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Blackheaded Fireworm

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This Issue:

Address Correction

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Thank you!

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Editor

Blackheaded fireworm, Rhopobota naevana, is another important pest in Wisconsin cranberry. Blackheaded fireworm (BHFW) is found in all cranberry growing regions in the country. It strictly feeds on cranberry in most parts of the country, but also is known to feed on a related species, the evergreen blueberry, on the west coast[1].

Black headed fireworm
Order: Lepidoptera (moths and butterflies)
Family: Tortricidae (leafroller family)
Scientific name: *Rhopobota naevana*

Adult Blackheaded Fireworm

Damage

Blackheaded fireworm has two generations in a season, and mainly causes damage to the foliage of the cranberry plant. Feeding can cause damage to the terminal parts of the uprights, which can inhibit fruit bud formation the next season. The first generation BHFW larvae feeds on the new upright growth, and intense outbreaks can cause the vines to take on a brown, burnt appearance- hence the name "fireworm"[1]. Larvae prefer newly developing fresh growth. If a larva emerges before the new growth begins, it may burrow into older leaves, causing lighter colored patches to appear.

Cranberry upright damaged and webbed by BHFW larva.

Larvae use silk to weave together three or four leaf tips, creating a tent where they can feed protected from natural enemies. As they grow, they can sew entire uprights together, and in severe outbreaks, several larvae can weave uprights together into a nest, where they can feed undeterred1. The webbed uprights are usually the first signs of infestation noticed by growers.

Second generation larvae will sometimes feed on the blossoms, hollowing out the ovaries. They also weave upright tips together and can damage the fruit by scarring the outside or excavating the berries[1].

Description and Life Cycle:

BHFW has two generations per year. They overwinter as single eggs on the underside of cranberry leaves. Eggs hatch in May, and the larvae of the first generation begin to feed on the new upright growth. Larvae are yellowish with a shiny black head capsule and reach a maximum size of about ½" in length[2]. They wiggle erratically when disturbed and have been observed dropping out of a pre-cut hole in their leaf tent to escape predators, returning on a silken thread[3].

Larvae generally mature in about two and a half weeks and pupate in the leaf litter on the ground for about two weeks[4]. Adult flight of the first generation occurs in late June and early July. Adults are a grayish-brown color and about ¼" long[2]. Moths fly at dusk and can be found hovering above the vines1. For both generations, females are able to lay eggs one day after they emerge and can lay approximately 70-80 eggs[5].

Cranberry scarred by BHFW feeding

Second generation larvae hatch from eggs during bloom and adult flight occurs in August. This generation of adults lays eggs that will overwinter and emerge the next spring.

Monitoring:

Sweep net sampling can be used to detect populations of BHFW larvae, with the economic threshold of 2 larvae per set of 20 sweeps[2]. Sweeping for small larvae can be misleading as the numbers do not correlate well with actual infestation levels in a bed. In addition, BHFW are often found distributed in patches or "hot spots", particularly along edges. Visual sampling of buds and leaves for webbing, mining, and frass in known hot spots should be conducted. Adult BHFW can be monitored using pheromone-baited traps that are commercially available. These consist of a rubber septum containing the synthetic female sex pheromone that is placed in a sticky trap (e.g. Pherocon II trap or 1C wing trap). Adult flights should be monitored beginning in early June and traps should be checked and cleaned weekly. The first flight should occur during June/July and the second flight in August/September.

BHFW larva

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Blackheaded Fireworm

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Control

Reports on the effectiveness and timing of the spring flood for blackheaded fireworm vary, but flooding can be a useful tool if temperature and dissolved oxygen content of the water, as well as the stage of the plant, are carefully considered[6]. There are no significant larval parasitoids of BHFW, but rates of egg parasitism can be up to 99%. Mating disruption using SPLAT technologies have shown to be effective and are currently under development.

Table 1. Effectiveness of foliar-applied insecticides against blackheaded fireworm (BHFW)

	Rate/acre	BHFW
Grandevo 30G	3 lb	+
Venerate 94L	8 qt	+
Venom 70SG	4 oz	+
Closer 2.2SC	5.7 oz	--
Altacor 35WG	4.5 oz	+++
Assail 30SG	6.9 oz	++
Belay 2.1SC	4 oz	++
Delegate 25WG	6 oz	++
Diazinon 4EC	3 qt	++
Imidan 70WP	4 lb	++
Intrepid 2F	16 oz	+
Confirm 2F	16 oz	+
Knack 0.86EC	16 oz	--
Lorsban 4E	3 pt	++
Rimon 0.83EC	12 oz	++

Performance rating scale: "--": inadequate control, "+": 70 – 79% control, **"++": 80 – 89% control, "+++": 90%+ control**

Chemical control options include broad-spectrum insecticides such as organophosphates (e.g., Diazinon, Imidan) and carbaryl, selective insecticides like IGRs (e.g., Intrepid, Confirm, Rimon), spinosyns (e.g., Entrust, Delegate), microbial compounds (e.g., Grandevo and Venerate), neonicotinoids (e.g., Assail, Belay), and diamides (e.g., Altacor) can provide some control of BHFW. Check the table below for overall rating of insecticides from Jack Perry's trials (Table 1). If warranted, sprays can be applied at ½" of new growth, hook stage to start of blossom, and after bloom, similar to the sparganothis fruitworm's spray schedule.

A cranberry bed that has been damaged by an outbreak of BHFW.

It is important to minimize sprays during bloom but also directly before bloom to avoid residual contact with pollinators. Using reduced risk pesticides, such as Altacor, Confirm, Intrepid, Rimon or Venerate, especially around bloom will help protect pollinators. Sprays after bloom should pay special attention to pre-harvest intervals, so as always, read and follow the label. Some insecticides face MRLs export limitations in cranberry so make sure to check with your handler before using them.

Happy growing season!

References

1. Averill, A., and M. Sylvia. 1998. Cranberry Insects of the Northeast. University of Massachusetts, Amherst.
2. Martinson N. and L. Kummer. Year Unlisted. Wisconsin Cranberry Insect Pest Identification Pocket Guide. Fey Publishing Company, Wisconsin Rapids, WI.
3. Fitzpatrick, S.M., J.T. Troubridge, and C. Maurice. 1994. Parasitoids of blackheaded fireworm (*Rhopobota naevana* Hbn.) larvae on cranberries, and larval escape behavior. J. Entomol.Soc.Brit.Columbia.91.
4. Fitzpatrick, S. M. 2009. Insect Life Histories in Fruit, Shoot and Root Environments of Cranberry and Blueberry. Ix International Vaccinium Symposium. 810: 231–249.
5. Fitzpatrick, S.M., and J.T. Troubridge. 1993. Fecundity, number of diapause eggs, and egg size of successive generations of the blackheaded fireworm (Lepidoptera: Tortricidae) on cranberries. Environ. Entomol. 22:818-823.
6. Cockfield, S.D. and D.L. Mahr. 1992. Flooding cranberry beds to control blackheaded fireworm (Lepidoptera: Tortricidae). J. Econ. Entomol. 85(6):2383-2388.

Article by:
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Bee Literate, Bee Healthy, Bee Respectful

Without bees our world would be a difficult place to survive. Bees feed themselves and their young on the diverse flora found in our natural woodlands, creating an environment that aids in the health and productivity of wildlife that inhabit and feed their young in those areas. In turn, bees provide humans with sustainable food sources that can even include the meat that is on your plate. As the world's population continues to increase and large agricultural monocultures become more the norm so does the need for more commercial pollination services nationwide that requires pushing the beekeepers to make their colonies do more with less.

Losses to commercial honey bee colonies in the US have surpassed acceptable levels. Those exceptional bee losses were first described as Colony Collapse Disorder (CCD) in 2006. Bee keepers have losses every winter, but what was missing was the great amount of dead bees. The bees were gone, vanished, disappeared. And these disappearing bees were not happening during the winter but during the bee keeping season.

A 10% colony loss is acceptable in the bee keeping industry, but in 2006 the average losses in the US were 31%. In 2010 losses continued to be around 34%, and in 2013 over 45% colony losses were reported (see graph below). Scientific research is on-going with a number of factors suspected. I had the opportunity to participate in a Q & A session with a bee keeper who will be bringing his colonies to the cranberry marshes very soon. Scott Hynes from Delta Valley Farms, Inc. located in Wynne, AR., outlined 7 different areas of concern and investigation into CCD, but noted that at any time these areas of investigation can be changed or added to as new information continues to be discovered.

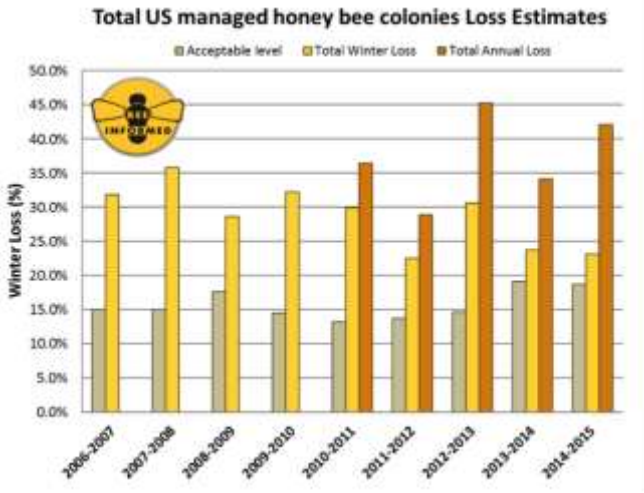
1.) Bee Pests and Disease such as American and European foul brood, small hive beetles, and tracheal mites. Although these pests do not initiate CCD like symptoms, they may exacerbate the disorder.

2.) Queen Source: There are few breeder queens in the United States that are used to produce millions of queen bees. A bottle neck of low genetic diversity can create bees that are more susceptible to pest and disease pressure.

3.) Chemical Use:

a.) In hive: pest management strategies are used by bee keepers, which include chemical use to maintain healthy colonies. Even though following labeled guidelines for use, these chemicals could cause sub-lethal affects on workers, queens, and drones.

b.) Chemical toxin in environment: Conventional agricultural systems manage pests on their crops which may affect non target insects and beneficial foraging bees. Bees can get sub-lethal amounts of chemicals from farms and homes while pollinating, drinking water or through inhalation. Neonicotinoids, such as Imadiclopryd are a controversial topic right now as they can be present in pollen and nectar-reaching lethal concentrations in some situations. There is no direct link between these insecticides and CCD; however they may make the hives more susceptible to infection from other causes, such as parasites or pathogens.



Nathalie Steinhauer[1], Karen Rennich[1], Kathleen Lee[2], Jeffery Pettis[3], David R. Tarpy[4], Juliana Rangel[5], Dewey Caron[6], Ramesh Sag ill[6], John A. Skinner[7], Michael E. Wilson[7], James T. Wilkes[8], Keith S. Delaplane[9], Robyn Rose[10], Dennis vanEngelsdorp[1]

4.) Genetically Modified Crops: Many GMO seeds are chemically treated with systemic insecticides that later may appear in plant nectar and pollen.

5.) Varroa mites and pathogens: The biggest threat to colonies even over CCD is the varroa mites. The viruses they transmit plus the chemical controls for the mites may contribute to CCD, although CCD has been seen in hives with manageable mite populations.

6.) Nutritional fitness: Malnutrition in adult bees weakens the immune systems, rendering them unable to fight pests and diseases. In many situations, the commercial hives are fed a diet of a monoculture crop and have very limited if no access at all to other wild flowers. The diet of the honey bees is not diverse as keepers need to push their hives to pollinate crops and some farmers, especially large corporate systems, have hundreds of acres of one crop and no other flowering plants to help supplement the bee diet. It would be like feeding our children a diet of rice. On most cranberry marshes, we have diverse sources of pollen and nectar to aid in the health of the hives, as woodland and waterways surround the majority of our cranberry acreage.

7). Undiscovered or new pests and diseases introduced into the United States. Nosema apis is a microsporidian that lives in the digestive tract of the honey bees. It has been noted for many years but in 2006 a new nosema species was identified. Elevated levels of this parasite in the bees will cause the hives to exhibit CCD symptoms and leave their colonies never to return.

It appears that CCD is probably caused by a combination of factors. Stress or a combination of stresses can suppress the bee's immune system. Research is rigorous and intense on this disorder and we can only hope that through education and stewardship we can minimize the future excessive losses to commercial hives, even if we cannot pinpoint exactly what is causing CCD.

On a similar note, because chemical use is an easy target for several reasons, the EPA is proposing additional labeling for compounds. These compounds may contribute to weakening commercial hives and to the Colony Collapse Disorder. Compounds include: Acephate (Orthene), Acetamiprid (Assail), Carbaryl (Sevin), Chlorpyrifos (Lorsban), Phosmet (Imidan), and Spineotorm (Delegate) to name a few. The new proposed labeling, which is currently under a comment period, would not allow use of these compounds from the start of bloom until the completion of flowering while commercial honey bees are on site. The Cranberry Institute and the Wisconsin Cranberry Growers Association (WSCGA) are working to ensure the language on the proposed labeling is reasonable and acceptable for the cranberry industry.

Cranberry Journal—Grower Update

David Bartling
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Although I have only been fully immersed in growing cranberries for about a year and a half, I could not imagine a much better spring for growing our crop! I noticed our first few flowers last week and the rest of our property is nearly all "hooked" out. After having a conversation with our bee keeper, we will be receiving our bees next week (the week of 6/15).

We did not do a bug flood this year do to our renovation project, so we sprayed Confirm on our entire property a couple weeks ago after finding high cutworm counts. Our corrective fertilizer is on, applied to weak spots or newer beds, and due to our low Copper and Magnesium levels in our soils we applied a corrective 0-0-22 with those two elements mixed in. Our Evitol/Callisto combination seems to be slowly taking its effect on the beds where it was applied. Willows and maples have been pulled and the only major "problem" weeds we have left are Goldenrod and Buttercup.

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