

# Cranberry

## Crop Management Newsletter

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### This Issue:

**White Grubs in  
Cranberry Marshes** 1

**Observations from  
the Field** 2

**Cottonball** 3

**Cottonball: To  
spray or not to  
spray?** 4

**An Invitation to Bats  
in Wisconsin  
Cranberry Marshes** 5



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## WHITE GRUBS IN CRANBERRY MARSHES

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“White grubs” are merely a generic name for the larvae of several types of beetles in the Scarab family. There are almost 30 species of Scarabs in the genus *Phyllophaga* that occur in Wisconsin; they are often referred to as May beetles, June beetles or May/June beetles. Only one species, *Phyllophaga anxia*, is known to attack cranberries.

The May/June beetle is a white grub species that is widespread in the U.S. and is considered a highly destructive insect pest. White grubs of the May/June beetle damage cranberry plants by chewing off the roots. Since the white grubs feed on the roots below ground, they can often go undetected until measurable loss to the root system has occurred. Moreover, white grubs can be relatively difficult to control because soil insecticides must penetrate the cranberry canopy to effectively make contact with the grubs located in the root zone within the soil. Consequently, marsh managers MUST ensure that respective insecticide treatments get to the target zone (roots) where the white grubs are located to achieve maximum control.

**Biology and Damage** May/June beetle adults are rather large, full-bodied insects, typically > 1-inch long. Adult females are typically slightly larger than their male counterparts, and they can be fairly easily differentiated by their color as females are typically dark-brown to black and males are light-brown to reddish. May beetle adults emerge and are active just after sunset. The beetles fly to the tops of trees to feed and mate, returning to the cranberry marshes

before sunrise. They are highly attracted to lights, and are often observed bouncing off of screened doors. Individual females typically lay approximately 20 – 50 eggs in her lifespan. After a gestation (incubation) period of about 3 – 4 weeks, the eggs hatch and young, 1<sup>st</sup> instar larvae (white grubs) begin feeding on the roots of cranberry plants. Fully mature larvae (white grubs) are almost double in size compared to the adult.

The May/June beetle species that is most common in cranberry marshes in Wisconsin requires three years to complete its life cycle. Hence its name, May/June beetles fly in May and June, mate and lay eggs during this period. Eggs normally hatch within a couple weeks, and newly hatched (young) larvae begin feeding on the roots of cranberry plants. Early-on, the white grubs are about 1/4” in length, they continue to grow and feed through the first year of their life cycle until the soil temperatures drop below 50 F°, typically in the late fall or early winter. At this point, they will they burrow down below the frost line to overwinter much like a black bear. The following spring the white grubs will move back up to resume feeding on roots throughout the growing season, all while continuing to develop (mature) into the final larval stage (i.e., 3<sup>rd</sup> instar). Once again, the white grubs burrow downward in preparation for overwintering as the soil temperature cools. In the third year, the white grubs again move back to the root zone to feed until early summer (around late-June-July). The white grubs then begin

(Continued on p. 6)

## OBSERVATIONS FROM THE FIELD

**Jayne Sojka, Lady Bug IPM, LLC**

**May 16, 2012**

### OPTIMUM pH LEVELS

Since the mini clinic on April 10<sup>th</sup> I have been asked to put together a list of Optimum pH levels for some of the Wisconsin approved pesticides. Following please find a partial chart that we have been working on. If you have a specific question on a product not listed, please contact that particular chemical representative and they will look it up for you.

I would like to thank Tomah Cooperative, Larry Fiene, many growers, and the internet for helping me put this list together.

Remember, when using a pesticide let's get the BEST control possible by doing what we CAN to make it happen. Buffer the pH up or down accordingly.

pH meters can be purchased just about anywhere. Aquarium shops have them readily available and most of your chemical suppliers can obtain them for you within a short period of time. Please note that when checking the pH do so before you put the chemical in the mix tank.

### BRONZED UPRIGHTS

For the past several weeks we have been observing a salt and pepper look across entire cranberry beds of bronzed uprights. Suzanne and I have been asking our growers what may

*(Continued from Column 1)*

have happened. We went through the usual scenario of harvest equipment, ice, flooding, fertility, sanding, pruning, flooding for three or four times, and any other stress that we could possibly think of. After talking to all the growers involved the only common thread we discovered was the fact that in November during an unusually dry spell these growers did not bring up the water in the ditches. We think that drought in the late hour of the fall is the cause of this bronzing that we see today. Look at your own properties and see if there is anything like this on your higher beds or dryer areas.

Pie areas and areas on the beds that may not have been reached with our sprinklers during frost events are now showing a fair amount of side-shooting. We also see an umbrella hook in those areas as well. The side shooting may double our chances of have two reproducing uprights in 2013 but for this year there will be little chance of a crop there. Understand that this is NOT entire beds, just the areas where wind may have played havoc with our protection methods.

We are seeing beautiful roughnecking plus early hooking throughout Wisconsin. Remember to talk with your bee keepers as most of us will need them earlier than normal. Have a great week!



Spray Material Product	Optimum pH	Half-Life at pH indicated (50% decomposition)					
		9.0 Basic	8.0 Basic	7.0 Neutral	6.0 Acidic	5.0 Acidic	4.5 Acidic
Actara	7.0 pH	Susceptible to alkaline hydrolysis in pH >9.0					
Admire	6.0 pH	355 days	Fully stable at a pH of 5 & 7				
Assail	7.0 pH	Unstable in water pH below 4.0 and above 9.0					
Avaunt		Stable over wide range of pH					
Bravo	7.0 pH	Stable over wide range of pH					
Confirm	7.0 pH	Stable over wide range of pH					
Diazinon	7.0 pH	29 days	3 wks	10 wks		14 days	8 days
Dipel	6.0 pH	Unstable in pH > 8.0					
Dithane	5.5 pH	4 hours		17 hours		20 days	
Fusilade	7.0 pH	17 days		21 wks			
Imidan	5.0 pH		33 minutes	1 hour	36 hours	7 days	13 days
Intrepid	7.0 pH	Stable over wide range of pH					
Lorsban	5.0 pH		1.5 days	35 days		63 days	
Orthene	7.0 pH	16 days		46 days		40 days	
Poast	7.0 pH	Stable in pH 4.0 - 10.0					
Round-up	5.5 pH	5.0 - 6.0 pH is optimum					
Sevin XLR	7.0 pH	24 hours	2.5 days	24 days	100 days		
Spintor	7.0 pH	Stable in pH 6.0 to 11.0				12 hours	
Tilt	7.0 pH	Stable over wide range of pH					
Warrior	6.5 pH	Stable in pH of 5.5 to 7.0					

Adjusting the pH of the spray solution can reduce spray material decomposition and make the spray more effective.

The above chart shows the Spray material Half-Life or the time it takes for half the amount of chemical to be decomposed.

## COTTONBALL

Patty McManus

UW-Extension Fruit Crops Specialist

Cottonball is a troublesome disease on some cranberry marshes, especially in older, peat-based beds. The pathogen, *Monilinia oxycocci*, overwinters in infected, mummified berries that didn't get harvested the previous year. Note, however, that not all dried up berries are cottonball mummies. For photos of mummies and other signs and symptoms of cottonball, see UW-Extension bulletin no. A3194, available at [www.learningstore.uwex.edu](http://www.learningstore.uwex.edu). The amount of disease that develops in 2012 will depend in part on the weather, but growers who have had a cottonball problem in recent years should be prepared to scout for signs and symptoms and possibly spray fungicides.

The first line of control is cultural: removing diseased fruits and mummies through harvest and subsequent "trash" floods. There is some evidence that shoots subjected to freezing are susceptible to infection, so spring frost protection is critical. Cottonball tends to be worse in mossy areas of beds and areas in which sand remains saturated in the spring. Therefore, moss and water management should be considered.

The sterol inhibitor (SI) fungicides are the most effective fungicides for controlling cottonball. These include propiconazole (Orbit, Tilt, Propimax) and fenbuconazole (Indar). The brand names of products labeled for use on cranberry have varied over the past few years, so be certain that cranberry is listed on the label before using it. The wording on product labels varies, but four sprays of SI fungicides are permitted: two during shoot elongation (to prevent tip blight) and two during bloom (to prevent fruit infection). Azoxystrobin (Abound), a strobilurin fungicide, is permitted for use during bloom, but it is not as effective as either propiconazole or fenbuconazole under moderate to high levels of cottonball (i.e., greater than about 15% cottonball berries at harvest). Research from the 1980s showed that Bravo is effective when applied during bloom, but it carries the risk of burning flowers and fruit, so I would not recommend it for cottonball when we have better options available. Copper is not

effective. In 2012 we will be testing some newer fungicides, including Evito, for cottonball control. Field tests conducted in the late 1990s and early 2000s showed that under low to moderate disease pressure (i.e., less than about 15% cottonball berries at harvest), making two SI fungicide sprays during bloom was just as good at reducing cottonball at harvest as making two sprays during shoot elongation *plus* two sprays at bloom.

To the extent possible, spray a variety according to its developmental stage, rather than treating early and late varieties at the same time. If spraying during bloom, be certain that the first spray goes on at 10-20% bloom. These early flowers are the ones most likely to set fruit and therefore are the most important ones to protect. Never spray fungicides to control cottonball after bloom. Infection has already happened, and it is too late for fungicides to kill the fungus which is safely harbored in the developing berry.

The fact that the SI fungicides, which have a single-site mode of action, have been used frequently and often exclusively to control cottonball for the past 30 years is reason to be concerned about fungicide resistance developing in *M. oxycocci*. Our research in the late 1990s indicated that resistance had not yet developed at sites where the SI fungicides had been used for 16 years. To further delay the onset of resistance, try to minimize the number of SI sprays so that on average, you use them three or fewer times per season. So, for example, if you spray a sterol inhibitor four times this year, then in 2013, you should back off to just two SI sprays during bloom. Alternatively, in 2013 you could use the SI during shoot elongation but switch to Abound for the bloom sprays.

Continued on pg. 4

## Cottonball To spray or not to spray?

*Continued from p. 3*

Situation	Recommendation
No history of cottonball in the bed; little or none on the marsh.	Do not spray.
No history of cottonball in the bed; a minor problem in neighboring beds.	In general, do not spray the bed with no history. But if this is a particularly valuable bed (e.g., high-yielding new variety) consider bloom sprays.
Cottonball a chronic but minor problem, with less than 5% of fruit infected most years.	Fungicides are imperfect and not likely to bring that 5% level down much. But consider spraying during bloom to keep the problem in check. If not every year, then every other year.
About 5-15% cottonball in last year's harvest.	Spray twice during bloom, first at about 10-20% bloom and again at full bloom.
More than 15% cottonball in last year's harvest	Spray during shoot elongation, starting when about half the shoots show 1/2" new growth and again about 10 days later. Also spray during bloom, first at about 10-20% bloom and again at full bloom.
Tip blight symptoms are easy to find.	Spray during bloom during the current year and watch cottonball levels closely at harvest. If fruit cottonball is more than 15%, then spray during shoot elongation and bloom the following year.

## An Invitation to Bats in Wisconsin Cranberry Marshes

Suzanne Arendt

RedForest Crop Consulting, LLC



Most cranberry growers have expansive acreage beyond the cultivated cranberry

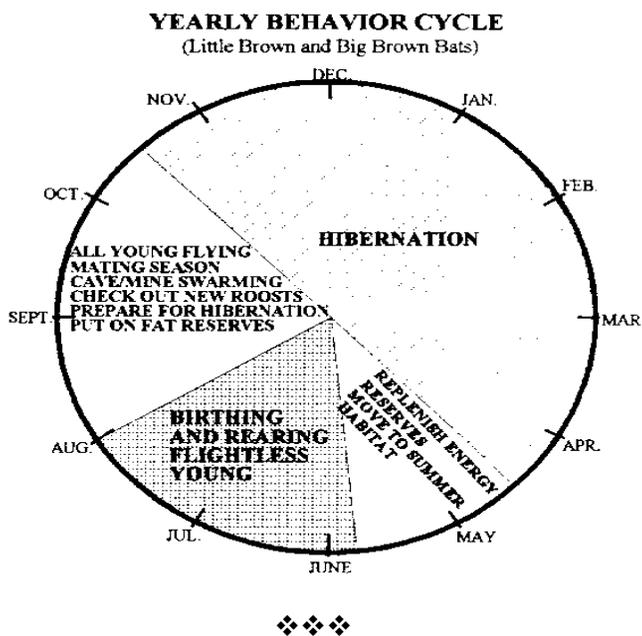
acreeage. All of this acreage provides incredible opportunities for increased biodiversity and sustainability of wildlife and plant survival beyond what most businesses in the US can provide. One mammal that I find fascinating and a bit obscure are BATS. There are mainly seven species of bats in the state of Wisconsin and all have an ecological and economic importance to agriculture. Cranberry growers and bats can certainly have a symbiotic relationship without the fear of them taking over our attics, barns, and giving us rabies. Bats are beneficial to agricultural areas and cranberries have additional opportunities beyond our beds and support land to facilitate survival of a these species. Many bats find homes in our adjacent woodland and love to be near water. Some bats fly as low as 6" off the ground and up to 1000 feet...that sounds like some cranberry beds I've seen! Bats are also very hungry mammals too, for instance, the little brown bat is known to consume one third of its body weight in as little as thirty minutes! Bats eat mosquitos, gnats, flies, beetles, wasps, and moths including LEPIDOPTERAN species! Could the bats help us manage our pest populations?! I doubt they would eliminate a need for a control measure, but in some cases populations could be larger without out very beneficial bat neighbors. Beyond our natural woodland habitat we can provide artificial roosting sites for our friends. Simple bat houses can be easily made and hung from poles about 10-15 feet away from trees. Bats typically like it hot so facing them south will provide maximum sunlight for them to stay cozy warm. The best habitat for many species of bats includes diversity such as agriculture, water, forest, and urban landscape and for most of us cranberry growers; we have no problem fulfilling their needs. Modern forestry practices, urbanization, new construction designs for building structures, wind turbines and white-nose disease have all negatively impacted populations of some species of bats in our state. Cranberry growers have a

(Continued from Column 1)

unique opportunity to extend our stewardship to bats by continuing to provide excellent habitat on our marshes and to also incorporate artificial structures for them to roost in. At least four species of bats will roost in man-made houses. So, I think that if we can help, why wouldn't we? Bats are amazing creatures. Designs for bat houses can be found on <http://dnr.wi.gov/org/land/er/bats/bathouse.htm> Or you can simply buy them from places like Gemplers or other outdoor sporting goods stores.



Trivia question: What are baby bats called?



Answer: pups

## White Grubs in Cranberry Marshes (Continued from p. 1)

the pupation (transformation) process in the soil where they develop into adults in by fall. However, although they transform into adults, they remain in the soil over the winter and do not emerge until the following spring (i.e., May – June) to start a new generation.

Larvae cause damage to cranberry plants by feeding (pruning) on the roots, thus inhibiting the plant's ability to take up nutrients and moisture. As a result of the white grub feeding damage, when the stems are tugged-on, the vines feel as though it is loose, just sitting on the soil surface. When population densities are high, significant plant death can occur. Most damage by May/June white grubs occurs in the second and third years of the life cycle as the grubs are larger and thus cause more damage.

**Monitoring and Control** Currently, there are no commercially available traps, lures or other specialized methods for monitoring adults. Although plant dieback can be caused by several factors; where dieback is evident, simply dig up the soil and inspect for grubs and damaged roots. The grubs are easily seen within the top 3-4 inches of soil; some may even be at the soil sur-

face. Throughout Wisconsin, many of the white grubs may be in the same larval stage in the same year. In these locations, some years may have dramatically more noticeable adult flights. Consequently, damage is much more likely to occur in the second and third years after the observed more abundant flights.

White grubs can NOT be controlled by flooding, sanding, or currently available biological control methods. Belay (an insecticide) was recently registered for use to control white grubs in cranberries! Admire insecticide is another insecticide that is registered for white grub control in cranberries. Both insecticides have been demonstrated to provide good control of numerous white grub species when applied preventatively (at egg hatch, when the grubs are young). The performance of these insecticides on larger, more mature grubs is poor. Consequently, timing of these products is essential for maximum control.



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