The New York Berry News

CORNELL UNIVERSITY

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What's Inside

Strawberry and blueberry harvest will be in full swing as we head into July. In many plantings around NY, it appears that there will be an exceptionally large crop of strawberries. On the other hand, it also appears that a number of blueberry and raspberry plantings have suffered substantial winter injury, to which the extent of damage has become apparent over the last few weeks. The extraordinarily wet spring has created conditions favorable for many fruit rotting and soil-borne diseases and, to make matters worse, winter-injured plants tend to be more susceptible to disease. Growers need to be scouting regularly this time of year to determine the need to protect your crops from both insect and disease pests.

In this month's edition of the NYBN we cover the important disease and insect pests of berries and are getting you geared up for renovation.

Pesticide News:

INDAR 75WSP: Growers should be aware that the section 18 for Indar 75 WSP on blueberry expires on June 30. At this point, all the critical applications for managing mummyberry have passed, thus Indar is no longer needed for the remainder of the season.

Current News and Events:

Small Fruits Twilight Meeting Agenda and Contact Information

Following is the agenda for the Small Fruits Twilight Meeting scheduled for June 24, 2003 at Cornell University's New York State Agricultural Experiment Station in Geneva. Please register in advance by contacting Kathleen Morabito at (315) 787-2234 or at kmm64@cornell.edu. There is no charge for attending.

5:30 p	Registration begins -strawberry taste panel begins
6:00	Introductions
6:05	Strawberry variety trial- Courtney Weber - Variety comparisons and tasting - Introducing Cornell's newest strawberry cultivars
6:45	Strawberry pest management- Bill Turechek, Greg English-Loeb, Juliet Carroll, and Marvin Pritts
7:15	Raspberry Phytophthora root rot ratings- Jeremy Pattison
7:30	Raspberry pest management- Bill Turechek, Greg English-Loeb, Juliet Carroll, and Marvin Pritts
8:00	Other small fruits research, grower questions, and open discussion

Two (2) NYS certified pesticide applicator recertification credits can be earned for categories 1a, 10, and 22.

The meeting will be held at the experiment station's Darrow Farm on Gates Road. Gates Road is approx. 3 miles west of the experiment station off of County Road 4 (this is North Street in Geneva which runs west out of town). The Darrow farm is approximately 1 mile south of County Road 4 on Gates Road. Signs will be posted. For more information contact Dr. Weber at caw34@nysaes.cornell.edu or at (315) 787-2395.

Midwest Blueberry Crop Down

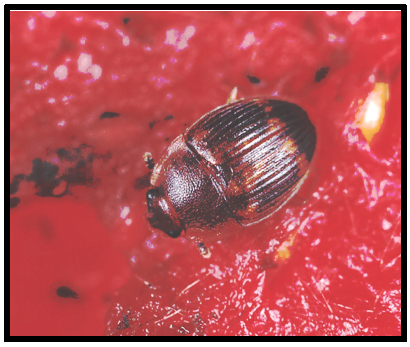
Bruce Bordelon, Purdue University

At the Blueberry Growers of Indiana meeting this week, growers discussed the crop "guestimate" for the 2003 season. They are expecting a crop 25-30% below average due to winter injury. Jersey, the most widely grown variety in the state, suffered the most damage. Growers in Michigan are also reporting considerable winter injury, so Michigan's crop will likely be lower than normal as well. Due to below average crops in most production areas, prices this year should be better than last year for both fresh and processed fruit. Last year Indiana produced about 3.1 million pounds of blueberries and ranks 7th nationally in production. (*Source: Facts for Fancy Fruit, Vol. 03, No. 06, June 6, 2003*)

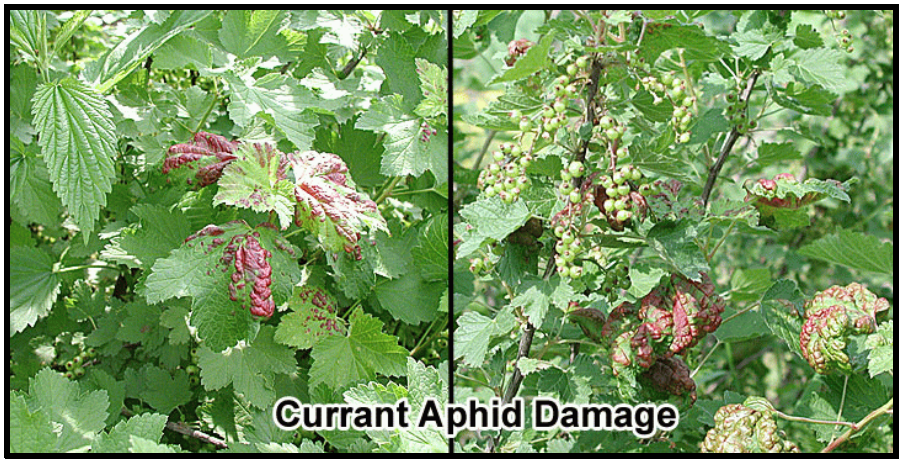
Arthropod Pest Management Update

Greg English-Loeb, Dept. of Entomology, Cornell University, Geneva, NY

There is no major news concerning insecticides and miticides for this issue. There are a couple of pest alerts to pass on, however. First, in strawberries, we are just now seeing are first ripe fruit (weekend of June 14) and not coincidently, we are starting to find strawberry sap beetle in fields. Rebecca Loughner, a graduate student in entomology at Cornell, has been monitoring strawberry sap beetles in the woods and in strawberry plantings for over a month now, almost on a daily basis. Up to late last week she has been slowly catching more and more sap beetles in traps near the woods but not much if any in the fields. But starting at the end of last week she caught many more beetles overall, including in the planting. In fact we saw our first damaged berry last Friday. It seems, therefore, that as the berries begin to ripen, the beetles, if present in the area, start to move into the fields and feed. We are not sure when they start laying eggs. As of the middle of last week females did not contain mature eggs. This may have changed over the weekend, however.



Thus, it might be a good time to inspect ripe fruit for strawberry sap beetle damage or for the beetles themselves. I suggest you first look at fruit near wood edges. Examine the underside of ripe fruit that touch the ground for small circular feeding holes. The small, oval-shaped adult beetles are very skittish (quick to flee when disturbed) so you may only find the damage. Don't confuse strawberry sap beetle damage with slug damage (and there is a fair amount of that around also). Slugs typically carve out bigger holes or scrapes than sap beetles. If you decide to treat for strawberry sap beetle, remember that good coverage is important. Both Danitol and Bridage are labeled for use against strawberry sap beetle but Danitol has a 2 day to harvest interval while Brigade does has no preharvest interval. There is a 24 hour REI for both products.



We have also been observing current aphid damage on currents and gooseberries in the Finger Lakes area for the past two weeks. Feeding by aphids on the undersides of leaves causes reddish crinkles or bumps on the tops. Malathion is labeled for use against current aphid, but inspect plants for presence of live aphids before treating. Often predators and parasitoids will take care of aphid problems by the time you get the pesticide applied. Also, we do not have an estimate of how much actual damage to the plant the aphids are causing (no established economic threshold).

We now are moving into the summer period and there are a number of arthropod pests that start to show up past bloom. I covered some of these in the last issue of the Berry News, but here are a few more to look out for.

— On Blueberry —

Blueberry maggot is probably the most important summer pest for blueberries, although it has not been as serious a problem in New York as other blueberry producing areas such as New Jersey. The blueberry maggot overwinters in the ground as a pupa (the immature stage before becoming an adult fly). Emergence begins around mid-June and continues through much of the summer. Even though the blueberry maggot only has 1 generation per season, adults appear over an extended time period (emergence is not very synchronized). Indeed, under some environmental conditions, pupae can stay in the soil for 2 or even 3 years before emergence. After emergence, adult females need to feed for 7 to 10 days before they start laying eggs. Eggs are inserted under the skin of ripening berries. Eggs hatch in a few days and the larvae feed and develop for around 20 days before dropping to the ground to pupate. During the early part of larval development there are no obvious external symptoms on the blueberry that it is infested. Later the berry may become soft and appear to ripen early.

An important part of controlling blueberry maggot is learning when emergence begins. Yellow sticky cards, baited with a food source for the adult flies (protein hydrolysate and ammonium acetate) can be used to detect the first flies of the season. These traps are commercially available. Place traps along the edge of the planting or in woods near wild blueberries to better estimate when activity begins. Interestingly, some organic growers have used these baited traps to control blueberry maggot by surrounding their fields with traps and changing them frequently. It may take several years of this kind of trapping before populations are significantly reduced. For most problem fields, regular applications of pesticides, beginning after activity is detected and continuing until harvest, is necessary to adequately protect fruit.

Adult Japanese beetles can also present problems for blueberry growers during the summer, although this is less true for U-pick operations. The adults emerge at the end of June and into July and feed both on blueberry foliage and to some extent on fruit. The damage appears as skeletonized leaves or surface scarring of the fruit. During harvest beetles can also be dislodged from the plant and contaminate the packed berries. Several insecticides are available that provide moderate to good control of Japanese beetles (e.g. carbaryl, malathion). Note, though, that beetles are very mobile and will fly into fields from long distances.

— On Raspberry —

We covered most of the relevant arthropod pests of raspberries in the last edition of the electronic newsletter. Tarnished plant bug and cane borers continue to be a threat into the summer; tarnished plant bug nymphs and adults feed on developing fruit and cane borer larvae feed inside canes. As fruit ripens picnic beetles can become a problem. The adult beetles are attracted to damaged or over ripe fruit where they feed and also may spread fruit rots. Japanese beetles can also cause injury to raspberry foliage and fruit during July and early August.

August is the time that the adult Raspberry crown borer makes its appearance. The adult is a very attractive moth that superficially resembles a yellow jacket. You may notice the adults resting on foliage during the day. It's the larvae, though, that cause the major problem. Reddish-brown eggs are placed on foliage in August and September. After hatching the larvae find a protected place near the base of the cane to spend the winter. The next spring the larvae enter the crown and roots where they spend the next year. In the second year the larvae continue to feed until early summer, at which time they form pupae and then emerge as adults in late summer to start the cycle over again. During the growing season look for withering, wilting and dying canes, often with half-grown fruit. Destroying these canes down into the crown may help reduce crown borer populations. Note that no insecticides are currently registered in New York for control of crown borer.

— On Strawberry —

Harvest is around the corner for June-bearing strawberries. For later maturing cultivars tarnished plant bug (TPB) can still cause injury to fruit so keep on monitoring for nymphs. For day-neutral cultivars, TPB becomes an increasing problem for the August harvest. As mentioned above, strawberry sap beetles are now becoming more active in fields. Finally, after renovation is a good time to treat for cyclamen mite if this mite pest has been a problem for you. Use lots of water. Also, if you have problems with root weevils and want to try nematodes, the fall is a good time to apply plus

another application the following spring.

— On Currant & Gooseberry —

Last year I noticed a fair amount of foliar damage from two-spotted spider mite on currants during the summer. The cool and wet spring this year is not very conducive to mite outbreaks, but its worth keeping and eye out now that summer weather seems to have arrived. Keep an eye out for reduced plant vigor, bronzing of foliage, and webbing on leaves and shoot tips. A good hand lens (magnifying glass) is often needed to see these tiny pests, especially if you are over the age of 40 like I am.

Strawberry Anthracnose

Bill Turechek, Dept. of Plant Pathology, Cornell University, Geneva, NY

Anthracnose is a serious disease of strawberry that can affect foliage, runners, crowns and, most importantly, the fruit. In the Northeast, the disease is caused by the fungal pathogen *Colletotrichum acutatum*. Although the pathogen is endemic to the Northeast, it is believed that the pathogen is introduced into plantings on infected nursery plants. Anthracnose is considered to be a warm-weather disease with an optimum temperature for development near 80 F. Consequently, the disease is generally not a problem in the Northeast unless warmer temperatures and rainfall prevail during fruit set and harvest. The spores of the pathogen require free water on the plant surface to cause infection, and splashing water is required to disperse spores. Once the pathogen is established in the field, the fungus can survive the winter on plant debris and mummified fruit where it may become a problem in subsequent years if the weather is warm and wet.

In research plantings here at Geneva, we have found anthracnose infected berries. Although temperatures haven't been exceptionally warm over the past few weeks, it has been exceptionally wet for long periods of time with moderate temperatures. These conditions, apparently, also favor the development of disease. It is important to realize that anthracnose can spread rapidly, and if you can find it in your planting prior to peak harvest, you need to be prepared to protect your berries prior to any significant rain event.

Symptoms. The pathogen attacks the fruit, runners, petioles, and the crown of the plant; however, we have not been able to establish crown infections from greenhouse inoculation with New York isolates. On the petioles and runners, dark elongated lesions develop which often girdle the stem (Fig. A). When petioles or runners become girdled, individual leaves or entire daughter plants may wilt and die. On fruit, symptoms first appear as whitish, water soaked lesions up to 3 mm in diameter. As lesions develop, they turn a light tan to dark brown and eventually become sunken and black with in 2 to 3 days (Figs. B and C). This is known as black spot. After several days, lesions may be covered with salmon-colored spore masses. Infected fruit eventually dry down to form hard, black, shriveled mummies. Fruit can be infected at any stage of development. Both ripe and unripe fruit can be affected. When crown tissue becomes infected, the entire plant may wilt and die. The internal tissue of infected crowns will be firm and reddish brown (seen by slicing through the crowns. Crown tissue may be uniformly discolored or streaked with brown, and infected tissues may also produce salmon-colored spores. Leaves can also become infected and advanced lesions appear similar to those caused by *Phomopsis*.

Disease management. In plantings with a history of the disease, control measures must begin early and continue throughout the season, particularly when warm and rainy weather occur at prior to harvest. Anthracnose first develops on petioles and/or as latent infections (invisible) on leaves where the lesions produce spores that serve as the source of

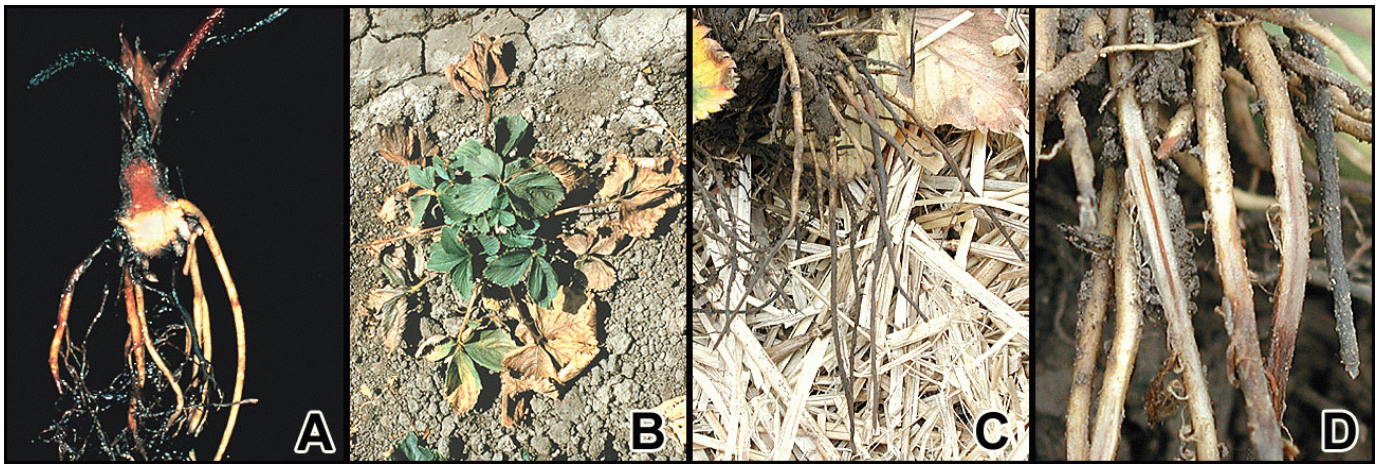
inoculum for fruit infection. Anthracnose fruit rot is very difficult to control when disease has been left to develop unchecked prior to fruit development and environmental conditions are favorable for infection during harvest. If you suspect that the disease is in your field once the plants are established, it is recommended that you minimize the amount of splashing/water movement since the pathogen is splashed dispersed. Cultural methods that reduce splashing, such as the use of drip irrigation rather than overhead, and mulching with straw, are recommended. In fields with anthracnose, additional straw mulch can help reduce the spread of the disease.

Fungicides are only partially effective at stopping an epidemic once the disease has become easily noticeable in the field; therefore, fields should be scouted regularly, particularly during fruit set. Quadris 2.08F, Captan 50WP or 80WP, and, possibly, Switch 62.5WG are the most effective fungicides against anthracnose. Optimally, fungicides should be applied to maintain continuous coverage ("calendar applications") or they should be applied before an expected rain event. If applications are planned around rain events, fungicides should be applied to give enough time prior to wetting to allow the fungicide to dry completely on the foliage and fruit; I recommend 3 to 8 hours prior to wetting. During fruit development and through harvest, Quadris 2.08F (12 fl oz/A) is the most effective fungicide against anthracnose. Captan is also effective but must be applied on a calendar schedule. Using Captan in this manner can leave residue, generally something growers wish to avoid during harvest. Switch 62.5 WG is an excellent gray mold fungicide with some activity against anthracnose. We generally will recommend its use during bloom only, since its efficacy against fruit rot is marginal relative to Quadris.

Phytophthora Diseases of Strawberry

Bill Turechek, Dept. of Plant Pathology, Cornell University, Geneva, NY

In recent weeks, I have encountered a number of strawberry fields affected by either Phytophthora crown rot, caused by *Phytophthora cactorum,* or red stele, caused by *Phytophthora fragariae*. The abundance of rain combined with saturated soils this spring has created conditions particularly favorable for these two diseases. Below is a brief description of both diseases to help growers identify the problem in suspect plantings. This is followed by control recommendations.



Phytophthora crown rot:

Symptoms: Initially, affected plants are stunted and the leaves appear pale or bluish-green. During periods of rapid growth, during fruit development and/or as the season becomes warmer and drier, the leaves quickly wilt, turn brown and the entire plant collapses (this is unlike symptoms caused Verticillium wilt where wilting occurs from the outer leaves towards the crown of the plant [Fig. B]). Plants are usually affected in clusters within fields, generally in low-lying or wet areas of the field, rather than as isolated plants scattered throughout the planting. Extensive reddish-brown to brown necrosis of the upper portion of the crown is typical for plants infected recently (Fig. A). This is seen by digging up and cutting the crown in half longitudinally. The main and feeder roots of affected plants tend not to be as discolored or damaged compared to those roots affected by red stele (see below). As the infection progresses, the entire crown rots and decays making diagnosis difficult. This fungus also affects the berries and causes the disease leather rot. Interestingly, the two symptoms may or may not occur together during the same year.

Red stele:

Symptoms: Like Phytophthora crown rot, affected plants appear stunted and off-color and eventually wilt and collapse during periods of rapid growth or when the weather turns warm and dry. Plants are usually affected in clusters within fields, generally in low-lying or wet areas of the field, rather than as isolated plants scattered throughout the planting. Unlike crown roe, the roots of affected plants have a "rat tail" appearance caused by the loss of the fine, branched feeder roots from the main roots (Fig. C). The main roots are generally rotted at the tips back towards the crown and dark lesions are often found along the roots. Scraping away the outer portion of the root just above the rotted portion usually reveals a reddish stripe down the center of the root (i.e., the stele)(Fig. D).

Control:

There a number of varieties that are resistant or have some tolerance to red stele such as Earliglow, Allstar, Northeastern, Mohawk, Tristar, and Sparkle. If a planting was lost due to either of these diseases, strawberries should not be replanted to this site until has undergone several years of rotation with non-host crops or, if you are gambler, you can try to plant a resistant variety if the site can be improved. In established plantings, excess water should be drained from fields where possible. New plantings should be planted on a well-drained site and/or drainage tiles should be installed if standing water is a recurrent problem. Because splashing water helps to distribute both pathogens, a thick layer of straw mulch is recommended to reduce splashing. This will also protect berries from developing red stele where crown rot is a problem. Also, avoid walking or driving machinery through affected areas and then entering unaffected areas of the planting. The fungi are easily transported on soils stuck to the bottom of shoes or in tractor tires.

Ridomil Gold 4EC (1 pt/treated A) OR Aliette 80WDG (2.5-5 lbs/A) are effective against reducing the severity of these diseases. When infections are mild, it may be possible for plants to recover after chemical treatment. However, these fungicides will not offer very much protection if applied to susceptible varieties planted on a wet site. When treating for either of these two diseases, you need to treat only in and a few rows around the affected area, i.e., you do not need to treat the entire planting.

Renovation of Strawberries

Marvin Pritts, Dept. of Horticulture, Cornell University, Ithaca, NY

A common practice following harvest is to "renovate" the beds. Renovation is largely a thinning process to prevent overcrowding caused by the rooting of too many runner plants. It is also an IPM practice that can reduce disease and mite pressure later in the season. Renovation should occur in mid-July, but no later than August 1.

As a first step, many growers apply 2,4-D to kill perennial broadleaf weeds in the row. After several days following the 2,4-D application, leaves are mowed off the plants as a disease prevention measure, to aid in the penetration of miticides, and to allow the application of other herbicides, such as Sinbar, that would otherwise burn the leaves. Leaf removal is not essential, though, and can be detrimental if the root system is unhealthy or if the planting is under water stress. The application of 2,4-D is not essential, particularly if broadleaf weeds are not a problem. Remove leaves close to the crown, being careful not to damage the tops of crowns.

Immediately after mowing, the plant row is narrowed to a 10 to 15 inch width with a disk harrow or rototiller. Since new roots are formed above older roots on the crown, plants also benefit from an inch of soil over top of the crowns when rows are narrowed. Removing the side guards of a tiller is one way to mechanically throw soil over the rows during the narrowing process. However, more than one inch of a soil covering can be detrimental.

Within a day or two of mowing and narrowing, the planting is fertilized. In most cases, it will have been 10 months since the strawberry plants have last received fertilizer, so a majority of fertilizer should be applied at this time. A leaf analysis can be used to determine what later adjustments in fertilizer rates may be necessary. As a rule, growers apply about 60 80 lb/A actual nitrogen at renovation. (Leaf analysis is a valuable tool for fine-tuning fertilizer applications and maximizing crop quality. Collect 50 fully expanded leaves after renovation, usually in mid-August, and send them to Nutrient Analysis Lab, Dept. of Horticulture, Cornell University, Ithaca, NY 14850. Call 607-255-1785 for submission forms.)

As a later step in the renovation process, preemergent herbicide and/or miticide can be applied. Without leaves to interfere, pesticides can penetrate around the crowns, providing more thorough coverage and effective control. However, these pesticides should be applied within just a few days of leaf removal; otherwise, new leaves will emerge from crowns and these will be extremely sensitive to preemergent herbicides. In addition, once weed seeds germinate,

most preemergent herbicides are no longer effective against them.

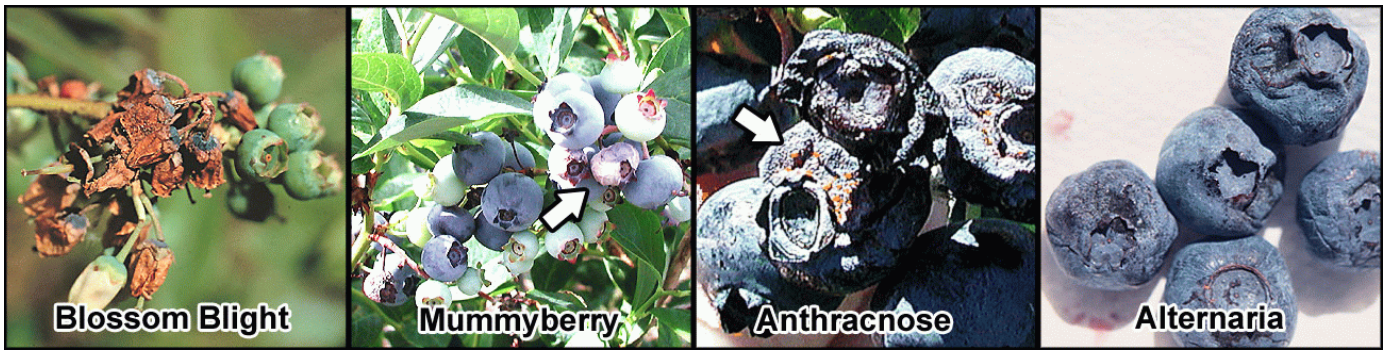
As a final step, the planting should be irrigated to reduce any stress that may have been imposed from leaf removal, to move fertilizer into the root zone, and to create conditions favorable for new leaf growth. Plantings that undergo intensive renovation are able to remain fruitful and productive for 4 or 5 years.

Blueberry Fruit Rots

Bill Turechek, Dept. of Plant Pathology, Cornell University, Geneva, NY

As we are nearing the beginning of blueberry harvest, this article will summarize the most common berry rots growers can expect to see during harvest. Mummyberry, anthracnose, and alternaria fruit rot are the most common fruit rots occurring in New York. Gray mold or botrytis fruit rot can also occur, however the fruit rot phase is generally less important than the blossom and twig blight phase of the disease.

Botrytis blossom and twig blight is a disease that is common in years when rainy weather occurs during bloom. Virtually all young and tender tissues are susceptible to attack; older tissue is resistant to infection. Infected blossoms and young shoots turn brown and become covered with a fuzzy gray mass of spores. This year I have seen several plantings with blossom blight. Mature fruit can become infected, however, symptoms do not typically develop until after the fruit have been harvested. Managing this disease effectively requires the application of fungicides during bloom. After bloom, fungicides used to manage anthracnose and alternaria fruit rots should keep botrytis in check.



Mummyberry is the most serious fruit rotting disease of blueberry in NY. In early spring, infected berries produce a mushroom-like structure called an apothecia in which the primary inoculum (i.e., ascospores) are formed. Ascospores are disseminated by wind and rain and infect emerging leaf buds and shoots. Infected shoots and leaves wilt, turn brown and die; this is the shoot blight phase of the disease. Its appearance is similar to, and sometimes confused with, frost damage. Infected shoots produce conidia (a second kind of spore) that infect the blossoms. Blossom infections are not evident until the fruit begins to ripen later in the season when the berries begin to shrivel and turn a pinkish color. These are "mummyberries" and they have been colonized by the mummyberry fungus. Infected berries eventually fall to the ground, shrivel, and turn dark brown in which they will serve as the source of primary inoculum the following spring.

Anthracnose, also known as 'ripe rot', occurs less frequently than mummyberry in New York. The disease is caused by the same fungus that causes anthracnose on strawberry. The fruit rot appears just as the berries start to ripen at harvest and often begins as a softening and sinking of the berry at the blossom end of the fruit. During warm and wet weather, salmon to orange-colored spores can ooze from infected berries and these are disseminated by splashing water where they can infect healthy berries. The fungus is also capable of infecting leaves where it causes brown-black necrotic lesions that vary in size and shape from small and circular to large and irregular. It has been suggested that at least 12 hours of continual wetness is required at temperatures of 59 to 85 F in order for these spores to germinate and cause infection. In my opinion, a 12 hour wetting period is probably a good estimate of what is required for infection to occur at cooler temperatures. However, when temperatures exceed 80 F the wetting period needed for significant infection is probably much shorter. Based on studies done with strawberry, a 3-6 hour wetting period when temperatures are in excess of 80 F could lead significant infection.

Alternaria fruit rot is not as common as anthracnose. Berries infected with *Alternaria* tend to develop a soft, watery rot as the fruit begins to ripen and a green to black mat of fungus forms at the calyx end of the fruit. The fungus can also infect leaves causing irregularly shaped, brown to gray spots 1-5 mm in diameter. Spores produced on the leaves are probably the primary source of inoculum for fruit. However, once the disease appears on fruit, they are an equally if not more important source of inoculum because of the fruit to fruit contact.

Ideally, management of the fruit rots begins at bloom and continues up to harvest. An application of Topsin-M 70WSP (1 lb/A) or Topsin-M (1 lb/A) PLUS Captan 50WP (5 lb/A) or 80WP (3 lb/A) is a good tank mix that targets the three fruit rots. Topsin-M has protectant activity against the blossom blight phase of mummyberry (it is ineffective against the shoot blight phase targeted in early spring); Topsin-M also has some activity against Phomopsis twig blight. This year a section 18 for Topsin-M has been granted for New York. You can obtain a copy of the section 18 by visiting: http://www.nysaes.cornell.edu/pp/extension/tfabp/pestnews.shtml. Captan should be used strictly as a protectant. Captan can be applied up to the day of harvest, however, it has 96 hour reentry interval. Abound 2.08F was labeled for use on blueberry last year and is the most effective fungicide against anthracnose. However, caution needs to be exercised when using Abound because it is extremely phytotoxic to certain apple varieties. Abound should NOT be sprayed where spray drift may reach apple trees, when conditions favor drift beyond intended area of application, and do not spray Abound with spray equipment intended for use on apple trees.

Blueberry Scorch (AKA Sheep Pen Hill Disease AKA BBScV)

Peter Oudemans, Blueberry & Cranberry Research Center, Rutgers University, Chatsworth, NJ

[*Editor's note: Blueberry scorch has yet to be found in NY; however it is widely disseminated in NJ and was recently discovered in MA. Growers should be on the lookout for symptoms reminiscent of Blueberry Scorch and report any suspect plantings to CCE Extension Agent as soon as it is discovered*.]

This year BBScV is expressing itself in a very severe form. Symptoms of this virus disease is now very apparent in both Atlantic and Burlington Counties. Diseased plants are easily recognized and scouting for them should be in full operation. In the table below I have given an outline of cultivars and symptom severity. Infected plants should be removed now or flagged for removal later.

Cultivar	Symptoms
Chanticleer, Duke, Elliott, Berkeley, Weymouth	Blossoms blighted, tip dieback evident, leaves stunted and chlorotic. This is considered the most severe expression of the disease.
Coville, Sierra	Tip dieback evident with some blossom blighting. Bushes will set a crop but yields are reduced.
Bluecrop	Some blossom blighting and reduced fruit set, leaves chlorotic. Tip dieback is infrequent. Typically bushes show increasing symptom development over a period of years.
Bluetta, Early Blue, Blueray	No symptoms observed. Infections may be masked by other virus diseases such as red ring spot.

Key points for a Virus Disease Management Program

Identification, diagnosis. Developing the ability to recognize symptoms and knowing the virus type is key to developing a management program. Identification of a virus is often difficult unless it has been previously described. In the case of scorch there are several approaches to identification. If you are unsure of the symptoms an antibody based method should be used. Several options exist. We have had success with the BBScV AgriCheck detection kits supplied by Hydros, Inc. of Fallmouth MA (tel. # (508) 540-2229).

Vector management. Viruses must be transmitted by a vector such as an insect (aphids, leaf hoppers, beetles, white flies etc.), a nematode (such as the sting or dagger nematodes), pollen or mechanically by grafting, abrasion and pruning. For the scorch virus aphids are considered the primary insect vector and growers should follow current recommendations for aphid management.

Sanitation. This refers to developing or maintaining a virus free farm. Although proven successful sanitation practices represent a serious time commitment and require significant effort. Removal of infected plants should be conducted yearly. Symptom expression is greatest at this time of the season therefore scouting for diseased plants should be underway. If plants cannot be removed now they should be flagged for removal later because symptoms will decrease. For planting or propagating the grower should be certain that only healthy mother plants and certified planting material be used. (*Source: Blueberry Bulletin Vol. 19, No. 7, May 30, 2003*)

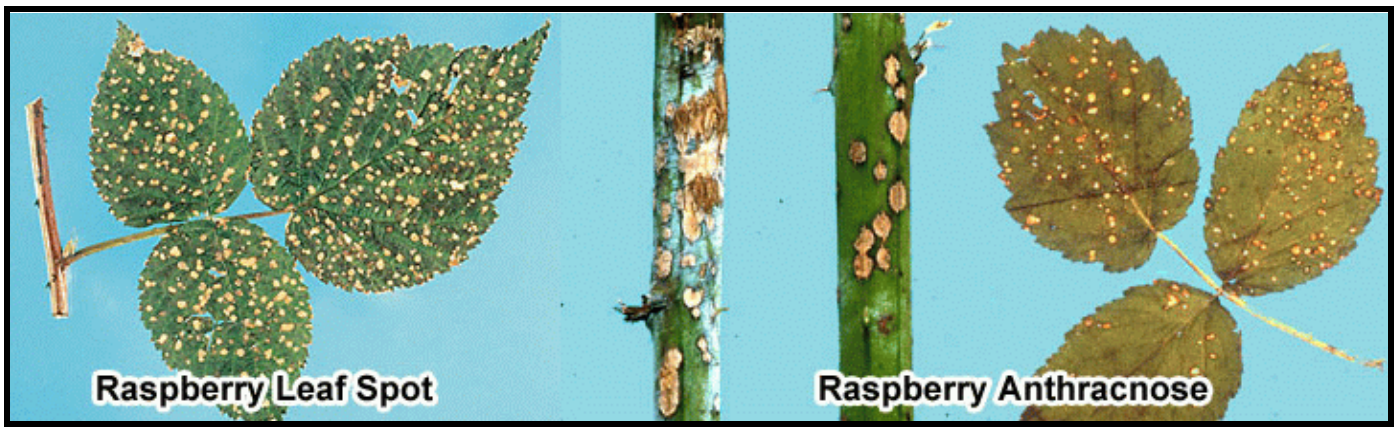
Don't Get Put On The Spot!

Cathy Heidenreich, Dept. of Plant Pathology, Cornell University, Geneva, NY

There are several diseases on brambles that make their appearance in early to mid summer. Most of these diseases can be diagnosed by examining the symptoms they cause on their leaves and canes. This article discusses the most common summer diseases of brambles, their identification and control. Be on the look out for the following summer diseases:

Raspberry leaf spot: Red raspberries are generally more susceptible to this fungal disease than black raspberries. The disease causes premature leaf drop when infection is severe, reducing vigor and making plants more susceptible to winter injury. A similar disease occurs on blackberries (Septoria Leaf Spot, *Septoria rubi*) but is not commonly found in our growing region. Taylor and Sentry are particularly susceptible cultivars. Other susceptible cultivars include Reveille, Canby, and Boyne. Latham, Heritage, September, Fallgold and Redwing are less susceptible.

How to recognize it: Leaf infections start out as small (1/16") greenish brown to black, round to angular spots on the upper surface of young leaves in late spring to early summer. These spots may lighten in color to white or gray, and typically enlarge and coalesce as the season progresses. Dead areas may sometimes drop out, producing a shothole effect on the leaves. Small, inconspicuous cane lesions may also occur at cane bases. Early leaf symptoms of this disease may be confused with those of raspberry anthracnose. Examine stems for purple red to ash grey lesions in the mid stem regions, which indicate anthracnose infections.



What to do: Remove old fruiting canes, and dead and damaged canes after harvest. Apply Nova 40W at 1.5-2.5 oz/A in plantings with a history of the disease or when conditions favor disease development.

Orange rust: This is the most important bramble rust disease in the Northeast affecting black and purple raspberries and blackberries; red raspberries are not susceptible to this disease. Unlike other rusts, orange rust has only a single host, remaining on *Rubus* spp. to complete its entire life cycle. Although given the same name, orange rust is caused by two different species of fungi: one that affects black and purple raspberries, caused by *Arthuriomyces peckianus*, and the other that affects blackberries, caused by *Gymnoconia nitens*. Wind and rain carry spores of these two fungi to raspberry and blackberry leaves in late May to early June. When conditions are favorable, spores germinate and infect leaves. Orange yellow pustules (aecia) form on the undersides of infected leaves, that several weeks later become covered with waxy orange masses of spores. Depending upon weather conditions, small brown back spore structures (telia) develop on the underside of infected leaves three to six weeks later. Telia release another spore type that may infect directly and also produce basidiospores, which overwinter in buds. Both fungi become systemic and grow down into crowns and roots, where they overwinter. Orange rust does not kill plants but greatly reduces both plant yield and vigor. Infected plants rarely recover, so losses from this disease can be of serious economic significance.

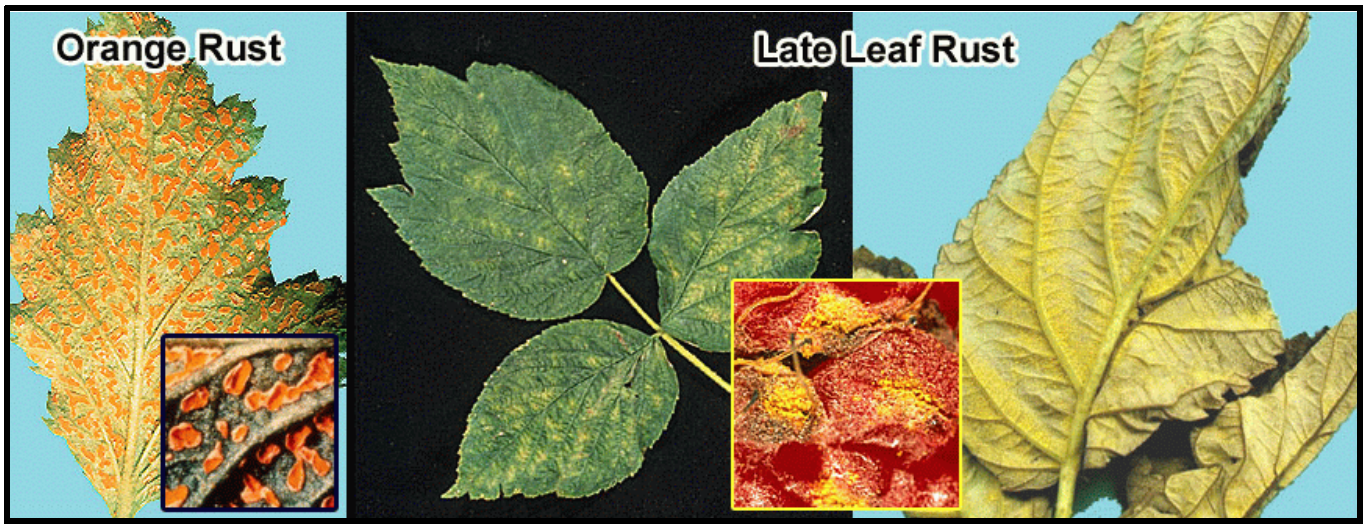
How to recognize it: The lower surfaces of new leaves are covered with yellow orange pustules and waxy orange spore masses. New canes arising from infected plants in spring are weak, spindly, and thornless, sometimes with misshapen, pale leaves. These infected canes arise in bunches, rather than singly as with healthy plants. Orange rust differs from late leaf rust in that it does not cause fruit infections.

What to do: Avoid new plantings near wooded areas or fence rows unless wild brambles are eradicated first. Check new

plantings carefully 1 month after establishment, and each year thereafter in early spring when canes are 12-18" tall. It is essential to identify, dig up and burn infected plants before spores are released from aecia on leaf lower surfaces. Nova 40W may be applied to remaining plants to help reduce the number of new infections.

Late leaf rust: Known also as autumn, late raspberry, late yellow, American spruce-raspberry rust, this disease affects mainly cultivated red and purple raspberries and some wild red raspberries. Caused by the fungus, *Pucciniastrum americanum*, late leaf rust differs from orange rust as infections do not become systemic, and it requires a second host (White spruce, *Picea glauca*) to complete its life cycle. This disease was previously thought to be of minor importance but serious outbreaks have become more common in recent times. Severe infections may result in premature leaf fall, reduced plant vigor and yield and increased winter injury to infected canes. Fruit infections lead to production of bright yellow spore masses on fruit surfaces, making fruit unmarketable for fresh-market sales. Summer-bearing cultivars often escape fruit infections; Fall-bearing raspberries tend to develop fruit infections if weather conditions are favorable for disease development.

How to recognize it: Leaf upper surfaces develop small yellow spots that gradually turn brown before leaves die in the fall. Yellow pustules with powdery spore masses (called uredinia) can be seen in corresponding areas on leaf lower surfaces by late July. Additionally, flowers, flower calyxes, petioles and fruit of all stages are susceptible to infection. Late leaf rust differs from orange rust in that it has powdery, rather than waxy, spore masses on the lower sides of leaves. Canes lesions have been reported in some instances, but are not common.



What to do: Avoid establishing new plantings near white spruce stands. Where practical, remove white spruce. Removal and destruction of infected leaves and debris in the fall should reduce overwintering inoculum and spruce infections in the spring.

Powdery mildew: This fungal disease, caused by *Sphaerotheca macularis*, may be a problem on susceptible cultivars of red, black and purple raspberries when weather conditions are favorable. Blackberries and hybrids are usually not affected. Susceptible cultivars include Royalty, Reveille, Latham, Hilton, Dundee and Logan. Although this bramble disease is caused by the same fungus responsible for strawberry powdery mildew, strains of the fungus appear to be host specific i.e. strawberry strains do not infect raspberry and visa versa. *S. macularis* overwinter as mycelia (minute fungal threads) in buds on shoot tips or as cleistothecia (spore producing structures) on infected canes. These serve as inoculum sources for initial infections. Conidia (secondary spores), produced abundantly on infected tissue, are spread by wind and cause repeat infections. Warm, dry weather favors development and spread of this disease, which often appears in mid- to late summer.

How to recognize it: Undersides of infected leaves are covered with powdery white mycelial growth, some times causing them to curl upwards. Some cultivars develop light green blotches on leaf upper surfaces, corresponding to white patches below. Infected shoots appear long and spindly with dwarfed leaves. Severe infections may cause stunting of plants and yield reductions. Flower infections can reduce both quantity and quality of fruit.

What to do: Remove infected primocanes and bury or burn them to reduce spores for disease spread. Nova 40W is an excellent mildewcide and should be used on susceptible varieties.

Verticillium wilt: Verticillium wilt is a very serious disease of black raspberries, often called bluestem or blue stripe wilt, because of the symptoms it causes on canes. Red raspberries are generally more resistant to *Verticillium* than black raspberries. The disease also occurs on purple raspberries and blackberries. Two species of the fungus have been shown to cause wilt of brambles, *Verticillium albo-atrum* and *V. dahliae*. These fungi are common soil pathogens and infect more than 160 other crops and weed species. Crops such as potato, eggplant and pepper are particularly susceptible to *Verticillium*; other potential host crops are strawberry, stone fruits (such as cherry), squash and cucumber.

How recognize it: Leaves of infected plants turn pale in mid-summer. Infected plants may appear to recover during cool fall weather. The following spring, however, leaves wilt, turn yellow and fall off, starting at the bottom of the cane and progressing upwards. Symptoms may only be seen on one side of the cane or the other, or only on one or two canes out of several in a hill. Infected canes show blue discoloration and may appear stunted. Infected plants usually die in 1-3 years. Symptoms on red raspberry are less severe, but similar. Infected blackberry canes do not turn blue. Those infected canes surviving the winter may leaf out and set fruit, only to collapse during warm weather.

What to do: Brambles should not be planted after susceptible crops without a 3-4 year rotation to non-host crops such as wheat or corn. Weeds such as nightshade, horse nettle, groundcherry, redroot pigweed and lambs quarters should also be strictly controlled in current and future planting sites to keep *Verticillium* populations low in soil. Alternatively, the planting area should be treated with a broad-spectrum fumigant prior to planting to reduce incidence of this disease. Fungicide applications to the soil have proved ineffective in controlling Verticillium wilt.

Control of Gray Mold in Brambles

Annemiek Schilder, Dept. of Plant Pathology, Michigan State University, East Lansing, MI

Botrytis gray mold is the most serious and common fruit rot disease of raspberries and blackberries. It is caused by the fungus *Botrytis cinerea*, which also infects numerous other crops, including strawberries, grapes and ornamentals. It is especially severe during prolonged rainy and cloudy periods just before and during harvest. Typically, fall raspberries are more prone to gray mold because of the cool, wet conditions prevailing during fruit development and ripening. Fruit infections also tend to be more severe in the interior parts of the canopy and on fruit clusters close to the ground, due to the higher humidity and reduced airflow.

The fungus overwinters as minute black bodies (sclerotia) in plant debris, including old canes and leaves. In spring, the sclerotia produce large numbers of microscopic spores, which are spread by wind to susceptible plant parts. The spores infect young blossoms, berries, and even leaves and canes when there is sufficient moisture. Only a few hours of moisture, provided by rain, dew, or irrigation water, are needed for infection under optimal conditions (70-80 F). The fungus usually enters the fruit through the flower parts where it remains inactive (latent) within the tissues of the infected green fruit. As the fruit matures, the fungus becomes active and rots the fruit.

So while infection occurs at bloom, symptoms are not usually observed until harvest. Symptoms are rapidly enlarging, light-brown areas on the fruit. Infected berries become covered with gray, dusty growth of the fungus containing millions of spores, hence the name "gray mold." Healthy berries can also become infected by contact with diseased berries. For instance, one sporulating berry in a cluster can infect the entire cluster. Wounds can also predispose berries to infection. Under favorable conditions for disease development, healthy berries may become a rotted mass in 48 hours.

Cultural methods are very important for control of botrytis gray mold. Choosing a site with good airflow can considerably reduce humidity in the canopy. Low-density plantings and narrow rows and trellising can also reduce a buildup of humidity. Good weed control and moderate fertilizer to avoid lush growth are also important. Selecting a resistant cultivar or, at the minimum, avoiding highly susceptible cultivars will help to reduce the need for control measures. During picking, avoid handling infected berries, since spores can be transferred to healthy berries. Timely harvesting and rapid post-harvest cooling can also help to reduce losses to botrytis gray mold.

Several fungicides are labeled for control of *Botrytis* in raspberries. Fungicide sprays during bloom are important to prevent pre-harvest infections, while post-harvest infections can be reduced by sprays closer to harvest. Elevate is a

relatively new, reduced-risk, protectant fungicide with a zero-day PHI that provides good control of pre- and post-harvest gray mold. Since only four applications may be made per season (and only two consecutively) because of the risk of resistance development, Elevate should be alternated with fungicides with a different mode of action. My recommendation is to save Elevate for critical sprays, for example, during wet periods at bloom and for sprays closer to harvest. Other fungicides that may be used in the spray program are Rovral, which has a zero-day PHI; or Nova, which has a zero-day PHI. Some growers have experienced poor control with Rovral, which may indicate that Rovral-resistant *Botrytis* strains are present in their fields. Nova was found to significantly reduce post-harvest gray mold and Cladosporium rot (green-looking fuzzies) in a small plot raspberry trial in Michigan. (*Source:* Michigan Fruit Crop Advisory Team Alert, Vol. 8, No. 13, July 9, 2002)

Winter Injury in Raspberry

Bob Tritten, Eric Hanson, Annemiek Schilder, Gary Thornton, Michigan State University

Over the last three to four weeks, we have noted a collapse of summer raspberry canes at many farms across the state (Michigan). These canes appeared to be healthy earlier this spring, and in most cases began to develop normal bud swell and leaf development. Later it became more apparent that these canes were injured by some cold weather events that occurred this past winter.

Our best guess is that most of the injury to raspberries in the southern part of the state occurred during a cold event last December 3 and 4, 2002. For southern Michigan, recall back to last fall when we had an untypical mild season. According to weather records at several reporting stations around the region we did not experience the typical gradual cooling of temperatures in October and November. Many stations reported temperatures of in the range of -12 to -15˚F on the nights of December 3 and 4, 2002. Up until that time we only hit 15˚F once, and only saw temperatures in the low 20's a couple times. Many raspberry plants still retained leaves in early December, additional evidence that they had not harden off as they typically do in the fall. In northern parts of the state, injury appears to have resulted from a cold event in early March. On March 1, temperatures approached 40˚F, and by 5:00 AM on March 3, it was -12˚F. In some fields, this abrupt change killed the canes back to the snow line. In other plantings only the tops of the canes were killed back.

Not all fields were heavily damaged. One variable that affects the hardiness of canes appears to be disease control. For the past few years we've also noticed in fungicide trials in southeast Michigan that winter injury is much less where disease control programs have been implemented the previous season (see Table 1). This is most likely due to the reduction in foliar and cane diseases, such as leaf spot, anthracnose, spur blight and cane blight. Anthracnose and cane blight in particular can weaken canes and predispose them to winter injury. Spur blight may kill buds at lesion sites and leaf spot may result in premature leaf senescence, which may also reduce winter-hardiness in severe cases. These diseases may not be apparent until later in the season (e.g. after harvest). We believe cane diseases play a bigger role in winter injury than previously assumed. Some varieties are particularly prone to cane diseases and may experience repeated problems when disease control is poor. Fungicides that are effective against foliar and cane diseases are Captan+Benlate, Abound and Nova. Ideally, these materials should be alternated to prevent development of fungicide resistance in target fungi. Remember that Abound belongs to the same chemical class and therefore have the same mode of action. Lime sulfur will reduce overwintering inoculum when applied as a delayed dormant spray. [*Editor's note: Cabrio EC and Captan 80WDG (the only formulation of Captan registered on raspberry) are not yet labeled in NY; we anticipate the Captan label by the end of this year but are uncertain about the status of Cabrio EC*].

Treatment, Rate/A	Application Timing [z]	Leaf Spot Severity (%)	Anthracnose Incidence (%)	Spur/Cane Blight Incidence (%)	Live Floricanes per 3 ft in 2003
Untreated		4.50 a [y]	77.5 a	32.5 a	2.8 a
Captan 50WP 4lb Abound 2.08F 10 fl oz	**1, 3, 5 2, 4**	0.28 b	10.0 c	22.5 a	17.8 c
Captan 50WP 4lb Nova 40W 2 oz	**1, 3, 5 2, 4**	0.15 b	10.0 c	15.0 a	15.3 bc
Compost Tea	**1, 2, 3, 5**	0.13 b	10.0 c	12.5 a	9.3 ab

[z] Spray dates in 2002: 17 May (leaf expansion), 29 May (prebloom), 10 Jun (green fruit), 19 Jun (green fruit), 9 Jul (ripe fruit).
[y] Column means followed by the same letter are not significantly different according to Fisher's Protected LSD test (P=0.05).

Of course varieties differ in winter hardiness. The 2002-03 winters were a good test of hardiness for 15 varieties in a trial at the Southwest Michigan Research and Extension Center in Benton Harbor. The previous two winters were relatively mild and only injured the tenderest varieties. The varietal differences have held across years (Table 2). The hardiest types in this trial are Boyne, Killarney, Latham, Nova and Prelude. Those that appear hardy enough for southern Michigan but may suffer injury in northern parts of the state include Canby, Encore, Reveille, Titan and K81-6. Those that do not appear adequately hardy, even for southern Michigan, are Lauren, Malahat, Qualicum, and Tulameen.

Winter-injured canes should be removed from fields as soon as possible. In severely affected fields where there are few healthy canes, it may be best to mow entire rows or sections off and simply start over for next year. While this is a severe treatment, it will reduce pruning and spray costs and may reduce disease by eliminating injured wood. (Source: Michigan Fruit Crop Advisory Team Alert, Vol. 18, No. 7, May 27, 2003)

	Winter kill (inches/cane)		
Variety	**2001**	**2002**	**2003**
Boyne	2	1	1
Canby	4	1	25
Encore	1	0	10
Glen Ample	2	0	22
Killarney	3	0	2
Latham	3	0	2
Lauren	8	3	28
Malahat	12	8	31
Nova	1	1	1
Prelude	0	0	1
Qualicum	6	1	37
Reveille	1	0	4
Titan	6	0	12
Tulameen	23	7	35
K81-6	2	1	17

Table 2. Winter injury to red raspberry canes at SWMREC, Benton Harbor, MI.

Questions or Comments about the New York Berry News?

Send inquiries to: Dr. William (Bill) Turechek, New York Berry News, Editor
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WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, MAY 18th, 2003

	Temperature				Growing Degree Days (Base 50)			Precipitation (Inches)			
	High	Low	Avg	DFN[1]	Week	Season[2]	DFN	Week	DFN	Season	DFN
Hudson Valley											
Albany	69	36	55	-3	38	199	55	1.46	0.69	5.5	0.59
Glens Falls	69	31	53	-4	25	126	18	1.09	0.25	4.04	-1
Poughkeepsie	70	36	54	-5	30	148	-26	0.58	-0.4	3.01	-2.99
Mohawk Valley											
Utica	68	38	52	-5	24	167	38	2.33	1.5	6.06	0.42
Champlain Valley											
Plattsburgh	69	32	53	-3	24	100	-9	1.8	1.17	4.56	0.14
St. Lawrence Valley											
Canton	73	37	55	2	37	128	36	1.4	0.77	4.24	-0.29
Massena	70	37	55	-1	36	109	4	1.5	0.94	4.33	0.24
Great Lakes											
Buffalo	75	43	54	-3	34	180	47	2.06	1.36	4.47	-0.17
Colden	75	39	51	-4	19	120	26	1.62	0.85	5.22	-0.58
Niagara Falls	73	40	53	-5	30	156	11	1.56	0.93	4.74	-0.09
Rochester	74	38	54	-4	32	178	27	1.8	1.19	3.97	-0.18
Watertown	71	37	53	-2	28	132	36	1.15	0.53	2.55	-1.48
Central Lakes											
Dansville	76	37	51	-6	19	124	-13	1.52	0.89	4.81	0.38
Geneva	75	39	53	-4	30	156	29	2.09	1.46	5.46	0.9
Honeoye	76	35	53	-4	35	172	42	2.26	1.65	5.07	0.52
Ithaca	73	35	52	-4	27	126	18	1.15	0.41	4.28	-0.47
Penn Yan	76	38	52	-4	28	175	48	1.37	0.74	3.92	-0.64
Syracuse	72	38	54	-4	34	189	39	1.71	1.01	5.3	0.11
Warsaw	73	37	49	-5	15	100	20	2.89	2.12	6.17	0.82
Western Plateau											
Alfred	76	37	51	-4	16	123	28	1.46	0.71	4.91	-0.04
Elmira	76	33	52	-4	25	165	46	1.27	0.57	2.97	-1.49
Franklinville	75	34	49	-3	15	101	40	1.59	0.82	5.4	0.14
Sinclairville	75	39	50	-4	14	121	39	2.15	1.29	6.33	0.31
Eastern Plateau											
Binghamton	67	37	51	-6	20	149	35	0.81	0.04	3.81	-1.25
Cobleskille	67	35	52	-4	18	107	8	0.99	0.17	6.23	0.91
Morrisville	69	35	49	-6	16	92	-1	2.82	1.98	8.49	3.33
Norwich	71	37	52	-4	22	109	6	0.99	0.15	5.12	-0.38
Oneonta	74	40	53	0	26	138	50	1.17	0.19	5.75	-0.2
Coastal											
Bridgehampton	69	33	53	-3	30	106	-4	0.01	-0.83	7.39	1.17
New York	66	47	57	-6	48	268	7	0.07	-0.77	4.03	-2.02

1. *D*eparture *F*rom *N*ormal
2. Season accumulations are for April 1st to date

The information contained in these weekly releases are obtained from the New York Agricultural Statistics Service (http://www.nass.usda.gov/ny/), who in turn obtains information from reports from Cornell Cooperative Extension agents, USDA Farm Service Agency, Agricultural Weather Information Service Inc., the National Weather Service and other knowledgeable persons associated with New York agriculture. Their cooperation is greatly appreciated.

WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, MAY 25th, 2003

	Temperature				Growing Degree Days (Base 50)			Precipitation (Inches)			
	High	Low	Avg	DFN[1]	Week	Season[2]	DFN	Week	DFN	Season	DFN
Hudson Valley											
Albany	81	43	59	-2	62	261	49	0.37	-0.4	5.87	0.19
Glens Falls	81	37	57	-1	55	181	17	0.31	-0.53	4.35	-1.53
Poughkeepsie	79	38	56	-6	43	191	-57	0.42	-0.56	3.43	-3.55
Mohawk Valley											
Utica	80	37	57	-2	50	217	29	1.35	0.51	7.41	0.93
Champlain Valley											
Plattsburgh	83	41	59	2	62	162	-3	0.82	0.17	5.38	0.31
St. Lawrence Valley											
Canton	82	35	58	2	58	186	46	1.66	0.96	5.9	0.67
Massena	82	39	58	1	56	165	7	1.43	0.87	5.76	1.11
Great Lakes											
Buffalo	78	39	58	-1	59	239	43	0.97	0.26	5.44	0.09
Colden	75	36	54	-3	35	155	13	1.03	0.2	6.25	-0.38
Niagara Falls	78	40	57	-3	49	205	-6	1.43	0.76	6.17	0.67
Rochester	77	42	57	-2	53	231	14	1.08	0.45	5.05	0.27
Watertown	80	34	57	2	54	186	42	1.98	1.35	4.53	-0.13
Central Lakes											
Dansville	76	36	55	-5	37	161	-38	1.01	0.35	5.82	0.73
Geneva	76	40	57	-2	48	204	17	1.03	0.33	6.49	1.23
Honeoye	78	34	55	-4	43	215	23	1.71	1.07	6.78	1.59
Ithaca	77	36	56	-2	48	174	13	1.06	0.29	5.34	-0.18
Penn Yan	75	36	56	-2	52	227	40	0.68	-0.02	4.6	-0.66
Syracuse	80	37	58	-2	58	247	30	1.77	1.01	7.07	1.12
Warsaw	72	37	53	-3	29	129	4	0.97	0.17	7.14	0.99
Western Plateau											
Alfred	75	36	54	-3	34	157	12	0.99	0.19	5.9	0.15
Elmira	75	34	56	-3	44	209	31	0.72	-0.03	3.69	-1.52
Franklinville	75	29	52	-3	23	124	26	0.9	0.09	6.3	0.23
Sinclairville	73	38	53	-3	29	150	24	1.16	0.25	7.49	0.56
Eastern Plateau											
Binghamton	74	40	55	-4	40	189	19	1.79	1.02	5.6	-0.23
Cobleskille	78	38	55	-3	36	143	-7	0.56	-0.28	6.79	0.63
Morrisville	73	37	54	-3	31	123	-18	1.38	0.52	9.87	3.85
Norwich	80	37	55	-3	40	149	-6	0.92	0.08	6.04	-0.3
Oneonta	80	39	56	1	45	183	49	0.71	-0.27	6.46	-0.47
Coastal											
Bridgehampton	76	37	55	-4	34	140	-27	1.39	0.55	8.78	1.72
New York	78	49	58	-6	59	327	-31	0.58	-0.26	4.61	-2.28

1. *D*eparture *F*rom *N*ormal
2. Season accumulations are for April 1st to date

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WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, JUNE 1st, 2003

	Temperature				Growing Degree Days *(Base 50)*			Precipitation (Inches)			
	High	*Low*	*Avg*	*DFN*[1]	*Week*	*Season*[2]	*DFN*	*Week*	*DFN*	*Season*	*DFN*
Hudson Valley											
Albany	74	52	61	-2	81	342	47	2.26	1.42	8.13	1.61
Glens Falls	72	48	59	-1	67	248	14	1.45	0.63	5.8	-0.9
Poughkeepsie	75	50	60	-3	72	263	-74	3.4	2.42	6.83	-1.13
Mohawk Valley											
Utica	67	50	58	-4	57	274	13	1.35	0.47	8.76	1.4
Champlain Valley											
Plattsburgh	70	48	59	-2	64	226	-10	0.72	0.02	6.1	0.33
St. Lawrence Valley											
Canton	67	45	57	-2	52	238	37	1.74	1.04	7.64	1.71
Massena	70	46	58	-3	56	221	-3	1.66	1.04	7.42	2.15
Great Lakes											
Buffalo	68	44	56	-5	47	286	13	0.95	0.17	6.39	0.26
Colden	71	42	55	-4	39	194	-8	1.34	0.46	7.59	0.08
Niagara Falls	72	43	56	-6	46	251	-39	1.1	0.38	7.27	1.05
Rochester	71	44	57	-4	53	284	-9	0.89	0.24	5.94	0.51
Watertown	65	46	56	-3	43	229	25	1.62	0.99	6.15	0.86
Central Lakes											
Dansville	72	43	56	-5	43	204	-71	1.5	0.75	7.32	1.48
Geneva	71	40	56	-5	49	253	-8	1.82	1.06	8.31	2.29
Honeoye	73	41	57	-4	51	266	-3	1.44	0.71	8.22	2.3
Ithaca	71	44	57	-3	49	223	-5	1.98	1.16	7.32	0.98
Penn Yan	70	44	57	-4	53	280	19	1.57	0.81	6.17	0.15
Syracuse	71	47	59	-3	64	311	15	1.03	0.26	8.1	1.38
Warsaw	70	37	54	-5	33	162	-19	1.24	0.36	8.38	1.35
Western Plateau											
Alfred	72	43	56	-3	43	200	-7	1.55	0.66	7.45	0.81
Elmira	72	44	57	-3	52	261	12	1.26	0.46	4.95	-1.06
Franklinville	72	40	54	-3	30	154	8	0.87	-0.01	7.17	0.22
Sinclairville	72	42	54	-4	31	181	-1	0.89	-0.08	8.38	0.48
Eastern Plateau											
Binghamton	67	47	57	-4	47	236	-3	2.02	1.24	7.62	1.01
Cobleskille	69	48	58	-2	55	198	-16	2.22	1.3	9.01	1.93
Morrisville	67	47	56	-3	44	167	-34	1.8	0.89	11.67	4.74
Norwich	72	48	58	-2	60	209	-9	1.7	0.79	7.74	0.49
Oneonta	71	49	59	2	61	244	52	2.11	1.11	8.57	0.64
Coastal											
Bridgehampton	77	47	59	-3	60	200	-39	4.11	3.26	12.89	4.98
New York	79	51	62	-5	86	413	-57	3.76	2.92	8.37	0.64

1. *D*eparture *F*rom *N*ormal
2. Season accumulations are for April 1st to date

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WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, JUNE 8th, 2003

	Temperature				Growing Degree Days *(Base 50)*			Precipitation (Inches)			
	High	*Low*	*Avg*	*DFN*[1]	*Week*	*Season*[2]	*DFN*	*Week*	*DFN*	*Season*	*DFN*
Hudson Valley											
Albany	75	42	60	-5	73	415	22	0.5	-0.34	8.63	1.27
Glens Falls	75	34	57	-5	55	303	-15	0.25	-0.52	6.05	-1.42
Poughkeepsie	76	44	58	-7	60	323	-116	1.52	0.61	8.35	-0.52
Mohawk Valley											
Utica	72	41	57	-6	57	331	-15	0.69	-0.23	9.45	1.17
Champlain Valley											
Plattsburgh	80	39	57	-6	55	281	-41	0.48	-0.22	6.58	0.11
St. Lawrence Valley											
Canton	73	37	56	-5	50	288	13	0.12	-0.64	7.76	1.07
Massena	75	37	57	-5	54	275	-28	0.13	-0.56	7.55	1.59
Great Lakes											
Buffalo	70	43	58	-6	54	340	-25	0.49	-0.35	6.88	-0.09
Colden	72	39	56	-5	43	237	-38	0.62	-0.34	8.21	-0.26
Niagara Falls	72	44	58	-6	56	307	-76	0.17	-0.6	7.44	0.45
Rochester	74	41	59	-5	61	345	-36	0.85	0.15	6.79	0.66
Watertown	74	35	56	-5	48	277	0	0.14	-0.54	6.29	0.32
Central Lakes											
Dansville	73	37	56	-8	45	249	-116	0.71	-0.16	8.03	1.32
Geneva	74	43	58	-5	59	312	-37	0.24	-0.59	8.55	1.7
Honeoye	74	37	58	-5	63	329	-31	0.47	-0.36	8.69	1.94
Ithaca	73	35	57	-5	56	279	-29	0.67	-0.17	7.99	0.81
Penn Yan	75	44	59	-4	64	344	-5	0.25	-0.58	6.42	-0.43
Syracuse	74	40	59	-4	68	379	-7	0.62	-0.22	8.72	1.16
Warsaw	70	37	54	-6	35	197	-51	0.86	-0.11	9.24	1.24
Western Plateau											
Alfred	73	36	55	-6	43	243	-38	0.79	-0.22	8.24	0.59
Elmira	75	35	57	-6	56	317	-17	0.66	-0.18	5.61	-1.24
Franklinville	72	35	54	-5	34	188	-18	1.11	0.14	8.28	0.36
Sinclairville	72	38	55	-5	37	218	-33	0.45	-0.59	8.83	-0.11
Eastern Plateau											
Binghamton	70	40	55	-7	44	280	-41	0.9	0.06	8.52	1.07
Cobleskille	72	41	57	-5	49	247	-43	0.98	0	9.99	1.93
Morrisville	69	37	55	-6	41	208	-64	0.77	-0.17	12.44	4.57
Norwich	75	34	56	-6	48	257	-36	0.89	-0.06	8.63	0.43
Oneonta	73	39	57	-4	52	296	35	0.9	-0.08	9.47	0.56
Coastal											
Bridgehampton	76	46	60	-3	70	270	-57	3.95	3.06	16.84	8.04
New York	76	51	63	-6	95	508	-90	3.75	2.91	12.12	3.55

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