



Cranberry Station Newsletter

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UMASS CRANBERRY STATION

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Why fungicide resistance management is more important than ever

In 2014, the European Union (EU) decreased the allowable amount of chlorothalonil (e.g., Bravo®) residues on cranberry fruit. The new cranberry Maximum Residue Level (MRL) of 0.01 ppm (previously 2.0 ppm) is effective this growing season and **it essentially eliminates the use of chlorothalonil as a fruit rot control option for export-certified fruit**. It is very important that you communicate with your fruit handler before making any chlorothalonil applications and confirm whether the new MRL affects you.

Grower survey data collected in our 2014 meeting revealed that last year, approximately 89% of growers (n=91) made at least one chlorothalonil application for fruit rot control. This means that in order to comply with the EU MRL, many MA growers will have to reexamine fungicide alternatives in bogs with a history of high fruit rot incidence. Fungicide efficacy field trials in Massachusetts have consistently ranked chlorothalonil and mancozeb as the most effective chemicals available against fruit rot, followed closely by Proline®, and Indar™ in combination with Abound®. Ferbam and copper fungicides are not nearly as effective and should not be the foundation in a fruit rot fungicide program. With such few chemical tools left in our fruit rot management toolbox; this new MRL highlights yet again, the importance of proper bog management and cultural practices that avoid plant stress.

Moreover, this change will likely result in an increased use of newer fungicides (Proline®, Indar™, and Abound®). These products are considered less harmful to human and environmental health, but overreliance on these chemicals and improper use can accelerate the development of fungicide-resistant pathogen populations. Fungicide resistance is defined as a reduced sensitivity in fungal populations to certain fungicides and once resistant pathogen populations build up in a field, fungicide applications may provide very little or no disease control. In contrast to older fungicides with a **multi-site mode of action** (e.g., chlorothalonil and mancozeb), **single-site mode of action** fungicides like Proline®, Indar™, and Abound®, pose a much higher risk of selecting for fungicide-resistant pathogens. In order to preserve the effectiveness and durability of these fungicides it is **CRITICAL** to incorporate several or all of the fungicide resistance management strategies listed below:

- Follow ALL label instructions, including application interval and recommended rate. Never use less than the lowest recommended rate on the label.
- Alternate or mix fungicides with different modes of action and FRAC codes.
 - Use FRAC codes on labels to determine mode of action. Same FRAC codes indicate that fungicides have the same mode of action. For example, Proline® and Indar™ have a different trade name and active ingredient, but they have the **same** mode of action and FRAC code (3).
- For best fruit rot control and fungicide resistance management, mix Abound® with Indar™ or Proline®.
- Apply Indar™/Abound® and Proline®/Abound® during the early to mid-bloom period and use multi-site contact fungicides (chlorothalonil or mancozeb) in later applications.

Weed Control for Spring 2015!

As of this writing, most bogs should be clear of snow cover. Once the bogs have dried out, it's time to think about applying preemergence herbicides. Casoron and Devrinol are the most common spring preemergence herbicides. Evital is also used in the spring, but is less common. If your vines look weakened, applying Casoron or Evital may intensify vine stress. Devrinol is the "easiest" on the vines compared to the other herbicides. QuinStar may be handler-restricted; be sure to check with your handler before using.

Devrinol. Devrinol is now sold as a dry flowable formulation (DF-XT) and as a liquid formulation (2XT). Devrinol 50-DF is still legal to use and may still be in the pipeline, but UPI is phasing out this formulation. You can split your Devrinol applications and use different formulations in the same year but you cannot exceed the rate limits. If applying to peat beds, do not exceed 18 pounds/A or 18 quarts/A (depending on which product you use). When applying to sand beds, do not exceed 12 pounds/A or 12 quarts /A. You can apply combinations of the two formulations but only do 18 total UNITS of Devrinol. Devrinol works best when applied to a weed-free surface. Weeds listed on the label include nutsedge, rice cutgrass, and purple beggarticks. 24-hr REI.

Casoron 4G. Casoron will control annual grasses and some broadleaved weeds. See the Chart Book or a label for the list of more than 40 weeds that can be found on many cranberry bogs. If you are using Casoron for broadleaf control, rates of at least 60 lb/A are needed, otherwise you are really wasting your money and time. Spring applications of Casoron (80 lb/A) did suppress Poverty grass in demonstration-style plots. Do not exceed 100 lb/A total for Casoron in a 12-month period. 12-hr REI.

Evital 5G. Using demonstration plots, we found good control of Poverty grass using spring applications of 80 lb/A Evital. Growers have also reported good control using about 60 lb/A. Evital can be a little tougher on the vines when applied in the spring, but we have found yields were not depressed even when we saw symptoms. However, if your vines are stressed from the winter and snow, Evital may be more likely to cause injury. 12-hr REI.

QuinStar. QuinStar can control dodder, yellow loostripe and other broadleaf weeds and some grasses. If you are using QuinStar, make sure you are using product with an up-to-date label. The supplemental label expires June 23, 2015 but the manufacturer has transferred the supplemental information into the master label. Newer product has the following code: AD022013/051811. 12-hr REI. Allow 30 days between applications.

Moss control. If you want to do sphagnum moss control, applications of iron sulfate are made in the spring once the bog is dry. Ammonium sulfate works on haircap moss. Casoron can be effective against both haircap and Sphagnum, but you must use high rates (90-100 lb/A). Casoron is better against Sphagnum when applied in the fall. As always, be careful applying Casoron to vines that look stressed! Evaluate the state of your vines before making any herbicide application.

Make sure that the weeds you have out on the bog will be controlled by the herbicides you are applying. If you are in doubt, take pictures and email them or bring in samples for ID. This is the best way to manage your money and your weeds!!

Hilary Sandler

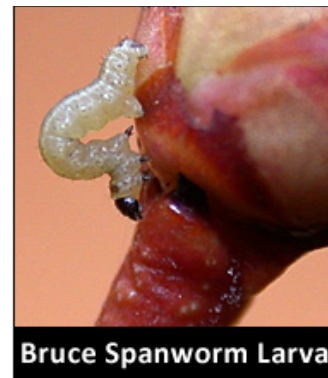
Winter Moth Basics for 2015

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Winter Moth (*Operophtera brumata*): This is a new and important pest of cranberry and other fruits in Southeastern New England. Moths emerge from the soil usually in late November and may be active into January. The male moths are light brown to tan in color and all four wings are fringed with small elongate scales that give the hind margins a hairy or fringed appearance. The female is gray, almost wingless and cannot fly. Winter moth caterpillars are pale green caterpillars with a white longitudinal stripe running down both sides of the body. They are “loopers” or “inchworms” and have just 2 pairs of prolegs. At maturity, the caterpillars will be approximately 1-inch long, whereupon they drop to the soil for pupation. Pupation occurs from late May into early June.



Winter Moth Larva



Bruce Spanworm Larva

Life Cycle: After mating, the female deposits eggs loosely in bark crevices, under bark scales, or elsewhere. Adult moths then die and the eggs over-winter. Eggs are dark-colored at first but turn orange within 3-4 weeks. In late-March or early-April, **just prior to hatching, they turn red and eventually a deep, shiny blue.** Eggs hatch when temperatures average around 55°F. **It is believed that egg hatch in MA occurs when approximately 177 to 239 growing degree days (GDD) above a base of 40°F (starting Jan 1) have accumulated,** which is historically during the second week in April. After hatching, the larvae begin feeding.

See <http://www.yourweekendview.com/outlook/agriculture/growing-degree-days/> to calculate the GDD for your location. Good bio-indicators are flowering red maples. **Models suggest that we will reach egg hatch after April 15, 2015.** GDD accumulation will be posted on the UMass Cranberry website.

Damage: Caterpillars feed within both flower and foliar buds. Once a bud has been devoured from within, the caterpillar will migrate to other buds and repeat the process. Destruction of the flower buds leads to greatly diminished harvest on fruit crops. Older larvae feed in expanding leaf clusters and are capable of defoliating trees and other plants, when abundant.

Management: Scout bogs early for winter moths larvae! Winter moth larvae are likely present by May 1. Injury can occur to developing tips before populations can be detected. So, if you have a history of winter moth injury, you may need to apply a prophylactic spray early in the season. The best choices for control are Avaunt, Delegate, and Intrepid. Avaunt cannot be used on flow-through bogs. For Avaunt and Delegate, allow 7 days between applications. Intrepid is a growth regulator product and the larvae must eat it to be affected. It has greater residual and is more active than Confirm. However, Intrepid is Zone II-restricted and restricted use. The action threshold is an average of 18 larvae per sweep set.

For detailed information concerning the biology and management of Winter Moth, visit the following: <http://extension.umass.edu/landscape/fact-sheets/winter-moth-overview> or <http://extension.umass.edu/landscape/fact-sheets/winter-moth-identification-management>
and for current regional updates the landscape message at: <http://extension.umass.edu/landscape/landscape-message>.

Winter Moth in Southern New England 2015 (*Heather Faubert, URI Coop Extension*). The average date of egg hatch in RI is April 10 but we expect a bit of a delay given the cool spring weather. Last November, I set up tree wraps at 5 locations: three in RI, one in Pawcatuck, CT and one in Acushnet, MA. The tree wraps encouraged female winter moths to lay eggs just below the tree wraps. Over the next week I'll remove all the tree wraps and look for eggs to monitor. I removed the tree wraps at URI last week and found hundreds of eggs to monitor. Winter moth eggs start out orange, but then turn blue a few days before hatching. Very handy for monitoring egg hatch!

It is important to control winter moth just when hatching for apple, cranberry and blueberry, it is less important for landscape trees. When eggs hatch, winter moth caterpillars wriggle into swollen buds and begin feeding. For apple, cranberry and blueberry, swollen buds are primarily flower buds and once caterpillars are inside buds they are protected from insecticide sprays until just before bloom. By this time many flowers may have been damaged or destroyed, destroying the crop. Landscape trees, on the other hand, can withstand early winter moth feeding damage. To save trees from being defoliated, insecticides can be applied after trees leaf-out, but before excessive feeding damage has occurred.

Biological control The fly, *Cyzenis albicans*, has successfully controlled winter moth outbreaks in Nova Scotia in the 1950's and the Pacific Northwest in the 1970's. *C. albicans* lay eggs on leaves of winter moth host plants. When eating leaves, winter moth caterpillars accidentally eat fly eggs too. A fly egg hatches and the larva develops inside a caterpillar body. When a parasitized caterpillar drops to pupate, it digs into the soil but instead of a winter moth caterpillar pupating, the fly pupates instead. The fly pupa remains in the soil until the following spring when it emerges as an adult fly at the same time winter moth eggs hatch.

Parasitic flies have been released in Massachusetts since 2006 and in Rhode Island since 2011. In Massachusetts, some of the early release sites are already seeing winter moth populations decline due to high rates of parasitism. In Rhode Island, we recovered flies for the first time in 2014 in Goddard Park. In a few years we hope to start seeing winter moth controlled by *C. albicans*.

Late Water this spring?

This will be a year to think long and hard before holding late water. The preliminary Keeping Quality Forecast is GOOD so there is no compelling reason to use Late Water for fruit rot management.

If you feel that you have other reasons to do so, look the bog over very carefully for signs of injury. Even in the absence of visible injury, the long period in snow, ice, and water will surely have depleted the plant's carbon reserves and there will not be much opportunity for the plant to replenish prior to the time when you would want to apply the late water flood.

If there was stress prior to winter, then late water may be an additional stress on the vines and could be risky. Some growers have seen leaf drop in areas where they had yellow vine (YVS) last year.

If the bog was in great shape last fall and if the crop was small as well, carbon reserves would have been maximized prior to winter and that may be a favorable factor.

The bottom-line - unless you really need to do late water, this may be a good year to pass.

Carolyn DeMoranville

COOPERATORS NEEDED for upright dieback on-farm trials

If you have bogs with a history of upright dieback and you are interested in exploring management alternatives, please contact me via email at esaalau@umass.edu or by calling the Station at (508) 295-2212 ext 18.

Erika Saalau Rojas, Extension Plant Pathologist

*** Chart Book Errata ***

Page 49 of the 2015 Chart Book (print version only) should read 1.9 tsp NIS, not 1.6 tsp (referring to the amount of NIS to use with Callisto). The web version is correct.

The Oregon Cranberry Nutrient Management Guide is a great resource, with illustrations, about cranberry growth and yield in addition to the nutrient information. While the nutrient recommendations are for Oregon, much of the information will be valuable to MA growers. The Guide can be downloaded for free from Oregon State at this web address:

<https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/54896/em8672.pdf>

IPM MESSAGE is now active!

Call 508-295-2212 ext. 60
or visit website homepage to read the message!
<http://www.umass.edu/cranberry>

WORKER PROTECTION STANDARD HANDLER TRAININGS

Last Wednesday of spring months
CRANBERRY STATION LIBRARY, 2-4 PM

Worker Protection Trainings for cranberry workers in the handler category will be offered in 2015: April 29th, May 27th, and June 24th. There is a \$5 fee to cover the cost of the WPS training manual. If you have a pesticide license, you do not need this training. **Contact Martha Sylvia:** 508-295-2212, ext. 20 to sign up or for additional information.



Carolyn DeMoranville, Director

PRELIMINARY KEEPING QUALITY FORECAST

The forecast is **GOOD** for keeping quality.

As of April 1, there are 5 out of 10 possible points that favor keeping quality for the 2015 Massachusetts cranberry crop. The 5 points were based on the cumulative sunshine hours being low in February and high in March (3 points) and low average air temperature during March (2 points). High rainfall in March prevented us from getting any additional points. The final keeping quality forecast (available after June 1) may improve if temperature and rainfall conditions during April and May remain cool and dry. Unless the final keeping quality forecast worsens or you have areas with a history of high fruit rot disease pressure, the preliminary forecast suggests that fewer fungicide applications and /or using less than the maximum recommended fungicide application rate may be sufficient for proper fruit rot management. However, keep in mind that all chemical applications should be carried out according to product label instructions and that due to fungicide resistance concerns you should never use less than the lowest recommended fungicide rate.

As for holding late water this spring, it appears that there is no compelling reason to use late water to enhance fruit quality at harvest. Before considering this practice, assess if there was any major winter injury or if plants display any other stress symptoms and consider carefully your reasons for using later water.

Erika Saalau Rojas (Extension Plant Pathologist)