UMass Amherst EXTENSION

Berry Notes

Volume 16, 2004

Prepared by the University of Massachusetts Fruit Team

June 3, 2004, Vol. 16, No. 8
http://www.umass.edu/fruitadvisor/berrynotes/index.html

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

IN THIS ISSUE:

CROP CONDITIONS

STRAWBERRY
- Strawberry Weed Management Update
- Grubs and Weevils Potentially Infecting Michigan Strawberry Plantings

BRAMBLE
- Raspberry -- Fruit Rot and Cane Botrytis
- Orange Rust of Brambles

BLUEBERRIES
- Managing Blueberry Fruitworms During Bloom
- Blueberry and Other Berry Crops Receive Provado Label
- Admire Section 3 Label for Blueberries
- Blueberry Fertigation Guidelines

GRAPES
- Grape Update from Long Island
- Eutypa Dieback Management Focuses on Cultural Methods

RIBES
- Frequent Rains May Affect Fungicide Choices
- Fertilizing After Heavy Rains
- Lightning Safety

UPCOMING MEETINGS

CROP CONDITIONS

Strawberries: Disease pressure in strawberries remains high due to the persistent wet weather. Fruit is sizing up and may be ripening in some locations. Risk of damage from Strawberry Clipper and Tarnished plant bug is declining as the fruit develops, except for very late sites or varieties. Reports of two-spotted spider mites (TSM) are beginning to increase. Scout fields soon to determine if predator releases or miticide applications are indicated. TSM populations can explode suddenly in warm weather. Predator releases should be made if TSM populations exceed 25% of leaves examined, but not sooner because predators will not survive. Predators such as *Neosieulus fallacis*, may be ordered from sources listed in the New England Small Fruit Pest Management Guide (call me for a copy). Slugs may be abundant this year during harvest especially in fields that are well mulched with straw. Weed management in newly planted fields is important now, especially after all this rain. See more on a weed management update below. . **Raspberries** are in bloom to early fruit development. Botrytis fruit rot management is still key, especially if wet weather continues. Two-spotted spider mites are beginning to show up. Early intervention is essential for good management. Watch out for fire blight infections and orange rust infections. See more on that below. Fertilizer applications can be made to fall bearing raspberries now. **Blueberries** are postbloom and well into fruitset. Earlier issues of Berry Notes have discussed Blueberry Scorch Virus. This virus is transmitted by aphids feeding on infected bushes and then on uninfected ones. Aphid control is therefore key to managing the spread of Blueberry Scorch in and between plantings. We have a new tool for controlling aphids in Provado 1.6F which recently received a federal label for blueberries. See more on this below. Cranberry Fruitworm are beginning to be active in Massachusetts. Check traps weekly at a minimum. Control measure should be taken once trap captures have peaked, probably in another 10 days-or so. **Grapes** still growing slowly showing from 6" to 12" of shoot growth depending on location. Disease management is still a high priority. See more about this below. Also, prebloom foliar nutrient sprays can be made soon.

Weekly crop and weather report for New England available from USDA website: www.usda.gov/nass/pubs/staterpt.htm.

Strawberry

Strawberry Weed Management Update

A. Richard Bonanno, UMass Extension

Introduction

The 2003-2004 version of the New England Small Fruit Pest Management Guide is available and all small fruit growers should have a copy of this publication. There were many revision made to the strawberry weed management section. The major ones are explained below. In addition, there is a narrative on weed management during the summer months. All other information that will be presented here can be found in the Small Fruit Guide.

Major Herbicide Label Change

2,4-D Formulation Change: Amine 4 is the new formulation of 2,4-D amine (salt) available for use in strawberry. Formula 40 will no longer be available. There are many ester and low-volatile ester formulations on the market for other uses of 2,4-D. Be certain to NEVER use ester or low-volatile ester formulation of 2,4-D on vegetable or fruit crops. Both ester and low-volatile ester formulations of 2,4-D can move from the target area after application under warm weather or low humidity conditions. They have the potential to damage crop far from the site of application and their movement is unpredictable.

Gramoxone (paraquat) Formulation Change: Gramoxone Max 3S has replaced Gramoxone Extra for all uses. Label rates are generally lower than the old formulation since Gramoxone Max contains more active ingredient per gallon. As with the old formulation, the use of a non-ionic surfactant is still required. With Gramoxone, always remember that better weed coverage through the use of more water per acre will result in better weed kill.

Dacthal 75WP (DCPA): Dacthal herbicide was back on the market during 2002 and 2003 with all the previous labeling. The price of this product has more than doubled, however, rising to approximately $14 per pound. One critical uses of this product is on newly transplanted strawberry. The revised Sinbar label, described below, has somewhat lessened the need for Dacthal for broadleaf weed control but does not replace Dacthal for control of annual grasses. Because of the expense of this product, it will not be commonly used.

Sinbar 80 WP (terbacil): The supplemental label for strawberries has been revised to allow use during the transplant year as well as on soils with between 0.5% and 2% organic matter. During the planting year, Sinbar may be applied at 2 to 3 ounces per acre after transplanting but before new runners start to root. If strawberry plants have developed any new foliage prior to application, irrigation or rainfall (0.5 to 1 inch) is required to wash the Sinbar off the strawberry plants. In late summer or early fall, a second application may be applied at 2 to 6 ounces per acre to control winter annual weeds. This application must also be followed by 0.5 to 1 inch of irrigation or rainfall to wash the Snbar off the plants. A third application of 2 to 4 ounces per acre can be applied, as usual, after the strawberry plants are dormant and just prior to mulching.

For soils with at least 2% organic matter, there is no maximum amount per application; however, no more than 8 ounces of Sinbar can be applied per year. For soils with between 1 and 2% organic matter, a maximum of 4 ounces of Sinbar can be applied at any one time with an annual maximum of 8 ounces per acre. For soils with between 0.5 and 1% organic matter, a maximum of 3 ounces of Sinbar can be applied at any one time with an annual maximum of 6 ounces per acre.

Following the establishment year, applications can only be made just after renovation and just prior to mulching. Applications are now allowed, however, on soils with between 0.5% and 2% organic matter using the same guidelines for rates as above. As always, be careful with Sinbar in strawberries, especially with potential overlap of sprayer passes which will double the rate and increase the potential for injury in some varieties. Please consult the new supplemental label for addition information, rates, precautions, etc.

Grubs and Weevils Potentially Infecting Michigan Strawberry Plantings

Rufus Isaacs, Entomology Bob Tritten, Southeast MSU Extension

A few different beetle species can cause economic injury to strawberries in Michigan, either as adult beetles feeding on leaves or as the grub stage feeding on roots. The grub stage is usually the most damaging, particularly in newly planted fields. Knowing the biology and life cycles of these pests can help with planning, monitoring and management.

White grubs

There are many different white grubs (larvae of May and June beetle, Japanese beetle and rose chafer in the family Scarabeidae), and each of these may feed on roots of strawberry plants. This feeding weakens plants and exposes them to soil-borne diseases such as black root rot. Because adult beetles prefer to lay eggs in grassy fields, the risk of white grub infestations is often highest in new plantings

established where grass was present the year before. Fields with sandy soils also have greater risk of grub problems.

The C-shaped larvae are whitish gray with brown heads and three pairs of legs; they are 0.5 to 1.5 inches long depending on the species. [**Editor's Note**: a good factsheet from Ohio State University describing the various species of white grubs and how to identify them can be found at http://ohioline.osu.edu/hyg-fact/2000/2510.html.] Once larvae become mature they pupate in the soil and then emerge as adults. These feed on leaves in late summer, which can result in skeletonized leaves, so scouting strawberries in the fall is very important to identify the presence and timing of adult activity. Adult beetles range in length from 0.5 to 1 inch and vary in color from tan to dark brown and are shiny.

Adult females lay eggs in the soil in late spring or early summer with a preference for grassy areas. The eggs hatch about two weeks later. Young larvae feed on roots throughout the summer and burrow deep into the soil under the frost layer to overwinter. In the spring they return to the root zone to feed. These larger larvae feed more and can cause much greater damage than they did in the fall. May and June beetles take more than one year to complete development, remaining as larvae in the soil for more than one summer, whereas Japanese beetles and rosechafer complete development in one year. The May and June beetles are nocturnal (active at night), while Japanese beetles and rosechafer beetles are active in the daytime.

Root weevils There are three main species of root weevils (family Curculionidae – snout weevils). These are the strawberry root weevil (*Otiorhynchus ovatus*), the black vine weevil (*Otiorhynchus sulcatus*) and the rough strawberry weevil (*Otiorhynchus rugosostriatus*). These weevils are very similar in their biology and damage potential.

Root Weevils

Root weevil larvae are thick-bodied, white, legless grubs with brown heads. They are usually C-shaped and smaller than the grubs described above. [**Editor's Note**: a good fact sheet from the University of Maine on identification of various root weevils can be found at http://pmo.umext.maine.edu/factsht/Strawpro.htm].

Larvae reach about 0.25 inch in length. Larvae of these weevils feed on strawberry roots and crowns, and this can weaken, stunt or kill plants. Damaged plants are more susceptible to winter injury and diseases, and they may have leaves that turn red or berries that are undersized. Weevil infestations are typically in patches across a field, and symptoms may be similarly uneven. Depending on the year and the timing of egglaying, weevils overwinter as full-grown larvae, pupae or adults in soil, plant debris or other protected habitats. As conditions warm in the spring, larvae and pupae complete development and emerge as adults in May or June.

Adult strawberry root weevils are black or dark brown and are about 0.25 inches long with rows of small pits on their backs. Black vine weevils and rough strawberry root weevils are slightly larger. They have jointed antennae attached to their hooked snout. Adult weevils cause notching to the leaf edges, but this feeding rarely causes economic loss, and protection of roots is the focus for management. Identification of adults or grubs of these root weevils should be done by a specialist (such as MSU Diagnostic Services). The adult strawberry root weevils are flightless and they feed on leaves at night. Egglaying by the females occurs in strawberry fields throughout the summer, and each female can deposit up to 200 eggs. These eggs hatch in about ten days and larvae burrow through the soil to feed on roots until they mature or until cold temperatures suspend their activity.

Monitoring

Examine plants in the spring in areas with poor vigor. Use a spade to lift a section of row and examine the roots and surrounding soil. If grubs are found, control measures should be taken after harvest when the adults emerge. Examine the field every one to two weeks throughout the season for leaf notching damage to identify adult emergence.

Cultural controls

For white grubs, do not plant strawberries into a field that was grass the year before, or near to a grassy field. Instead, prepare the field by leaving it fallow or planting it with a non-grass cover crop or alternative crop such as pumpkins for at least one season prior to strawberries. To reduce pressure from weevils, isolate new fields away from infested fields, because flightless adults do not travel far. Any infested fields should be plowed under before new beds are planted.

Control by insecticides

Spraying for adult control is usually not very effective. In fields where white grubs have been detected, Lorsban 4E® can be applied before planting at 2 quarts per acre for white grub control, in sufficient water for thorough coverage. Applications should be incorporated into the soil to reach the grubs. Many other restrictions apply, check the label. During late 2003, Admire® (imidacloprid) was registered for use in strawberry and in 2004 for blueberry. This new insecticide has been tested extensively in Michigan turf and blueberries for Japanese beetle control, where it has given excellent control. The new label allows for post-harvest application only with a range of 16 to 24 ounces per acre against the white grub complex. This product requires at least 0.25 inches of rain soon after the application (or sufficient irrigation) to get the product into the soil. The

label allows for application by normal ground equipment, banded over the row or as a chemigation application.

We recently received funding from the North American Strawberry Growers Association and from the Michigan State Horticultural Society to evaluate some new insecticides in Michigan strawberries for grub and weevil control. We hope to have results to report to the industry this winter.

Control by nematodes

Soil-dwelling nematodes have been evaluated for a number of years against weevils and grubs. The parasitic organisms attack the insects in the soil and kill them by feeding and multiplying inside. We have no experience yet with evaluating these in Michigan strawberries for control of these pests, but researchers in other Eastern states report good control with them. There are many sources of insect parasitic nematodes, and it is important to know what you are getting and which species of pest it is effective on. Proper application of nematodes is also required to enable them to survive long enough to achieve control. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, May 4, 2004*)

Brambles

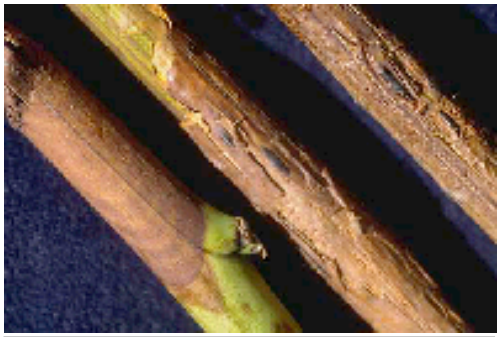
Raspberry -- Fruit Rot and Cane Botrytis

Sonia Schloemann, UMass Extension

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

Botrytis fruit infections in raspberry. Illustration from Oregon State University Extension Fact Sheet 947.

Wet weather or a lot of overhead irrigation is also necessary for high levels of infection to occur. Therefore, air circulation within the canopy, especially in the fruit zone, is very important. This is accomplished through good pruning practices in the dormant season. If significant wetting periods occur during bloom, the likelihood of infection by Botrytis is very high, and control measures may be needed.



Botrytis cane infections in raspberry. Illustration from Oregon State University Extension Fact Sheet 947

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

Cultural control

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

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

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

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

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

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

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

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

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

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

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

Orange Rust of Brambles

Michael A. Ellis, Ohio State University

Orange rust is the most important of several rust diseases that attack brambles. All varieties of black and purple raspberries, and most varieties of erect blackberries and trailing blackberries are very susceptible. Orange rust does not infect red raspberries.

Unlike all other fungi that infect brambles, the orange rust fungus grows "systemically" throughout the roots, crown and shoots of an infected plant, and is perennial inside the below ground plant parts. Once a plant is infected by orange rust, it is infected for life. Orange rust does not normally kill plants, but causes them to be so stunted and weakened that they produce little or no fruit.

Symptoms

Orange rust-infected plants can be easily identified shortly after new growth appears in the spring. Newly formed shoots are weak and spindly. The new leaves on such canes are stunted or misshapen and pale green to yellowish. This is important to remember when one considers control, because infected plants can be easily identified and removed at this time. Within a few weeks, the lower surface of infected leaves are covered with blister-like pustules that are waxy at first but soon turn powdery and bright orange. This bright orange, rusty appearance is what gives the disease its name. Rusted leaves wither and drop in late spring or early summer. Later in the season, the tips or infected young canes appear to have outgrown the fungus and may appear normal. At this point, infected plants are often difficult to identify. In reality, the plants are systemically infected, and in the following years, infected canes will be bushy and spindly, and will bear little or no fruit.

Causal Organism and Disease Development

Orange rust is caused by two fungi that are almost identical, except for a few differences in their life cycles. Arthuriomyces peckianus occurs primarily in the northeastern quarter of the United States and is the causal agent for the disease in Ohio. Gymnoconia nitens is a microcyclic (lacks certain spores) stage of A. peckianus. G. nitens is the more common orange rust pathogen on erect and trailing blackberries in the Southeast.

In late May to early June, the wind and perhaps rain-splash



spreads the bright orange aeciospores from the pustules on infected leaves to healthy susceptible leaves where they infect only localized areas of individual mature leaves. When environmental conditions favorable for infection occur, the spores germinate and penetrate the leaf. About 21-40 days after infection, small, brownish black telia develop on the underside of infected leaflets. The teliospores borne in these telia germinate to produce a basidium, which in turn produces basidiospores. These basidiospores then infect buds on cane tips as they root. They also may infect buds or new shoots being formed at the crowns of healthy plants in the summer.

The fungus becomes systemic in these young plants, growing into the crown at the base of the infected shoot, and into newly formed roots. As a result, a few canes from the crown will show rust the following year. The fungus overwinters as systemic, perennial mycelium within the host. Orange rust is favored by low temperatures and high humidity. Temperatures ranging from 43 to 72˚F favor penetration and development of the fungus, but higher temperatures decrease the percentage of spore germination. At 77˚F, aeciospores germinate very slowly, and disease development is greatly retarded. Spore germination and plant penetration have not been observed at 86˚F. Aeciospores require long periods of leaf wetness before they germinate, penetrate, and infect plants.

Control

- Whenever possible, start with disease-free, certified nursery stock.
- When diseased plants first appear in early spring, dig them out (including roots) and destroy them before pustules form, break open, and discharge the orange masses of spores. If plants are not removed, these spores will spread the disease to healthy plants.
- Remove all wild brambles from within and around the planting site. Wild brambles serve as a reservoir for the disease.
- Maintain good air circulation in the planting by pruning out and destroying old fruited canes immediately after harvest, thinning out healthy canes within the row, and keeping the planting free of weeds.
- Fungicide sprays are generally not considered an effective control method for orange rust.

(***Source**: Ohio State University Extension Fact Sheet, HYG-3010-94*)

Blueberries

Managing Blueberry Fruitworms During Bloom

Rufus Isaacs and John Wise, Michigan State University

The larvae of two moth species can infest young blueberry fruit starting at the early fruit set stage, in some years before 100 percent petal fall. Their presence is often not noticed until several weeks after 100 percent petal fall with premature ripening of infested berries or the webbing of berries together by cranberry fruitworm. However, an Integrated Pest Management approach using monitoring, scouting and appropriate application of effective controls can prevent fruit contamination by these pests.

The cranberry fruitworm and the cherry fruitworm have similar biology, so they are usually controlled together. Adults of both species can be monitored using pheromone traps hung in the top third of bushes, preferably on edge bushes near wooded borders. Traps are checked weekly to provide information on the start of moth flight and duration of adult emergence. Although the traps have caught very few moths so far this year, the expected warming trend this week is expected to bring the first consistent emergence of these pests. No degree day model has been developed for this insect, so once adults have been trapped scouting for eggs should commence. Egg scouting should initially be focused on bushes near to woods or un-managed blueberry fields where abundance is usually the highest. Eggs are laid in or around the calyx cup of young developing fruit and usually clustered three to five feet high on the bush. A hand lens is generally needed to see these eggs, and a fact sheet on identifying fruitworms in blueberry is available at the MSUE blueberry information page at: http://www.msue.msu.edu/fruit/bluberry.htm Once eggs hatch, the young larvae burrow directly into the fruit, so there is only a small window of time when insecticide residues can be picked up by the insect. Cherry fruitworm will spend all of their larval stage within one or two berries, whereas cranberry fruitworm larvae will move from berry to berry until the whole cluster is webbed and full of brown frass. Correct timing and coverage are critically important, and so regular scouting of fields, use of sufficient spray volume and selecting appropriate spreader-stickers can increase activity of most insecticides applied for fruitworm control.

During bloom period when there is some early fruit set, options for control are limited due to the need to protect foraging bees. However, three products registered for use during bloom have provided consistent control of fruitworms in trials at the Trevor Nichols Research Complex over the past several years. These are the B.t. products such as Dipel® and the insect growth regulators Esteem® and Confirm®. B.t. products must be ingested by the larva to be effective and are best applied when daily temperatures are likely to reach 70°F. B.t. has relatively short activity, providing five to seven days active residue depending on the weather conditions. Confirm is also active primarily through larval ingestion, but has a longer residual activity of 14 days. Esteem is active primarily on the egg stage of fruitworms, therefore should be applied soon after egg-laying commences.

After 100 percent petal fall, the range of options for fruitworm control increases with Imidan®, Asana®, and SpinTor® all providing effective control. With all these products, maintaining good coverage is still important to get residue to the parts of the berry where fruitworms are found. Large-scale research trials with Michigan blueberry growers have also demonstrated that use of Confirm® can also provide control of fruitworms in the post-petal fall period. Because of the selectivity of this product, it has minimal impact on natural enemies that lay their eggs inside fruitworm larvae. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 18, No. 6, May 20, 2003*)

Blueberry and Other Berry Crops Receive Provado Label

Rufus Isaacs , Michigan State University

A full label was recently granted by the Environmental Protection Agency for use of Provado 1.6 F (Bayer CropScience; http://www.cdms.net/ldat/ld6AQ015.pdf) in blueberry, currants, elderberry, gooseberry, huckleberry, juneberry, lingonberry, and salal. This product has been labeled for the past three years in Michigan for use in blueberry under Section 18 labels, so we have good experience with this product in research trials and on-farm research. This article provides some recommendations for blueberry growers to achieve maximum effect from applications of this product.

Provado is labeled for use against blueberry aphids, leafhoppers, thrips, and adult Japanese beetles. Two main rates are recommended on the new label; 4 oz and 8 oz, with a maximum application of 40 oz per season. For aphid control, the lower 4 oz rate is highly effective and only one application should be needed for getting good control of aphids. To control aphids, get good coverage of the plant including the lower branches where aphids are most abundant. This rate is also expected to be effective against sharpnosed leafhopper, though we do not have data on this specific pest.

Application of Provado at 8 oz per acre provides initial lethal activity against adult Japanese beetle. As the compound is absorbed into the leaves, lethal activity declines and sublethal affects, such as reduced feeding and paralysis continue for seven to ten days. This product has a three-day pre-harvest interval. Provado also requires thorough coverage for optimal control of beetles, because beetles can move to untreated regions of bushes if residues are not throughout the bush.

Although the new label does not have blueberry maggot listed, multiple years of experience with this product both at the Trevor Nichols Research Complex and with grower cooperators give us high confidence that if the product is applied for Japanese beetle, then fruit will also be protected against blueberry maggot. Our research trials at a 6 oz rate have provided significant control of blueberry maggot, and we expect this pest to be added to the label soon.

As always, label directions should be carefully followed when using this product, and the label must be in the possession of growers before application. Provado must not be applied during bloom. Copies of the label for Provado in berries can be acquired from chemical distributors, or there is a PDF copy that can be downloaded from http://www.cdms.net/ldat/ld6AQ015.pdf. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, June , 2004*)

Admire Section 3 Label for Blueberries

Gary Pavlis, Rutgers University

EPA approved the expanded label for Admire on 5/21. While we have approval, Bayer needs some time to process the full label. Bayer has sent on a supplemental label for Admire on blueberries (http://www.cdms.net/ldat/ld68H022.pdf) . The supplemental label outlines the same rates, application methods and restrictions as are present on the full label. Therefore, grower use will not change over the season when

the full label becomes available. The Admire/blueberry label must be in your possession at the time of application. The label states a use rate of 3.3 to 3.9 fl. oz. per 1000 row feet, or 16 to 32 oz. per measured acre (16-19 oz is all that is needed). There is a PHI of 7 days, and like Provado, there is an REI of 12 hr. Apply with ground equipment in an 18" band on both sides of the row or chemigate through a drip irrigation system. Dry soil should be irrigated just prior to application, and the application itself should be followed with .5 to 1" of irrigation. Apply in the evening, so the Admire is not broken down by sunlight. Do not apply more than .5 lb. a.i. of imidacloprid per season, and make no more than 1 application of Admire to the soil per season. Admire when used to control oriental beetle grubs will also give several weeks of aphid control. However it takes a few days after application to accumulate in the plant to the levels required for aphid control.

Admire should be applied at least 7 days before the first picking, or be applied as a post harvest material. Grubs should be targeted at their youngest stage, or as they hatch and are at the 1st and 2nd instar stages, and while still close to the soil surface. Admire has little effect on 3rd instar and older larvae. Older 3rd instar grubs start to appear by mid August. Therefore, applications should be made well in advance of that date.

The first oriental beetle eggs will probably appear around the end of June. Therefore try to delay application as late as possible. Applications made in May may simply degrade if exposed to the sun. With the earliest varieties like Weymouth, application can be made immediately after the last picking. With Duke and Bluecrop, try to make an application 7 days before the first picking. With late season varieties like Elliott, apply no later than July 1. (***Source**: Blueberry Bulletin, Vol. XX, No. 8, May 25, 2004*)

Blueberry Fertigation Guidelines

Gary Pavlis, Rutgers University

Growers have asked me for some guidelines for fertigating blueberries. As you may be aware, our research in new Jersey has shown that fertilizing blueberries a little at a time through the trickle system has shown to be very beneficial. Increases in yield have been seen each year of the research. In addition, increases in fruit firmness have often been seen. Thanks to Mary Beth Sorrentino, USDA-CSRS for some of the technical information in this article.

Over the years the following guidelines have been developed:

1. Determine the amount of Nitrogen required/acre/year for each field. Total N should be based on leaf analysis the year before however 60# of Nitrogen/A is a good base recommendation for mature plants if a leaf analysis has not been conducted.

2. Multiply total acres to be fertigated by #/A and convert to total gallons for the season.

3. Fertigation period is 6-8 weeks, starting at 3/4 bloom. Fertigate once a week for 1-2 hours during the normal irrigation schedule. Run irrigation a minimum of 1/2 hour before and 1/2 hour after fertigation. If travel time from the injection point to the final application point is longer, allow for one hour before and after fertigation time of travel. This will ensure application uniformity to the furthest emitter within the zone. As a rule of thumb, for a scheduled irrigation, irrigate at least 3-4 hours during a 1- 2 hour fertigation. Using a 1gph emitter, irrigate 4-6 hours every 3 days, with a .5 gph emitter, irrigate 8-12 hours every 3 days. This is based on no rainfall and ET rates of .2"-.26"/day.

4. Install tensiometers to monitor soil moisture within the 12"-18" root zone depth. For loamy sands and sandy loams irrigate when readings are 20-30 CB on the tensiometers. This will supply needed water and fertilizer to the root zones.

5. Injection pump should be sized for maximum acreage/zone that you plan to irrigate/fertigate at one time (2 hour injection time, for a 4 hour irrigation per zone). Example- a 10 acre drip system at 60# N requirement/acre will need 600 gallons of liquid 10-10-10. If injection is scheduled for once a week for 8 weeks, 75 gph injection pump is recommended for a one hour injection period. If you inject for 2 hours, the rate is lower (37.5 gph injection rate). If zones are over 10 acres, plan for between 50-100 gph injection rate. A lower injection rate can be used with a longer fertigation/irrigation period. (***Source**: Blueberry Bulletin, Vol. XX, No. 8, May 25, 2004*)

Grapes

Update from Long Island

Alice Wise & Wayne Wilcox, Cornell University

Phomopsis loves the cool, damp weather. Expect to see more of this disease. If a good spray schedule is maintained, other diseases should be controlled. Rapid shoot growth and hence unprotected foliage is cause for worry but past experience dictates that if the schedule is tight and all the other things are lined up (right materials, properly calculated rates etc.) everything will be OK. Otherwise, it is now prime time for all the major fungal diseases – phomopsis, black rot, downy mildew, powdery mildew. With all the rain, disease pressure for all these fungi is high.

Powdery Mildew: Again, a synopsis of information presented by pathologist Wayne Wilcox along with local observations. Powdery mildew has emerged as one of the more difficult fungal diseases to manage. Mid-60's to mid-80's temperatures are ideal for disease development and spread. Rain is required to get the season's first infections established, but not for disease spread throughout the rest of the year. While optimum relative humidity is 85%, it is not nearly as important as temperature. Still, it is a factor with some growers last year noting that PM was worse in parts of the vineyard near water. In California, a computer model tells growers when powdery mildew pressure is low-medhigh based upon temperature, and some spray reductions have been based largely on the fact that while temps remain >90°F, the fungus is inactive. Doesn't help much for NY – a vast majority of our summer is spent in the optimum temperature and humidity zone.

Do cluster infections the previous year provide a huge pool of overwintering inoculum? Not necessarily. Large numbers of overwintering cleistothecia, the black dots within a healthy PM infection late in the season, are usually the result of significant foliar disease. Inoculum from diseased fruit contributes a lot less. This is a bright spot as often fruit infections are not accompanied by leaf infections or leaf infections are minimal.

What to do about PM control for 2004? The newest and best option is a new fungicide from Dow called Quintec. The NYSDEC has approved a "Special Local Needs" (SLN) Section 24 (c) registration that allows the use of the new powdery mildew fungicide, Quintec, on grapes. This SLN registration will allow use of the product in a manner that should be fully adequate for our needs in New York but entails some significant restrictions of the broader uses allowed on the federal label. These are:

- Grapes only (the federal label allows other selected crops)
- Maximum of 3 applications of 3 to 4 fluid ounces of product per acre (the federal label allows more applications at a wider rate range)
- A vegetative buffer strip of at least 25 feet is required between areas to which Quintec is applied and to which surface water features (such as ponds, streams, and springs) exist in order to reduce the potential for contamination of water from rainfall runoff.

All product sold in NYS will have a sticker affixed to it, saying that this SLN registration supercedes the use directions on the container (i.e., the federal label), and that a copy of the SLN label must be in the user's possession. Chemical distributors will have access to the SLN label and should provide it at the time of purchase.

A quick review: Quintec is strictly a protectant fungicide, it has absolutely no post-infection or eradicant activities. It also is strictly a powdery mildew fungicide, no other diseases are controlled. In Wilcox's trials over the last several years, it has consistently provided very good to excellent control of PM on Chardonnay, Concord, and Rosette (susceptible hybrid) grapes when applied at 2-week intervals.

In a trial last year on Chardonnay, Wilcox got better control with the 4 fl oz/A rate than the 3 fl oz rate. In fact, the program with three applications at 4 fl oz/A (immediate prebloom, 2 wk later, and midsummer) in rotation with with a sterol inhibitor and sulfur was the best out of 27 different treatments in this strobilurin-resistant Chardonnay vineyard. Where strobilurin resistance is an issue or a significant concern, Quintec should now be viewed as the 'big gun" for PM control and fit into that slot in a rotational program, if it is to be used. This means somewhere near the start of bloom (preferably just a little before) and 2 weeks later, to maximize control of cluster infections. A third application, if desired, could be fit in somewhere mid-summer in order to provide additional "ammunition" against foliar infections.

Wine grape growers whose buyers are shy about sulfur at or after veraison might consider this option, which should provide significant forward protection towards harvest. Note that there is a risk for the PM fungus to develop resistance to Quintec, so the maximum of three applications per year is a good resistance-management strategy. It will need to be tank-mixed with mancozeb prebloom or used midsummer after black rot and Phomopsis control are no longer needed. At a retail cost of approximately $4/fl oz, the 3 fl oz/A rate

is significantly more expensive than the prebloom rate of Rubigan but equivalent to the midsummer Rubigan rate. Note that this SLN expires on December 31, 2004. It is hoped that the federal label will be approved in NYS in time for the 2005 growing season.

The strobies are still useful in some vineyards, an important point as Quintec supplies may not meet demand. For PM, Abound is less effective than Sovran is less effective than Flint. Minimize the number of applications – actually the Abound label has been changed to 3 apps instead of 4. If these materials are still working and you want to keep it that way, 2 apps per season is even better. Use a higher rate of material, make sure coverage is excellent and tank mix with sulfur. It is not advisable to use any of the strobies alone for PM control. Stick to a 10-day interval instead of a 14-day. Abound should still work for black rot and downy, so there are reasons for some growers to continue using it. Sidebar: the strobies don't do so well on Phomopsis, although inoculum levels and associated pressure for this disease typically dissipate after bloom.

Other options – sulfur works well. Remember its limitations: short intervals and it washes off. The DMI's (sterol inhibitors such as Nova, Elite, Procure, Rubigan) still have some resistance issues as well. It is somewhat site specific but certainly keep your eyes open if using them. Apparently there was a report from France indicating that when tank mixed, sulfur reduced activity of the DMI's. Wilcox was skeptical about this but not 100% sure.

Contact materials are the final group. One advantage to most of these materials is that they are considered organically acceptable. In order to use them effectively – think of coverage, coverage, coverage. Of JMS Stylet Oil, Kaligreen, Nutrol, Oxidate and Serenade, only JMS Stylet Oil has consistently provided good PM control. It too has its limitations – incompatibilities with other materials and a very real phytotoxicity risk if applied in temperatures >85˚F. It seems prudent to use Stylet Oil early season then after bloom only for PM clean up or perhaps for its miticidal effect. Local research done in 2003 at the research vineyard indicates that Stylet Oil is an excellent end of the season spray, providing long-term control of PM equivalent to sulfur. Sometimes winemakers like to minimize end of season sulfur sprays to avoid fermentation issues. In same research, two sprays of Stylet Oil, as has been shown in other studies, did depress Brix slightly. It seems probable that a single end of the season JMS spray used in a well managed vineyard will have little or no effect on Brix on LI. (***Source**: Long Island Fruit & Vegetable Update, No. 12, May 28, 2004*)

Eutypa Dieback Management Focuses on Cultural Methods

Annemiek Schilder, Michigan State University

Symptoms

Eutypa dieback in grapevines is caused by the fungus *Eutypa lata*, which infects the wood of the vine. Symptoms are most easily spotted in the vineyard from about 10 inches of shoot growth until bloom. As the canopy closes, symptoms are often obscured by healthy growth. Shoots of diseased vines are stunted to varying degrees and have small, cupped leaves. The cupped leaves may also have light yellow or pale green edges or areas between the large veins. As the leaves expand, they crack and start to look ragged. Sometimes, the symptoms are so mild they are easily overlooked. A depressed area (canker) may be found on a branch or trunk in the vicinity of the symptoms. When infected branches or trunks are cut transversely, the wood may display a wedge-shaped brown area. The vine may also appear "weak" with few new shoots and many dead canes. Often the symptoms are restricted to one arm. This is why the disease was once called "dead arm." Infected vines slowly decline over several years, produce fewer and fewer shoots, and eventually die. In some cases, infected vines may survive for extended periods of time or even appear to recover from the disease. Vines do not show symptoms for several years after they are first infected, which makes the disease difficult to detect in its early stages. 'Concord' and many wine grape cultivars are susceptible, while 'Niagara' appears to be fairly resistant.

Eutypa cane infection. Ohio State University Extension Fact Sheet. HYG-3203-95

Monitoring

Through annual monitoring of affected vineyards, we have found that expression of the shoot stunting and leaf cupping symptoms is variable between years with some vines showing symptoms one year but not the next. This makes it difficult for growers to detect and tag infected vines. The reason for this variability is not known, but it appears to be related to weather conditions. Since the symptoms are caused by a mobile toxic substance produced by the fungus in infected wood, exposure of growing shoots to the toxin may be affected by the rate at which shoots grow. While this theory has not been proven, it is interesting to note that over the past five years in Michigan, symptoms were most severe during cold springs with slow shoot growth, e.g., in 2002. In this case, the number of vines showing symptoms was also much higher than in prior years. During years with warm springs (e.g., 1999), it was difficult to find infected vines. Infected vines are typically scattered throughout the vineyard or occur in small patches. As many as 20 percent of the vines in an affected vineyard may be diseased, dead, or missing.

Eutypa trunk infection. Ohio State University Extension Fact Sheet. HYG-3203-95

Biology and management

The fungus enters the plant through wounds such as pruning cuts. Ascospores are produced in fruiting bodies on wood of infected vines. Vine trunks and branches lying in the vineyard can be a source of inoculum for several years. Airborne ascospores are released year-round, except during dry warm periods in the summer. Spores are even released in the winter at temperatures above freezing. Moisture from rain or melting snow is sufficient for spore production. It is difficult to protect the pruning wounds from infection, since the fungus is active most of the time and the wounds remain susceptible to infection for several weeks or more. Painting or spraying the fungicide Benlate (benomyl) on pruning wounds has been shown to be effective in reducing infection, but rather impractical in a climate like that in Michigan since pruning is mostly done in the winter. Besides, Benlate is no longer available for use.

Control should therefore focus on cultural methods, such as:

1. Removing large pieces of wood from the vineyard to reduce inoculum pressure;
2. Burning wood piles as soon as possible, since they remain sources of ascospores, which can easily reach nearby vineyards;
3. Monitoring and tagging infected vines annually;
4. Pruning out infected canes or branches well below visible cankers or discoloration in the wood;
5. Renewal of trunks (except where the cankers extend below the soil line);
6. Removal and replanting of infected vines. Since symptoms take so long to develop, successful management of Eutypa dieback takes a concerted and continuous effort on the part of the grower.

It may also be difficult to decide when to remove or prune infected vines, since yields are not seriously reduced until symptoms become severe. As a rough guide, if you see 20 or more severely stunted shoots on a vine, half or more of the fruit yield may be lost. Vines nearly dead may produce no fruit at all or only a fraction of the yield of a healthy vine.

In the future, there may be other options for control, but at this time, the best management approach is to be vigilant and monitor vineyards at least once a year. If you are not sure whether you have Eutypa dieback, send a sample to a diagnostic lab or contact the Small Fruit Pathology program at MSU. We have developed a DNA-based method with which we can rapidly detect the fungus in infected vines. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, May 25, 2004*)

General Information

Frequent Rains May Affect Fungicide Choices

Annemiek Schilder Michigan State University

Frequent rains favor plant disease development in several ways: 1) Moisture is required for fungal growth and spore production, 2) Water on plant surfaces is required by many fungi for infection; 3) Rain promotes the spread of rain splash-dispersed pathogens, 4) Rain can wash fungicides off plant surfaces, and 5) Rainy or windy weather may prevent fungicide applications at the optimum time for protection. The only fungi that do not benefit from a lot of rainfall are powdery mildews, since powdery mildew spores burst when they are immersed in water. Powdery mildews prefer moderate to high humidity instead. This explains why powdery mildew can be a major problem in drier climates, like California.

Since many fungicides are protectant in nature, they have to be applied to plant surfaces before fungus spores land and infection takes place. An infection period occurs when the minimum requirement of moisture duration and temperature have been met for an infection to take place. Infection periods are difficult to predict, but are likely during prolonged wet periods if inoculum is available and the temperature is favorable. So the grower is placed between the proverbial rock and a hard place. However, some generalizations can be made with regard to fungicide groups and their properties that can help growers decide which fungicide may be most suited to the situation; assuming, of course, that the fungicides are labeled and effective against the disease(s) in question.

In general, the sterol inhibitor (SI or DMI) fungicides, such as Nova, Elite, Bayleton, etc., have the most "kick back activity," which means that they can stop a relatively recent infection in its tracks. They have this activity because they are systemic and can move into the plant tissues where the infection is taking place. This also means they become rainfast within a short amount of time. The amount of kickback activity depends on the disease and the specific fungicide, and can be as much as 96 hours (4 days). However, it is more likely to be between 48 to 72 hours. One important thing to remember is that if kickback activity is required, the highest labeled rate should be used. At lower rates, the kickback activity is lost. The SI's don't have as much "forward activity," in the range of 7 to 10 days.

The strobilurin fungicides, such as Abound, Sovran, Cabrio, Flint, etc., have the more forward activity (about 14 days) but less kickback activity (about 24 hours) than the SI fungicides. They are surface systemic, i.e. they distribute themselves locally in the wax layers of the plant. Some also have translaminar activity, which means that they can move from the top of the leaf to the bottom of the leaf and protect both surfaces. Strobilurins are very rainfast. So if you are concerned that an infection period has taken place in the past couple of days, it is advisable to apply an SI fungicide, whereas if you are more concerned about protection during a rainy period forecasted in the next two weeks, a strobilurin is a better option.

Other commonly used fungicides such as Captan, Ziram, and Mancozeb, are contact materials and strictly protectants. Since they are not systemic, they have little kick-back activity. While some products stick better to plant surfaces than others, none are fully rainfast, and a portion of the protective activity will be lost after a heavy rain or frequent overhead irrigation. They need to be reapplied about every seven days during rainy periods. If conditions are dry they will remain effective longer. Spreader-stickers may be added to increase rainfastness of protectant fungicides. Spreader-stickers should not be added to systemic materials, since those need to be able to penetrate plant surfaces. Many products already have spreader-stickers incorporated in the formulation (e.g., Bravo Weatherstik or Dithane Rainshield) and don't require additives to be effective.

Oils, such as JMS Stylet Oil, and potassium salts (e.g., Armicarb, Kaligreen) have eradicant activity against powdery mildews. These can be very helpful after colonies have started to appear. These products will kill existing colonies and seem to work primarily in that manner. However, thorough coverage is very important, as they need to contact the fungus colonies in order to be effective.

For most fungicides, even those that are systemic or surface-systemic, it is important to reapply them after substantial new plant growth has occurred, since the new growth will not be protected. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, June , 2004*)

Fertilizing After Heavy Rains

Eric Hanson, Michigan State University

Growers have questioned whether they should apply more fertilizer to compensate for nutrients leached out of the rootzone by recent heavy rains. The only nutrient to be concerned with is nitrogen (N). Soil N in the nitrate form is very mobile and leachable, so several inches of rain certainly can push nitrate beyond the reach of roots. However, perennial fruit crops get most of their N from soil organic matter and fertilizer applications are only a supplement. Warm, moist soils supply ammonium and nitrate to plants through mineralization of N in organic

matter, so nitrate leached by rain is generally replaced through additional mineralization. This is why in most cases, I don't think more fertilizer is needed to compensate for nitrate losses.

Additional N is justified in some specific situations. Generally, plantings on extremely sandy soils low in organic matter may benefit from additional N because these soils supply less N through mineralization. If all N was applied in one application, an additional application of 20% may be justified if a heavy crop of fruit is set. If the crop load is light, no additional N is needed. If growers use split applications and have already applied the first application, they can also increase rates in the last application by up to 20 percent if a heavy crop is expected. Again, do not increase N rates if the crop load is light.

If additional N is going to be applied, consider which form is best. Urea is an inexpensive N source but is prone to volatilization. This means that if urea remains on the soil surface, N may be lost to the atmosphere as ammonia gas. Up to 40 percent of N applied, as urea may be lost under the worst conditions. Losses are generally minimal if: 1) more than 0.2 inches rain or irrigation follows applications to wash urea into the soil, 2) temperatures stay cool (below 75 degrees) until rain is received, or 3) soil pH is below 5.5. This means that urea may not be the best choice if the extended forecast is for hot, dry weather (and irrigation is not available). Urea may also be a poor choice for plantings that were just limed because the pH of the soil surface may be very high, which promotes volatilization. In these situations calcium nitrate may be a better source since nitrate is not prone to volatilization. Ammonium nitrate has intermediate volatilization potential since only half of the N in this source is ammonium. (***Source**: Michigan Fruit Crop Advisory Team Alert, Vol. 19, No. 3, May 25, 2004*)

Lightning Safety

Interesting weather the last few weeks, thunder and lightning! It's our turn: lightning strikes the earth about 8 million times a day. But it is nothing to mess with: lightning is the leading cause of weather related deaths, causing more deaths and injuries than hurricanes, tornadoes and floods. Here are a few reminders about lightning safety.

Plan ahead!

- If thunderstorms are predicted in your area, don't be caught where you can't take shelter on short notice.
- Watch for signs of rapid thunderstorm growth. Cut clouds don't have to be directly overhead for lightning to strike, it can arc out from the thunderstorm.
- If it will take a while to reach shelter – give yourself time to reach the safe place before lightning is an immediate threat.

Don't be the tallest object!

- Don't stand in an open area such as a crop field or golf course.
- Don't ride in open vehicles (such as ATVs, open tractors, etc.) or on horseback.
- If caught outdoors, don't lie flat on the ground. If you feel your hair stand on end, lightning may be about to strike; crouch on the balls of your feet with your head down (create as little surface area as possible).

Avoid dangerous lightning situations!

- Stay away from trees, poles, and other isolated tall objects
- Avoid operating agricultural equipment, especially tillage implements.
- Stay in your car or tractor cab. Cars and enclosed tractor cabs are excellent lightning shelters as long as you don't touch the metal frame. Lightning will flash around the vehicle; it is a myth that rubber tires have anything to do with the safety of a vehicle.
- Go inside a sturdy building or in the enclosed cab of a vehicle that has a solid metal top. The building should be non-conducting (not metal). Do not be in contact with any metal on the building or vehicle.
- Don't touch anything that could conduct electricity. Stay off the telephone and out of the bathtub/shower (electricity can travel through wires and plumbing). Stay away from wire fences and water (these can transmit current from a distant lightning strike)

How far away is it?

To determine the number of miles between your location and a lightning strike, count the number of seconds between the lightning flash and the sound of thunder and divide by five (sound travels one mile in five seconds). For example: you hear thunder 10 seconds after you see lightning, divide 10 by 5 to determine that the lightning strike was 2 miles from your location. Keep in mind, though, that the average distance from one flash to the next in the same storm may be two or three miles – 10 to 15 seconds flash-to-bang. (***Source**: Massachusetts Healthy Fruit, Issue 11, June 02, 2004*)

Adapted from Nebraska Coop. Extension NF266 by S. Meyer and R. Grisso; http://ianrpubs.unl.edu/safety/nf266.htm

Upcoming Meetings

June 15 - Massachusetts Fruit Growers Twilight Meeting
OESCO, Inc. (Orchard Equipment), *Route 116, Conway, MA http:www.oescoinc.com*
5:30 PM Store tour
6:30 PM Speaking program will include updates of current cultural practices and integrated pest management approaches.
Pesticide-license recertification credit (2hours) will be offered.
A $10/person ($20 maximum/orchard) registration fee will be charged.
Directions: Northbound on I-91, use exit 24. Follow Rte. 116 North for 7 miles to OESCO. Southbound on I-91, use exit 25. Follow Rte. 116 North for 6 miles to OESCO. If these directions are not clear, call Wes Autio at 413-545-2963; Jon Clements at 413-478-7219; or OESCO at 800-634-5557. Refreshments will be served.

June 9 - CT Pomological Society Twilight Meeting:
Maple Bank Farm in Roxbury, CT www.maplebankfarm.com
5:30PM
This is a diversified vegetables, fruits and greenhouse retail operation operated by Howard and Cathleen Bronson.
Directions to Maple Bank Farm, 57 Church St., Rte 317, Roxbury, CT. From eastbound or westbound on I-84, take Exit 15 to Rte 6 and 67. Go northwest, staying on Rte 67 toward Roxbury for about 7 miles. Go right on Rte 317 (Church St.). Farmstand is on right, about one half mile. See their website at www.maplebankfarm.com for more info.

June 16 - Massachusetts Fruit Growers Twilight Meeting
Mann Orchard *65 Pleasant Valley St., Methuen, MA*
5:30 PM Farm tour.
6:30 PM Speaking program will include updates of current cultural practices and integrated pest management approaches.
Pesticide-license recertification credit (2hours) will be offered.
A $10/person ($20 maximum/orchard) registration fee will be charged.
Directions: I-495 (Exit 47) or I-93 (Exit 48) to Rt. 213. Rt. 213 to Pleasant Valley St./Rt. 113 exit. Right at light on Pleasant Valley St. Mann Orchard store on left across from shopping mall entrance. If these directions are not clear, call Wes Autio at 413-545-2963; Jon Clements at 413-478-7219; or Mann Orchard at 978-683-0361. Refreshments will be served.

June 17 Massachusetts Fruit Growers Twilight Meeting
Phantom Farm
Diamond Hill Rd., Cumberland, RI
5:30 PM Farm/store tour.
6:30 PM Speaking program will include updates of current cultural practices and integrated pest management approaches.
Pesticide-license recertification credit (2hours) will be offered.
A $10/person ($20 maximum/orchard) registration fee will be charged.
Directions: take Exit 11 off I-295 for Rt. 114. Travel north on Rt. 114 for 1.7 miles. Orchard and Farm Stand are on left. If these directions are not clear, call Wes Autio at 413-545-2963; Jon Clements at 413-478-7219; or Heather Faubert at 401-874-2750. Refreshments will be served.

June 17 - Essex County Fruit Growers Twilight Meeting
Turkey Hill Farm, 380 Middle Rd., Haverhill, MA. turkeyhillfarm@comcast.net
6:30 Farm tour and speaking program by Sonia Schloemann reviewing pest management news for blueberries and raspberries
Directions: from Rte. 495 take Exit 52, go east on Rte. 110 (toward Merrimac) for one mile and turn right on Middle Rd., farm is .7 mile on the right.

June 19, 2004 - Massachusetts Cultivated Blueberry Growers Meeting
Turkey Hill Farm, 380 Middle Rd., Haverhill, MA.
12:00 noon.

Farm tour and speaking program by Dr. Bob Childs on Winter Moth and Canker Worm in Blueberries. Also, equipment demonstrations by Orchard Equipment and Supply Co. and Charles Harris Irrigation Co. Bring your own chair & picnic lunch; soft drinks and dessert provided.
Directions: from Rte. 495 take Exit 52, go east on Rte. 110 (toward Merrimac) for one mile and turn right on Middle Rd., farm is .7 mile on the right.

June 23,2004 - UMass Extension Vegetable Twilight Meeting
Dumas Farm- Oxford, MA
Blueberry and Tomatoes
For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

July 1, 2004 - UMass Extension Vegetable Twilight Meeting
Czajkowski Farms- Hadley, MA
Vegetables, Berries and Tobacco
For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

October 12, 2004 - UMass Extension Vegetable Twilight Meeting
Seeds of Solidarity- Orange, MA
Sustainable Production Methods, Farm Energy Saving, Farm to School Program Speakers
For more information and directions contact Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

---

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 over like products are intended or implied.