New York Berry News

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Wow...the heat wave that dominated New York's weather last week pushed blueberries and strawberries into bloom at breakneck speed. At this time of year, gray mold and tarnished plant bug are now on every grower's mind, so we revisit these two important pests in this issue of the New York Berry News. When going after gray mold, strawberry and blueberry growers should apply a fungicide with anthracnose activity (such as Captan or CaptEvate) in their bloom sprays if this disease has been a problem in past seasons - more on this and other fruit rotting diseases in the next issue of the NYBN. If you haven't already done so, nitrogen fertilization should be on the agenda for most of your small fruit crops. But read Lori Bushway's article on nutrient management in strawberry before fertilizing established strawberry plantings. From our friends in New Jersey, a few tips on bee pollination in blueberry, and what to look for when scouting for blueberry scorch virus symptoms. Orange rust in brambles will be making its appearance soon; its management is covered in this week's edition as well. And last (but not least) for the disease pests, I cover some of the important diseases in *Ribes*. We wrap up this edition with a 'Smart Marketing' article – although written primarily for the vegetable audience, much of what is presented is pertinent to fruit growers. And finally, this edition picks-up on the NY Agricultural Statistics Service's weekly weather summaries, so you get an idea of how the past few weeks and the season stack up to the norm.

Upcoming Meetings

May 26, 2004: *Western New York Petal Fall Meeting I*, at Jim and Laurie Peters', Church Rd. Farm, Williamson, NY (Wayne Co). The meeting will be held at 1 PM.

May 27, 2004: *Western New York Petal Fall Meeting II*, at Russell's Farms on Drake Settlement Rd., Appleton, NY (Niagara Co). The meeting will be held at 1 PM.

August 10-12, 2004: *Empire Farm Days*, Rodman Lott & Son Farms, Seneca Falls, N.Y. For more information call 877-697-7837, or visit www.empirefarmdays.com

August 18-20, 2004: *NASGA's Summer Tour*, Quebec City, Canada, for more information you may call Patricia Heuser at 814-2383364 or visit www.nasga.org/meetings/04summertour/promo.htm

Eat Your Strawberries

Lori Bushway, Senior Extension Associate in Berry Crops, Department of Horticulture, Cornell University, Ithaca.

The signs of summer are now appearing: the "U-PICK STRAWBERRIES" signs. Late May marks the start of our local fruit season with naturally sweet and juicy strawberries. Beyond their delicious flavor, local strawberries are high in vitamin C, folic acid, potassium and fiber. You need only seven medium strawberries to obtain

Nutrition Facts
Serving Size 1 cup, whole (144g)

Amount Per Serving	
Calories 46	Calories from Fat 4
	% Daily Value*
Total Fat 0g	1%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 1mg	0%
Total Carbohydrate 11g	4%
Dietary Fiber 3g	12%
Sugars 7g	
Protein 1g	
Vitamin A	0%
Vitamin C	141%
Calcium	2%
Iron	3%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

141% of the recommended daily allowance of vitamin C. However, why stop at seven when you have barely consumed 46 calories of a delightfully sweet, fat-free treat. In addition, strawberries are high in natural antioxidants such as ellagic acid and anthocyanins. These compounds help our bodies battle damaging free radicals; advancing heart health, reducing the risk of certain types of cancer, and boosting total body wellness.

The immediate reward for strawberry eaters is equally fulfilling as the long term health benefits. Strawberries add interest, lively color and flavor to both indulgent and healthy recipes. Enjoy them fresh, with shortcake, on ice cream, in a smoothie, or tossed into cereal, salads or yogurt. Stock the freezer with washed hulled berries or make some jam or jelly. When the days are short and the landscape is dull, it is always a pleasure to open a jar or the freezer to taste the sweetness of last summer. It makes the wait for the first signs of our New York summer more bearable. Locally grown June-bearing strawberries are available late May through much of July.

Biology and Management of Tarnished Plant Bugs in Strawberries

Greg English-Loeb, Small Fruit Entomologist, Department of Entomology, Cornell University, Geneva

Tarnished plant bug (TPB), *Lygus lineolaris*, is the key arthropod pest of strawberries in the eastern US and in the absence of control measures, these bugs are capable of damaging over 75% of the crop. With strawberries in bloom, this is a good time to re-familiarize yourself with TPB.

Biology and Life-cycle

TPB overwinter as adults in weedy areas or under the dead foliage and mulch within the field. Starting around the beginning of May, the adults leave their winter resting places and fly out in search of food and suitable sites to lay their eggs. All of the Lygus species feed and lay eggs in a wide variety of plant hosts, but they exhibit a strong preference for plants just before and during flowering. As adults, TPB are very mobile and are capable of flying long distances in search of suitable host plants. When such a plant is found, the female will deposit single eggs within insertions she has made in the plant tissue. Approximately three weeks later these eggs will hatch and start the next generation of bugs. When they first emerge, Lygus nymphs are small (c.a. 1/32 of an inch in length), green and resemble an immature aphid. As they get larger, it becomes easier to distinguish the characters that separate Lygus bugs from aphids: Lygus nymphs have slightly clubbed antennae, move much faster than aphids, and do not have the cornices seen in aphids (Fig A). After the nymphs emerge they begin feeding on the plant, and this is where the economic damage occurs. Nymphs (and adults) prefer to feed on the immature fruit and flowers of their host plants. In strawberries, nymphs feed on the seeds of developing fruits. This feeding damage kills these seeds, and as a consequence the fleshy part of the fruit fails to enlarge in this area, resulting in a "catfaced" or "buttonberry" fruit (Fig B). Although adults can and do feed on strawberry fruits as well, there are usually not enough adults in the spring to result in economic damage for June-bearing cultivars. It takes about 6 weeks of spring temperatures for the nymphs to mature into adults and start the cycle over again. In the Northeast there are 2 – 3 generations of bugs per year. Hence, day-neutral varieties can experience high densities later in the season.

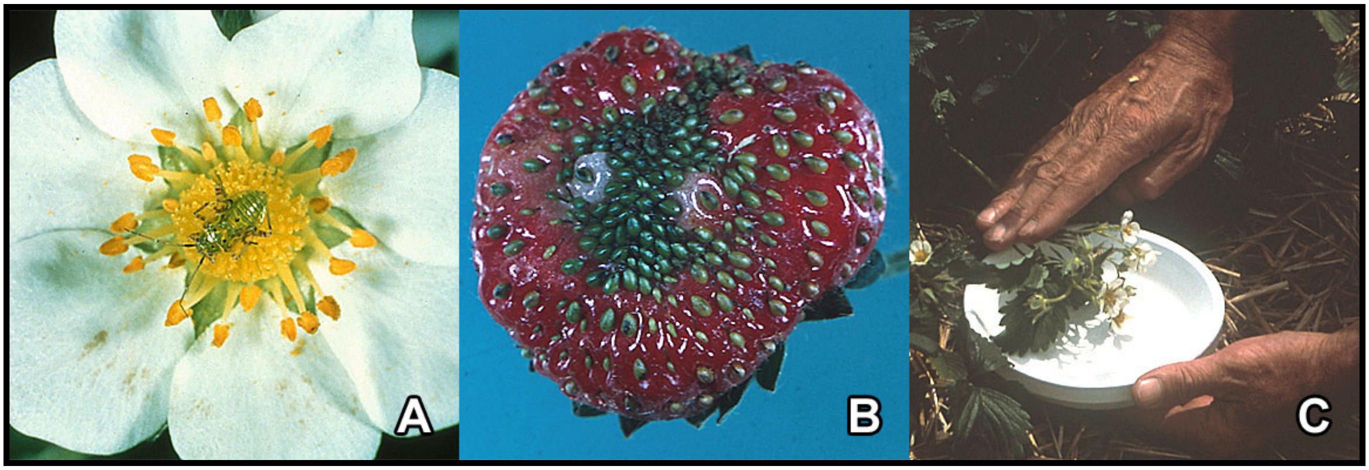
Management of TPB

Sampling: In our area, sampling for TPB should begin during bloom and continues until close to harvest. Not all sites will have sufficient densities of TPB to warrant control so it's worth your time and money to sample. Fruit or flower clusters are randomly selected throughout the field and tapped over a white pan or small bucket to remove the lygus nymphs (Fig C). For processing strawberries, a threshold of 1 nymph per cluster can be used. In fresh strawberries, a threshold of 0.25 nymphs/cluster may be used. Instead of counting nymphs, a presence/absence scheme had been developed to rapidly assess TPB nymph populations. If 2 out of 15 clusters are infested, corresponding to 0.25 nymphs/cluster, then chemical treatment in recommended.

Control

TPB can be difficult to control. The adults are naturally tolerant of many insecticides and because they are so mobile, recolonization of the field can happen quickly. This, coupled with a low damage threshold for this pest, means that we have yet to devise a perfect management technique. However, there are several strategies that have proven useful in controlling the bugs.

Cultural / sanitation strategies: Investigators have observed that injury from TPB varies among different strawberry cultivars (e.g. Honeoye typically has less damage than Earliglow). However, the reasons for these differences in "resistance" are not fully understood. Cultivars could differ in several ways that would influence success of TPB and damage: 1) attractiveness for egg-laying, 2) emergence of nymphs, 3) attractiveness for nymphs, 4) survival and/or development of nymphs, and 5) plant tolerance to feeding. Over the past several field seasons we examined some of these factors. Although more work is needed, we found that variation in productivity (tolerance) was the key factor in determining differences in proportion of fruit injured. Plants that produce more flowers and fruit, on a per area basis, tend to suffer proportionally less fruit damage than less productive plants. The mechanism for this effect is not totally clear. In part, though, it seems that high fruit density reduces the overall impact of feeding by nymphs such that fruit are still marketable even when fed upon. Also, cultivars that flowered earlier in the season tended to have proportionally less severe damage than later-flowering cultivars. Once the fruit has reached full size it is no longer susceptible to TPB damage. If this occurs before large populations of the nymphs hatch less damage will occur. Early season varieties can also be susceptible to frost injury, so care needs to be taken in selecting varieties suitable for your particular microclimate.



Removal of other host plants for TPB may also help reduce the number of bugs that reach your field. Weeds that flower early in the season (soon before strawberries bloom) are of particular concern if they occur close to the field. Removal of weeds from within the strawberry field may help in reducing infestation levels. Note, however, that it is very important not to disturb (pull, mow, etc) the weeds while your plants are in the susceptible stage. TPB adults will readily leave the disturbed weed hosts and enter the strawberry field instead!

Biological control: There are several species of wasps that attack the eggs or nymphs of TPB. A former graduate student at Cornell, Dr. Kelley Tilmon, worked with *Peristenus digoneutsi*, originally introduced from Europe to control plant bugs in alfalfa. This parasite attacks TPB nymphs, and has become established in New Jersey and many areas of New York. Kelley was not able to estimate the impact of this wasp on TPB in strawberries but she did find that it was most common in organic plantings or plantings that used a minimal amount of insecticides. Time will tell whether this and other natural enemies of TPB will reduce overall populations enough to be of help. Because of the low economic threshold for TPB in strawberries, however, it is unlikely that biological control can provide a complete answer.

Chemical control: There are a number of compounds registered for use against TPB in strawberries – see the Cornell Guidelines for specific advice. Before spraying for TPB, make sure that there are enough of the nymphs in the field to worry about (see above under sampling). Target your sprays for the nymphs – these are the bugs causing the most damage for June-bearing cultivars. Sprays timed for the occurrence of damage (too late) or for the first appearance of the adults (too early) have little effect on the amount of fruit damage. Don't spray when bees are foraging on the flowers – Honeybee pollination of strawberries results in increased fruit size and higher yields. It is also important to pay attention to the labeled pre-harvest interval for the compound selected to make sure that it is allowable to pick the fruit after treatment.

Summary

Although TPB causes significant injury to strawberries in New York, we are less vulnerable to this pest than strawberry growers in the south. Two factors are involved. First, overwintering adults are sensitive to harsh winter conditions so that spring population levels are often quite low in our area. Second, we mostly grow June-bearing varieties of strawberries that are often done fruiting before TPB populations build to high levels. Nevertheless, TPB in New York can cause significant injury and needs to be carefully monitored. Planting productive cultivars and keeping weeds under control will help reduce TPB pressure. Several effective insecticides are also available to prevent populations from exceeding the economic threshold.

What Fungicide Do I Choose for Disease Control in Strawberries?

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

[Editors note: There are a few editorial rearrangements to reflect the differences in fungicide registrations between Michigan and New York, plus I altered some of the suggested schedules to reflect my bias - otherwise this is a very nice article dealing with

strawberry disease management]

There are more choices for disease control in strawberries than ever before. This can be a rather bewildering experience, as growers have to consider the disease control spectrum, efficacy ratings and cost per acre for each product. This article aims to help strawberry growers in the decision-making process by outlining unique aspects of several strawberry diseases, characteristics of the newer fungicides, and by suggesting several possible fungicide programs. A few notes on specific diseases:

1) Control of leaf diseases, such as common leaf spot, scorch, Phomopsis leaf blight and angular leaf spot may only be needed on susceptible cultivars. Some leaf diseases can spread to the berries (e.g., Phomopsis can also cause a fruit rot), or berry caps (angular leaf spot (see below) and scorch). If these have been a problem in the past, start fungicide sprays before bloom.

2) Leather rot (*Phytopthora cactorum*) is best controlled by growing strawberries in well-drained soil and by applying straw mulch between the rows to prevent the berries from touching the soil (where the fungus resides) and prevent soil from splashing up onto the berries. If there still is a problem, use Ridomil Gold or Aliette for control. Some phosphorous acid products such as Agri-Phos (similar to Aliette) may also work, but have not been evaluated on strawberries in Michigan. Spray during bloom and fruit development.

3) Angular leaf spot is a bacterial disease that is characterized by translucent leaf spots and blackening of the berry caps. It is favored by cool, wet weather and nights with temperatures close to freezing. The bacteria are spread by rain splash or by irrigation water. Copper (e.g., Kocide, Cuprofix, Bordeaux, etc.) is the only chemical that works against this disease. Some labels suggest adding lime as a safener to reduce the risk of crop injury. In susceptible varieties, start spray applications before bloom to prevent multiplication of the bacteria on the leaves before they jump to the berry caps.

4) Botrytis gray mold, the predominant fruit rot in most areas where strawberries are grown, primarily enters the berries through the blossoms, which means that chemical control should be focused on the bloom period. The *Botrytis* fungus can produce numerous spores on dead leaves and other plant matter and spreads easily by wind. Make sure to protect the king blooms especially, since these provide the largest berries. The other period for control is pre-harvest, since *Botrytis* can spread rapidly from infected berries to ripe and overripe berries. Pre-harvest sprays reduce post-harvest rots and increase shelf life of the berries.

5) Most other fruit rots, including anthracnose, tend infect the berries somewhat later in the season, i.e., during the green fruit or ripening stage. Anthracnose fruit rot is favored by warm, humid conditions and can spread rapidly during rains or frequent irrigation. In cool seasons, it tends to appear closer harvest or may not show up at all. Anthracnose fruit rot can be identified by black sunken lesions with wet, orange (and sometimes gray) spore masses in them. The anthracnose fungus is able to multiply on the leaves without visible symptoms, which may explain its sometimes widespread and sudden appearance in fields.

New fungicide characteristics (prices are estimates for comparative purposes only and may vary depending on the supplier and quantity purchased). Please follow label directions carefully before use.

Elevate (fenhexamid) is a fungicide with a new chemistry that has excellent activity against Botrytis gray mold. While fenhexamid has some systemic activity, it should be used as a preventative fungicide. The fungicide gets rainfast quickly. Can be used to alternate with fungicides in other chemical classes. The label rate is 1.5 lb/acre (approximate cost: $41/acre). PHI=0 days.

Captevate (fenhexamid and captan) is a pre-mix of Elevate and Captan. It has excellent activity against *Botrytis* as well as moderate to good activity against anthracnose and other leaf spot and fruit rot diseases. This formulation appears to perform a bit better than a tank mix of Elevate and Captan. The label rate is 3.5-5.25 lb/acre (approximate cost: $42-$63/acre). At the high rate, the dose is equivalent to 1.5 lb Elevate and 5 lb Captan. The PHI=0 days.

Abound (azoxystrobin – this product was labeled as Quadris in the past) is a strobilurin-type fungicide with good to excellent broad-spectrum activity against leaf spots, powdery mildew and fruit rots. It does not have much activity against Botrytis gray mold. It is surface-systemic and has limited back action. The fungicide gets rainfast quickly. The label rate is 6.2-15.4 fl oz/acre (approximate cost: $12-$30/acre; $24 at the 12-oz rate). The number of applications is restricted for fungicide resistance management. PHI=0 days.

Switch (cyprodinil and fludioxonil) is a mixture of a systemic and protectant active ingredient (both are new chemistries). Switch has excellent activity against Botrytis gray mold and moderate to good activity against anthracnose and scorch. The label rate is 11-14 oz/acre (approximate cost: $39-$50/acre). PHI=0 days.

Older fungicides such as Topsin M, Captan, Thiram, Sulfur, etc. remain effective disease control tools. The approximate prices per acre: Topsin M $16/acre; Captan $13/acre; Thiram $8/acre; Sulfur $1-2/acre; and copper formulations: $3 to $4/acre.

Suggested fungicide programs

These programs will provide control Botrytis gray mold, anthracnose, and/or foliar pathogens. Other combinations are possible. If angular leaf spot control is needed, add a copper product. If leather rot control is needed, apply Ridomil Gold or Aliette.

Prebloom	Bloom (2 sprays)	Green berry	Pre-harvest	Cost/A	Comments
	Elevate			$82	Under low/moderate gray mold pressure
	Elevate		*Switch*	$132	Under moderate/high gray mold pressure
Topsin M + Captan	*Elevate*		*Switch*	$160	Same as above w/ foliar disease activity
	CaptEvate		*Abound*	$150	Under moderate anthracnose pressure
Captan	*CaptEvate*	*Abound*	*Abound*	$187	Under high anthracnose pressure
	Thiram	*Abound*	*Thiram*	$50	Under low to moderate disease pressure
Captan	*Thiram*	*Thiram*	*Captan*	$30	Under low to moderate disease pressure

Nutrient Management in Strawberries

Lori Bushway, Senior Extension Associate in Berry Crops, Department of Horticulture, Cornell University, Ithaca.

Nutrition and fertilization are important factors in maintaining healthy and productive strawberry plants. It is difficult to provide precise recommendations for a particular farm, because many factors influence nutrient uptake and availability including pH, moisture, organic matter content, clay content, mineral composition, tillage, herbicide use, fertilization history and weather. Using a combination of soil testing, tissue analysis, scheduled fertilizer applications and observation of crop response is currently a grower's best approach for managing nutrients in strawberry fields.

Soil tests have been used for many years to estimate the amounts of nutrients available to plants. Soil tests are most appropriate for the year prior to planting. With the exception of N, sufficient fertilizer and lime can be applied and incorporated prior to planting to obtain pH of about 6.5 and meet nutritional needs over the life of the planting. Growers can obtain instructions and sample soil test bags from their local Cornell Cooperative Extension Office www.cce.cornell.edu or from Cornell Nutrient Analysis Laboratories (607) 255- 4540 or www.css.cornell.edu/soiltest/. Soil testing laboratories use different methods to extract plant-available nutrients so results are not directly comparable from one laboratory to another.

Soil test recommendations for strawberries are really just ballpark estimates of fertilizer needs, because crop response data for each nutrient on different soil types have not been generated. Most growers assume a higher level of precision in soil tests than actually exists. A soil test approximates nutrient needs, but it cannot really be used to fine-tune a fertilizer program.

Plant tissue analysis can 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. Leaf nutrient analysis can alert a grower when nutrient levels are approaching deficiency or if fertilizer is being over-applied. Leaf nutrient analysis also provide accurate results for all essential mineral, not just for the 4 or 5 major ones reported in soil tests. For strawberries, growers should collect 50 leaves newly expanded leaves representative of the entire field after renovation in late July or early August, remove petioles, wash leaves in distilled water, dry, place in a paper bag and send to the laboratory for analysis. A leaf analysis, including nitrogen cost about $32 at the Nutrient and Elemental Analysis Laboratory www.hort.cornell.edu/department/facilities/icp/index.html or (607) 255-1785.

For nitrogen management growers must continue to rely upon scheduled fertilizer applications as large fluctuations in N that occur from week to week make estimating its availability with soil test and even leaf analysis of limited value. A typical N fertilization regime might be as follows:

Year 1:	30 pounds per acre four weeks after planting 40 pounds per acre in early September
Year 2:	70 pounds per acre immediately after fruiting 30 pounds per acre in early September

A specific nutrient management approach for strawberries should included: conducting a soil test and amending the soil according to recommendations prior to planting; and after planting, conduct a foliar tissue analysis at least every other year, monitoring the soil pH regularly and a completing a soil test every three years as well as always being alert for any unusual-looking leaves and unexplained reductions in plant growth or yield.

For additional details on soil and nutrient management in strawberries consult Chapter 7 in the Strawberry Production Guide available from NRAES at: www.nraes.org/publications/nraes88.html.

Blueberry Pollination

Gary C. Pavlis, County Agricultural Agent, Rutgers University, Chatsworth, NJ

[Edited (ever so slightly) by Bill Turechek]

Pollination is an important factor in production of the highbush blueberry. Lack of adequate pollination causes reduced yield, small berry size, and a delay in berry maturity. It is chiefly the honey bee which performs this task. While bumble bees are efficient and diligent pollinators (even under more adverse weather condition), their numbers are steadily decreasing. According to MSU Entomologist, Dr. Roger Hoopingarner, "Historically, feral (wild) honey bee colonies have provided more than half of the pollination in Michigan." Wild bee populations are declining. This is due to changes in our own blueberry production practices which remove bee forage and suitable habitat, and there is the problem with mites. Varroa and trachael mites are killing wild and managed colonies in the U.S. The varroa mite has completely wiped out all of the wild colonies in Europe. It is certain that our dependence upon this population of bees will be reduced in the next few years. What does this mean for blueberry producers? What happens when we lose the free pollination service provided by wild bees? You probably already know - more honey bees.

Blueberries have a tremendous number of blossoms per acre. A single bush may have 2,000 to 3,000 blossoms. At a planting density of 870 bushes per acre, that's 1.75 to 2.6 million flowers! Large-block single-variety plantings make it essential that high numbers of pollinators be available at one time. The number of colonies needed per acre is determined by weather during the bloom period, colony size, variety, and blossom density per acre. Weather during blossom time affects the honey bee's foraging efficiency. Honey bee activity increases as the temperature increases from 50 to 95 F. Sunshine also increases foraging, especially at lower temperatures. Cold, wet, windy weather decreases foraging activity. Temperatures above 95 F will also reduce foraging as the bees spend their time cooling the hive.

As a general rule, over-wintered colonies are stronger than package bees. A three pound package may have 12,000 bees, while an over-wintered colony may contain two to three times as many. Honey bee colonies will be smaller in an early bloom year. In essence, the crop has developed faster than the development rate of the forager bees. Are honey bees the answer? Many of you have seen your bees fly out of the hive, past your 'Jersey' bushes, and over to your neighbor's 'Rubel' field. This preference for one variety over another is not fully understood. It may be related to the quantity of nectar, pollen, sugar concentration, or flower color. At this time, honey bees are the best bet. For the long term, we need to learn to cultivate the wild pollinators. The recommended concentration of hives per acre to use are tabulated below: Remember that the number of hives needed per acre depends on the variety you have. (*Source: The Blueberry Bulletin, May 2004*)

Attractiveness to Bees			
Very (1 hive per 2 acres)	*Moderately (1 hive per acre)*	*Poor (2 hives per acre)*	
Rancocas	Weymouth	Stanley	Elliot
June	Bluetta	Concord	Jersey*
Rubel	Blueray	Berkeley	Earliblue*
	Pemberton	Coville	
	Darrow		
	Bluecrop*		

*Efficiency of pollination poor, add 1/2 more hive per acre

Blueberry Scorch (AKA Sheep Pen Hill Disease)

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

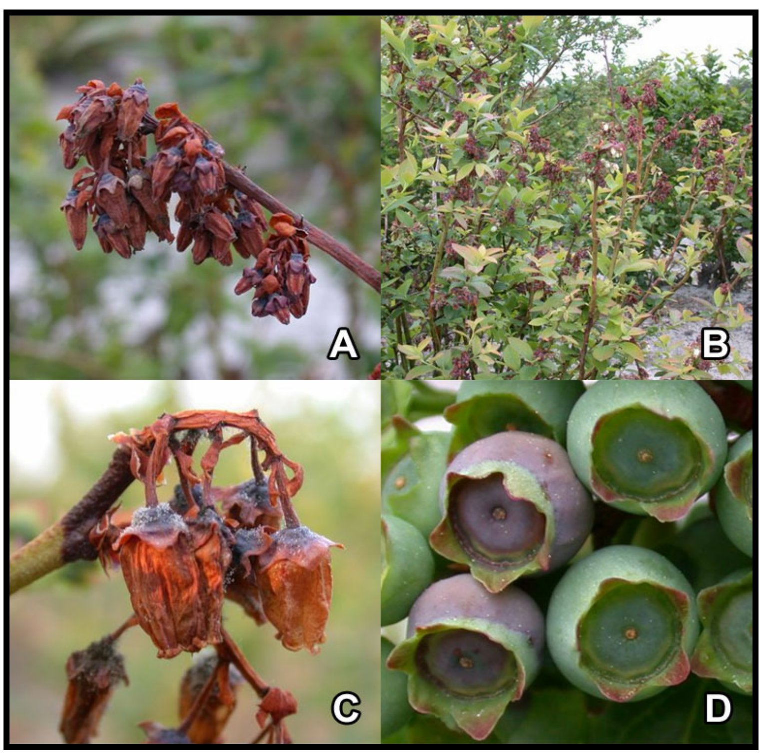
[*Editor's note: Blueberry scorch has yet to be found in NY; however it is widely disseminated in NJ and was recently discovered in MA. Growers should be on the lookout for symptoms suggestive of Blueberry Scorch and report any suspect plantings to a CCE Extension Agent as soon as it is discovered.*]

Blueberry scorch is a virus disease that is increasing greatly in frequency in New Jersey. The pathogen causes flowers to die without being fertilized and can result in major crop losses. In Burlington and Atlantic counties fields with 70-90% of the plants infected have been observed. Thus this disease represents a serious threat to the blueberry industry.

Growers and scouts should watch for development of scorch at this time and flag all suspect bushes. Symptoms are easily seen during bloom. Growers should be aware if this disease is present on the farm and where the infected bushes are located. Mark locations of the disease on a farm map and monitor these areas in subsequent years. When suspect bushes are found they should cut back and removed. Aphid scouting and management should be made high priority in fields with infected plants.

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 (Fig A and Fig B)).
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.

Symptoms of the disease vary depending on the cultivar. In Weymouth, Duke, Elliott, and Chanticleer classic symptoms of scorched blossoms and a Phomopsis-like die-back are commonly seen (Fig A, B). Blossom blighting by scorch can also be confused with blighting caused by *Botrytis*. These two can be distinguished by looking for the gray sporulation on the stem end that is characteristic of *Botrytis* infection (Fig C). (Figure D shows early ripening that is characteristic of *Botrytis*-infected berries – these generally drop prematurely). In other cultivars such as and Bluecrop the blossom scorch is less common and fruit may appear to set but will not develop. The plants may also appear chlorotic (yellowing similar to nitrogen deficiency) and partially defoliate. The disease may be easier to see by standing back from the bushes rather than close inspection. Shortly after bloom the plants will begin to recover. Even though symptom expression may not occur every year, infected bushes remain a source of inoculum in the field increasing the possibility for disease spread.



A virus causes blueberry scorch. For viruses to infect a plant they must enter a living plant cell through a wound. In the case of blueberry scorch, aphids can carry the virus on the sucking mouthparts or the stylus and inject the virus into the cell while feeding on plant sap. Once inside the cell the virus begins to multiply and spread to other cells in the plant. Eventually, the entire plant becomes infected and develops symptoms. Once a plant is infected it does not recover. Although infected plants may appear healthy during some years the infection is persistent and will greatly reduce berry production over the long term. Furthermore, the infected plants represent a source of inoculum that can be transmitted to healthy plants. For these reasons, it is a very good practice to remove infected plants. The virus is easily transmitted from mother plants to rooted cuttings making it critical to obtain cuttings from healthy mother plants only.

Recently, the NJ Department of Agriculture surveyed a number of NJ nurseries. These nurseries are now certified to be free of the Scorch virus. Growers should avoid purchasing plants from nurseries that are not certified. Introduction of scorch on to a farm will increase the risk of spreading the disease to other fields and also increase the cost due to removal and replanting. (*Source: The Blueberry Bulletin, April 2004*)

Orange Rust of Blackberries and Raspberries

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

We should expect to be seeing symptoms of orange rust on infected black and purple raspberries and blackberries soon. Orange rust occurs only on black and purple raspberries and blackberries and not on red raspberries. New canes from infected plants tend to be weak, spindly, thornless, and usually have misshapen, pale leaves. In contrast to new canes, they usually come up in bunches rather than singly. The lower surfaces of new leaves and for several weeks afterwards are covered with orange spores. It is important to scout your plantings and ***dig up and remove*** any infected plants before they release spores and spread the disease. Once a plant is infected with disease, it is infected for its life. Growers that wish to use chemical control for orange rust should begin sprays just before the orange spores are released from infected plants. These sprays should focus on protecting uninfected plants in plantings with infected plants. The fungicide Nova 40W at 2.5 oz/A are the fungicides currently registered in New York for control of orange rust. Nova can be applied on a 10 to 14 day schedule until leaves on infected plants dry up and stop producing the orange spores. This is usually around mid-July.

Managing Diseases of Currant and Gooseberry

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

There are several important diseases of currant and gooseberry that growers need to be concerned about managing. White pine blister rust (*Cronartium ribicola*) is perhaps the most serious of these (Fig A). White pine blister rust affects many different *Ribes* spp. but is particularly problematic on black currant. When the disease is severe, susceptible varieties such as 'Ben Alder' and 'Ben Nevis' can be completely defoliated by August – this can lead to winter-killed bushes due to lack of hardening. Leaf spot (Fig. B), also known as anthracnose (*Drepanopeziza ribis*), is perhaps the most serious disease of gooseberry. Powdery mildew (*Spaerotheca mors-uvae*), or as it is sometimes referred to as American mildew, a problem on gooseberry and black currant, 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). If leaf spot (anthracnose) and/or powdery mildew have been a problem in past seasons, a typical *Ribes* spray program should include a dormant application of copper hydroxide or lime sulfur targeted at reducing their overwintering populations (the timing for this application has obviously passed). 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. This use pattern, however, can and often results in phytotoxicity, so pay careful attention to your plants when several consecutive applications are made.

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 rust
Nova 40W	Leaf spot, anthracnose
Potassium bicarbonate (e.g., Kaligreen)	Powdery mildew
Rovral 4F	Gray mold
Sulfur	Powdery mildew
Switch 62.5WG	Gray mold

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 rust. 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, is labeled for the control of rust on blackberry and raspberry, and, most importantly, worked well in trials we conducted last year.

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).

Shortcuts to Measuring Crop Profitability: Are They Misleading?

David Conner, Research Associate, Dept. of Applied Economics and Management, Cornell University

Knowing whether a crop is profitable is a crucial piece of information for farm management. Yet for diversified vegetable farms, some growing hundreds of different crops or varieties, measuring this can be a daunting task. Many prominent organic farmers in the Northeast use and advocate the use of a simple rule of thumb: the "$30 per pick-pack hour rule." This rule states that for every hour spent harvesting and packing produce by the farmers and their crew, it ought to result in at least $30 in revenue. For example, if three workers spend two hours picking and one hour washing and packaging a given crop (a total of nine person-hours – 3 x 2 + 3 x 1 = 9), this product should bring at least $270 (9 x $30) in sales.

Using this rule is much easier than tracking all the costs (inputs and labor, plus indirect and overhead costs) associated with growing a crop. However, data collected over two growing seasons (2002 and 2003) from seven organic vegetable farms in the Northeast cast doubt on the usefulness of this rule. This doubt is based on two main arguments: (1) $30/hour may not cover the total cost of production, and (2) a key underlying assumption of this rule – that all production costs associated with raising a crop (excluding harvest and packing) are roughly equal for all crops – is violated.

The production costs were gathered on seven organic vegetable farms in five Northeast states. They are participating in the Northeast Organic Network (NEON; see www.neon.cornell.edu) project and were identified as being 'exemplary" farms. While these farms do not represent a random or even a "typical" sample, the results of the following analyses should provide a caution against relying too much on this shortcut measure of crop profitability.

Break-even Analysis

The first analysis measures the break-even revenue per pick and pack labor hour. It is calculated by taking the total production costs (direct variable costs like labor and inputs, plus overhead and indirect variable costs, including land, machinery, maintenance, marketing, etc.) and dividing by the total number of person-hours spent harvesting and packing. Farms that achieve this dollar per hour figure will exactly break even, i.e., will meet all costs but make no profit. A farm that fails to bring in this amount of revenue per hour will lose money; an amount greater than this figure indicates profit.

The following table (Table 1) shows the maximum, minimum and average break-even revenue figures for each of ten crops. Some crops have only two observations (data from only one farm over two years); others have up to eight. Note that, on average, only four crops (beet, carrot, onion, strawberry) would actually make money if the farmer only made $30/pick-pack hour. Five crops (Asian greens, lettuce, string beans, tomatoes and winter squash) would need, on average, to produce over $50/hour to break even.

Table 1. Summary of Break-even Revenues ($/hour)

Crop	Maximum	Minimum	Average
Asian Greens	75	35	55
Beet	21	17	19
Carrot	23	23	23
Garlic	38	28	32
Lettuce	75	15	54
Onion	27	23	25
Parsnip	53	29	41
Strawberry	17	13	15
String Bean	100	78	89
Tomato	195	24	85
Winter Squash	90	27	65

Finally, out of 42 data points (all farms, all crops), only 16 would have made money at $30/hr, while 26 would have lost.

Production Costs Before Harvest

The $30/hour rule assumes that the costs up to harvest are roughly equal on all crops; data from these seven farms call this assumption into question as well. For each crop on each farm, the harvest and packing labor costs were subtracted from production costs (inputs plus labor). The results were then compared across farms and across crops.

Looking at data from different crops over two years for the same farm, the differences in production costs before harvest are quite large. The costs differ from a minimum factor of 2.71 on one farm to a maximum factor of 10.89 on another. Clearly, costs before harvest are not roughly equal, even on the same farm. Looking at similar crops over different farms and years, the differences are much less pronounced. Four crops (beets, carrots, onions, string beans) vary by a factor of 1.2 or less. It is important to note, however, that analysis of each of these crops used data from only a single farm; these factors reflect the difference between two consecutive crops years on the same farm. Four crops (garlic, lettuce, tomato and winter squash) vary by a factor of 2.5 or more; these data all come from multiple farms.

Implications

Certainly, the $30/hour rule has some value. Proponents claim that it may help growers gauge how fast and efficiently the crew is working, as well as providing information on the prices they received. It may also work better for growers who do much of the on-farm labor themselves and have less out of pocket labor expenses. This analysis does suggest caution in relying too heavily on this rule. While this analysis uses data from a small number of crops and farms, the fact that so few would make a profit at $30/pick-pack hour is cause for concern. Furthermore, the key assumption of roughly equal costs for all crops before harvest is also questionable.

It is a daunting task to measure all costs across all crops on a diversified farm. However, reliance on quick but rough rules of thumb may lead to poor crop choices. Clearly, a measure in between these two extremes is in order. Here are some suggestions:

- Measure all costs for a handful of crops: perhaps select one you believe is a sure money maker, once you think may be less profitable, and
- Given that costs for a single crop on a single farm changed little over the two years, do a few in-depth measurements on different crops each year.
- Calculate the break-even revenue for the whole farm (total farm expenses divided by total pick-pack hours), measure this figure for a few select crops, and compare.

- Use, with some caution, published Enterprise Budgets from other sources. Full budgets from the NEON project will be available in a book to be published shortly. Vern Grubinger's Sustainable Vegetable Production from Startup to Market contains budgets for several crops; they were compiled several years ago, so some price adjustment may be needed. Organic vegetable budgets from Rutgers (New Jersey) and North Carolina State Universities are also available.

Forms (both paper and spreadsheet) to guide the measurement of small fruit and vegetable crops are available from Dr. Wen-fei Uva, Senior Extension Associate, Department of Applied Economics and Management, Cornell University.

"Smart Marketing" is a monthly marketing newsletter for extension publication in local newsletters and for placement in local media. It reviews the elements critical to successful marketing in the food and agricultural industry. Articles are written by faculty members in the Department of Applied Economics and Management at Cornell University.

Check out the NYSAES Tree Fruit and Berry Pathology web site at:

www.nysaes.cornell.edu/pp/extension/tfabp

Questions or Comments about the New York Berry News?

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WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, APRIL 25th, 2004

	Temperature				Growing Degree Days (*Base 50*)			Precipitation (*inches*)			
	High	*Low*	*Avg*	*DFN[1]*	*Week*	*YTD[2]*	*DFN*	*Week*	*DFN*	*YTD*	*DFN*
Hudson Valley											
Albany	91	35	57	8	50	66	45	0.31	-0.39	2.34	-0.16
Glens Falls	87	31	54	7	39	46	34	0.38	-0.32	2.03	-0.42
Poughkeepsie	89	39	59	10	69	84	52	0.6	-0.25	2.76	-0.1
Mohawk Valley											
Utica	79	34	53	6	34	45	25	1.4	0.56	3.3	0.31
Champlain Valley											
Plattsburgh	82	26	49	3	22	22	8	0.16	-0.54	2.8	0.46
St. Lawrence Valley											
Canton	75	28	51	7	30	32	22	0.07	-0.63	2.36	-0.01
Massena	76	27	51	6	31	31	19	0.15	-0.48	2.11	-0.11
Great Lakes											
Buffalo	76	38	55	8	40	62	42	0.71	0.01	3.38	1
Colden	76	38	54	9	34	43	33	0.91	0.03	3.73	0.56
Niagara Falls	73	39	55	7	38	54	30	1.15	0.41	3.44	0.79
Rochester	78	39	54	6	39	56	31	1.16	0.53	3.21	1.04
Watertown	74	30	53	7	35	38	26	0.61	-0.02	2.49	0.41
Central Lakes											
Dansville	78	38	54	7	38	47	25	0.99	0.29	3.74	1.38
Geneva	80	36	53	6	30	41	23	1.23	0.53	4.08	1.65
Honeoye	82	39	56	9	45	57	38	0.92	0.22	4.01	1.55
Ithaca	79	34	54	8	39	48	34	1.1	0.4	3.99	1.57
Penn Yan	78	36	55	8	45	60	42	1.34	0.64	4.09	1.66
Syracuse	80	36	55	7	43	55	32	0.79	0.02	3.29	0.51
Warsaw	77	36	51	8	31	40	33	0.74	-0.07	3.86	1.03
Western Plateau											
Alfred	78	38	55	10	41	50	40	0.98	0.23	3.77	1.17
Elmira	82	33	55	8	50	62	46	0.74	0.11	3.26	1.04
Franklinville	80	35	54	11	40	47	42	0.58	-0.2	3.67	0.93
Sinclairville	79	38	55	10	39	50	41	0.85	-0.06	3.65	0.46
Eastern Plateau											
Binghamton	81	34	54	7	40	58	44	0.69	-0.08	2.64	0.05
Cobleskill	83	31	53	7	36	44	32	0.35	-0.42	2.33	-0.42
Morrisville	76	33	50	5	15	22	13	1.06	0.29	3.5	0.94
Norwich	82	32	55	9	41	49	37	1.07	0.25	3.75	0.96
Oneonta	83	38	57	12	47	55	46	0.92	0.08	3.33	0.47
Coastal											
Bridgehampton	68	41	53	5	24	25	12	0.34	-0.57	8.18	4.86
New York	80	46	60	7	74	106	43	0.15	-0.76	3.33	0.18

1. *D*eparture *F*rom *N*ormal
2. *Y*ear *T*o *D*ate: 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.

WEATHER REPORTS OF TEMPERATURES AND PRECIPITATION THROUGHOUT NEW YORK STATE FOR WEEK ENDING SUNDAY 8:00am, MAY 2nd, 2004

	Temperature				Growing Degree Days (*Base 50*)			Precipitation (*inches*)			
	High	*Low*	*Avg*	*DFN*[1]	*Week*	*YTD*[2]	*DFN*	*Week*	*DFN*	*YTD*	*DFN*
Hudson Valley											
Albany	82	37	58	7	65	131	85	0.86	0.16	3.2	0
Glens Falls	81	32	54	4	51	97	67	0.61	-0.15	2.64	-0.57
Poughkeepsie	83	40	57	5	50	134	71	1.02	0.09	3.78	-0.01
Mohawk Valley											
Utica	82	32	55	5	59	104	61	0.59	-0.23	3.89	0.08
Champlain Valley											
Plattsburgh	85	31	54	5	58	80	48	0.14	-0.51	2.94	-0.05
St. Lawrence Valley											
Canton	79	33	54	7	46	78	52	0.4	-0.3	2.76	-0.31
Massena	82	34	55	7	54	85	55	0.47	-0.12	2.58	-0.23
Great Lakes											
Buffalo	76	31	54	5	48	110	66	0.66	-0.03	4.04	0.97
Colden	77	27	52	5	41	84	57	0.69	-0.15	4.42	0.41
Niagara Falls	77	28	54	4	47	101	52	0.61	-0.09	4.05	0.7
Rochester	80	30	56	6	57	113	61	0.45	-0.18	3.66	0.86
Watertown	79	32	55	7	48	86	57	0.57	-0.04	3.06	0.37
Central Lakes											
Dansville	79	28	53	3	46	93	47	0.62	-0.02	4.36	1.36
Geneva	83	30	56	6	57	98	57	0.15	-0.55	4.23	1.1
Honeoye	83	29	55	6	52	109	67	0.17	-0.5	4.18	1.05
Ithaca	82	31	55	6	56	104	72	0.34	-0.36	4.33	1.21
Penn Yan	81	31	57	7	58	118	77	0.61	-0.09	4.7	1.57
Syracuse	83	33	58	7	65	120	70	0.86	0.09	4.15	0.6
Warsaw	77	24	52	6	45	85	65	0.44	-0.33	4.3	0.7
Western Plateau											
Alfred	79	28	53	5	46	96	70	0.77	0.07	4.54	1.24
Elmira	82	28	55	6	54	116	79	0.48	-0.18	3.74	0.86
Franklinville	77	26	51	5	39	86	71	0.56	-0.21	4.23	0.72
Sinclairville	77	27	52	6	39	89	66	0.79	-0.1	4.44	0.36
Eastern Plateau											
Binghamton	77	28	54	5	51	109	76	0.74	-0.03	3.38	0.02
Cobleskill	82	32	54	5	51	95	66	0.77	0	3.1	-0.42
Morrisville	76	27	49	1	37	59	34	0.6	-0.17	4.1	0.77
Norwich	81	31	53	4	48	97	67	0.66	-0.15	4.41	0.81
Oneonta	84	32	56	9	61	115	90	0.92	0.01	4.25	0.48
Coastal											
Bridgehampton	63	36	52	1	18	43	12	1.37	0.46	9.55	5.32
New York	73	42	59	3	61	167	60	1.58	0.67	4.91	0.85

1. *D*eparture *F*rom *N*ormal
2. *Y*ear *T*o *D*ate: 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, MAY 10th, 2004

	Temperature				Growing Degree Days (Base 50)			Precipitation (inches)			
	High	Low	Avg	DFN[1]	Week	YTD[2]	DFN	Week	DFN	YTD	DFN
Hudson Valley											
Albany	75	36	53	-2	30	161	77	0.48	-0.26	3.68	-0.26
Glens Falls	74	28	50	-3	23	120	60	0.54	-0.23	3.18	-0.8
Poughkeepsie	82	35	54	-2	37	171	64	1.01	0.03	4.79	0.02
Mohawk Valley											
Utica	78	33	49	-5	20	124	47	1.15	0.37	5.04	0.45
Champlain Valley											
Plattsburgh	80	29	50	-3	27	107	46	0.43	-0.2	3.37	-0.25
St. Lawrence Valley											
Canton	79	26	48	-5	16	94	43	0.8	0.14	3.56	-0.17
Massena	82	27	49	-4	20	105	46	0.94	0.38	3.52	0.15
Great Lakes											
Buffalo	71	33	48	-6	13	123	45	0.99	0.31	5.03	1.28
Colden	74	30	48	-4	9	93	41	1.82	1.03	6.24	1.44
Niagara Falls	71	28	47	-7	10	111	24	1.05	0.39	5.1	1.09
Rochester	77	33	50	-5	20	133	42	0.59	0.01	4.25	0.87
Watertown	80	27	48	-4	16	102	48	0.81	0.25	3.87	0.62
Central Lakes											
Dansville	75	32	49	-5	14	107	26	1.93	1.3	6.29	2.66
Geneva	79	34	50	-4	16	114	40	1.62	0.99	5.85	2.09
Honeoye	78	32	51	-3	19	128	52	1.48	0.85	5.66	1.9
Ithaca	78	33	50	-3	18	122	61	1.58	0.88	5.91	2.09
Penn Yan	79	34	53	-1	29	147	73	1.54	0.91	6.24	2.48
Syracuse	82	37	52	-3	25	145	56	1.31	0.58	5.46	1.18
Warsaw	72	29	47	-4	8	93	50	2.28	1.51	6.58	2.21
Western Plateau											
Alfred	75	32	50	-2	18	114	62	2.04	1.34	6.58	2.58
Elmira	77	30	53	-1	34	150	81	1.91	1.21	5.65	2.07
Franklinville	75	29	48	-2	9	94	62	1.32	0.55	5.55	1.27
Sinclairville	76	29	49	-2	14	103	57	1.73	0.89	6.17	1.25
Eastern Plateau											
Binghamton	73	34	50	-3	20	129	65	1.59	0.87	4.97	0.89
Cobleskill	74	31	49	-4	17	112	57	1.11	0.34	4.21	-0.08
Morrisville	72	25	46	-7	9	68	18	1.34	0.56	5.44	1.33
Norwich	74	32	49	-4	14	111	53	1.35	0.51	5.76	1.32
Oneonta	78	34	52	2	27	142	93	1.11	0.15	5.36	0.63
Coastal											
Bridgehampton	79	33	54	2	34	77	16	0.73	-0.17	10.28	5.15
New York	83	44	58	-1	61	228	60	0.56	-0.35	5.47	0.5

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