Weekly Update

Using Your Sprinkler System to Protect Blueberries from Freezes

By E. Hanson and M. Longstroth, Michigan State University, edited by CLS

Blueberry growers can protect against spring freezes by using sprinklers to reduce damage to blueberry flowers. Sprinklers are used near bloom time when the flowers are visible and the lows are forecast to be in the upper to mid 20’s. Unless your system is specifically designed to provide a lot of water in a short period of time it is doubtful that it will protect below 24°F. Understanding how your irrigation system works allows you to protect your fruit, but sometimes turning on the system will cause more damage than leaving it off because buds jacketed in dry (not wet) ice can become much colder than the air due to evaporation from the ice.

How Sprinkler Freeze Protection Works

It seems counterintuitive that you can protect plants with ice but the system works because water, when it freezes, gives up heat to the environment. This is just the opposite of when you need to add heat to melt the ice. If the ice is wet, the water on the outside is freezing, the ice on the inside is melting and the temperature inside the ice is 32°F. As long as we keep the ice wet we can keep the temperature in the ice at freezing. This is warmer than the cold temperature that will cause damage, which is usually in the high 20’s at around bloom time.

Know how much protection your sprinkler system can provide

Your system's irrigation rate and uniformity determine the freeze protection the sprinkler systems can provide. More water is needed to protect at lower temperatures and higher wind speeds. Most systems in Michigan are designed to deliver 0.12 to 0.15 inches of water per hour. These systems can protect to 22°F under very still conditions.

Brown Marmorated Stinkbug Traps set Throughout the Capital District

The CDVSFP is setting traps to monitor Brown Marmorated Stinkbug, an invasive new pest that attacks everything from sweet corn to tomatoes and raspberries, across our region. We have three black light traps, indicated in yellow on the map at the left, to attract adult stinkbugs, and 9 Tedder traps, which contain a pheromone that attracts nymphs. Traps will be checked weekly, assuring timely alerts for growers. Besides trapping for these insects, we will be monitoring crops for damage caused by them. A handful of BMSB’s have been found in the Capital District already; stay tuned for more information on their spread and on control and exclusion options. –CLS

The map on the left indicated counties in the CDVSFP in gray, and traps are white (Tedders) or yellow (blacklight).

“Serving the research and educational needs of vegetable and small fruit growers in Albany, Columbia, Fulton, Greene, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, & Washington Counties”
Organic Agriculture in New York

By Brian Henehan, Senior Extension Associate, CCE:
Organic agriculture represents a growing segment, albeit small, of production and food processing in New York State. To gain a better understanding of what opportunities might yet be available to New York farmers and processors, a three year research project is looking at opportunities and barriers to growth of organic agriculture in New York. The first phase of the project was to document current organic agricultural production in New York.

In the Dyson School of Applied Economics and Management, Brian Henehan and Jie Li have compiled and released the most recent and most complete statistics about organic production in New York State published in a Dyson School Extension Bulletin titled Organic Agriculture in New York State, Which is available online at: http://www.aem.cornell.edu/outreach/extensionpdf/2010/Cornell-Dyson-eb1013.pdf.

The authors acknowledge the National Agriculture Statistics Service (NASS) which collected this extensive data as well as the dedicated organic farmers who were interested and responded to the survey. In New York, 1,577 surveys were mailed to certified, exempt, and transitional organic farmers. An impressive 1,412 surveys were returned reporting on 2008 farm production and information.

The organic crops and farm products with the highest sales from certified and exempt farms are listed in the following table. Given the significant role dairy farming plays in New York agriculture, it is not surprising that four out of the top five farm crops or products include milk and dairy cows, hay and haylage, corn for grain or silage and soybeans. Vegetables, potatoes and melons ranked third on the list.

Organic farmers were fairly optimistic about their future with 37% reporting that they planned to increase their organic production. Despite the impression that organic farmers sell direct to consumers, the largest portion of reported sales (39%) was to processors, mills, or packers, then to grower cooperatives (17%), direct to consumers (15%), and then distributors, wholesalers, or brokers (12%). More than half (58%) of their “first point of sales” were made locally, within 100 miles, and almost all (92%) within 500 miles. This sales pattern could be explained by the large share of sales from organic milk production, the largest contributor to organic sales in the state.

There are a number of programs and projects at Cornell University focusing on organic food and agricultural production. Faculty and Extension personnel at the College of Agriculture and Life Sciences as well as at the Agricultural Experiment Stations (both at Cornell and in Geneva), the Homer C. Thompson Research Farm, and the Organic Program Work Team comprised of Cooperative Extension, faculty and practitioners are expanding knowledge about organic production and food processing. A summary of Cornell-led projects can be found online at: http://www.cues.cornell.edu/cals/cuaes/organic/

Although organic agriculture and food processing represent a small share of total production in New York State, there may be opportunities for farms or businesses to tap into this approach to agriculture and food production. The final two phases of the research project will focus on food and beverage manufacturing and the forecast for consumer demand.

Organic Agricultural Products Marketed from Certified and Exempt Farms in New York State

<table>
<thead>
<tr>
<th>Rank</th>
<th>Crop/Product</th>
<th>Total Certified &amp; Exempt Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Milk &amp; Dairy Cows</td>
<td>$62,615,402</td>
</tr>
<tr>
<td>2</td>
<td>Corn for grain and silage</td>
<td>11,343,944</td>
</tr>
<tr>
<td>3</td>
<td>Vegetables, potatoes, &amp; melons</td>
<td>9,463,516</td>
</tr>
<tr>
<td>4</td>
<td>Hay &amp; Haylage</td>
<td>6,156,169</td>
</tr>
<tr>
<td>5</td>
<td>Soybeans</td>
<td>4,607,897</td>
</tr>
<tr>
<td>Total</td>
<td>Top 5 Farm Products</td>
<td>$94,186,928</td>
</tr>
</tbody>
</table>


Websites of Interest

Diagnose pest and disease problems using color pictures: http://vegetablemdonline.ppath.cornell.edu/

Cornell Guidelines for fruit and vegetables: http://www.nysaes.cals.cornell.edu/recommends/

Cucurbit Downy Mildew forecast: http://www.ces.ncsu.edu/depts/pp/cucurbit/

USDA Fruit and Vegetable Market News: www.marketnews.usda.gov/portal/fv

Fungus Gnats and Shoreflies in Greenhouses

We have been getting calls from greenhouse growers who have little black “flies” around the plants. This description may allow us to narrow the culprits down to two pests, but from there careful identification is the key to determining control measures.

If the “flies” are thin, like mosquitoes:
You might be dealing with fungus gnats. These gnats are quite delicate, with long legs and antennae. They often fly in a zig-zag pattern, but it may be easiest to ID them off of your sticky traps, where you can get a good look at the features. Besides their overall thin-ness, look for a “Y” pattern on the wings.

If the “flies” look more like tiny houseflies:
You are probably dealing with shoreflies. These insects are much stockier, with fat bodies and shorter legs. They also have white marks on their wings, which are absent from the wings of fungus gnats.

Damage to plants:
One reason correct identification is key is because shoreflies do not actually cause any damage to your plants. Even if you see small white larvae in the potting soil (especially of very moist plants) there may not be any cause for concern. Larvae of shoreflies feed on algae, not plant roots. Fungus gnats generally like wet soils and can be worse in soil mixes that are heavy and hold a lot of water. This season’s fairly overcast weather has left soils particularly wet this spring. If using a compost based potting mix, you might want to consider adding a little extra perlite to the mix to improve the drainage. This addition may mean that you have to water more frequently, but in general your fungus gnat problems should be less and your plants might appreciate it as well. –CLS and CDB

Monitoring is the key:
To determine trends of populations of either pest, you can use yellow sticky cards, changed once a week.

Gnat control: Bacillus thuringiensis var. israelensis, sold under the trade name of Gnatrol, is most effective against the young first instar larvae. The bacteria must be ingested by the larva, after which a toxic protein crystal is released into the insect’s gut. Larvae stop feeding and die. Gnatrol is only toxic to larvae for two days. Repeat applications, i.e. two or three applications at high rates, may be needed to provide effective control.

Late Blight Found on Greenhouse Tomatoes in CT

By Dr. Meg McGrath, LIHREC

Infected potato seed is likely the source of the pathogen for this outbreak of late blight detected last Friday, although the seed pieces reportedly looked okay. However, it can be difficult to detect infected potato seed. There may be very limited symptoms, especially with the new strains (genotypes) like US-22 that are more aggressive on tomato than potato and are less aggressive in tubers than US-8, which has been the main strain occurring in potato. And there are often other diseases present, including Pythium, soft rot or dry rot. There is thought to be a higher risk for potato seed with a tomato strain of the late blight pathogen to develop foliar symptoms because sprouts are less likely to be killed than with a more aggressive potato strain.

During spring 2010 late blight also developed around this time on tomatoes in greenhouses and high tunnels in a few locations in the region. Nearby plantings of potato were suspected as being the source of the pathogen for these outbreaks. Source plants were not found; however, in a potato crop it is very difficult to find plants with symptoms resulting from the pathogen being in their seed and thus that are the sources of a late blight outbreak. So far this season there have been reports of late blight in potato seed in WA, MI, and WI. This ‘obligate’ pathogen is thought to only be able to survive over winter in potato tubers in areas where there are not living plants throughout the winter (e.g. southern FL). The only other way it could survive over winter in the north is by reproducing sexually and producing its thick-walled oospore; fortunately at this time the pathogen’s two mating types are not known to

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Tomato plants as well as potatoes should be inspected for symptoms of late blight routinely and thoroughly throughout this season beginning now. When suspect symptoms are found, immediately notify one of the CDVSFP specialists and promptly submit samples of symptomatic tissue enclosed in a plastic bag.

Late blight is considered a community disease because of the ease with which the pathogen can spread among crops and its devastating potential. Therefore sharing information about late blight occurrence is critical. Samples are also needed for a national project investigating various aspects of late blight including occurrence of the genotypes. A preventive fungicide program is recommended for late blight.

Transplant Height and Hardening Off

By Michelle Infante-Casella, Rutgers. At this time of year growers are anticipating planting vegetable transplants in the field. Greenhouse and outside weather factors can contribute to transplant growth and quality, and when plants can get out into the field. Transplants may be at the perfect growth stage to plant into the field, but if reoccurring rains (what rains???) prevent field preparation or the ability to get into a prepared field to plant then transplants need to be held. Holding back plants and preventing them from getting too tall can be a challenge. In some crops plant growth regulators can be used. However, in vegetable crops there are few growth regulators labeled or that work well, and in some cases these products may continue to restrict growth in the field.

Perhaps a safer way to control height is using the DIF method (the difference between day and night temperatures in the greenhouse). In most greenhouse heating programs the greenhouse will be much hotter in the day than in the night. The greater this difference the more the plants will stretch and grow tall. By reducing this temperature difference or even by reversing it to have higher night temperatures you can greatly reduce stem elongation. The critical time period is the first 2-3 hours after sunrise. By lowering temperatures to ~55 degrees Fahrenheit for the first 2-3 hours of daylight, starting just before dawn and then going back to 60-70 degrees Fahrenheit for the rest of the day can keep plants shorter and stockier. This method does not work well for all transplants and is mainly for controlling height in tomato transplants.

Another method is mechanical movement of plants by brushing them over the tops two times a day with a pipe or wand made of a soft or smooth material. Be careful to gently do this so not to damage softer plants like squash, cucumber and pepper. Reducing watering and fertilizer is also a method in controlling plant growth. However, be sure not to reduce water or fertilizer so much that it causes plant injury. Besides reducing growth, limiting watering and fertilizer just before planting is part of the hardening off process.

When hardening off vine crops, tomatoes, peppers, or eggplants, do not lower the temperatures for hardening more than 5 degrees Fahrenheit below the recommended minimum growing temperature. Tomato, pepper, broccoli, cabbage and cauliflower are best hardened off at temperatures around 60 degrees Fahrenheit. Cucumber, squash, melon, and eggplant are best hardened off at around 65 degrees Fahrenheit. Cold tolerating transplants like lettuce can be hardened off at temperatures as low as 40 degrees Fahrenheit. Even though cole crops like broccoli and cauliflower survive cold temperatures, they should not be hardened right away to cold temperatures after leaving the greenhouse to prevent bolting and buttoning of the crop later during head formation.

Capital District Vegetable and Small Fruit Program is on Facebook-Become a Fan!

Everyone is working to take advantage of the many media outlets available now, and we’re trying to make sure we stay with the times too! We have created a Facebook page to communicate with growers, stakeholders, Master Gardeners, and other Extension personnel. We will be posting useful information about disease and insect outbreaks in our area, sharing other pages or links that might be of interest, and fielding questions. We will also be working to show agriculture in its best light here in the Capital District. If you don’t have Facebook, don’t worry! You will always receive the most thorough information here in the newsletter. –CLS
but only to 26°F if there is a slight breeze (2-4 mph). If you do not know your delivery rate, catch water in 6 to 8 cans placed on the ground throughout the planting.

Most systems cannot easily be changed to deliver more water and protect to lower temperatures. Increasing the operating pressure is not advisable because the volume is not increased substantially (increase from 60 psi to 80 psi may provide only 15 percent more water). Higher pressure can also break lines. Higher pressures also generate considerable mist and changes the uniformity of application.

Larger nozzles can be installed in some systems but only if the capacity of the main-lines, well and pump can handle the added volume. For example, 9/64-inch nozzles that deliver 0.12 inches water per hour require 60 gallons per minute per acre. Switching to 5/32-inch nozzles would deliver 0.15 inches per hour but require 68 gallons per minute per acre. Even if systems can provide adequate volume to protect from temperatures in the low 20's, breakage from ice accumulation can be considerable.

**When to attempt frost protection**

Blueberry flower buds and flowers become more sensitive to cold as they develop. Swollen but closed flower buds tolerate 15° - 20°F. At tight cluster or early pink bud (individual flowers are visible but still tight in bud), injury will occur between 18° and 23°F. Once flowers have separated from one another but the corollas (petals) are still closed, 22° - 25°F may be lethal. By the time the corolla is half their full length, they are damaged at 25° to 26°F. Fully open flowers are killed at 27°F. The most sensitive stage is just after the petal fall, when 29°F may cause damage.

Dr. Mike Mainland from North Carolina State University provided a useful rule of thumb during a workshop in 2003. He suggested not even attempting frost control until at least a few flowers are open. He reasons that most flowers are tight enough to tolerate 22°-24°F until the first flowers open, so protecting before the first bloom is not useful. This rule of thumb is especially useful when there is a wide difference the emergence of buds on a shoot. If most of the flower buds on a shoot are terminal (at the end of the shoot) and are opening at the same time, then you might want to frost protect in late pink bud. But there is no reason to try and protect flower buds at temperatures below 23° or 24°F.

Another consideration is wind. Don't attempt to frost protect if the combination of wind and temperature will exceed to capacity of your system to protect. Dr. Mainland suggested studying the weather forecast closely, and hanging colored flagging in the field to indicate wind strength.

**How early in the evening should I start irrigating?**

When irrigation begins, air temperatures drop due to evaporative cooling. The amount of cooling depends on the relative humidity. If the air is very dry (dew point 15° – 20°F), start the irrigation when the air temperature drops to 36°F. If the relative humidity is high (dew point above 24°F), start irrigating when air temperature falls to 34°F.

**When can I stop irrigating?**

Stop irrigating when the ice is melting and temperature is rising. Ice breaking free from branches indicates water is forming under the ice and it is likely safe to quit. Normally this is when temperatures are above freezing and rising. Beware of sudden dips in the temperature soon after sunrise.

**Soil surface considerations**

Some frost avoidance can be gained by keeping the soil surface clean of vegetation, moist and packed. Moist soils have a large capacity to capture and store heat energy during sunny days, and release heat to maintain air temperature during cold nights. Weeds, sod, and plant residues insulate the soil from the sun and reduce heat capture. In addition, tall grass and weeds raise the effective ground level. This is important since cold air is heavier than warm air, and settles along the ground and in the lowest areas of fields. If fields are covered with foot tall grass or weeds,

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flower buds a foot higher in the canopy may be injured during a frosty night. Mowing fields with tall weeds is worthwhile.

Another consideration is that moist soils have a higher heat capacity than dry soils, and packed soils absorb more heat than recently cultivated soils. It is not worthwhile to cultivate just before a frost. Some growers attempt to irrigate during the day prior to predicted frosts in order to increase the water content of the soil. Wet soil will absorb more heat. This may be of some value if water is applied early in the day, and there is ample sun to warm the wet soil. Irrigating late in the day or on cloudy days will not increase soil temperatures and provide more heat at night. The bottom line is that clean, moist, and packed soil surfaces absorb the most radiant energy during the day, and protect from frost by releasing this heat during the night.

### Upcoming Meetings and Notices

Organic Field Days, June 1st, Washington and Schoharie Counties. Join Dr. Thomas Bjorkman and Elizabeth Dyck as we tour two farms using cover cropping extensively in their rotations. We will discuss ways to increase cover crop use in your rotation, ways to control cover crops, and the effects cover crops have had on the health of soils on these farms. More details will be included in next week’s Weekly Update.