries is also possible. Read and understand the

label completely before applying 2,4-D amine. If grasses are a problem, sethoxydim (Poast 1.5 EC) or clethodim (Select 2 EC) will control annual and some perennial grasses. However, do not tank mix these materials and 2,4-D.

See ID 169 and the product label for rates and especially for precautions.

2. Mow the old leaves off just above the crowns 3-5 days after herbicide application. Do not mow so low as to damage the crowns.

3. Fertilize the planting. A soil test will help determine phosphorus and potassium needs, but foliar analysis is a more reliable measure of plant nutrition. For foliar analysis, sample the first fully expanded leaves following renovation. Generally, nitrogen should be applied at 25-60 lbs/acre, depending on vigor. It is more efficient to split nitrogen applications into two or three applications at regular intervals, rather than apply it all at once. A good plan is to apply about half at renovation and half again in late August when flower bud develop is occurring.

4. Subsoil: Where picker traffic has been heavy on wet soils, compaction may be severe. Subsoiling between rows will help break up compacted layers and provide better infiltration of water. Subsoiling may be done later in the

sequence if crop residue is a problem or if soils are too wet at this time.

5. Narrow rows: Reduce the width of rows to a manageable width based on your rowspacing, the aisle width desired, and the earliness of renovation. A desirable final row width to attain at the end of the season is 12-18 inches. Wider rows lead to low productivity and increased disease pressure. This means that rows can be narrowed to as little as 6 inches during renovation. Use a tiller or cultivator to achieve the reduction. Since more berries are produced at row edges than in the middle, narrow rows are superior to wide rows. Narrow rows will give better sunlight penetration, better disease control, and better fruit quality.

6. Cultivate: Incorporate the straw and other plant material between rows and throw a small amount of soil over the row by cultivation. Strawberry crowns continue development at the top, and new roots are initiated above old roots on the crown, so 1/2 - 1 inch of soil on the crowns will facilitate rooting. This also helps cover straw in the row and provides a good rooting medium for the new runner plants.

7. Weed control: Pre-emergence weed control should begin immediately. Dacthal, Sinbar or Devrinol are suggested materials. See ID-169 and check the product labels carefully. Devrinol must be incorporated by

irrigation, rainfall, or cultivation to be effective. Rate and timing of Sinbar application is critical. If regrowth has started at all, significant damage may result. Some varieties are more sensitive to Sinbar than others. If unsure, make a test application to a small area before treating the entire planting. Use 2 to 6 oz/acre/application and no more than 8 oz/acre/year total. Sinbar should not be used on soils with low organic matter, or on sensitive varieties like Guardian, Darrow, Tribute, Tristar and possibly Honeoye. If Sinbar gets onto strawberry leaves, irrigate to wash it off.

8. Irrigate: Water is needed for both activation of herbicides and for plant growth. Don't let the plants go into stress. Ideally the planting should receive 1 to 1-1/2 inches of water per week from either rain or irrigation.

9. Cultivate to sweep runners into the row until plant stand is sufficient. Thereafter, or in any case after early September, any runner plant not yet rooted is not likely to produce fruit next year and can be removed. Coulter wheels and/or cultivators will help remove these excess plants in the aisles.

10. Adequate moisture and fertility during August and September will increase fruit bud formation and improve fruit yield for the coming year. Continue irrigation through this time period and fertilize if necessary. An additional 20-30 pounds of N per acre is suggested, depending on the vigor. (**Source:** *Facts for Fancy Fruit 05-04, June 20, 2005*)

Weed Control at Strawberry Renovation

Doug Doohan, Ohio State University

Seasoned growers know that weed control at renovation is critical to maintain a productive and long-lasting planting. While the main purpose of renovation is stimulate new growth and daughter plant production the basis for next years crop, unless weeds are consistently controlled that future crop may never come to fruition. Narrowing the rows, cultivation and mowing all help to reduce weed growth in the renovated berries but the key to a clean field is judicious use of herbicides.

Good growing conditions during summer are required to stimulate strawberry renewal and for herbicides to work therefore, don't turn off the irrigation system! If perennial grasses such as quackgrass or johnsongrass were present during harvest apply either Poast or Select immediately after harvest. Crop oil concentrate must be used with these herbicides but not with any others that are recommended on strawberry. Nearly all growers should apply either Stinger (Ohio Section 24C No. OH-030004) or 2,4-D amine (Formula 40) before starting renovation. Use 2,4-D if the predominate broadleaf weeds are plantains, dandelions, and mustards. Use Stinger if Canada thistle, clover, vetch, docks and sorrel predominate. Stinger controls

dandelions very well but is more costly to use than 2,4-D and does not control mustards or plantain. On the other hand it is much more effective than 2,4-D on thistles, clovers, and docks and is worth the extra money. Both herbicides require a rain-free period of 6 hours after application. Wait 4-6 days after the Stinger or 2,4-D application before mowing old leaves off the beds. Narrowing the rows and cultivating will not impair herbicide activity if delayed to this point. Remember to put the irrigation pipe back in the field and turn it on!

Narrowing the beds and cultivating between rows will stimulate weed seed in the soil to germinate. Not more than one week after cultivation (and not sooner than two weeks after applying Poast or Select - if used) apply Sinbar or a tank mix of Sinbar and Devrinol. Sinbar can be applied at 4 to 8 oz/A. Use the low rate on sandy soils, low in organic matter and the high rate on heavy soils with high organic matter. Sinbar is not recommended on soils with less than 1/2 % organic matter. Devrinol can be used at 4 to 8 lbs/A. At 4 lb Devrinol will improve control of annual grasses. For those needing to control common groundsel 8 lbs are needed, and even then control may be inadequate. Both Sinbar and Devrinol require moisture to activate them;

however, with Devrinol it is important to supply 1 inch of water within 24 hours of application or sunlight will degrade the herbicide. Watch closely for strawberry (cyclamen) mite and other pests following renovation. Mites not only damage the crop on their own but predispose the crop to damage from the renovation herbicide.

Post harvest Sinbar will often provide control well into the fall; however, you have to keep an eye on your fields. All growers will benefit tremendously by applying Sinbar again, in early fall this is known as the Labor Day treatment. Stay tuned to this station for more on late summer weed control. (*Source: Ohio Fruit ICM News, Volume 9, No. 23 June 23, 2005*)

It's Time to Register for the 2005 Summer Tour

“Farming on the Urban Fringe”

Wednesday, August 17 to Friday, August 19

When it comes to registering for NASGA's 2005 Summer Tour in the lower Hudson area of New York there are two dates to keep in mind:

The deadline for getting a room at our special rate of \$125 per night is Wednesday, July 20.

Because of our contract with the bus company, the optional side trip to New York City must be confirmed with a full bus by Friday, July 29.

We're letting you know early, because if you want to be part of the fellowship and learning that takes part during this annual event . . . it would be best if you register now. A last minute registration may mean disappointment for you and for everyone else.

Right now one bus has been reserved for the main two-day tour. Registrations for a second bus will be accepted on a first come, first served basis with priority for NASGA members and those signing up for both days of the two-day tour. A second bus will only be added if interest merits it. By sending in your registration right away, you won't find yourself on the waiting list, which means you will be able confirm your travel plans right away.

The tour schedule is included in the attached brochure and is on the NASGA website:

www.nasga.org/meetings/2005/summerTour/brochure.htm

Take these three steps today:

1. Print the registration form and send it to NASGA. Make it easy on yourself and NASGA . . . pay by credit card and fax your completed form to 1-814-355-2452.
2. Make your hotel reservations. Call the Courtyard Fishkill by Marriott (1-800-320-5741) and be sure to mention NASGA to obtain our special group rate.
3. Make your travel plans and get ready to enjoy another NASGA adventure.

An Exceptional Opportunity to Learn about Agriculture: Our tour group will be joined by one of the most well-known and well-respected “voices” for agriculture in New York's Hudson Valley. Dave Tetor is active in numerous farm organizations and is a supporter of farm life through his many public, political, and personal involvements. He was one of the leaders who propelled a comprehensive report titled “At a Crossroads: Agricultural Economic Development in the Hudson Valley.” He is also a congenial and well-loved TV personality who will bring the local color to life for our NASGA travelers.

RASPBERRY

Summer Bramble Chores

Gina Fernandez, North Carolina State Univ.

This list was developed by Dr. Gina Fernandez, Small Fruit Specialist at NC State University and reviewed and revised with the assistance of Dr. Marvin Pritts at Cornell. Chores and timing may be somewhat different in your area or for your cropping system.

Plant growth and development

- Fruit development.
- Rapid primocane growth.
- Floricanes senesce.
- Primocane fruiting types flower and produce fruit.

Pruning and Trellising

Erect types:

- In warm climates with a long growing season, hedge (tip) the new primocanes when they are about 6-12” below the top wire of the trellis to encourage lateral branching. Continue hedging at monthly intervals to maintain desired branching and height of canopy (laterals should reach top wire).
- In colder climates, tip primocanes once when they are about 2 – 3 ft. tall to encourage lateral branching.
- Prune out spent floricanes after they have produced fruit, do not thin out primocanes until mid-to late winter.

- ❑ Train primocanes to trellis to minimize interference with harvest. Shift trellises or V trellises make this relatively easy.

Trailing types

- ❑ Train new primocanes to middle of trellis, or on the ground in a weed free area or temporarily to trellis outside of fruiting area (depends on trellis type).
- ❑ Cut back side shoots to 18" (after dormancy in cold climates).
- ❑ Remove spent floricanes after harvest.

Weed management

- ❑ Mow along side of row to maintain the width of the bed to 3-4 ft.
- ❑ Weed growth can be very vigorous at the same time as the bramble crop peaks.
- ❑ Weed control is best done earlier in the season before harvest commences.
- ❑ Mow middles regularly to allow pickers to move through rows easily.

Insect and disease scouting

Insects

- ❑ Raspberry crown borer (canes girdled and wilt)
- ❑ Psyllid
- ❑ Two spotted spider mite
- ❑ June beetle

Diseases

- ❑ Botrytis
- ❑ Late rust
- ❑ Sooty blotch
- ❑ Orange rust
- ❑ Powdery mildew

Water management

- ❑ Bramble plants need about 1"-2" water/week, and this amount is especially critical during harvest.
- ❑ For blackberries (not raspberries) in warmer climates only, consider installing an overhead system for evaporative cooling to reduce sunscald. Turn on once or twice a day from 10 am to 3 pm for short periods of time (approx. 15 minutes).
- ❑ Give plants a deep irrigation after harvest.

Nutrient management

- ❑ Take leaf samples after harvest and send to a clinic for nutrient analysis. Do not fertilize with nitrogen at this time of the year.

Harvest and marketing

The busiest time of the year for a blackberry or raspberry grower is the harvest season. Each plant needs to be harvested every 2-3 days. For larger plantings, that means fruit is picked from some part of the field every day of the week.

- ❑ Pick blackberries when shiny black for shipping. Those that are dull black are fully ripe and suitable for PYO only.
- ❑ Pick directly into clamshells with absorbent pads OR for PYO use soft drink flats.
- ❑ Keep harvested fruit in shade and move into coolers as soon as possible to lengthen the shelf life of the fruit.
- ❑ Use forced-air precoolers for best removal of field heat.
- ❑ Store at 32 to 34°F and 95% relative humidity.
- ❑ Freeze excess fruit for jam, juice or wine.

(*Source: Bramble Newsletter, Vol. 21, No. 2 Summer, 2005*)

The Organic Way- In Search of Sustainable Botrytis Management

Elsa Sánchez, Kathy Demchak & Graham Sanders, Penn State University

Last year we started a research study to examine the effectiveness of several biorational products and cultural strategies for Botrytis management for raspberries. This study is being funded by the State Horticultural Association of Pennsylvania, NE Sustainable Agriculture Research and Education Program, North American Bramble Growers Association and IR-4. In May of 2004 we planted 'Nova' and 'Prelude' red raspberries at the Russell E. Larson Research Farm, Rock Springs, PA. This year we have been working with researchers from the University of Massachusetts and the USDA and an advisory board of growers in PA and MA to select different products to trial.

The products which will be included in the trial are:

Milstop – The active ingredient of Milstop is potassium bicarbonate. Milstop is approved for certified organic production.

Endorse – Endorse is not currently labeled for raspberry production. It is a biorational fungicide used in turf.

Stor-Ox – The active ingredient of Stor-Ox is hydrogen dioxide. It is a broad spectrum fungicide and bactericide approved for certified organic production.

Lime Sulfur – Lime Sulfur will be used as a 1% solution during the growing season instead of the 5 – 10% solution used during dormancy.

Vigor-Cal-Phos and Stor-Ox (applied separately) – Vigor-Cal-Phos is a foliar nutritional supplement containing 13% phosphate, 3% calcium and 0.25% copper.

Phostrol – The active ingredients of Phostrol are mono- and dibasic sodium, potassium and ammonium phosphates. It is a biorational fungicide.

Additionally, we'll compare V-trellis with I-trellis (supported hedgerow) for differences in the environment within the raspberry hedgerow and

Botrytis incidence and severity. Finally, we're going to examine cane thinning at two times during the growing season to determine how it will affect Botrytis incidence and severity.

The products will be applied to the raspberries beginning in May when the plants flower. The trellis systems are being installed and we'll begin the cane thinning treatment later in the growing season. As we gain more information, we'll keep you posted on the study. (*Source: The Vegetable and Small Fruit Gazette, Vol. 9, No. 6- June 2005*)

BLUEBERRY

Monitoring for Blueberry Maggot Flies

Rufus Isaacs, Michigan State University

The blueberry maggot fly is a primary pest of blueberry because its maggots develop inside the fruit, and there is zero tolerance for infestation. With the high soil moisture this spring and warm weather expected over the next few weeks, emergence of blueberry maggot flies is expected to start in the next two to three weeks. To ensure that the first flies are detected, blueberry growers should deploy monitoring traps before the middle of June to ensure detection of the start of this pest's emergence.

Yellow Pherocon AM sticky boards are recommended for monitoring flies early in their activity season. These traps should be hung in a V shape in the top of the blueberry bush, with the yellow side facing downwards. Twist ties can be used to hold the trap in this position, and leaves should be cleared from the area near the trap to prevent contamination and to allow flies easy access to the trap. Monitoring traps should be checked at least once per week. Any blueberry maggot fly caught on the trap should be counted, recorded and removed. These flies have an inverted W pattern on their wing, and this should be identified before counting so only the pest insects are being counted.

For maximum effectiveness, Pherocon AM yellow boards must be recoated or replaced after three weeks of exposure. To increase fly attraction to traps, they should be baited with ammonium acetate or ammonium carbonate baits. The traps can be purchased with bait

mixed into the sticky coating, or the regular yellow traps can have "superchargers" added to them (small yellow plastic containers) that release the odors to attract flies. A supercharger should be hung with each trap and should be replaced or refilled periodically to maintain their activity, according to the manufacturers' recommendations.

For effective monitoring in commercial highbush blueberry operations, a minimum of two Pherocon AM boards are needed for every five acres. One trap should be placed in the field adjacent to wild host plants, and the other trap should be placed in the center of the five-acre block. This will allow detection of fly populations that move into the field versus those resident in the field.

If flies are trapped immediately after they emerge from the soil, there is a 7 to 10-day period before egg-laying begins. Because of this, if flies are trapped the first insecticide treatments should be timed for within a week after the first fly captures. This maximizes the impact of the treatment against egg-laying flies to prevent fruit infestation. Sticky green spheres may also be used for monitoring blueberry maggot fly. However, these traps are more effective later in the season when the majority of the flies have attained sexual maturity. Sticky spheres should be placed within the bush approximately six inches from the top of the bush and baited. (*Source: Michigan Fruit Crop Advisory Team Alert, vol. 19, No. 3, June 15, 2004*)

Too Few Leaves on my Blueberry Bushes!

Becky Grube, University of New Hampshire

Several blueberry growers around the state have been reporting that their bushes have fewer leaves than normal. The leaves did not fall off – they never formed to start with. In some cases, the entire bush may be affected, but it's usually only select canes. Those canes or bushes that have very few leaves tend to have

abnormally heavy fruit set. Those with lots of leaves have comparatively few fruits.

What's going on?

During the growing season, the blueberry bush forms buds for the next year – in spring and early summer, it makes the buds that will be leaves, and in late summer it makes the buds that will become fruits. Heavy fruit set this year means

that the bush made a lot of fruit buds last year. They do this when they have excess energy to go around, which many did last year because yields were light (in part due to the mummyberry disease) so they were not spending energy ripening fruit.

If a branch has lots of fruit buds from the previous year, it pours its energy into setting fruit, and NOT into producing leaves. Blueberry bushes preferentially pour energy into fruit rather than leaves. This is why we see branches that have either lots of fruit OR lots of leaves, but not both.

An aside: Pruning during the winter can bring the fruit and leaf buds into balance for the bush. One grower reported to me that they had left some of their ‘Bluetta’ bushes unpruned last winter. The bushes that had NOT been pruned have very heavy fruit set and very few leaves, whereas those that had been pruned had a better balance between fruit and leaves. Another complicating factor: winter injury can weaken canes slightly without actually killing buds. These weakened canes have less energy overall, so this problem may be more apparent on exposed canes or older canes that were more susceptible to winter injury.

Why is this a problem?

If a bush (or a cane) doesn’t have very many leaves, it cannot produce the energy it needs in order to ripen the berries. So even though there are many berries, the berries will likely be undersized, and will not be very sweet, if they ripen at all. Further, the bush will not have excess energy to pour into either 1) next year’s fruit buds or 2) the root system, strengthening it for the coming winter. This will stress the plant, or at the very least, the cane in question.

What to do?

The objective is to ripen and harvest as much of the current fruit set as possible. A couple of suggestions that may help:

Fertilization: Due to the amount of rain we had earlier in the season, some of the nitrogen applied earlier in the season may have leached away and was not taken up by the bushes. A soil application now of 50-75 lbs ammonium sulfate (10-15 lbs actual nitrogen) would ensure bushes have adequate fertility. Bill Lord, former UNH fruit specialist, says that he has had success stimulating leaf cover with two foliar sprays, 7-10 days apart, of LB urea at a rate of 3 lbs/100 gallons of water. **Caution:** *Foliar sprays should not be applied the day after a long period of rain or if air temperatures are over 80F, to avoid burning plants.*

Fruit removal: Depending on the severity of the problem, you may want to do some selective pruning to reduce the fruit load now, before the fruits get any larger. This may be more important for young bushes (<3 years), where significant stress could limit future plant growth. Fruit removal will increase the quality of the berries you do have. It will also reduce the stress on the plant, and increase potential yields next year. Judging how much is ‘too heavy’ is subjective, but it’s probably too heavy if you are already seeing that berries are smaller than you would expect (or than on other canes). You will have to balance the labor required to remove fruit with the potential benefit in yield, both this year and next. It’s important to remember that even though you are cutting off fruit, these fruits will not likely ripen properly, and so you will not be losing profits. If not removed now, these canes should certainly be removed in the next pruning cycle. **Caution:** *IF you decide to prune now, make sure to sanitize shears frequently (i.e. between bushes) with a 10% bleach solution or specialized nursery or greenhouse disinfectant to prevent transmission of viruses or other diseases!*

A caveat:

Too few leaves are a general sign that the bush is experiencing any number of stresses. One such stress is winter injury, but it could also be caused by nutritional problems, root damage, insects, diseases, improper pH, etcetera. Trying to determine the source of the underlying stress is important to help manage it in future years.

GRAPE

Long Island Grape Update

Alice Wise, Cornell Cooperative Extension

Pest Update: Disease pressure has been low with the exception being powdery mildew. PM is a season long threat. A reminder that as we move through bloom into early fruit set, newly formed berries are highly susceptible to fungal diseases. Powdery mildew and black rot have been particularly troublesome in recent years due to infections at this time. With the dry weather however, the risk of black rot infection is low.

Potato leafhopper has been mostly a no show though there are a few around. This time last year there were treatable levels in vineyards. (AW)

Grape Berry Moth: Though not a universal concern on Long Island, this is the time of year that grape berry moth (GBM) can be found in the likely places, namely in edge rows adjacent to woods. As berries start to size up, feeding will continue and potentially impact yield in these higher risk areas. Treatment for leafhopper with certain materials (Imidan, Sevin, Danitol) will also control GBM.

Apparently, in the Lake Erie region, GBM has developed some resistance to Sevin, evident because of a series of control failures.

If GBM is the only insect of concern, options are GBM pheromone products, Bt products such as Biobit and Dipel, and two newly labeled products SpinTor and Entrust.

Mating disruption with pheromones is most appropriate for blocks with low to moderate infestations. The older version Isomate-GBM pheromone ties are no longer being sold. They are also no longer labeled in NY according to the DEC website. The new version, Isomate-GBM Plus, is labeled and is just undergoing tests at Geneva.

Growers have given it mixed reviews. Cornell Entomologist Greg English-Loeb indicates that pheromone ties release pheromone for about 60 days, thus may need to be reapplied. 3M Sprayable Pheromone Mating Disruption for GBM is a microencapsulated product. There would be some labor savings with a spray as putting out 400 ties/acre is a labor intensive activity. English-Loeb recommends two app's, with each application effective for about 2 weeks. Neither of these products are OMRI listed.

The Bt's Biobit and Dipel are OMRI listed. They can be effective if applied to young larvae, thus scouting is essential. Use back to back applications targeted at the cluster zone. If the canopy is dense in the cluster zone, pull a few leaves prior to spraying to improve penetration. See the labels for specifics on rate, timing and compatibility issues.

Spinosad is in a relatively new class of chemicals with activity vs. caterpillars, thrips, some beetles and flies. Produced by a soil-dwelling microbe, it is formulated into the commercial products SpinTor

2SC (EPA# 62719-294) and Entrust (EPA #62719-282) for use on many crops.

Entrust is the OMRI-approved version for organic production. Control of GBM and thrips are listed on the new SpinTor primary label and on a supplemental label for Entrust (thus both the primary and supplemental label must be on hand). Download current and supplemental NY-approved labels from the Internet at <http://pmep.cce.cornell.edu/pims/current>. Because Spinosad breaks down fairly quickly and because both SpinTor and Entrust are targeted toward larvae, two applications per generation may be required. Both products should be easy on beneficial insects. Trials in both NY and Michigan on Labrusca grapes indicate that control levels have not generally been as high as some broad-spectrum standards such as Danitol or Sevin, which may be due to its relatively short residual. According to entomologist Dan Gilrein Spinosad has performed well against western flower thrips on grape and ornamentals in greenhouse studies.

The GBM fact sheet can be found at <http://www.nysipm.cornell.edu/factsheets/grapes/pests/gbm/gbm.html>.

The publication Risk Assessment for GBM can be found at: <http://www.nysipm.cornell.edu/publications/grapeman/risk.pdf>. Risk management is most relevant for larger blocks. In smaller vineyards, the "edge effect" permeates the entire block.

Note also that Geneva Entomologist Greg English-Loeb published an overview of insect and mite control, similar to Wilcox's annual write up. This was distributed via the vineyard manager listserv. If you would like an electronic or hard copy, please contact us. (*Source: Long Island Fruit & Vegetable Update, Vol. 05, No. 15, June 25, 2005*)

Crop Load Adjustment in Grapes

Bruce Bordelon, Purdue Univ.

Annual pruning of grapes is necessary to balance the amount of fruit production with the amount of vegetative growth to insure economic yields of high quality fruit. Pruning severity is based on the strategy of 'balanced pruning,' which dictates the correct number of buds to retain, or 'crop load,' which determines the number of clusters to retain. Both methods are based on the vine's pruning weight or 'vine size', which is an indication of the vine's capacity to ripen the crop. Many growers prune vines lightly during the early spring to assure adequate bud number following this year's winter injury, and in case of damage by a late frost or freeze. Now that the danger of frost and freeze is over and grape shoots are growing rapidly, growers should

go back through the vineyard and determine if crop load adjustment is needed. The crop load is adjusted by removing shoots and/or clusters. New shoots are easily broken off by hand without the need for pruners. Growers should pay close attention to the fruitfulness of shoots. Shoots from primary buds have full fruiting potential, whereas secondary buds and latent buds on older wood produce shoots with little or no fruiting potential, depending on cultivar.

Ordinarily, all secondary shoots and shoots from older wood should be removed. However, on varieties that may have suffered winter injury or frost damage this year, the secondary shoots may be the only shoots available. Shoots should be spaced evenly along the trellis if possible and at a density of about four to six shoots per foot of row. Cluster

thinning (removing one or more of the clusters on each shoot) done before bloom results in the least yield reduction because the remaining cluster(s) generally set more berries. However, on tight clustered cultivars, cluster thinning after bloom can result in looser, less rot susceptible clusters. Keeping records of average cluster

weights and vine yields can help determine the appropriate amount of fruit to retain now. (*Source: Facts for Fancy Fruit, Vol. 05, No. 3, June 1, 2005*)

Shoot Positioning and Canopy Management

Bruce Bordelon, Purdue Univ.

Now that we are past fruit set and shoots have toughened-up, it's time to get serious about shoot positioning in grapes. Varieties differ in their need for shoot position due to their growth habit and vigor. Some varieties such as Vignoles and Chancellor tend to have relatively short shoots that stand up well on their own, so shoot positioning is seldom needed. Other varieties such as Traminette, Foch and all the American varieties produce horizontally growing shoots that tend to run along the top of the trellis and cause significant shading of the fruit and renewal zone. Shoot positioning is very important with these varieties. The need for shoot positioning on other varieties will vary depending

on vigor of the particular site. In high cordon-trained vines, shoot positioning involves pulling lateral-growing shoots off the top of the trellis to hang vertically downward. In mid-wire cordon-trained vines, shoot positioning is done by tucking shoots between sets of catch wires, or pulling catch wires up into position so that the shoots grow vertically upward. Shoot positioning is critical for improving sunlight exposure of fruit and increasing fruit quality. Additionally, it improves fruitfulness of the basal nodes on the shoots for full fruiting potential next year. Shoot positioning may need to be repeated two or three times during the summer. (*Source: Facts for Fancy Fruit, Vo. 5, No. 4, June 20, 2005*)

General Information

Retailing Requires TQBM: Total Quality Berry Management

Kevin Iungerman, Cornell Cooperative Extension

We have just begun to move into berry season, with the first row-covered strawberry production coming on locally this week (week of 6/13). Despite very cold temperatures in the region on the morning of May 13 (23°F in Burnt Hills, 27°F widely) I saw little or no cold injury in strawberries, raspberries, and blueberry plantings I have visited. Most injury was confined to tip dieback of summer red raspberries, more so with purple and black. Our recent tropical heat wave -- complete with random monsoons -- pretty much reversed our earlier heat unit deficit. As of 6/15, we are about at normal berry cropping times across the board. Because of the moisture, berries are likely to be on the larger side, and for strawberries and raspberries, may be especially prone to rapidly reach over-maturity; this will be accentuated if the heat resumes. With this in mind, I have incorporated an earlier article I prepared having to do with harvest and post harvest berry handling. The timing on this should be close to ideal.

Respiration rates of various fruits stored at different temperatures °F (in mg CO2 kg-1 h-1).					
	@32	@41	@50	@59	@68
Raspberry	24	55	92	135	200
Blackberry	22	33	62	75	155
Strawberry	15	28	52	83	127
Blueberry	10	12	35	62	87

Total Quality Berry Management (TQBM) involves aspects of proper site selection and preparation, the choice of suitable cultivars, maintaining optimum nutrition and pest management, and educating pickers regarding point of harvest criteria, and especially careful handling. TQBM places emphasis upon the rapid movement of the crop from the farm to a pre-arranged market destination via a continuous maintained cold-temperature handling chain. TQBM addresses the need for storagelife plus shelf life, where 'Shelf-life' refers to the extent to which sufficient berry eating quality (i.e. marketing quality) is maintained without cold storage. While in contrast, 'Storage-life' refers to the extent to which eating quality is maintained in berries with cold storage. The goals of TQBM are to expand berry marketing options by using rapid refrigeration to 1) extend the window of quality fruit availability, and 2) the shipment range of this excellent eating quality fruit than was previously thought possible. TQBM changes the 1 - 2 day shelf life of picked berries @ ambient temperatures (68°F.) to a specific crop's maximum attainable post-harvest quality

range. Using proper harvesting and storage techniques, it is possible to maintain quality raspberries for 7 days after harvest, strawberries for 2 weeks, and blueberries for 3 weeks.

Perhaps the three most important keys to achieving TQBM are the following:

- Appreciating the dynamics of post-harvest physiology.
- Using rapid two-stage cooling.
- Maintaining a refrigerated transport and handling chain.

First and foremost, remember that following harvest fruit remains alive! And while harvest is a radical event in a fruitlet's existence, it is not the end of the berry's life -- not yet. Life encompasses senescence and deterioration as well as growth and maturity. Respiration and transpiration are processes governing this cycle of life and post-harvest decline. Post-harvest life span is directly related to the inherent respiration rates of fruit.

What then must be done with harvested fruit to put the brakes on respiration and transpiration to ensure TQBM?

- Harvest in the cool of the day. Have a runner or individual pickers take filled flats to a shaded central pickup point.
- Cover flats with a moist, light-colored tarp and provide shelter from the wind in order to retain water vapor.
- Rapidly cool fruit to remove field heat. An 18° drop in fruit temperature equals a 2X - 4X drop in respiration rate.
- E.G. Raspberries held at 32°F and 90% RH, rather than 77°F and 30% RH, water loss rate will be 35 times slower.
- E.G. Strawberry shelf life, at 30°F, is 50% greater than at 40° F.

Refrigeration is an absolute to TQBM. Passive refrigeration has the advantage of being relatively inexpensive, but involves a long cool-down period, which severely compromises storage-life potential. Controlled atmosphere (CA) cold storages (which combine refrigeration, higher

Respiration is the oxidation (O₂) of food reserves in the fruit to produce energy. A simple representation of the process would be:

Starches / sugars → ↓O₂ → organic acids → ↓O₂ → simpler carbon compounds → ↓O₂ → eventually CO₂ + H₂O + heat

Our second concern, transpiration, involves water loss. It is prompted by differences of water vapor concentration (i.e. which means pressure differences). Like all gasses, water vapor disperses from regions of greater concentration to regions of lesser concentration. Harvested fruits, and indeed all plants, constantly lose water to the environment. Vapor pressure decreases over a gradient between the fruit cell, the intercellular spaces surrounding those cells, to the atmosphere surrounding the fruit. This means a concentration gradient moving from about a 99% relative humidity to one of 50% to 80% depending upon the outside environment.

Putting these two forces together, unmanaged respiration and transpiration cause many undesirable outcomes:

- Sugars are oxidized and cells lose turgor pressure.
- Energy deficit and membrane disarray open fruit to pathogen invasion.
- Symptoms of deterioration and senescence as follow:
- Loss of berry crispness, texture, flavor, sweetness, and nutritive value.
- Loss of Berry weight due to shrinkage, shriveling.
- Wilting, softening, and berry rot (death).

CO₂ levels, and reduced O₂ levels to reduce respiration rates) has a similar cooldown phase, but due to the modified gas environment, it is conducive to long-term produce storage. However, it is not rapid enough for highly respiring fruits (such as our small fruits) and is cost-prohibitive to smaller growers. A third general cooling approach is pre-cooling which utilizes two-stage refrigeration. It has the advantage of being relatively easy to construct and adapt, and it is the least expensive approach after passive. Liquid ice, hydro cooling, or vacuum cooling as pre-cooling methods, have differing problems of practicality for small fruit processing, higher pathogen transmittal risk, and relative expense. Rapid forced-air pre-cooling is the most practical choice for most small fruit operations. Several operating principles are involved for rapid forced-air cooling:

- Refrigerated air (35°F) is ducted so that it is pulled to and through covered vented flats. Warm air then returns to flow over the coils of cooling unit to repeat the cycle. Air leakage is controlled in the loop and the larger cooler.
- Heat is removed by convection not conduction. A monitoring unit tracks fruit flesh temperature drop and trips fans (i.e. turns them off) within 5° of 32°F. (Excess air movement causes dehydration).
- Ideal design: a separate cooling chamber sized to harvest flow. Can be adapted to a portion of a cooler.

TQBM requires both rapid pre-cooling and high relative humidity (RH). Theoretically, if the cold storage

could be at 100% RH, so long as there is a vapor pressure differential between the warmer fruit and the cold air of the storage, fruit would continue to rapidly lose moisture until temperatures were equated. Cool-

down in a passive system is too slow. Even if fruit and cooler have similar relative humidities, the differences of temperatures represent very different drying powers, for vapor pressure deficit. (VD)

Location and Temperature °F	Humidity Relative %	Pressure (mm Hg) Vapor	Deficit
	Fru, Air	Fru, Air	
Fruit, Air @ 37	100, 90	5.69, 5.12	.57
Fruit, Air @ 32	100, 90	4.58, 4.12	.46

(See example →) (Note: Storage RH & VD never = 0) (Information from USDA Agricultural Handbook 68, p 20.)

- Recommended storage regimens:

Raspberries and Strawberries at 32°F and 90-95% RH. Blueberries at 32°F and 85% RH

Rapid pre-cooling puts the brakes on pathogens too. *Rhizopus* rot is unable to grow below 40°F, and *Botrytis spread* to healthy fruit is arrested at 32°F. In general, Rapid cooling to 32°F complements fungicide control to counter the incidence of various food spoilage fungi, including: *Cladosporium*, *Penicillium*, *Mucor*, *Aureobasidium*, *Alternaria*, *Epicoccum*, *Didymella Species*.

TQBM also requires that you maintain the ‘Cool Quality Chain’. Consider this: farmgate to consumer fruit loss, due to deterioration and rot, is estimated at about 40%, and it is largely due to poor handling. Some 14% of the loss occurs in the chain from farmer to wholesaler, 6% from wholesaler to retailer, and 22% from the retailer to the consumer. (Gives new meaning to loss leaders in the produce section.) In the cool quality handling chain, there are plenty of opportunities or places for things to go wrong. You need to focus on your percentage piece of the problem and you need to educate your customer on his, so that together you may enhance everyone’s profit and satisfaction.

TQBM seeks to avoid the losses associated with handling and transport breaks in the cool quality chain. This can be achieved by observing the following:

- After pre-cooling, cover berry containers with rubber-banded cellophane (reduces water loss,

excludes contaminants, and aids overall appearance).

- Cover flats with plastic before removal from cold storage. Maintain covers over cellophaned fruit through each phase of refrigerated movement.
- When placed in ambient air, allow berries to warm above the dew point before removing the outer plastic. (Deters sweating or condensation on either berries or cello. Reduces pathogen development risk and appearance problems.)
- Pre-cool fruit first, and move by refrigerated transport. (Refrigerated trucks are incapable of removing field heat.)
- Avoid non-refrigerated breaks in cool fruit movement.
- Properly position flats on pallets in truck. Do not overload the vehicle, as free air movement is critical. Air should flow from the front elevated cooling unit, to the rear of the truck, to be deflected down and under flats.
- Avoid flat contact with the truck body (this can raise flat temperatures as much as 20°F).
- Use trucks with good air suspension. Avoid stacking over wheels. Make sure to stabilize the load.

(Source: Northeast Fruitlet, Vol. 9, No. 5, June 2005)

Upcoming Meetings

Jul.11, 2005, Sherman Farm Twilight Meeting. E. Conway, NH. Contact Tina Savage (603)539-3331 for info. Sponsored by University of New Hampshire Cooperative Extension.

July 12, 2005, University of Massachusetts Crops Research Center in South Deerfield, MA Contact Ruth Hazzard (413-545-3696)

July 18, 2005 Massachusetts Fruit Growers' Association Summer Meeting, Nicewicz Farm 116 Sawyer Road Bolton, MA TBA Jon Clements (413-478-7219)

Tuesday, July 19, 2005 Whitefly Biocontrol on Poinsettias - Information Session at Mahoney's Growing Division, Woburn, MA 10:00 AM - 12:00 PM

Poinsettia growers are invited to join us for an information session on using biological control to manage whitefly at Mahoney's Growing Division, Woburn, MA. Our featured speaker will be Suzanne Lyon, Entomologist, University of Massachusetts-Amherst. Suzanne will talk about how parasitic wasps can be used on poinsettia crops this fall, costs for using parasitic wasps and purchasing and handling parasitic wasps. Suzanne has 8 years experience conducting whitefly biocontrol research on poinsettias and has successfully used biocontrol on poinsettia crops in commercial greenhouses. Karen McNaughton, IPM Scout and Aji Gnanaratnum, Head Grower at Mahoney's will also share their experiences. Four years ago, Aji began using parasitic wasps to manage whiteflies on poinsettias as a participant in the UMass research project. Last year Aji transitioned poinsettia production greenhouses to biological control. Two contact hours have been approved for pesticide recertification. For more information see <http://www.umass.edu/umext/floriculture/> and click upcoming events.

Registration will be accepted by phone, email or mail. To register contact:
Tina Smith, University of Massachusetts, 413-545-5306, tsmith@umext.umass.edu
Paul Lopes, University of Massachusetts, 508-295-2212 ext.24, lopes@umext.umass.edu
Leanne Pundt, University of Connecticut, 802-626-6240, leanne.pundt@uconn.edu

This program is sponsored by a Northeast SARE grant to the University of Massachusetts and University of Connecticut Extension Floriculture Programs as part of the Sustainable Greenhouse Health Maintenance Program.

Jul. 26, 2005, Green Wagon Farm Twilight Meeting. Keene, NH. Contact Carl Majewski (603)352-4550 for info. Sponsored by University of New Hampshire Cooperative Extension.

UMass Extension - Weed Identification Workshops

Correct weed identification is an important first step in the development of an effective weed management program. Using a classroom presentation, potted weed herbarium and weed walk, UMass Extension Specialist Randy Prostek will help participants enhance their weed identification skills. Feel free to bring a weed or two to identify. Workshop held rain or shine (lunch not provided), 9 am - 3 pm.

4 pesticide contact hours available; MCLP and MCH credits will be offered.

Broadleaf and Grassy Weeds

July 27 - Elm Bank, Wellesley

July 28 (bilingual Spanish/English) - Elm Bank, Wellesley

August 11 - Cape Cod

Grassy Weeds in depth

Sept. 1 - Amherst

Cost \$90/person (pre-registration required, space is limited). Registration is first-come, first-served through the mail. For a registration form, go to www.umassgreeninfo.org or call (413) 545-0895.

Wednesday, August 11, 6:00-8:00 pm—Tour of Small Fruits at Cornell Orchards Meet at Cornell Orchard Store, Rt 366, Ithaca. Show and Tell of the small fruit plantings with Marvin Pritts, Professor of Horticulture and berry specialist at Cornell. Marvin will talk about the production and marketing of some unusual small fruits, such as hardy kiwi berries, currants, gooseberries, and more. Current research going on at CU Orchards with strawberries, raspberries, and other small fruits will also be discussed.

Tues. Aug.16, UNH Horticultural Farm Twilight Meeting. Durham, NH. Contact Cheryl Estabrooke (603)862-3200 for more info. Sponsored by University of New Hampshire Cooperative Extension.

Massachusetts Berry Notes is a publication of the University of Massachusetts Extension Fruit Program which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements of products mentioned in this newsletter over like products are intended or implied.