DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Pest Management News

Dr. John D. Hopkins, Associate Professor and Extension Entomologist – Coeditor
Dr. Kelly M. Loftin, Professor and Extension Entomologist – Coeditor

Contributors

Dr. Becky McPeake, Professor and Wildlife Extension Specialist
Dr. Bob Scott, Professor and Extension Weed Scientist
Sherrie E. Smith, Plant Pathology Instructor, Plant Health Clinic Diagnostician

Letter #3 **July 31, 2016**

Squash Vine Borer Management for Home Garden and Commercial Squash and Pumpkin Production

John D. Hopkins

Squash vine borers in Arkansas are one of the most damaging and most common pests of squash and pumpkins, especially in home gardens. Plant types affected include hubbard squash, gourds, pumpkins, zucchini, acorn squash, and yellow squash. Butternut squash is less susceptible than other squashes and cucumbers and melons are usually not attacked.

The adult of the squash vine borer, *Melittia cucurbitae* (Harris) [Order Lepidoptera, Family Sesiidae] is a clear-winged moth with metallic greenish-black scales on the front wings. The hind wings are transparent and the casual observer might mistake this moth for a wasp. The adult is approximately 1 inch long and the abdomen is ringed with orange and black. These moths fly quickly and noisily about plants during the daytime. Female moths lay their small (1/25 inch), oval, somewhat flattened, brownish eggs on stems (normally close to the ground) in late May or early June. Young borers hatch in about a week, tunnel into stems and feed. Larval excrement (frass) may extrude from the entry points and affected stems and vines may ultimately wilt and die. Larvae feed within the plant for about four weeks until they are full grown. These larvae have a brownish head,

six short slender true legs on the thorax and five pairs of short prolegs on the abdomen. Each proleg bears two transverse rows of crochets (curved spines). When full grown, larvae leave the plant stem, burrow into the soil and form a cocoon. Two or three weeks later, adults emerge, giving rise to a second generation of squash vine borer in Arkansas (usually early August). The insect overwinters an inch or two below the soil surface inside a tough, dirt-covered, silk-lined, black cocoon about 3/4 inch long, in either the larval or pupal stage.

Management

There are several **non-chemical control measures** that can be utilized to minimize the impact of squash vine borers in the home garden:

1) You should plant borer-tolerant cultivars.
2) You can cover emerging plants with floating row covers to provide early protection on young plants. When blooming begins, the covers should be removed.
3) You can wrap the stem and base of the plant with something like pantyhose to prevent the laying of eggs by adults.

The University of Illinois rated the susceptibility of twelve varieties (types) of squash on degree of resistance to squash vine borer attack, *www.urbanext.uiuc.edu/bugreview/squashvineborer.html*. A rating of 1 indicates most resistant to vine borer; a rating of 5, least resistant.

Cultivar Preference of Squash Vine Borer

Variety or Type	Rating
Blue Hubbard (Hubbard type)	5
Boston Marrow (Hubbard type)	4
Golden Delicious (Hubbard type)	4
Connecticut Field pumpkin (ornamental)	4
Small Sugar pumpkin (ornamental)	4
Zucchini	4
White Bush Scallop	3
Acorn	3
Summer crookneck	2
Dickenson pumpkin	2
Green striped cushaw	1
Butternut	1

When utilizing **chemical control measures** to manage squash vine borer, timing is critical. The key to managing this pest with insecticides is controlling the borers before they enter the stem. Once inside the vine, insecticidal control is ineffective. Again, poor timing of sprays is the usual cause of inadequate control. Beginning in mid-May, plants should be monitored weekly for initial signs of the borer's frass at entrance holes in the stems. Very early signs of larval feeding indicate that other eggs will be

hatching soon. Insecticide applications should be targeted to control newly hatching larvae and should be initiated when early signs of larval feeding occur or when vines begin to run. To be effective, sprays or dusts need to penetrate the canopy to obtain good coverage of the vines. Plants should continue to be monitored for additional squash vine borer activity. Adequate control may require multiple applications on an application interval specified on the product label. Also, apply pesticides late in the afternoon to minimize exposure to honeybees.

When purchasing pesticides, be aware that name brands of homeowner pesticides change frequently, so always check the active ingredient of any pesticide before purchasing it. You will find the active ingredient listed on the front of the label. Also be sure to check the label for the pre harvest interval. This is the amount of time you must wait after spraying a crop before you can pick it. The following insecticides are examples of materials that are available to homeowners and will provide adequate control of squash vine borers if applied properly:

Homeowner Insecticides for Squash Vine Borer Control

Homeowner Squash Vine Borer Control in Pumpkins and Squash				
Insecticide active ingredient (%)	**Trade Name**	**Days to Wait to Harvest**	**Days to Wait Before Reapplication**	**Maximum Number of Applications per Season**
acetamiprid (0.05%)	Ortho Flower Fruit & Vegetable Insect Killer	0	5	5
bifenthrin (0.3%) + zeta-cypermethrin (0.075%)	Ortho Bug-B-Gon Insect Killer for Lawns & Gardens	7	7	-
esfenvalerate (0.425%)	Bengal Lawn & Garden Insect Control Concentrate Monterey Bug Buster II	3	7	-
permethrin (0.25%)	Bayer Advanced Complete Insect Dust for Gardens Bayer Advanced Complete Vegetable & Garden Insect Dust Martin's Viper Insect Dust Gordon's Garden Guard Insecticide	0	-	8

Organic Squash Vine Borer Control

Squash vine borer damage can be devastating to pumpkins and squash. Protect your patch by learning how to recognize damage before it's too late, and by handpicking, deworming the vines, and using row covers. At the first signs of the sawdust like frass, vines may be dewormed by slitting the vine lengthwise near where the damage is found and physically removing the borers. The stems should be immediately covered with earth. Sanitation is also important. After harvest is complete, vines should be removed from the garden and composted to prevent the remaining borers from

completing larval development. Burying a few nodes along each vine will encourage rooting at these nodes. This will lessen the impact if squash vine borers girdle the base of the vine.

Commercial Insecticides for Squash Vine Borer Control

Squash Vine Borer Control in Commercial Production Pumpkins and Squash			
Insecticide, Mode of Action Code, and Formulation	**Amount of Formulation Per Acre**	**Restricted Entry Interval (REI)**	**Pre harvest Interval (PHI) in Days**
acetamiprid, MOA 4A (Assail) 30 SG	5.3 oz	12 hrs	0
chlorantraniliprole 4.63%, MOA 28 + lambda-cyhalothrin 9.26%, MOA 3 (Voliam Xpress)	6.0 - 9.0 fl oz	24 hrs	1
flubendiamide, MOA 28 (Belt) 4SC	1.5 fl oz	12 hrs	1
*pyrethroids, MOA 3		*See table below for list of registered pyrethroids and REI.	*See table below for pyrethroid pre-harvest intervals PHI

*Pyrethroid Insecticides Registered for Commercial Cucurbit** Production						
Common Name	alpha cypermethrin	bifenthrin	esfenvalerate	lambda cyhalothrin	permethrin	zeta cypermethrin
Example Product	Fastac	Brigade	Asana XL	Karate/Warrior II with Zeon Tech	Pounce	Mustang Max
(REI)	(12 hrs)	(12 hrs)	(12 hrs)	(24 hrs)	(12 hrs)	(12 hrs)
Preharvest Interval in Days (PHI)	1	3	3	1	0	1
***All pyrethroid products listed in the above table are Restricted Use Pesticides (RUP) ** Cucurbits (Cucumber, Pumpkin, Summer Squash, Winter Squash)**						

All chemical information is given with the understanding that no endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned. Before purchasing or using any pesticide, always read and carefully follow the directions on the container label.

Blister Beetles and Alfalfa Hay

Kelly M. Loftin

Within the last few weeks we have identified a few blister beetles on various plants submitted for identification. I've also received a few beetles from alfalfa samples to identify. Any time beetles are found in alfalfa hay we become concerned. Are they the dreaded blister beetles which are toxic to horses? Of those samples, one contained crushed black blister beetles from alfalfa hay harvested in Kansas. The other samples were intact adult darkling beetles that often infest stored grain and can wander from their breeding site and enter hay stacks. Fortunately, darkling beetles are not toxic to horses and are usually found living, not dead and crushed in an alfalfa flake as are blister beetles. Blister beetle and darkling beetles are easily distinguishable. Blister beetles have a distinct "neck" while the darkling beetle lacks a narrowed neck (Figure 1).

Fig. 1. The blister beetle (left) with its distinct "neck" and the darkling beetle (right) lacking a distinct "neck". Photo by Lee Townsend, University of Kentucky.

Blister beetles belong in the family Meloidae and get their common name because they cause blistering when crushed or held tightly. During disturbance, cantharidin is discharged resulting in the painful blister. Although all life stages of the blister beetle contain cantharidin, we are most concerned about the adult stage because this stage is more likely to result in blistering if we handle one. Adult blister beetles can poison horses if they eat enough of the beetles. Blister beetles in the genus *Epicauta* are more likely to cause cantharidin poisoning (Figure 2). Even within this genus, cantharidin levels vary. The amount of cantharidin per beetle determines the approximate number of blister beetle that would be required to cause cantharidin toxicosis in horses.

Fig. 2. Blister beetles in the genus *Epicauta*

Black Blister beetle (*Epicauta pennsylcanica)*. Photo by Joseph Berger, Bugwood.org

Striped Blister Beetle (*Epicauta occidentalis*). Photo by Univ. of TN

Three-striped blister beetle (*Epicauta vittata*). Photo by Clemson Univ., Bugwood.org

Most blister beetle species have only one generation per year. Adult beetles lay eggs in the soil. Eggs will hatch into blister beetle larvae that can molt several times before transforming into pupa (the overwintering stage). Subterranean grasshopper eggs are important prey for blister beetles in the genus. An abundance of grasshoppers often result in an abundance blister beetles. Adult beetles emerge from the soil throughout the growing season; however, the period of peak emergence varies with the species. Adults feed on alfalfa flowers and foliage as well as soybeans, clover, peanuts, peas, and several weeds (goldenrod, pigweed, puncturevine and others). Blister beetles are gregarious and often congregate in large swarms within alfalfa fields and on other host plants.

The main concern of cantharidin toxicosis is from horses that consume hay contaminated with adult blister beetles. Once contaminated, the hay does NOT lose toxicity because cantharidin remains stable in dead beetles and does not degrade with heat or drying. Because alfalfa is a preferred plant, alfalfa hay is much more likely to contain blister beetles than grass hay. It is also less likely for horses to consume enough blister beetles while grazing to cause significant problems. Remember, live beetles emit cantharidin when crushed or handled which will result in a painful blister that will help deter live beetle consumption.

Using Table 1, we can get a rough estimate of the number of beetles it would take to kill a horse. The table shows that cantharidin levels vary widely and the actual number of beetles in the hay is very important. Depending upon the species, it can take tens to hundreds of beetles to cause toxicosis in horses. The two species that pose the most risk for livestock poisoning are the three-striped blister beetle (*Epicauta vittata*) and the striped blister beetle (*Epicauta occidentalis*). Another very important factor leading to blister beetle contamination is the tendency of blister beetles to congregate. Contamination of hay usually occurs when beetles are crushed during the crimping process or if beetles are crushed by equipment wheels prior to baling. For example, if an abundance of beetles congregated on a plant and were killed by the crimper or a conditioner, lethal numbers of blister beetles could occur in a single flake of alfalfa hay.

Table 1. Estimated number of beetles for a lethal (1 mg/kg bw) dose of cantharidin.

	Horse Weight (lbs)			
	250	500	800	1200
Cantharidin (mg / beetle)	**Number of Blister Beetles**			
0.5 (other blister beetles)	227	450	719	1090
5.0 (striped blister beetles)	23	45	72	109

Adapted from: L.H. Townsend, University of Kentucky.

Concerns about blister beetle contamination of alfalfa hay cannot be totally eliminated. However, specific harvesting practices can reduce the risk of blister beetle contamination. These practices include:

1. Cut hay without using crimpers (additional drying time may be required).
2. Use a sickle mower without a conditioner (usually slower and can allow time for beetles to get out of the way).
3. Avoid driving equipment on cut hay (helps prevent crushing beetles into the hay).
4. Cut hay prior to 10% bloom (hay cut in the early bloom stage minimizes beetle attraction to the flowers).

5. Match the cutting with the market (normally, first cutting alfalfa (May) and late September alfalfa are before and after the major blister beetle season and are the best cuttings to target for horse owner buyers).
6. Recognize blister beetles and understand their biology and behavior.
7. Effectively manage broadleaf weeds because blister beetles are attracted to blooms.
8. Thoroughly inspect and scout fields just before and during harvest to detect blister beetle presence.

Chronic Wasting Disease Regulations & Human Health

Becky McPeake

Chronic wasting disease (CWD) was first reported in January 2016 after a normal, healthy-appearing elk was harvested in October 2015 and tested positive. Soon after, the Arkansas Game and Fish Commission (AGFC) conducted a surveillance program to determine prevalence and distribution of this cervid-specific (e.g., deer and elk) disease. New regulations have taken effect statewide and in a ten county area where chronic wasting disease is believed to occur. These regulations are an attempt to contain the disease and prevent its transmission to other cervids in the state and region. The CWD Management Zone encompasses Boone, Carroll, Johnson, Logan, Madison, Marion, Newton, Pope, Searcy, and Yell Counties. In these counties, it is unlawful to feed deer and elk except when hunting on private land from September 1 – December 31. Feeding deer in a concentrated area is thought to accelerate disease transmission between animals, but biologists also desire higher deer/elk harvests in the CWD Management Zone to decrease disease incidence and transmission. Incidental feeding of wildlife from active livestock operations is allowable. Baiting nuisance wildlife such as feral hogs is allowed *only with approval* of the AGFC Chief of Wildlife Management. It is unlawful to use natural deer/elk scents or lures anywhere in the state, as these may contain prions associated with CWD. Additional regulations about hunting and transporting harvested deer and elk can be found on AGFC's website at www.agfc.com.

Some are concerned about consuming deer harvested both within and outside the CWD Management Zone. According to the Arkansas Department of Health and the Centers for Disease Control and Prevention, there is "no evidence that CWD poses a serious risk to humans or domestic animals," (http://www.agfc.com/hunting/Documents/CWD/CWD-ADHFactSheet.pdf). However, as a precaution, it is recommended hunters wear gloves and debone harvested cervids in the field. Do not cut through bone, the brain, or spinal cord, and do not consume organ meat. If a harvested animal is

suspected of having chronic wasting disease, it should be double bagged in a strong garbage bag and disposed of at a certified landfill with an approved dead animal disposal area. If a hunter wishes to have an animal tested for chronic wasting disease, contact the Arkansas Game and Fish Commission (800-482-9262) for information regarding procedures and submission locations. More information about chronic wasting disease can be found in the fact sheet *Chronic Wasting Disease in Deer and Elk in Arkansas*, FSA9110.

Mimosa Wilt

Sherrie E. Smith

Mimosa trees are common trees in the south. They are valued for their pink flowers and the tropical look they add to landscapes. The biggest disease problem with mimosa is Mimosa wilt, a vascular wilt caused by *Fusarium oxysporum* f. sp. Perniciosum. Symptoms are leaf yellowing and leaf wilt by midsummer. Most infected trees die branch by branch over several months, but some die within a few weeks of starting to wilt. Almost all infected trees die within a year of first wilting. In advanced stages, infected trees ooze a frothy liquid from cracks and grow sprouts on trunks. Brown streaks may be seen in roots and branches. This is a soilborne disease, and unfortunately, not much can be done for a tree with vascular wilt. Never use high-nitrogen fertilizers. A balanced fertilizer (10-10-10) may help alleviate symptoms in infected trees that aren't too far gone. Infected trees should be watered frequently to decrease wilt symptoms, and dead branches should be removed and burned. Two wilt-resistant varieties are available, Charlotte, with light-colored flowers, and Tryon, with deeper red flowers.

Mimosa wilt - *Fusarium oxysporum* f.s. *perniciosum*
(Infected tree with frothy ooze)

Amy Simpson, University of Arkansas Cooperative Extension

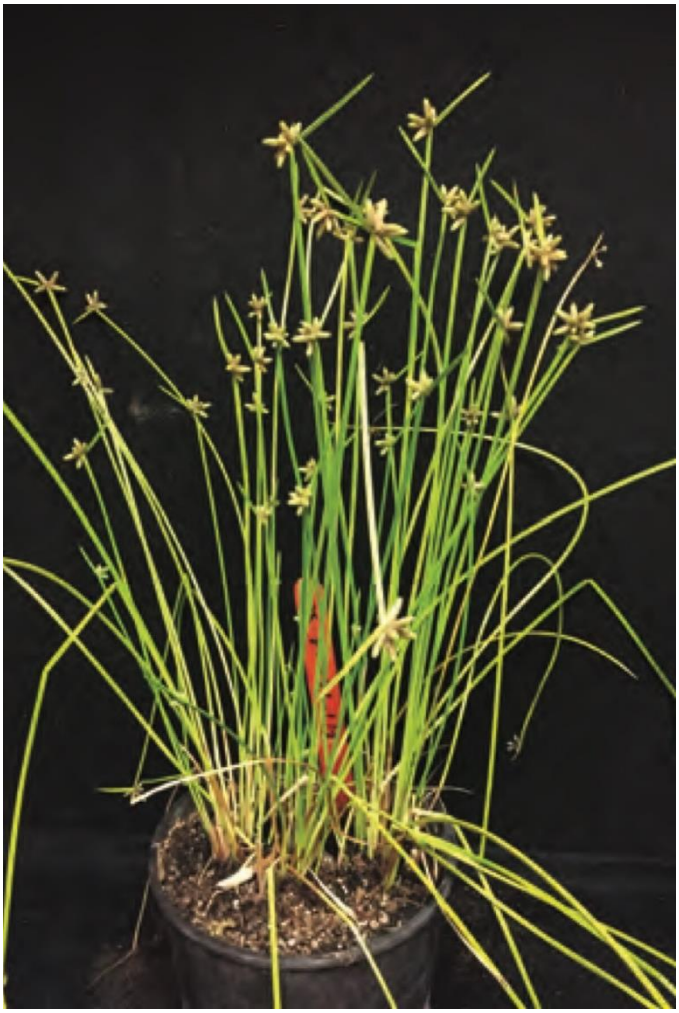
Mimosa wilt - *Fusarium oxysporum* f.s. *perniciosum*
(Branch with brown streaks in vascular tissue)

Sherrie Smith, University of Arkansas Cooperative Extension

Name That Weed

Bob Scott

Although common in Louisiana and California this sedge is relatively new to Arkansas. It is resistant to most ALS herbicides. For more info and ID you might try searching www.uaex.edu! Be the first to email me, Bob Scott at bscott@uaex.edu, with either of two commonly used common names and win a prize.



To The Readers

Please offer any suggestions for Urban or Livestock Integrated Pest Management topics (insect pests, plant diseases, weed problems, wildlife control problems) that you would like to see – *OR* – feel free to submit an article that you have prepared. Kelly and I will be glad to include it (subject to editing). Send feedback to jhopkins@uaex.edu or kloftin@uaex.edu.
