Integrated Cranberry Crop Management for Wisconsin

Cranberry
Crop Management Newsletter

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UW Extension Cooperative Extension

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This Issue:

ANOTHER ST. JOHNSWORT TO WORRY ABOUT. . .

Jed Colquhoun
UW - Extension Fruit Crops Weed Scientist

Just when you thought there were enough St. Johnswort species to worry about in cranberries, we have one more to add to the list: Pineweed St. Johnswort (*Hypericum gentianoides*), also known by the common name orange grass. While this plant is neither a pine nor a grass, these common names describe the appearance and odor. In general, the plant loosely resembles a young pine, and when crushed has a faint orange or peach odor. Pineweed is a native annual distributed across the eastern half of the U.S., including central and southwestern Wisconsin.

This plant has other distinguishing characteristics and is quite unique in appearance. Small, wiry stems have multiple branches near the top of the plant. The leaves are tiny, scale-like and opposite on the stem. Small, single yellow flowers with 5 petals terminate the vast majority of branches and resemble those of other St. Johnswort species. The flowers appear in mid-summer to early fall and produce dark red fruit capsules in fall. The plant grows to about the height of the cranberry vines.

While this plant is rather sparse in structure, when in dense populations it can be somewhat competitive. It prefers sandy, moist soils such as found in a cranberry bed. We are hearing just a few reports of this plant in cranberry beds this year, but this is the time to keep an eye out for it and remove the few newcomers before they spread to the point where the weed becomes more problematic. ❖❖❖

Pineweed
Hypericum gentianoides
Clusiaceae [=Hypericaceae]
(St. John's Wort) Family

UNDERSTANDING FROST AND FROST PROTECTION

Rebecca Harbut

UW - Extension Fruit Crops Specialist

So…it is 2 am and here I am sitting in my van on the marsh experiencing my first night of watching frost. I came fully prepared with a thermos of coffee, my sleeping bag and a van full of data logging equipment. It is really quite exciting…like a scientific stake out waiting for the answers to emerge from the night. We are logging temperatures during frost events on cranberry beds that are under cycled frost protection so that we can track the fluctuations in temperature that occur as the water turns on and off. (Thanks to Joe Lord for providing us with the cycling system and his expertise! And thanks to Kurt Rutlin for letting us use his beds!)

Since I am feeling inspired (and I need to kill some time) I thought I would write an article about frost and some of the important factors involved in frost protection.

As the cranberry plant develops during the season, the ***critical temperature – the temperature at which buds and/or other plant tissue can be killed,*** increases as the bud stage advances. Therefore, the first step in frost protection is determining what bud stage you are at and decide what temperature you are willing to go to (See 'Frost Hardiness of Cranberry Plant' Publication).

Effect of Dew Point During Frost Events

Example 1: Air Temp = 35°F, Dewpoint Temp=33°F

- Temperature will drop quickly until it reaches 33°F when condensation will form on the buds.
- Heat of condensation will compensate for some radiative heat loss and slow the rate of cooling

Example 2: Air Temperature =35°F, Dewpoint= 27°F

- Temperature will drop quickly until it reaches 27°F
- Damage to buds can occur quickly, so protective measures must be started earlier

Radiation Frost. Frost typically occurs on a clear, calm night which allows the development of an inversion layer which is characterized by cold air that settles in the bed and becomes warmer until you reach the 'inversion layer' where the temperature gradient is reversed and temperatures get progressively colder as you increase in altitude. The inversion layer is typically around 40-70 feet about the ground. Frost protection with wind turbines or forced air displacement systems are based on the idea of either 'pushing' the warm air at the inversion layer down or forcing the cold air up. During a frost event, the plant tissue is warmer than the air, so the tissue 'radiates' heat to the surrounding air and will progressively get colder and if air temperatures are colder than the critical temperature, the tissue will be killed.

Advective Frost/Freeze. This type of frost/freeze occurs when a cold air mass moves through an area and is accompanied by strong wind. It is difficult to protect a crop under advective freeze conditions.

Importance of Dew Point. The rate at which the bud temperature drops will be relatively fast until the temperature reaches the ***dew point*** **– the temperature at which condensation of the water vapor in the air first occurs.** The reason that bud cooling slows down when the dew point is reached is due to the release of heat that occurs when condensation is formed. This heat release compensates for some of the radiative heat loss slowing down the rate of cooling. So why is the dew point so important to watch? If the dew point is below your critical temperature, the buds will reach the critical temperature very quickly, and so protective measures must be accurately timed as damage can occur quickly. Under these conditions the white crystals typically seen during a frost may not form as there is no condensation at the freezing point, this is often referred to as a 'black frost'. If the dew

Continued at Understanding Frost on page 3.

WHEN HAIL HAPPENS

Patty McManus

UW-Extension Fruit Crops Specialist

and

Lindsay Wells, UW Graduate Student

After a mid-to late-summer hail storm, should you spray a fungicide to protect berries from fruit rot pathogens? Just about every year this question arises, and we have generally discouraged growers from spraying. Our reasoning is two-fold. First, Teryl Roper did an experiment in which he "dinged" detached berries and then sprayed some and left some not sprayed. He found no benefit from fungicides. Second, fruit rot pathogens mostly infect during bloom and early fruit set stages, so they are firmly entrenched and out of reach of fungicides, especially since fungicides registered on cranberry are mostly protective and not systemic in activity. Still, it's always bothered us that except for Teryl's non-replicated, picked-berry experiment, we don't have research to support our recommendation.

Therefore, we began research on this question last year and are continuing in 2011. In some experiments, we are simulating hail by blasting pea gravel at berries in the field. But we would also like to test the effect of fungicides following a natural hail event. If you suffer hail and would be willing to let us set up a small trial (about 8 x 12 ft) or two on your marsh, it would provide data valuable to the entire industry and to a graduate student working on her degree!

Alternatively, if you get hail and decide to spray a fungicide, it would be great if you could mark off a small area or two to leave NOT sprayed. Then, just before harvest, we could sample from the sprayed and not sprayed areas to see how the fungicide performed.

So, if hail strikes, and you are willing to help us with this research, please contact Lindsay Wells (graduate student) at 609-354-8645 (yes, that is 609, not 608) or ldwells@wisc.edu. The sooner after the event that you contact Lindsay, the better. Thanks for keeping us in mind. Although we hope to hear from someone, we hope it's someone else and not you! ❖❖❖

Continued from ***Understanding Frost*** *on page 2.*

point is above the critical temperature, the buds will approach the critical temperature more slowly so you have some more time to make decisions.

Irrigation. Applying water to protect the crop from frost is commonly used in cranberry and other fruit production. The principle of protecting the crop through irrigation is based on the *latent heat of fusion – the heat released during the transformation of liquid water to ice.* The transformation of one gallon of liquid water at 32°F to ice at 32°F releases 1200 BTU of heat. It is the release of this heat that maintains the plant tissue at 32°F and prevents the tissue from freezing. Colder temperatures will require more water in order to provide enough heat to protect the crop.

When to Start Irrigating. The general recommendation for fruit crops is to start the system when the temperature is 4°F above the critical temperature. When the irrigation is turned on, the application of water on the plant tissue causes a short term 'dip' in tissue temperature due to evaporative cooling (the same principle used to cool the crop during hot days). Therefore, it is critical to turn the irrigation on before you reach the critical temperature to ensure that the 'dip' caused by evaporative cooling does not result in the tissue temperature going below the critical temperature. A 'wet bulb' temperature can be a better indicator than the 'dry bulb' (standard thermometer) temperature of when the irrigation should be turned on.

Calibrating Thermometers. Your ability to accurately protect against frost relies on accurate thermometers. It is therefore important to calibrate your thermometers. This is easily done by placing your thermometers in a container of ice water. The temperature should read 32°F, if the thermometer is reading higher or lower, note the 'offset' and write it directly on the thermometer so you can adjust the temperature reading in the field. ❖❖❖

OBSERVATIONS FROM THE FIELD

Theresa Cira
Lady Bug IPM, LLC

Hello, my name is Theresa Cira. I am working with Lady Bug IPM this summer as well as Shawn Steffan and his crew. I graduated from UW Madison two years ago with my bachelor's degree in entomology and that is where I got my start working with cranberries. I helped Merritt Singleton and Dan Mahr for a summer and loved it! I hope that this summer I can write a few interesting and informative articles about insects for the newsletter. I would like to let you know what insects are out in your marsh, what they are doing, and why they are there.

It may seem like a never ending war when it comes to insects but not all the insects in your cranberry beds are pests. Cranberry vines can provide a safe habitat for many non-harmful insect species and for those insects that live part of their life in water the moist environment of a cranberry marsh is perfect for them. The following are some profiles of insects that have been found the last few weeks in cranberry beds around Wisconsin.

Figure 1. *Click Beetles*

Click beetles (Coleoptera: Elateridae) are very common small brown or black beetles. Their body is elongate and is covered with a hard shell. They get their common name from the ability to flip over when they are upside down. The beetle will bend and "click" their body until they have righted themselves and can crawl away. The immature click beetles are known as wireworms and they live in the soil. They look much like meal worms and can be agronomic pests in other crops such as corn and soybeans where they feed not only on plant roots but also on seeds before and after germination. So far they are not known to cause economic damage to cranberry vines.

Figure 2. *Wireworm*

Midges (Diptera: Chironomidae) are most commonly mistaken for mosquitoes. They are the "green mosquitoes" you will see flying around all summer. The adult midges have small delicate legs and wings much like a mosquito but can be a variety of colors from green to dark grey to iridescent blue. An important difference between mosquitoes and midges is that a midge does not have a proboscis, the sucking mouthparts that female mosquitoes have, so midges cannot bite humans. It is not even necessary for the adults to feed at all. The males often have hairy or plumose antennae. Sometimes large mating swarms of midges will be seen in spring and summer. The immatures of this group are very small red worm like animals that live in water and are an important part of many aquatic ecosystems. For the most part, they are scavengers helping to cycle nutrients and some species are even able to survive in polluted waters breaking down certain pollutants.

Observations From the Field *continued on page 5*

References to products in this publication are for your convenience and are not an endorsement of one product over similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

Observations from the Field *continued from page 4*

Figure 3. *Midges*

Crane flies (Diptera: Tipulidae) are sometimes thought to be gigantic mosquitoes and that is really what they resemble. These flies, however, cannot bite and often only live a few days as an adult. If the adult feeds at all it is thought to be on nectar, but in their short adult lives most crane flies only mate and die not even bothering to eat. Crane flies come in a variety of colors from amber-brown to black and white. The immature crane flies are legless worm like creatures with leathery like skin, usually found in moist or wet environments they are helpful in the decomposition process.

Aphids (Hemiptera: Aphididae) are very tiny insects that can be a variety of colors. Yellow, orange, and dark grey aphids have all been observed in cranberry beds this May. They are found congregating in large groups on the plants which they feed on. Immature aphids look like smaller versions of the adults but only adults will sometimes have wings. Aphids are able to reproduce parthenogenetically, meaning no male is involved and eggs develop without being fertilized. Some species of aphids damage crops with their feeding or by vectoring a plant disease; however, they are not known to be a pest in cranberry.

Figure 4. *Crane Flies*

Figure 5. *Aphid*

Figure 6. *Aphids*

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