Integrated Cranberry Crop Management for Wisconsin

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Contact us if you have any address corrections, additions, or deletions.

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UPCOMING DEGREE-DAY BENCHMARKS FOR SPARGANOTHIS AND DEGREE-DAY MAPS: AUGUST 8, 2016

Elissa Chasen and Shawn Steffan
USDA-ARS and UW Entomology

The maps below show degree-day (DD) accumulations for cranberry plants and *Sparganothis* fruitworm across Wisconsin through August 8, 2016. Temperature thresholds used for these calculations are 41º and 85 ºF for the plant, and 50º and 86 ºF for *Sparganothis*.

Figure 1 shows that Plant DDs throughout Wisconsin range from 1,875 to 3,340. The Central Wisconsin growing region has accumulated around 2,900 DD, while the Northern Wisconsin growing region has accumulated around 2,400 DD.

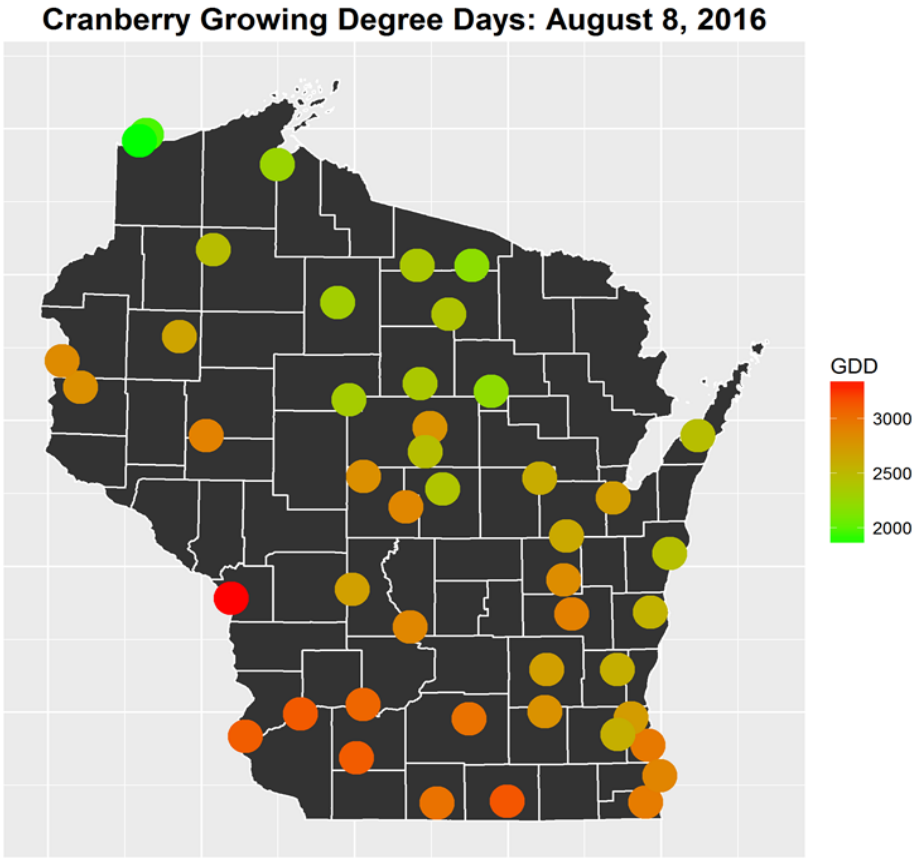

Figure 1

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UPCOMING DEGREE DAY BENCHMARKS (CONTINUED)

Figure 2	Event	DDs from March 1 (approximate)
	Flight initiation	595.7
	First eggs laid	681.0
	Peak flight	884.12
	First egg hatched*	895.4
	End of egg laying	1,634
	Last egg hatched*	1,890

* Egg hatch window: 895 – 1,890 DDs

Figure 2 illustrates life-history benchmarks of interest for *Sparganothis* fruitworm and the associated degree-day estimates for each benchmark (Deutsch et al. 2014). In Central Wisconsin, the last egg hatches (larval emergences) are just occurring.

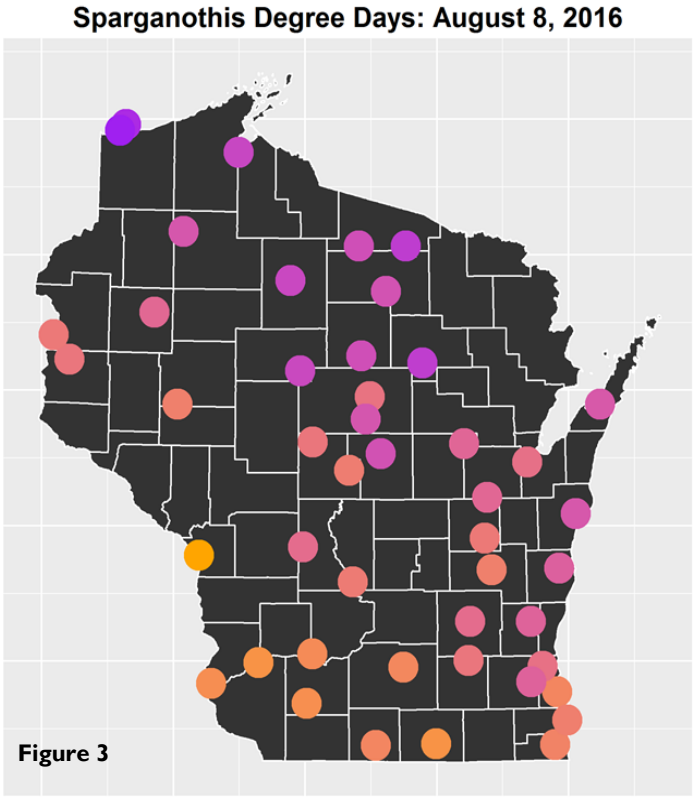

Figure 3

Figure 3: Throughout Wisconsin, *Sparganothis fruitworm* degree-days range from 1,089-2,214 DD. In Central Wisconsin, *Sparganothis* DDs are around 1,800, while in Northern Wisconsin, *Sparganothis* DDs are about 1,400.

Figure 4 allows for comparison of degree-days over the last three years. Based on our observational data from the last few years, plants at this time will be likely in cabbage head and moving into roughneck.

Figure 4

Aug 8	Cranberry Growing Degree Days			Sparganothis Degree Days		
	2014	2015	2016	2014	2015	2016
Central WI (Wisconsin Rapids)	2,580	2,803	2,873	1,627	1,757	1,839
Northern WI (Minocqua)	2,232	2,267	2,370	1,362	1,322	1,432

TIMING OF INSECTICIDE APPLICATIONS

Suzzane Arendt
RedForest Crop Consulting, LLC

Determining the best time to target a pest for optimum management can be a challenge, but really does matter today, tomorrow, and for years to come. In order to best manage cranberry insect pests, one must have a complete understanding of the pest. To determine insect infestations early and be proactive, knowledge of insect description and seasonal lifecycle is essential. Other key elements to consider include a comprehension of typical character of injury, status as a pest, how best to determine insect threats early utilizing the best field measures and to have experience with management options that will maximize control (including other pests that may be present at that time) while minimizing cost to the grower and the environment.

During these economically challenging times for many families in our industry, cost effective pest management is paramount but can be tricky to accomplish. Not all pests emerge at the same time, become an economic threat simultaneously, or are controlled by the cheapest organophosphate on the market. Incorporating a reputable Integrated Pest Management (IPM) program can help a grower save time and money for years to come. Benefits include (1) preventing a devastating infestation, (2) utilizing best management strategy based on expert knowledge and experience of chemical and cultural options, and (3) reduces or eliminates calendar sprays, spraying because the neighbor is, and clean-up sprays that were typical of the past.

Most IPM programs assess pest populations on a weekly basis. When making recommendations, consultants need to consider multiple factors that may impact the effectiveness of the control measure. Ambient temperature, humidity, short term future forecast, stage of growth of larvae, past or current adult flight, other pests present, control method preferred by or affordable for the grower, and phenology of the cranberry plant are some factors that aid in determining when the best time to treat the pest will occur. The timing of control measures can vary in effectiveness if even off by 3 days, especially when weather conditions are optimum for feeding. Spraying sometime before the next visit by the IPM consultant may not give you the best control that you need. A spray recommendation for Wednesday that does not get done until Sunday could mean missing a significant portion of the population and jeopardizes optimum control. Likewise, if a control measure is applied too early, the cost-effectiveness of the spray reduces because a good portion of the population will not be targeted. TIMING DOES MATTER. If weather conditions prove to be unfavorable for an application where an insecticide has been recommended, that product may need to be returned and a new product purchased. It is important to have this quick flexibility with your supplier. For example, Lorsban is effective only on small sparganothis fruitworm larvae, whereas Delegate is more effective on larger larvae. Using a product at the wrong time for the first generation of a pest can leave you spending significantly more money and time to control the second generation of a pest. Doing our best to maximize the cost-effectiveness of a spray includes many factors, and TIMING narrowed down to less than 7 days is essential to obtain the best control of insect pests.

CRANBERRY NUTRIENT MANAGEMENT: POTASSIUM

Carolyn DeMoranville
UMass Cranberry Station

The amount of potassium (K) in cranberry leaves is second only to that of nitrogen among the mineral nutrients and K is the element in the greatest abundance in the fruit. Potassium is important in the movement of sugars in the plant, in maintaining plant hydration, and in many enzyme reactions in the plant. K may also play a role in plant hardiness (frost resistance). Cranberry sand soils are naturally low in K, leading to an annual requirement for K additions. The low cation exchange capacity of sand means limited binding sites for K as well as for other cations like calcium and magnesium. This also means that adding large amounts any of these three can drive the others from the soil.

K is often added with N in NPK fertilizers and is the third number on the bag. Fertilizer convention is such that the third number is actually percent potassium oxide (K_2O), so to calculate the actual K, that number is multiplied by 0.83. When tissue and soil tests are in the sufficient range, the K requirement is roughly similar to that for N, so choosing an NPK with similar first and third numbers works well.

Recommended Potassium rates in Massachusetts.

	Recommended K rate lb/A	Other considerations
Soil and tissue tests normal	up to 80	look for NPK with similar first and third numbers
Soil and tissue tests low	60-100	Consider a supplement like SulPoMag or KMag at 100-150 lb/A
Tissue test high	up to 60	Use no supplements

Supplemental K may be applied as soon as the soil warms in the spring, generally in early May. Otherwise, K is generally added with nitrogen and phosphorus (NPK). Some growers apply K late in the season to promote plant hardiness or to 'shut down' growth. There is no research on the role of K in cranberry fall hardiness, although there are reports for other plants. Research into 'shutting down' growth with K showed that only extreme rate of K accomplished this through actually damaging the plant. If N has been applied judiciously, there should be no need to stop growth, growth rate will decline naturally in late summer.

Supplemental K is often added with magnesium (SulPoMag or similar product), but may be applied as a foliar spray (of little value in research trials) or as potassium sulfate (0-0-50). Muriate of potash (KCl, potassium chloride, 0-0-60) may be less desirable due to the adverse effects of chloride on cranberry vines when used at high rates over years.

CRANBERRY NUTRIENT MANAGEMENT: NITROGEN FOR HIGH-YIELDING HYBRIDS

Carolyn DeMoranville
UMass Cranberry Station

In Massachusetts, with the implementation of newer cultivars, we have revised our base rate recommendations for nitrogen (N) on established beds. These rates are based on analysis of the concentration of N in fruit tissue and in the biomass removed in harvest operations multiplied by the amount of biomass of fruit and leaves produced and then removed in harvest and detrashing operations. To replace the removed N, we need to apply fertilizer. The amount of N removed is then multiplied by a correction factor of 1.4 to account for the less than 100% efficiency of fertilizer uptake. The base rates calculated are then adjusted up or down based on seasonal conditions, observed plant growth, previous summer tissue tests, and historic bog responses.

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CRANBERRY NUTRIENT MANAGEMENT: NITROGEN (CONTINUED)

The N concentration in fruit and new growth is similar among the cultivars but the amount of biomass (crop load) and leaf area produced and then lost in harvest operations differs among the groups. The tissue biomass calculations for Early Black have been well researched: each 100 bbl of fruit has 5.1 lb of N. Since N concentration in all cultivars is similar, as crop increases, for all of them, we can just scale up from the 5.1 lb/100 bbl to the numbers of bbl/A produced or expected. Early Black detrashing during harvest removes 13.4 lb N per acre in plant biomass above what is removed in the fruit. That amount is likely similar in all small fruited cultivars. But as we look at larger fruited cultivars, we observe that the plants and particularly the leaves are larger than those of the natives. For Ben Lear and first generation hybrids such as Stevens, we multiply the 13.4 lb N for plant biomass in Early Black by 1.5; for the newer Rutgers and Wisconsin hybrids, we multiply by 2. The base range reflects varying crop loads: up to 600 bbl/A for the newer hybrids and up to 300 bbl/A for the others. This does not mean that higher yields necessarily would require more N. In fact, for all but the newest cultivars, adding more N than required can result in yield decline.

Recommended base Nitrogen rates in Massachusetts.

Cultivar group	Base N rate lb/A	Other considerations
Natives: Early Black and Howes	25-40	Reduce to 25-30 for crops less than 200 bbl/A
Older hybrids and large fruit: Ben Lear, Stevens, Grygleski #1, Pilgrim	35-50	Reduce to 35-40 for crops less than 200 bbl/A
Rutgers and University of Wisconsin cultivars: Crimson Queen, Demoranville, Mullica Queen, HyRed	50-80	Reduce to 50-60 for crops less than 300 bbl/A

OBSERVATIONS FROM THE FIELD: WEEK OF AUGUST 1ST

Jayne Sojka
Lady Bug IPM, LLC

JAPANESE BEETLES: We have been sweeping and observing Japanese Beetles on marshes for several weeks. For the most part, we find these beetles feeding on weeds.


Japanese beetle

FLEA BEETLES: This pest is starting 10 to 14 days earlier than normal and is still going strong. It seems that the hatch has been continuous. Because of the heat, we saw an increase. In two separate series of 20 sweep net catches, at first, only 5-8 flea beetle were caught and three days later it jumped to 23 to 30 flea beetle. Also, a feeding frenzy/leaf mining caused burn to the tips of the vines in some cases. IPM is all about timing the control measure while getting a majority of the hatch without economic stress. We have growers that have had to treat twice already to gain control and KEEP control of hatching Flea Beetle. Once again this

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OBSERVATIONS FROM THE FIELD (CONTINUED)

year, we came upon a HOT SPOT that was not one of our scouted beds, but we went into the bed to see just what the flea beetle pressure was. We swept 63 flea beetle in a few sweeps and observed the beetles feeding on the berries as well as the vines. Just how much damage is tolerable? What is economical control? How much should we do against one single pest?


Yellow Vine: before mending process


Yellow Vine: after mending process

YELLOW VINE: Carolyn De Moranville wrote an article dated back to August of 2007. She shared that the symptoms of Yellow Vines (YV) are most likely due to nutritional imbalances in the cranberry plants, but fertilizer management is NOT the cause of the problem. Instead, she believes that the nutrient imbalance is secondary to root problems caused by stress. The stress involved is most often water stress (too much OR too little). These stress conditions lead to poor root development. Typically, an excessively wet spring (like in 2016 with all the frost protection) can lead to the shallow roots. Casoron use can aggravate the problem.. YV plants do no do well at taking in nutrients from the roots. For this reason, adding more granular fertilizer will, most likely, do little to arrest or reverse YV. Instead, foliar feeding should be considered. Providing nutrients through the leaves (bypassing the roots) can help to bring the plants back into nutritional balance. I commend growers that are on top of the mending process. On many marshes, we now see a beautiful blue-green color cast and healthy mending. Others remain yellow and brown with upright density loss.

SUN SCALD: All across Cranberry Land in Wisconsin ,we are seeing exposed fruit showing Sun Scald. With temperatures in the high 80s for several days in a row, and excessive humidity, the top crop is showing stress. Growers have tried evaporative cooling but still we see scald. The only fruit affected are those exposed and facing the sun in the long afternoon hours. If we could only put a dome over the crop during these critical periods of time!


Sun Scald

BANDITS: A couple of weeks ago, we started having trouble with our trap lines. Several of our marshes were missing traps, stakes, and lures. It didn't matter if it was the BHFW, SPARG, Girdler or CFW trap the bandit didn't seem to prefer one over the other. This activity continued for several weeks. Then one day, in the broad day light we discovered four babies playing in the ditches around our trap line. The mystery has been solved! Baby Raccoon must have thought that we placed "TOYS" in the beds just for them to play with.

ATMOSPHERIC NITROGEN FIXATION

Willow Eastling
University of Wisconsin-River Falls, Undergraduate of Horticulture

With severe thunderstorms and heavy rainfall dominating the radar over the past weeks, several cranberry beds have shown dramatic changes as quickly as overnight. Some growers received up to 4 ½ inches of rainfall within one weekend and noticed a difference in their beds the very next day. This past week, we also observed changes, primarily increased amounts of vine growth within the cranberry plant. There are many variables to why lush growth happens, but one factor that may contribute is atmospheric nitrogen fixation.

Although the air is filled with approximately 78% nitrogen, cranberries are unable to absorb nitrogen in a gaseous state. One way atmospheric nitrogen can become plant-available is through lightning converting it from a gaseous state, to a liquid state. The vast amount of energy that lightning brings to the atmosphere breaks the nitrogen molecules apart and allows the nitrogen atoms to combine with oxygen atoms- forming nitrogen oxides. As the rain begins to fall towards the earth, these atoms are absorbed within the raindrops and are brought to the soil. From there, water carries the nutrients to the roots and translocates them throughout the plant. Free fertilizer!

While this process can be beneficial to cranberry vines, the vast majority of nitrogen fixation is accomplished by microorganisms in the soil. This is why growers typically do not rely on a lightning storm when planning their fertilizer programs, which results in some of the issues we are seeing this year. Most "fruit set" fertilizer applications were made prior to the storms or in between the storms, resulting in more nitrogen than intended. In the past, there have been years when lightning was responsible for 5-7% of the nitrogen in the soil.

So when is too much? Looking at the crop, the ideal growth of the vine should be an inch-and-a-half or five-to-seven layers of leaves above the fruit. This is to structurally support the crop below and efficiently capture the sun's energy for photosynthesis. Growth over nine layers of leaves is considered too much growth, which can result in cultural challenges. For example, dense vines may take longer to dry out, creating a perfect environment for pathogen growth. With more pathogens present, the odds of an infestation (rot) increases.


increase of vine growth after storms

In addition to pathogens, the berries do not seem to color as quickly due to sunlight being unable to reach the buried crop. Harvest will become more difficult with longer vines, as the picking process may have to be slowed and vines could be ripped out, resulting in more trash.

Atmospheric nitrogen fixation can be a blessing but only if it comes in the right increments. Although nitrogen fixation isn't the only reason why lush growth appears, it may be a factor for the unusual amount of lush growth observed this season. For some growers, it came at the perfect time- giving them just the right amount to set a few more berries and leaving them with little-to-no aborted pinheads. Other growers received too much, resulting in excess growth. Like most gifts from mother nature, atmospheric nitrogen fixation can be a blessing or a burden.

GROWER UPDATES

Adams 73 Cranberry

The work schedule at Adams 73 has been lighter this past week, but steady. Irrigation and weed control have been the top priorities. We did retreat some of our acres about a week ago that had high sparg numbers. Cranberry fruitworm was a nonissue for us this year, which is always makes a guy feel good. We do have a few flea beetle present in some beds, but nothing that requires attention.

A couple days from now, it will be time to attend the Summer Field Day. Where has the summer gone? I can remember the snow falling in May like it was yesterday. Despite the brutal weather in May, most growers I've talked with are saying they have very respectable crops developing.

Jeff Hopkins
Adams 73 Cranberry

Habelman Bros. Tunnel City

The growing season is coming to an end. The fertilizer applications are done. Our yellow vine syndrome has greened up. After several years of good weed control we decided not to apply Casoron. We used two applications of Callisto and the remaining weeds will be wiped in the next week.

As of now, the bugs are under control. We don't have a flea beetle issue at this time.

We are at 2,972 growing degree days and our soil temperature is still at 67 degrees. We are 156 growing degree days ahead of last year. With the last couple weeks of warm weather, the fruit is sizing up good. Hopefully mother nature will be kind to us to finish out the season without any damage.

GO BREWERS!!!

Team Habelman

P.S. WE ARE READY FOR FOOTBALL!!!

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