# The New York Berry News

CORNELL UNIVERSITY

Volume 02, Number 07 July 17, 2003


## What's Inside



Raspberries and blueberries are on the agenda for July and August. Summer-bearing raspberries are being harvested right now. It is important to recognize that raspberries ripen quickly and non-uniformly. If the first ripening berries are infected with *Botrytis cinerea* (gray mold) they will produce an abundance of spores that can infect berries ripening later. The key is to pick the crop frequently (every 2 days) and completely to remove all marketable (and very susceptible) fruit and overripe berries. So far, I haven't seen as much gray mold as I would have expected to see give the wet spring; this was the case for strawberries as well. However, if you find yourself in a situation where you need to protect your berries Switch, Elevate, and Rovral are excellent fungicides. All have a pre-harvest interval (PHI) of 0 days, Switch and Elevate have a re-entry interval (REI) of 12 hr, and Rovral has an REI of 24 hr.

Strawberry renovation should be nearly complete by now or on the agenda to be done soon, i.e., no later than August 1st (read Sonia Schloemann's article for step by step instructions). Be sure that the plants are well-watered before renovation, or they may have a difficult time recovering. Jewel plantings in western NY (and perhaps throughout NY) appear "tired" in many locations. We're not exactly sure why this occurring, but it could be related to the heavy fruit load in combination with the hot weather we experienced during harvest.

Blueberries are closing in on peak harvest. Last months's issue of the NYBN covered methods for protecting fruit form berry rots. In this months's issue Marvin Pritts will discuss tactics for protecting your berries form birds. As we get into the warmer and drier part of the summer, water-hungry plants, like blueberry, are often unintentionally neglected. Elsa Sánchez and Kathy Demchak discuss the finer details about watering highbush blueberries.

## Pesticide News:

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

## Current News and Events:

### Blueberries May Help Old Folks Keep Their Smarts

Anne Harding, Reuters Health

A cup of blueberries a day may keep "senior moments" away, new findings suggest. A team of Massachusetts and Florida researchers has shown that the fruit reduces aging-related damage in rat brains, and can also prevent mental decline in mice genetically engineered to develop Alzheimer's – like plaques in their brains. The findings, along with early results from human study, suggest a healthy diet can go a long way toward preventing the mental decline that often accompanies aging. Dr. James A. Joseph of the Center on Aging at Tufts University in Boston and USDA Human Nutrition Research told Reuters Health. Joseph presents his findings here Monday at the American Chemical Society's annual meeting.

Cell-damage products on normal metabolism know as free radicals can injure tissue, and effect known as oxidative damage. Antioxidants – found in several fruits and vegetables, including blueberries – help prevent this damage, which has been implicated in a number of conditions including cancer, Alzheimer's and heart disease. Oxidative damage is also a factor in aging. Aged rodents that consumed the human equivalent of one cup of blueberries a day showed less oxidative damage in tissue from two distinct brain regions, Joseph and his team found. To evaluate whether this effect might extend to behavior, Joseph and colleagues David Morgan, Gary Arrendash and David Diamond from the University of South Florida, put mice through a three-armed maze. Half of the mice were genetically engineered to develop Alzheimer's-like plaques in their brains, while the rest were not. In each group, half of the animals were given blueberry-based pellets. Testing began when the mice were young, before the genetically modified animals had developed plaques. The study lasted a year. The mice with pseudo-Alzheimer's theat didn't eat blueberries performed worse and worse on the maze over time. But the genetically modified animals given blueberries showed no decline, they performed just as well as normal mice, even though they still developed plaques. Joseph said he believes the berries' brain-protecting power goes beyond its known antioxidant and anti-inflammatory effects. Blueberries seem to "directly influence the way neurons communicate," he told Reuters Health. Preliminary results from a new study, he added, show that people who ate a cup of blueberries a day appeared to be protected from aging-related mental decline. Joseph expects the study will be published late this fall. The next steps, the Boston researcher said, will be to do more tests in transgenic animals, evaluate which chemicals in blueberries find their way into the brain, and study how the fruit might be protecting the brain. (**Source:** The Blueberry Bulletin, Vol. 19, No. 11; reprinted from Dixie Blueberry News, Georgia Blueberry Growers Association Newsletter, Vol. 2, No. 3).

## Cornell Small Fruit Workers Summer Tour, III

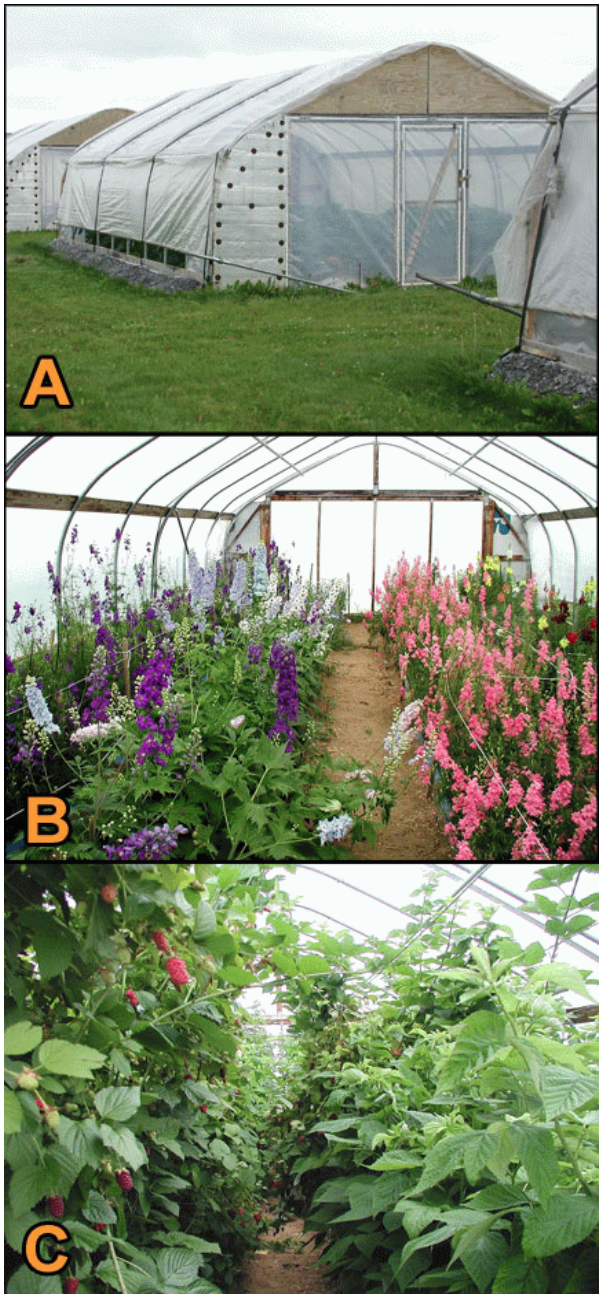
Bill Turechek, Dept. of Plant Pathology, Cornell University, Geneva

Several Cornell faculty, extension specialists, research technicians and students traveled last week on a tour of small fruit farms in central Pennsylvania. The tour was arranged and hosted by Kathy Demchak, Senior Extension Specialist at Pennsylvania State University. This is the third consecutive year in which a regional, small fruit tour for Cornell small fruit workers was held. There are essentially three reasons why we have these tours. First, is to learn about new and exciting opportunities in the production of small fruit crops. Second, because many of us are called regularly on to farms to diagnose a problem, we seek out both common and uncommon problems, namely disease, insect, or nutritional ailments, to help us sharpen our field diagnostic skills. Third, and perhaps most important, these tours give us the opportunity to form good working relationships with other small fruit workers and growers across the Northeast.

The tour started with a visit to Tom Styer's Farm and Market in Muncy, PA. Strawberries, a variety of vegetables, hanging baskets, and pumpkins are Tom's specialties. This was the only grower stop that included strawberry, so it was good opportunity for us to talk with Tom and get a growers perspective on the different strawberry varieties he grows, as well as his perspective on marketing them. It was also excellent opportunity for us to scout for several late season disease and insect pests. At this time of year, the three major foliar diseases are quite evident and potato leaf hopper damage can be easily spotted; these pests are addressed in greater detail in the articles that follow.


Our next stop was Kiwi Korners (http://www.kiwiberry.com/index.html), owned and operated by David Jackson and Holly Laubach. David and Holly have an impressive 14 acres dedicated to the commercial development and production of hardy kiwi (*Actinidia arguta*). Kiwi Korners was founded in 1987 and, over the last 15 years, they have grown and

tested and number of varieties and have experimented with different planting systems. Hardy kiwi is a slow-growing, difficult plant to cultivate, but as you can see from the pictures, it appears that Dave and Holly have got it down. Currently, they are working to establish markets, and are producing educational material about hardy kiwi for the consumer. If hardy kiwi is crop that you would be interested in learning more about, I certainly recommend that you contact David or Holly for advice. An interesting fact sheet about hardy kiwi can be found at http://ohioline.osu.edu/hyg-fact/1000/1426.html.




Our third stop was a visit to Ed Mashburn's Northumberland Berry Works (http://www.currants.com). Northumberland Berry Works started as an experimental planting of currants and gooseberries for the purpose of evaluating large numbers of varieties for commercial production in the Northeast. More recently, Northumberland Berry Works has changed from an experimental planting to a more conventional planting; basically focusing on growing advanced selections from established breeding programs and varieties referred from other sources for commercial production in the Northeast.

We were fortunate that our tour was timed to perfectly coincide with the ripening of gooseberries and black currants. Because Ed grows so many varieties from all around the world, we were able to taste several different types of both gooseberry and black currant. Also, we had a first-hand opportunity to see the most serious disease and insect pests on *Ribes* spp. (see article below). This is because Ed grows so many different varieties, with various levels of susceptibility, and he manages his planting with no commercial pesticides.

After a fine evening in State College, our next day began with a tour of Kathy's strawberry variety trial. Kathy is looking at several different varieties from breeding programs throughout the world to evaluate their commercial potential for Pennsylvania growers. I'm sure we'll be learning more about the results of this trial from Kathy as she collects and analyzes the data. We then met with Elsa Sánchez, assistant professor of horticultural systems management, who briefly discussed her latest project focusing on irrigation of blueberries (see related article below).

Our last stop was a tour of high tunnel production facility at the Center for Plasticulture (http://plasticulture.cas.psu.edu). Dr. Mike Orzolek is deeply invested in high tunnel production and gave us an excellent tour of the facility. As you can see from the photographs to the left, high tunnels resemble traditional greenhouses but are different in they are not equipped with electrical power or any automated ventilation or heating system. High tunnels are not permanent structures; an important distinction from greenhouses for taxation purposes. At the facility, Mike and several cooperating researchers and growers work to develop economically and ecologically sound production systems for a variety of crops. Of course, some crops are more amenable to high tunnel production than others; raspberries seem to have great potential.

## Arthropod Pest Management Update

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

In previous articles in the NY Berry News over the spring and early summer we have reviewed most of the arthropod pests you might run into during the entire season so I don't have a lot of new information to share in the July issue. But I did want to give you an update on some of the insects we are currently seeing and that might show up as the field season progresses.

While on our tour of small fruit production in Pennsylvania we observed a couple of key mid-season arthropod pests. **Potato leafhoppers** (both adults and immatures) were abundant everywhere we went. This species overwinters as adults in the southeastern USA and then migrates north in spring and early summer (it does not overwinter . They feed on a lot of different crops including many small fruits like strawberries, raspberries, and grapes. They use their soda-straw like mouthparts to pierce the water conducting vessels of the plant (xylem) and such out water and nutrients. If this is all they did it probably would not cause much problem. But they also inject saliva into the plant and for some species this causes a strong reaction in the plant. Typical symptoms include yellowing of leaf margins and distorted and possibly stunted leaves (see picture to the left). Different plant species respond differently and some are very sensitive while others are not. Raspberries, grapes, and strawberries are pretty sensitive. The adult potato leafhopper is iridescent green and wedge-shaped while the nymph is usually green and moves sideways in a unique manner when disturbed. If injury to foliage is moderate to severe, control may be necessary. Sevin [carbaryl] and Malathion 57 EC are labeled for potato leafhopper on raspberries but note there is a 7 days to harvest restriction for Sevin but only a 1 day restriction for Malathion. At this point of the season (renovation) it is not worth treating for potato leafhopper in strawberries although keep an eye on new leaves after renovation.

Adult **Japanese beetles** have been active for the past couple of weeks and we observed some feeding damage to foliage (blueberry, grapes) while in Pennsylvania. They live in the soil as immature grubs for most of their lives, feeding on the roots of plants, particularly grasses. But around July 4 we start to see the attractive adults active in our yards and agricultural fields. The adults are busy doing 3 things from July through August; feeding, mating and laying eggs. The adults have a broad diet, including the leaves and sometimes fruit of small fruit crops like grapes, raspberries and blueberries. We do not have very good estimates of the economic threshold for Japanese beetle on small fruit crops. Its likely raspberry, grape and blueberry plants can handle a fair amount of foliar feeding. Direct feeding damage to fruit is another thing again. Several broad-spectrum insecticides are effective in controlling adult Japanese beetles such as carbaryl (Sevin) and fenpropathrin (Danitol), although you should refer to the pest management guidelines and the EPA label to make sure the product is labeled for the particular crop of concern. Malathion will also provide some control. One thing to keep in mind when chemically treating for adult Japanese beetles is that they are very mobile and can re-colonize a field fairly quickly.

**Two-spotted spider mite** is another pest that we frequently see during the mid summer when temperatures are up and rainfall is down. This year has not been a great year for mites due to the cool and wet spring. However, things are heating up and we saw some damage while in Pennsylvania on currants. These mites feed on the foliage of a number of different kinds of plants and can be a problem on strawberries, raspberries, gooseberries and currants. Although they are around all season, dry and hot conditions may promote large populations that can cause significant injury. Also, broad-spectrum insecticides targeted at other pests can kill off natural enemies of spider mites, particularly predatory mites, thereby promoting outbreaks. Keep your eyes open for whitish stippling injury or bronzing on leaves. We do not have good estimates for economic thresholds for spider mites on small fruit crops other than strawberries, and even on strawberries, we need to refine our values. Chemical control options vary for the different crops. Hexythiazox (Savey) has been recently registered for mite control on brambles (prior to 2002 we had no miticides registered for raspberries) Savey kills eggs and immature mites and is most effective when used before populations get really large. Predatory mites, purchased from a commercial supplier, are also an option, but like Savey, they work best when released when spider mite populations are still relatively low. Brigade [bifenthrin] has mites on its label for raspberries but note that it is very toxic to predatory mites.

Briefly, below are some of the other arthropod pests to be aware of during the mid-summer.

## — On Blueberry —

**Blueberry maggot** will continue to be a concern for blueberry growers while there is fruit in the field. If you have a problem with maggot you need to continue treating for them on a regular basis until the end of harvest. Late June and into July is also a time when you might see damage from the blueberry stem borer, a beetle. The damage is caused by the larva of a beetle. The eggs are deposited on small stems near the tip. After hatching, the legless grub tunnels into the

stem and continues down the cane. The larva stays with the stems for three years. Tunneling in canes reduces vigor and weakens the plant. This pest is generally not a serious problem and is managed through selective pruning of weak shoots.

### — On Raspberry —

As fruit ripens, **tarnished plant bug** continues to represent a threat, as are **cane borer** and **picnic beetles**. The adult **raspberry crown borer** makes its appearance in late July and August. 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 may help reduce crown borer populations. Note that no insecticides are currently registered in New York for control of crown borer. Finally, late in August or September keep an eye out for injury on canes originating from egg laying activity of tree crickets. The female inserts eggs in canes, leaving long rows of punctures that can weaken the cane.

### — On Strawberry —

Toward the end of harvest you may have a fair amount of over ripe and rotten fruit in the fields. This fruit is ideal for larvae of **strawberry sap beetle** and **picnic beetle**. There is not a lot you can do about it. It is unlikely an insecticide can get to the larvae. Quickly getting to renovation, however, may help reduce survivorship of some larvae or pupae. Whether this translates into lower populations next season is not known. 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. There are not any major arthropod pests attacking foliage after renovation, although keep an eye out for spider mites. We currently do not have a good sense of whether spider mites can cause significant injury during this time period. On the one hand, the plants tend to be somewhat resistant to mites. On the other hand, the plants are busy initiating flower buds for the next year and may be more sensitive to spider mite injury than during the spring. Research is under way to develop an improved assessment of the economic threshold for spider mites at different times during the season.

### — On Currant & Gooseberry —

As mentioned above, keep an eye out for **spider mite** damage during the hot and dry period of the summer. We are still observing currant aphid on some plantings, although populations and damage symptoms should be declining.

## Strawberry Renovation

Sonia Schloemann, UMass Extension, Amherst, MA

Strawberry plantings grown in the traditional matted row system should be renovated after harvest for a number of reasons. These include 1) to reestablish narrow rows, 2) rejuvenate the canopy, 3) interrupt disease buildup, 4) knock down insect and mite populations, 5) allow for effective weed control, and 6) stimulate runner production. For best results, renovation should be started immediately after the harvest is completed. Ideally, individual fields or varieties should be renovated when picking is complete rather than waiting until all fields are ready. The following steps describe renovation of commercial strawberry fields.

**Controlling Weeds, Part I**: Annual broadleaf weeds can be controlled with 2,4-D Formula 40 at 2 to 3 pts./acre in 25-50 gallons of water applied immediately after harvest. Formula 40 is the ONLY 2,4-D formulation labeled for use in strawberries. The other amine formulations such as Weedar 64 or Amine 4 have a different formulation and are not labeled specifically for strawberries. If grasses are a problem, sethoxydim (Poast) will control annual and some perennial grasses. But do not tank mix Poast and 2,4-D.

**Mowing:** Mow the old leaves off a couple of inches above the crowns 3-5 days after herbicide application. Take care, especially in uneven fields, not to mow so low that you damage some of the crowns.

**Fertilizing:** Fertilize the planting with 20 - 40 lbs./acre of Nitrogen, depending on soil type and organic matter content. A soil test earlier in the season will help guide you on the amount of N to apply. This will also help determine phosphorus and potassium needs. Following up with a leaf tissue analysis in August will help evaluate the adequacy of

you fertilization program. A second Nitrogen application should be made in August to complete the N requirement of the plants and support fruit bud initiation.

**Narrowing rows:** Narrowing row width is important since the rows have a tendency to spread out over time. Wide rows lead to low productivity and increased disease pressure. Narrow rows will give better sunlight penetration, better disease control due to improved air circulation, and better overall fruit quality. Also, more berries are produced at row edges than in the middle. The desirable row width at full canopy is 12-18 inches. This means that rows can be narrowed to as little as 6 inches during renovation. This can be done using a roto-tiller, rotovator, multivaror or various cultivators. Contact you Extension Specialist, equipment dealer or another strawberry grower for advice on the various implements.

**Cultivation:** Work in straw between rows and throw a small amount of soil over the row by cultivation. Strawberry crowns continue development at the top, and new roots are initiated above old roots on the crown, so ½ - 1 inches of soil should be cast over the rows to help with rooting. This also helps cover straw in the row and provides a good rooting medium for the new runner plants.

**Subsoiling:** Soil compaction can result from tractor use and picker traffic in the field, especially on heavy, wet soils. Subsoiling between rows will help break up compacted layers and provide better infiltration of water. Subsoiling is best done late in the renovation sequence since straw and crop residue can interfere.

**Controlling Weeds, Part II:** Pre-emergence weed control should begin immediately after all cultivation and subsoiling is complete. Sinbar, Dacthal, or Devrinol are suggested materials. Check the product labels carefully. Devrinol must be incorporated by irrigation, rainfall, or cultivation to be effective. Rate and timing of Sinbar application is critical. If regrowth has started at all, significant damage may result. Again, read and follow the label recommendations carefully with all of these products.

**Irrigation:** Water is needed for both activation of herbicides and for plant growth. This is easy to forget when multiple crops are grown. All the previous steps can be compromised if this step is not taken. Don't let the plants go into stress. Ideally, the planting should receive 1 to1-1/2 inches of water per week from either rain or irrigation. (**Source:** Massachusetts Berry Notes (2001) Vol. 13, No. 12)

## Foliar Nutrient Analysis

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

Plant tissue analysis is used to measure directly the amount of nutrients in various plant parts, and for established perennial crops, is usually a better indicator of nutrient status than a soil test. Recommendations are based on the levels of 13 essential nutrients in your leaves at a specific time of the year (usually mid-summer). Unlike visual diagnoses, foliar nutrient analysis can alert the grower when nutrient levels are approaching deficiency so corrective action can be taken before problems occur. They also alert the grower if fertilizer is being over-applied. Unlike soil tests, foliar analysis provides accurate results for all essential mineral nutrients, not just for the 4 or 5 reported in soil tests.

For strawberries, recommendations are based on newly expanded leaves collected after renovation in late July or early August. Other sampling times or plant parts may prove to be more appropriate for certain nutrients, but until more detailed studies are done, foliar samples collected in mid-summer are the standard because nutrient levels fluctuate little then. For raspberries, select fully expanded primocane leaves in early August. For blueberries, select young leaves exposed to full sun in late July.

Collect at least 50 leaves, remove their petioles, and wash them in distilled water. Dry them, place them in a paper bag, and send them to the laboratory for analysis. Samples should be representative of the entire field. If a particular area of the field looks poor or has been fertilized differently from the rest, sample it separately.

A leaf analysis, including nitrogen, costs $28. Results should return from the lab within 2 - 3 weeks. Many nutrients can be applied in fall, and the recommendations will provide details on when to apply particular nutrient fertilizers and in what quantities. The leaf analysis is accurate only if the soil pH is within an acceptable range (5.5 - 7.0 for raspberries and strawberries; 4.0 - 5.0 for blueberries).

Conduct a foliar tissue analysis every other year. The soil pH should be monitored regularly, and a complete soil test performed every three years. Always be alert for any unusual appearance of leaves, and for unexplained reductions in growth or yield.

Sampling kits for are available through Cornell Cooperative Extension educators. You can also obtain sampling kits directly from the lab.

**Nutrient and Elemental Analysis Lab**
**Department of Horticulture**
**Cornell University**
**Ithaca, NY 14853**
**(607) 255-1785.**

## Summer Management of Foliar Diseases of Strawberry

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

In this months issue of the NY Berry News we will cover foliar disease management on strawberry. Foliar diseases are often overlooked because most do not become noticeable until after harvest or renovation. However, serious outbreaks of any of the diseases discussed below can seriously impact the vigor, winter hardiness, and even the production of a planting. At this point, it is not well understood when is the most critical time to manage disease or how much foliar disease can a strawberry planting tolerate. We are currently researching these questions with support from the North American Strawberry Growers Association and the New York IPM Program. Until we have a better understanding, though, we currently work under the assumption that severe infection in the summer (greater than 30% disease) is enough to impact the health of the plant and possibly result in the damage discussed above (this is based on some preliminary work done in my lab). In problem fields, I suspect that one or two well-timed fungicide applications in the summer months may be all that is needed to keep disease from reaching levels that may impact production.


**Leaf spot** is caused by the fungus *Mycosphaerella fragariae*. It is one of the most common and widespread diseases of cultivated strawberry. It is also the cause of black seed; a disease of the fruit that can occur when warm and wet conditions occur during bloom. Prior to the development of resistant cultivars, leaf spot was the most economically important disease of strawberry. However, since many commercially grown cultivars are not completely resistant to leaf spot, this disease is still significant on a number of cultivars including 'Honeoye', 'Idea', 'Marmolada', 'Raritan', 'Kent'.

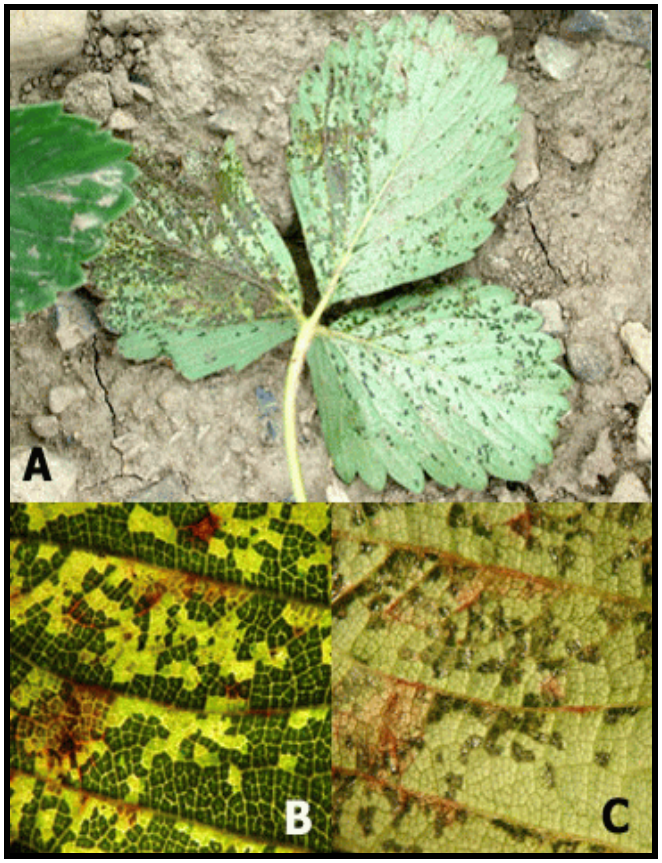
**Leaf scorch** is caused by the fungus *Diplocarpon earlianum*. It is a common disease of strawberry throughout the northeast. Epidemics occur normally from August to October. Leaf scorch can markedly reduce vegetative growth, weakening plants and resulting in a sharp reduction of growth of shoots and roots, a reduction in the number and vigor of crowns, and quite possibly fruit yield. Severely infected plants may die from environmental stresses, such as heat, cold or drought. Like leaf spot, losses vary depending upon cultivar susceptibility.

**Leaf blight** is caused by the fungus *Phomopsis obscurans*. The disease affects primarily older foliage in late summer and, like leaf scorch, can result in reduced plant vigor and yield in the following season. (It also can cause severe defoliation in nursery production areas in the southeastern US.) Leaf blight is particularly destructive to slow-growing or weak plants. It seldom damages young, runner plants, and rarely attacks the fruit in the Northeast like it does in the South. The spread of *P. obscurans* is favored by frequent rains, overhead irrigation, and heavy dews. Little spread occurs during hot, dry weather in the summer, although symptoms may continue to develop during this period.

Powdery mildew symptoms on underside of leaf. Fruiting bodies of the fungus can be seen towards the end of the summer (right picture).

**Powdery mildew** is caused by the fungus *Spaerotheca macularis*. Disease severity is most pronounced in areas that experience high humidity and moderate temperatures through the growing season, such as the coastal and Great Lakes regions of the US. Like most of the foliar diseases mentioned, severe outbreaks of powdery mildew can weaken plants leading to an increase in winter-injury and a reduction in yield. The disease has been prevalent after renovation in plantings in Geneva the past few years.

**Angular leaf spot** is caused by the bacterium *Xanthomonas campestris pv. fragariae*. In New York, it doesn't appear the disease is as widespread as the others addressed so far. The disease severely affects the foliage, and has the potential to attack the calyx (i.e., the sepals on fruit) or the crown of the plant. In planting of Kent in Geneva, the angular leaf spot pathogen was isolated from a number of fruit calyxes showing the symptoms of "brown cap". How prevalent this is across NY, and whether this organism was the primary cause or secondary invader has yet to be determined. Nonetheless, the disease is often left uncontrolled (mainly because there are no real control options) and, seemingly, this has little impact on the planting the following year.




(A) Symptoms of angular leaf spot on the underside of a leaf; (B) as they appear under transmitted light, i.e., leaf held towards the sky; and (C) from reflected light, i.e., leaf looked at from above.

**Management of foliar diseases:** Once the leaves begin to regrow after renovation, there are a number of options growers have to effectively manage disease.

Nova 40W is labeled for control of leaf spot, leaf blight, and powdery mildew and is a very effective against these diseases; I have not seen data to support its efficacy against leaf scorch. Applications should begin when disease appears and continue on a 14 to 21 day schedule or, better, when conditions favor disease development. Often, the first application can wait until after harvest. If disease pressure was serious prior to renovation, growers should make a note to consider beginning treatment before renovation next year. If repeated applications are necessary, it is recommended that Nova 40W be alternated with a tank mix of Topsin-M plus Captan.

If anthracnose fruit rot was (or has been) a problem, growers should use a fungicide that also has activity against this disease, such as Captan or Quadris. The fungus is capable of attacking the petioles of young leaves as they emerge after renovation. Fungicide applications at this time serve to protect the leaves from attack and reduce the pathogen population that can overwinter and cause outbreaks next season. Quadris has good activity against anthracnose and powdery mildew. In trials conducted in Ohio, Quadris was shown to have excellent activity against leaf blight as well. Captan will have good to excellent activity against anthracnose as long as coverage is maintained.

Fixed copper products are the only real option for managing angular leaf spot. Copper can be applied on 14-21 day schedule, but growers should be aware that as few as 3 successive applications of copper can result in phytotoxicity on some varieties, quite possibly doing more damage than disease itself. The collective experience of many small fruit pathologists in the Northeast is that treatment is often not necessary, as this disease can appear in epidemic from one

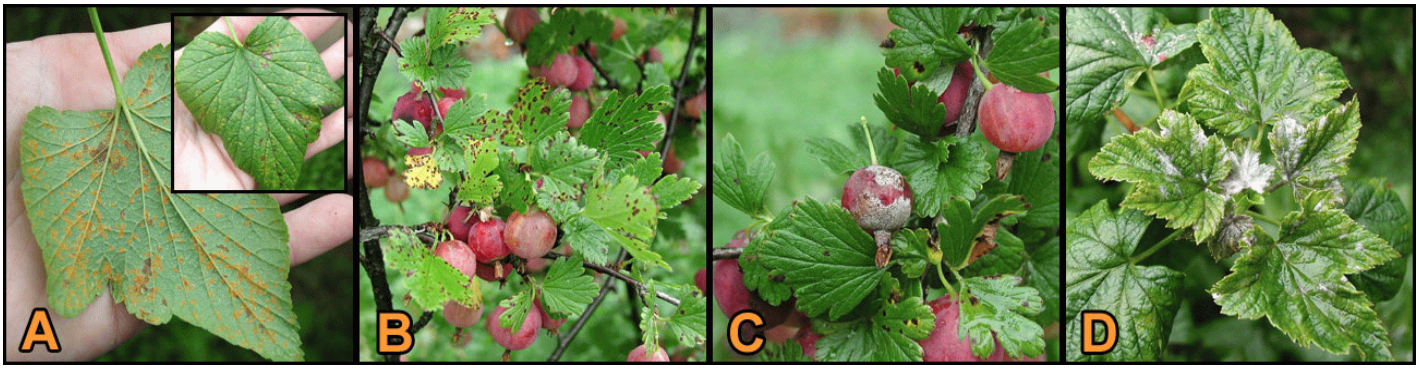
year but often not the next.

Lastly, a number of cultural practices can be used to help manage disease. New plantings should be established in sites with light, well-drained soil, with good air circulation and full exposure to the sun. In matted-row systems, runner plants should be carefully spaced when filling rows and the entire planting should be kept free of weeds to improve air circulation and reduce drying time for leaves. Removing and burning all debris at renovation (after harvest) helps to reduce overwintering inoculum of all leaf pathogens.

## Managing Diseases of Currant and Gooseberry

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

On our tour in PA, several important diseases were evident in established currant and gooseberry plantings. Leaf spot (Fig. B), also known as anthracnose (*Drepanopeziza ribis*), was widely seen on gooseberry. White pine blister rust (Cronartium ribicola) was found on susceptible black currant varieties such as 'Ben Alder' and 'Ben Nevis' (Fig A). When the disease is severe, these varieties can be completely defoliated by August leading to winter-killed bushes due to lack of hardening. Powdery mildew (*Spaerotheca mors-uvae*), or as it is sometimes referred to as American mildew, was quite obvious on gooseberry and black currant, and is a disease that must be managed every year if resistant varieties are not used (Fig. C and D).




In New York, there are several fungicides labeled for use on *Ribes* spp. (see Table). Beyond label recommendations, we have little practical experience with how well these fungicides work against the diseases discussed and when applications should be timed to achieve the best control. I will draw upon my experience with working with these fungicides on other crops to manage similar diseases, plus conversations with Steve Mckay of Cornell Cooperative Extension, to derive a best guess on how they may fare on currant and gooseberry. Steve and I are currently working together to evaluate the efficacy of several fungicides to control diseases on *Ribes*, including several of the most recently labeled, in an experimental planting of currant and gooseberry planted at the NYS Ag Experiment Station in Geneva, NY this spring. Although we may be able to get some preliminary information from this planting this year, it will take an additional two years before the planting is developed enough and has sufficient disease pressure to run truly challenging fungicide trials.

Starting from the beginning of the season, typical spray programs for disease management include a dormant application of copper hydroxide or lime sulfur targeted at reducing the overwintering population of leaf spot (anthracnose) and powdery mildew. Prebloom applications of copper or wettable sulfur beginning just before bloom and continuing on 7-10 interval or on an "as needed" basis are typical for managing anthracnose. Season-long schedules are often necessary in New York because the labeled fungicides are only moderately effective at controlling anthracnose, especially on the most susceptible varieties. However, this use pattern can and often results in phytotoxicity, so pay careful attention to your plants when several consecutive applications are made.

For powdery mildew, Nova can be applied at the first sign of symptoms or, in problematic plantings, beginning at prebloom, followed by an application at bloom, then by 2 additional applications at 14 day intervals. Nova is also registered for control of leaf spot and is thought to be moderately effective. Potassium bicarbonate (e.g., Kaligreen) is another option for powdery mildew control, but it is generally applied to knock back existing colonies in a rotational program with other fungicides. Oils and sulfur may also be used against powdery mildew, but they can not be mixed in the same spray tank or be applied close to each other in a spray schedule due to phytotoxic effects. Furthermore, some gooseberry varieties are "sulfur shy" and cannot tolerate the use of sulfur and excessive applications of oil may delay ripening. Only oils are labeled for control of rusts. However, if Nova is used to target powdery mildew, reasonable control of rust might be attained. Nova is very effective at controlling rust on apples and is labeled for the control of rust

| Fungicide | Labeled Against |
|---|---|
| ***Abound 2.08F*** | **None on label** |
| ***Copper (e.g., Kocide 2000)*** | **Leaf spot** |
| ***Elevate 50WDG*** | **Gray mold** |
| ***JMS Stylet Oil*** | **Powdery mildew, white pine blister** |
| ***Nova 40W*** | **Leaf spot, anthracnose** |
| ***Potassium bicarbonate (e.g.,*** | **Powdery mildew** |
| ***Rovral 4F*** | **Gray mold** |
| ***Sulfur*** | **Powdery mildew** |
| ***Switch 62.5WG*** | **Gray mold** |

on blackberry and raspberry.

Abound, Elevate, and Switch are the most recent fungicides labeled on Ribes. Along with Rovral, Elevate and Switch are mainly active against gray mold (*Botrytis cinerea*); this does not appear to be the most serious on Ribes spp. Abound could very well be effective against all the diseases of concern. Abound is known to have good activity against a variety of leaf spotting pathogens, good to excellent activity against many powdery mildews, and fair to good activity against certain rust diseases. However, the Abound label does not list any disease of currant or gooseberry. In New York, it is prohibited to apply any fungicide against a non-target pest (i.e., one that is not on the label) without a 2(ee) recommendation, or in a use pattern inconsistent with its labeling. So, according to the NYDEC, unless a 2(ee) recommendation for a specific disease is submitted (and anybody can do this) or Syngenta expands their label, Abound can not be applied. (I have spoken with the folks at Syngenta and brought this to their attention).

## The Blueberry Bird Problem: Options for Control

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

Birds are a major pest of fruit crops such as cherries, blueberries and some grape varieties. In a recent survey, blueberry growers in the northeastern United States estimated that nearly 30% of their crop is lost to bird depredation. Across the country, 10% of the blueberry crop is probably lost - at a cost of $10 million. Since the loss of Mesurol, no effective chemical repellent has been available. Netting is expensive and difficult to install, so most growers would like to avoid using it if possible.

For the past several years, with the cooperation of Paul Curtis, wildlife management specialist in the Department of Natural Resources, we have been examining the effectiveness of chemical repellents and audio scare devices for birds in blueberries and cherries. What follows is a summary of our experiences with these new technologies.

***Chemical repellents.*** Methyl anthranilate is chemically similar to the major flavor component of Concord grapes, and is manufactured in large quantities by food processors. Birds are repelled by its taste, and since it is generally regarded as safe for human consumption by the FDA, it would seem to be a viable alternative to Mesurol. This product is now registered for use in blueberry plantings (Bird-Shield and Rejex-It). However, we have found several problems with this material. First, it is a volatile compound and has a short residual on exposed fruit. We have found good repellency for about 3 days, but the material loses its effectiveness later. Similar results have been reported from Oregon and Florida. Second, to repel birds, a large amount must be consumed in one bite. It is less effective when applied uniformly as it would be with an air blast sprayer. Although methyl anthranilate works well as a goose repellent in turf, our expectation is that these formulations will not be widely used in fruit plantings until further improvements to the formulation are made.

***Sugar.*** Applications of sugar syrup have been shown to repel birds from blueberry plantings. The exact mechanism of repellency is unknown, but may relate to the inability of many bird species to digest disaccharides. (Most bird-dispersed fruits contain simple monosaccharide sugars.) The sugar is applied when the fruits begin to turn blue, and reapplied after episodes of rain. We dissolved 230 lbs of sugar in 21 gallons of hot water, yielding 40 gallons of solution. Olympic Spreader Sticker was added at 310 ppm. Birds damage was 50% less where sucrose was applied. Although each treatment cost $40 - $50 per acre, and we applied sugar 4 times during the season, the total expense ($160) was far less than the losses to birds that an adjacent field experienced. In field trials, the sugar also repelled birds, although an increase in Japanese beetles and yellow jackets was observed in treated plots.

***Audio scare devices.*** Distress tapes, cannons and firecrackers are audio devices to which birds rapidly acclimate. They are effective for only short periods of time unless moved regularly and supplemented with visual scare devices. Recently, a new electronic device named "Bird-Gard" has been developed with digitized, species specific bird distress

calls. The device we tested emitted distress calls of crows, robins and starlings every minute during daylight hours. We tested the device in two blueberry fields with high bird pressure, and found it to be effective for about 7 to 10 days. In one field, we added hawk models after a couple of weeks and observed a reduction in feeding. When the device was turned off, feeding increased dramatically. A new version of the Bird-Gard includes a shriek of a hawk prior to the distress calls, and elicits calls randomly. These modifications seem to enhance the effectiveness of the device.

Even though feeding by certain bird species was reduced, many birds still fed in the plantings, especially ground-feeders like sparrows and finches. Because blueberries ripen over such a long period of time, the birds have ample opportunity to habituate to the sounds. Furthermore, species composition changes over time, so sounds that work early in the harvest may not work at the end of the season. One blueberry grower reported that an owl model was very effective for him. The owl mounts on a bearing on top of a post, allowing the owl to swivel in the slightest breeze. In addition, the owl emits a loud shriek at intervals, powered by a solar cell. Combinations of audio and visual scare devices seem to be most effective.

***Others.*** We have surrounded a planting with strobe lights, but found they were not effective. We also tested "Bye-Bye Birdie" - a device from Japan that looks like a bird, but contains a powerful magnet purported to disrupt the natural sense of direction of birds, which they purportedly avoid for distances up to 70 ft. After hanging many of these magnets over a blueberry field, we found them to be ineffective. In addition, we tested a special machine that laid out a sprayable "biodegradable" netting. It is effective on vegetable crops for insect control, and seemed to have potential for blueberries as well. However, the application was too slow and likely to be uneconomical.

***Bottom line:*** Combinations of visual and audio scare devices with taste deterrents are the most practical substitute for netting at this time.

## Determining When To Irrigate Highbush Blueberry

Elsa Sánchez, Assistant Professor of Horticultural Systems Management; and Kathy Demchak, Small Fruit Extension Specialist, Department of Horticulture, State College, PA

The amount of water supplied to blueberry plants influences vegetative growth, fruit size and quality. Supplemental irrigation is almost always needed for maximal yields even in years of plentiful rainfall because rain events occur irregularly resulting in periods of drought during the growing season. In addition, the nature of the root system makes the plants sensitive to moisture fluctuations.

The distribution of the blueberry root system is dependent on the age of the plant and climactic and soil conditions. In general, blueberry plants have shallow root systems with the majority of the roots 8 to 12 inches deep in the soil and rarely deeper than 16 inches. Most of the roots, 90%, are located within the dripline of the blueberry canopy.

Root systems of highbush blueberry plants are composed primarily of very thin roots. Roots can be up to 0.04 inch in diameter, however most are 0.02 to 0.03 inches in diameter, about the thinness of a strand of hair. Blueberry roots lack root hairs that are used in other plants for mining the soil for water and nutrients. Instead, blueberry roots have formed a unique association with endomycorrhizal fungi. The fungi inhabit blueberry root cells and facilitate water and nutrient (especially nitrogen and phosphorous) uptake for the blueberry plant, essentially acting as root hairs. In return, the fungi use carbohydrates from the plant for nourishment. Endomycorrhizal fungi survival is jeopardized in production systems using extensive inorganic fertilizers and cultivation. In this situation the roots can be less efficient at water and nutrient uptake.

The following example will help determine the need for supplemental irrigation in various situations. First, determine the available water holding capacity of the root zone. Ascertain the soil texture of the site and use a rooting depth of 16 inches, multiply the rooting depth by the available water holding capacity (from the table below) to determine the available water holding capacity of the root zone. For example, a clay loam soil would have an available water holding capacity of 2.24 inches of water (0.14 inch of water per inch of soil multiplied by 16 inches of soil). The water held in the root zone should not drop below 50% of capacity to avoid moisture stress to the plants. In this example the amount of available water should not drop below 1.12 inches of water held in the root zone.

The next piece of information needed is how much water the plant uses a day or the average peak use rate. In New York, the average peak use rate varies from 0.17 to 0.23 inches per day (see the table below). A blueberry plant in Buffalo in July can be using up to 0.22 inches of water per day. With 1.12 inches of water easily available to use and no other water supplied, the plant will use 1.12 inches of water in about 5 days (1.12 inches of water divided by 0.22 inches of water per day equals 5.09 days). The daily peak values are averages and can be up to 25% higher.

Several methods exist to determine when to irrigate. One is the 'checkbook' or water budget method, which uses the

Available water holding capacity based on soil texture.
Source: Commercial Vegetable Production Recommendations Pennsylvania 2003.

| Soil Texture | Water Holding Capacity (in. of water /in. of soil) |
|---|---|
| **Course sand** | ***0.02 - 0.06*** |
| **Fine sand** | ***0.04 - 0.09*** |
| **Loamy sand** | ***0.06 - 0.12*** |
| **Sandy loam** | ***0.11 - 0.15*** |
| **Fine sandy loam** | ***0.14 - 0.18*** |
| **Loam and silt loam** | ***0.17 - 0.23*** |
| **Clay loam/silty clay loam** | ***0.14 - 0.21*** |

Monthly average potential evapotranspiration or peak use rate of water demand for July and August at various locations in New York.

| Location | Average Peak Use Rate (inches/day) |
|---|---|
| **Albany** | ***0.20*** |
| **Binghamton** | ***0.17*** |
| **Buffalo** | ***0.22*** |
| **New York** | ***0.23*** |
| **Rochester** | ***0.21*** |
| **Syracuse** | ***0.21*** |

Source: Pritts, M.P. and J.F. Hancock, 1992.

water holding capacity of the soil (described above). To use this method, determine the plant water use and the amount of rainfall daily. Subtract the daily plant water use and add the daily amount of rainfall to the available water holding capacity of the soil. Irrigate the plants when the available water holding capacity of the soil drops to 50% of capacity. Soil moisture content should be checked periodically to verify water use and availability.
Another method is to assume that blueberry plants need about 1 - 2 inches of water per week depending on the growth stage of the plant. Two inches may be supplied from the period of fruit expansion to harvest. Irrigate the plants when rainfall does not meet the plant demand water in a given week. This method is less precise than the water budget method. As with the water budget method, soil moisture content should be checked periodically to verify water use and availability. *(Source:* Fruit Times, 2003, Vol. 22, No. 11)

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**Questions or Comments about the New York Berry News?**


*Send inquiries to:* Dr. William (Bill) Turechek, New York Berry News, Editor
Department of Plant Pathology, NY State Agricultural Experiment Station
630 W. North Street, Geneva, NY 14456
OR *Email*: wwt3@cornell.edu

**WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, JUNE 15th, 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 | 77 | 55 | 66 | -1 | 112 | 527 | 22 | 0.65 | -0.23 | 9.28 | 1.04 |
| Glens Falls | 75 | 50 | 63 | -1 | 93 | 396 | -19 | 1 | 0.23 | 7.05 | -1.19 |
| Poughkeepsie | 80 | 56 | 65 | -1 | 108 | 431 | -123 | 1.45 | 0.54 | 9.8 | 0.02 |
| ***Mohawk Valley*** | | | | | | | | | | | |
| Utica | 75 | 51 | 65 | 1 | 104 | 435 | -10 | 1.29 | 0.31 | 10.74 | 1.48 |
| ***Champlain Valley*** | | | | | | | | | | | |
| Plattsburgh | 78 | 49 | 62 | -3 | 87 | 368 | -55 | 1.43 | 0.68 | 8.01 | 0.79 |
| ***St. Lawrence Valley*** | | | | | | | | | | | |
| Canton | 79 | 46 | 62 | -2 | 83 | 371 | 9 | 1.86 | 1.09 | 9.62 | 2.16 |
| Massena | 78 | 45 | 62 | -2 | 88 | 363 | -32 | 2.17 | 1.44 | 9.72 | 3.03 |
| ***Great Lakes*** | | | | | | | | | | | |
| Buffalo | 78 | 52 | 64 | -1 | 102 | 442 | -29 | 1.01 | 0.17 | 7.89 | 0.08 |
| Colden | 76 | 48 | 63 | 2 | 95 | 332 | -28 | 1.56 | 0.58 | 9.77 | 0.32 |
| Niagara Falls | 78 | 48 | 65 | -1 | 103 | 410 | -79 | 1.41 | 0.57 | 8.85 | 1.02 |
| Rochester | 80 | 49 | 66 | 3 | 115 | 460 | -22 | 1.13 | 0.43 | 7.92 | 1.09 |
| Watertown | 79 | 46 | 63 | 2 | 96 | 373 | 13 | 1.28 | 0.61 | 7.57 | 0.93 |
| ***Central Lakes*** | | | | | | | | | | | |
| Dansville | 76 | 48 | 64 | -2 | 100 | 349 | -120 | 1.29 | 0.38 | 9.32 | 1.7 |
| Geneva | 78 | 51 | 65 | 0 | 104 | 416 | -34 | 0.7 | -0.2 | 9.25 | 1.5 |
| Honeoye | 77 | 51 | 65 | 0 | 106 | 435 | -30 | 0.73 | -0.17 | 9.42 | 1.77 |
| Ithaca | 77 | 50 | 65 | 2 | 107 | 386 | -15 | 0.49 | -0.42 | 8.48 | 0.39 |
| Penn Yan | 78 | 44 | 66 | 2 | 113 | 457 | 7 | 0.51 | -0.39 | 6.93 | -0.82 |
| Syracuse | 79 | 49 | 66 | 2 | 116 | 495 | 7 | 1.07 | 0.18 | 9.79 | 1.34 |
| Warsaw | 74 | 49 | 62 | 1 | 83 | 280 | -47 | 1.89 | 0.86 | 11.13 | 2.1 |
| ***Western Plateau*** | | | | | | | | | | | |
| Alfred | 76 | 48 | 64 | 3 | 102 | 345 | -22 | 1.3 | 0.25 | 9.54 | 0.84 |
| Elmira | 78 | 46 | 66 | 3 | 114 | 431 | 0 | 0.65 | -0.25 | 6.26 | -1.49 |
| Franklinville | 75 | 46 | 62 | 3 | 88 | 276 | -1 | 2.03 | 1.01 | 10.31 | 1.37 |
| Sinclairville | 76 | 48 | 63 | 2 | 92 | 310 | -21 | 1.68 | 0.59 | 10.51 | 0.48 |
| ***Eastern Plateau*** | | | | | | | | | | | |
| Binghamton | 74 | 52 | 65 | 2 | 109 | 389 | -26 | 0.74 | -0.1 | 9.26 | 0.97 |
| Cobleskille | 75 | 54 | 64 | 2 | 97 | 344 | -34 | 0.42 | -0.56 | 10.41 | 1.37 |
| Morrisville | 74 | 46 | 61 | -1 | 79 | 287 | -66 | 0.91 | -0.07 | 13.35 | 4.5 |
| Norwich | 75 | 48 | 65 | 3 | 104 | 361 | -19 | 0.82 | -0.16 | 9.45 | 0.27 |
| Oneonta | 77 | 51 | 66 | 5 | 114 | 410 | 68 | 0.84 | -0.14 | 10.31 | 0.42 |
| ***Coastal*** | | | | | | | | | | | |
| Bridgehampton | 79 | 53 | 64 | -1 | 103 | 373 | -56 | 0.91 | 0.07 | 17.75 | 8.11 |
| New York | 85 | 57 | 69 | -2 | 137 | 645 | -95 | 2.07 | 1.26 | 14.19 | 4.81 |

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, JUNE 22nd, 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 | 80 | 52 | 65 | -3 | 110 | 637 | 7 | 1.01 | 0.17 | 10.29 | 1.21 |
| Glens Falls | 78 | 44 | 64 | -3 | 98 | 494 | -30 | 0.53 | -0.19 | 7.58 | -1.38 |
| Poughkeepsie | 79 | 49 | 63 | -6 | 90 | 521 | -160 | 1.81 | 0.96 | 11.61 | 0.98 |
| ***Mohawk Valley*** | | | | | | | | | | | |
| Utica | 79 | 44 | 62 | -4 | 89 | 524 | -31 | 1.68 | 0.7 | 12.42 | 2.18 |
| ***Champlain Valley*** | | | | | | | | | | | |
| Plattsburgh | 82 | 44 | 63 | -4 | 95 | 463 | -75 | 0.49 | -0.24 | 8.5 | 0.55 |
| ***St. Lawrence Valley*** | | | | | | | | | | | |
| Canton | 80 | 44 | 63 | -2 | 92 | 463 | 2 | 0.09 | -0.68 | 9.71 | 1.48 |
| Massena | 81 | 46 | 63 | -2 | 92 | 455 | -44 | 0.01 | -0.76 | 9.73 | 2.27 |
| ***Great Lakes*** | | | | | | | | | | | |
| Buffalo | 81 | 50 | 64 | -4 | 96 | 538 | -51 | 0.25 | -0.59 | 8.14 | -0.51 |
| Colden | 76 | 47 | 61 | -4 | 79 | 411 | -44 | 0.58 | -0.4 | 10.35 | -0.08 |
| Niagara Falls | 79 | 49 | 63 | -5 | 93 | 503 | -103 | 0.18 | -0.63 | 9.03 | 0.39 |
| Rochester | 80 | 48 | 63 | -4 | 93 | 553 | -40 | 0.21 | -0.49 | 8.13 | 0.6 |
| Watertown | 78 | 43 | 62 | -3 | 84 | 457 | 2 | 0.08 | -0.55 | 7.65 | 0.38 |
| ***Central Lakes*** | | | | | | | | | | | |
| Dansville | 76 | 44 | 61 | -7 | 76 | 425 | -159 | 0.9 | -0.01 | 10.22 | 1.69 |
| Geneva | 77 | 46 | 61 | -5 | 82 | 498 | -65 | 0.67 | -0.22 | 9.92 | 1.28 |
| Honeoye | 78 | 40 | 61 | -7 | 75 | 510 | -73 | 0.35 | -0.55 | 9.77 | 1.22 |
| Ithaca | 76 | 41 | 60 | -6 | 72 | 458 | -46 | 1.38 | 0.47 | 9.86 | 0.86 |
| Penn Yan | 78 | 47 | 63 | -4 | 90 | 547 | -16 | 0.9 | 0.01 | 7.83 | -0.81 |
| Syracuse | 80 | 46 | 63 | -4 | 95 | 590 | -11 | 0.94 | 0.03 | 10.73 | 1.37 |
| Warsaw | 78 | 46 | 60 | -4 | 68 | 348 | -68 | 0.43 | -0.58 | 11.56 | 1.52 |
| ***Western Plateau*** | | | | | | | | | | | |
| Alfred | 77 | 44 | 60 | -4 | 75 | 420 | -43 | 1.07 | -0.02 | 10.61 | 0.82 |
| Elmira | 76 | 39 | 61 | -5 | 79 | 510 | -30 | 1.75 | 0.84 | 8.01 | -0.65 |
| Franklinville | 77 | 39 | 58 | -5 | 61 | 337 | -21 | 0.45 | -0.57 | 10.76 | 0.8 |
| Sinclairville | 77 | 47 | 60 | -4 | 69 | 379 | -43 | 0.46 | -0.63 | 10.97 | -0.15 |
| ***Eastern Plateau*** | | | | | | | | | | | |
| Binghamton | 73 | 45 | 60 | -6 | 72 | 461 | -60 | 2.38 | 1.54 | 11.64 | 2.51 |
| Cobleskille | 76 | 43 | 62 | -3 | 83 | 427 | -50 | 0.87 | -0.11 | 11.28 | 1.26 |
| Morrisville | 76 | 44 | 61 | -3 | 77 | 364 | -82 | 1.46 | 0.48 | 14.81 | 4.98 |
| Norwich | 78 | 42 | 61 | -3 | 80 | 441 | -36 | 1.48 | 0.51 | 10.93 | 0.78 |
| Oneonta | 80 | 45 | 62 | -2 | 87 | 497 | 64 | 1.5 | 0.52 | 11.81 | 0.94 |
| ***Coastal*** | | | | | | | | | | | |
| Bridgehampton | 77 | 45 | 62 | -5 | 86 | 459 | -86 | 2.13 | 1.29 | 19.88 | 9.4 |
| New York | 83 | 54 | 65 | -7 | 109 | 754 | -141 | 2.27 | 1.43 | 16.46 | 6.24 |

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, JUNE 29th, 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 | 93 | 57 | 74 | 6 | 173 | 810 | 44 | 0.02 | -0.81 | 10.31 | 0.4 |
| Glens Falls | 91 | 51 | 71 | 5 | 148 | 642 | -3 | 0 | -0.7 | 7.58 | -2.08 |
| Poughkeepsie | 91 | 54 | 72 | 3 | 157 | 678 | -140 | 0.64 | -0.23 | 12.25 | 0.75 |
| ***Mohawk Valley*** | | | | | | | | | | | |
| Utica | 89 | 53 | 70 | 4 | 142 | 666 | -11 | 0.02 | -0.94 | 12.44 | 1.24 |
| ***Champlain Valley*** | | | | | | | | | | | |
| Plattsburgh | 92 | 54 | 74 | 7 | 171 | 634 | -28 | 0 | -0.7 | 8.5 | -0.15 |
| ***St. Lawrence Valley*** | | | | | | | | | | | |
| Canton | 87 | 56 | 73 | 9 | 164 | 627 | 57 | 0 | -0.77 | 9.71 | 0.71 |
| Massena | 90 | 53 | 73 | 7 | 161 | 616 | 2 | 0 | -0.76 | 9.73 | 1.51 |
| ***Great Lakes*** | | | | | | | | | | | |
| Buffalo | 87 | 57 | 70 | 2 | 142 | 680 | -39 | 0.01 | -0.79 | 8.15 | -1.3 |
| Colden | 87 | 53 | 69 | 5 | 135 | 546 | -15 | 0 | -0.95 | 10.35 | -1.03 |
| Niagara Falls | 88 | 54 | 72 | 4 | 152 | 655 | -80 | 0 | -0.75 | 9.03 | -0.36 |
| Rochester | 90 | 56 | 73 | 6 | 163 | 716 | 1 | 0 | -0.7 | 8.13 | -0.1 |
| Watertown | 88 | 54 | 70 | 5 | 142 | 599 | 36 | 0 | -0.55 | 7.65 | -0.17 |
| ***Central Lakes*** | | | | | | | | | | | |
| Dansville | 88 | 51 | 69 | 2 | 137 | 562 | -147 | 0 | -0.88 | 10.22 | 0.81 |
| Geneva | 91 | 56 | 73 | 6 | 161 | 659 | -28 | 0 | -0.83 | 9.92 | 0.45 |
| Honeoye | 90 | 52 | 71 | 3 | 146 | 656 | -57 | 0 | -0.82 | 9.77 | 0.4 |
| Ithaca | 90 | 51 | 70 | 4 | 138 | 596 | -22 | 0 | -0.87 | 9.86 | -0.01 |
| Penn Yan | 90 | 58 | 74 | 6 | 167 | 714 | 27 | 0 | -0.83 | 7.83 | -1.64 |
| Syracuse | 90 | 55 | 72 | 5 | 153 | 743 | 19 | 0 | -0.91 | 10.73 | 0.46 |
| Warsaw | 85 | 52 | 69 | 6 | 138 | 486 | -30 | 0 | -0.96 | 11.56 | 0.56 |
| ***Western Plateau*** | | | | | | | | | | | |
| Alfred | 88 | 50 | 69 | 5 | 133 | 553 | -14 | 0 | -1.05 | 10.61 | -0.23 |
| Elmira | 90 | 48 | 69 | 3 | 137 | 647 | -13 | 0.02 | -0.85 | 8.03 | -1.5 |
| Franklinville | 88 | 45 | 66 | 3 | 112 | 449 | 0 | 0 | -0.97 | 10.76 | -0.17 |
| Sinclairville | 85 | 48 | 67 | 4 | 123 | 502 | -21 | 0.09 | -0.96 | 11.06 | -1.11 |
| ***Eastern Plateau*** | | | | | | | | | | | |
| Binghamton | 86 | 55 | 71 | 5 | 146 | 607 | -30 | 0.02 | -0.82 | 11.66 | 1.69 |
| Cobleskille | 91 | 51 | 71 | 6 | 148 | 575 | -11 | 0.04 | -0.93 | 11.32 | 0.33 |
| Morrisville | 86 | 52 | 68 | 4 | 127 | 491 | -58 | 0.07 | -0.84 | 14.88 | 4.14 |
| Norwich | 92 | 51 | 69 | 4 | 135 | 576 | -9 | 0.1 | -0.81 | 11.03 | -0.03 |
| Oneonta | 90 | 54 | 71 | 7 | 148 | 645 | 111 | 0.19 | -0.79 | 12 | 0.15 |
| ***Coastal*** | | | | | | | | | | | |
| Bridgehampton | 93 | 56 | 73 | 6 | 163 | 622 | -52 | 0.05 | -0.74 | 19.93 | 8.66 |
| New York | 97 | 60 | 79 | 6 | 205 | 959 | -102 | 0.34 | -0.5 | 16.8 | 5.74 |

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, JULY 6th, 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 | 92 | 52 | 75 | 5 | 176 | 986 | 74 | 0.33 | -0.44 | 10.64 | -0.04 |
| Glens Falls | 90 | 49 | 72 | 4 | 157 | 799 | 23 | 0.15 | -0.51 | 7.73 | -2.59 |
| Poughkeepsie | 90 | 54 | 73 | 2 | 158 | 836 | -128 | 0.09 | -0.81 | 12.34 | -0.06 |
| ***Mohawk Valley*** | | | | | | | | | | | |
| Utica | 88 | 50 | 72 | 4 | 159 | 825 | 17 | 0.08 | -0.83 | 12.52 | 0.41 |
| ***Champlain Valley*** | | | | | | | | | | | |
| Plattsburgh | 92 | 57 | 73 | 5 | 166 | 800 | 4 | 0.37 | -0.3 | 8.87 | -0.45 |
| ***St. Lawrence Valley*** | | | | | | | | | | | |
| Canton | 86 | 55 | 73 | 7 | 163 | 790 | 102 | 0.24 | -0.52 | 9.95 | 0.19 |
| Massena | 87 | 54 | 72 | 5 | 158 | 774 | 36 | 0.28 | -0.43 | 10.01 | 1.08 |
| ***Great Lakes*** | | | | | | | | | | | |
| Buffalo | 85 | 59 | 72 | 3 | 157 | 837 | -21 | 0.22 | -0.5 | 8.37 | -1.8 |
| Colden | 86 | 53 | 70 | 5 | 143 | 689 | 13 | 0.63 | -0.25 | 10.98 | -1.28 |
| Niagara Falls | 87 | 57 | 72 | 3 | 158 | 813 | -60 | 0.5 | -0.17 | 9.53 | -0.53 |
| Rochester | 90 | 57 | 74 | 6 | 171 | 887 | 40 | 0.01 | -0.63 | 8.14 | -0.73 |
| Watertown | 85 | 54 | 72 | 6 | 154 | 753 | 70 | 0.11 | -0.35 | 7.76 | -0.52 |
| ***Central Lakes*** | | | | | | | | | | | |
| Dansville | 87 | 52 | 71 | 2 | 146 | 708 | -135 | 0.55 | -0.24 | 10.77 | 0.57 |
| Geneva | 88 | 56 | 73 | 5 | 164 | 823 | 2 | 0.51 | -0.24 | 10.43 | 0.21 |
| Honeoye | 89 | 53 | 72 | 2 | 156 | 812 | -39 | 0.67 | -0.06 | 10.44 | 0.34 |
| Ithaca | 87 | 51 | 72 | 5 | 155 | 751 | 11 | 0.44 | -0.39 | 10.3 | -0.4 |
| Penn Yan | 89 | 56 | 75 | 7 | 174 | 888 | 67 | 0.01 | -0.74 | 7.84 | -2.38 |
| Syracuse | 90 | 54 | 75 | 7 | 177 | 920 | 63 | 0 | -0.91 | 10.73 | -0.45 |
| Warsaw | 83 | 55 | 69 | 5 | 138 | 624 | 0 | 0.66 | -0.21 | 12.22 | 0.35 |
| ***Western Plateau*** | | | | | | | | | | | |
| Alfred | 87 | 51 | 70 | 5 | 144 | 697 | 17 | 0.54 | -0.43 | 11.15 | -0.66 |
| Elmira | 90 | 49 | 72 | 5 | 157 | 804 | 14 | 0 | -0.84 | 8.03 | -2.34 |
| Franklinville | 86 | 47 | 68 | 5 | 130 | 579 | 31 | 0.45 | -0.45 | 11.21 | -0.62 |
| Sinclairville | 85 | 53 | 69 | 4 | 135 | 637 | 5 | 1.21 | 0.24 | 12.27 | -0.87 |
| ***Eastern Plateau*** | | | | | | | | | | | |
| Binghamton | 87 | 53 | 72 | 4 | 153 | 760 | -2 | 0 | -0.84 | 11.66 | 0.85 |
| Cobleskille | 88 | 48 | 71 | 6 | 152 | 727 | 23 | 0.16 | -0.71 | 11.48 | -0.38 |
| Morrisville | 86 | 51 | 70 | 4 | 140 | 631 | -30 | 0.25 | -0.62 | 15.13 | 3.52 |
| Norwich | 88 | 49 | 70 | 4 | 145 | 721 | 19 | 0.16 | -0.7 | 11.19 | -0.73 |
| Oneonta | 90 | 51 | 72 | 7 | 155 | 800 | 156 | 0.22 | -0.7 | 12.22 | -0.55 |
| ***Coastal*** | | | | | | | | | | | |
| Bridgehampton | 90 | 57 | 73 | 4 | 164 | 786 | -27 | 1.76 | 1.04 | 21.69 | 9.7 |
| New York | 94 | 65 | 79 | 5 | 204 | 1163 | -74 | 0.03 | -0.87 | 16.83 | 4.87 |

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, JULY 13th, 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 | 89 | 56 | 72 | 1 | 157 | 1143 | 78 | 0.54 | -0.16 | 11.18 | -0.2 |
| Glens Falls | 89 | 50 | 69 | -2 | 134 | 933 | 18 | 1.27 | 0.64 | 9 | -1.95 |
| Poughkeepsie | 91 | 56 | 71 | -2 | 151 | 987 | -130 | 1.52 | 0.61 | 13.86 | 0.55 |
| ***Mohawk Valley*** | | | | | | | | | | | |
| Utica | 86 | 52 | 69 | -2 | 133 | 958 | 11 | 1.56 | 0.68 | 14.08 | 1.09 |
| ***Champlain Valley*** | | | | | | | | | | | |
| Plattsburgh | 89 | 51 | 70 | -1 | 140 | 940 | 4 | 1.53 | 0.9 | 10.4 | 0.45 |
| ***St. Lawrence Valley*** | | | | | | | | | | | |
| Canton | 85 | 48 | 69 | 1 | 132 | 922 | 108 | 0.76 | 0.06 | 10.71 | 0.25 |
| Massena | 85 | 48 | 68 | -2 | 128 | 902 | 31 | 1.32 | 0.62 | 11.33 | 1.7 |
| ***Great Lakes*** | | | | | | | | | | | |
| Buffalo | 84 | 59 | 70 | -1 | 144 | 981 | -24 | 0.87 | 0.21 | 9.24 | -1.59 |
| Colden | 84 | 55 | 68 | 2 | 128 | 817 | 21 | 1.39 | 0.57 | 12.37 | -0.71 |
| Niagara Falls | 86 | 58 | 70 | -1 | 143 | 956 | -63 | 1 | 0.37 | 10.53 | -0.16 |
| Rochester | 87 | 58 | 71 | 1 | 148 | 1035 | 48 | 0.57 | -0.02 | 8.71 | -0.75 |
| Watertown | 81 | 48 | 69 | 1 | 135 | 888 | 77 | 0.9 | 0.48 | 8.66 | -0.04 |
| ***Central Lakes*** | | | | | | | | | | | |
| Dansville | 85 | 54 | 68 | -3 | 130 | 838 | -145 | 1.37 | 0.66 | 12.14 | 1.23 |
| Geneva | 86 | 57 | 70 | -2 | 138 | 961 | 0 | 0.99 | 0.3 | 11.42 | 0.51 |
| Honeoye | 85 | 50 | 70 | -2 | 141 | 953 | -45 | 1.08 | 0.44 | 11.52 | 0.78 |
| Ithaca | 86 | 53 | 69 | 1 | 134 | 885 | 17 | 0.93 | 0.16 | 11.23 | -0.24 |
| Penn Yan | 87 | 56 | 71 | 2 | 147 | 1035 | 74 | 1.38 | 0.69 | 9.22 | -1.69 |
| Syracuse | 88 | 54 | 72 | 2 | 153 | 1073 | 76 | 1.23 | 0.34 | 11.96 | -0.11 |
| Warsaw | 79 | 53 | 66 | -1 | 112 | 736 | -1 | 1.19 | 0.41 | 13.41 | 0.76 |
| ***Western Plateau*** | | | | | | | | | | | |
| Alfred | 86 | 48 | 67 | 0 | 121 | 818 | 19 | 1.62 | 0.73 | 12.77 | 0.07 |
| Elmira | 90 | 54 | 70 | 0 | 141 | 945 | 19 | 0.85 | 0.07 | 8.88 | -2.27 |
| Franklinville | 83 | 53 | 67 | 2 | 119 | 698 | 45 | 1.61 | 0.77 | 12.82 | 0.15 |
| Sinclairville | 82 | 55 | 67 | 0 | 117 | 754 | 7 | 1.77 | 0.86 | 14.04 | -0.01 |
| ***Eastern Plateau*** | | | | | | | | | | | |
| Binghamton | 86 | 54 | 68 | -1 | 131 | 891 | -4 | 1.03 | 0.23 | 12.69 | 1.08 |
| Cobleskille | 87 | 54 | 68 | 1 | 128 | 855 | 26 | 1.24 | 0.43 | 12.72 | 0.05 |
| Morrisville | 85 | 53 | 68 | 1 | 125 | 755 | -25 | 1.27 | 0.43 | 16.4 | 3.95 |
| Norwich | 87 | 54 | 68 | -1 | 124 | 845 | 18 | 1.07 | 0.27 | 12.26 | -0.46 |
| Oneonta | 86 | 54 | 70 | 4 | 138 | 938 | 176 | 1.56 | 0.65 | 13.78 | 0.1 |
| ***Coastal*** | | | | | | | | | | | |
| Bridgehampton | 88 | 61 | 74 | 4 | 169 | 955 | -6 | 0.25 | -0.45 | 21.94 | 9.25 |
| New York | 92 | 64 | 78 | 3 | 200 | 1363 | -56 | 0.39 | -0.52 | 17.22 | 4.35 |

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

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