

VEGETABLE CROPS HOTLINE

A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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vegcropshotline.org

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STRIPED CUCUMBER BEETLES - (Rick Foster) - Striped cucumber beetles (see Figure 1) are out in large numbers throughout the state. Cucurbit growers should be scouting their fields on a regular basis for the next few weeks. Remember that muskmelons and cucumbers are susceptible to bacterial wilt, which is vectored by the cucumber beetles. For those crops, the treatment threshold is an average of 1 beetle per plant. Watermelons, squash and pumpkins are much less likely to be affected by bacterial wilt. Therefore, the only concern with those crops is the feeding damage by the beetles. The treatment threshold for those crops is 5 beetles per plant. There are a number of insecticides that will provide excellent control of cucumber beetles. When vine crops are growing as rapidly as they are right now, remember that there will be new, untreated tissue present for the beetles to feed on every few days. That's not much of a concern for watermelon, squash, and pumpkin but for muskmelons and cucumbers the untreated foliage is a potential site for infection with the bacterium. Therefore, when beetle numbers remain above the threshold, re-treating weekly is a good idea.

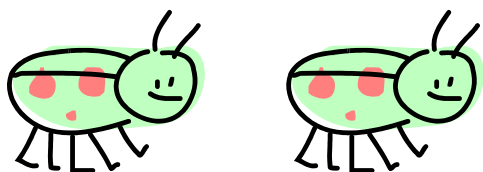


Figure 1: Feeding damage caused by a striped cucumber beetle (see insert) is visible on the underside of one cotyledon of this pumpkin seedling. (Photo by Liz Maynard)



POTATO LEAFHOPPERS - (Rick Foster) - I have heard some reports of infestations of potato leafhoppers. These insects migrate in from southern regions each spring and their arrival is mostly determined by storm fronts that carry them northward. They feed with their sucking mouthparts on a variety of crops, with potato and snap bean being the ones most commonly affected. Monitor for the adults by brushing the plant foliage with your hand and look for the light green hoppers flying away. Look for the nymphs by turning over leaves. The action threshold for green beans is 5 leafhoppers per foot of row and for potatoes is 1 adult per foot of row or 1 nymph per 10 leaves. It is important to scout and treat before you see symptoms. Once the plants start to show the yellowing and curling on the leaves, you have already sustained yield loss. Fortunately, there are a number of effective insecticides. See the *Midwest Vegetable Production Guide for Commercial Growers 2013* (ID56) for details.



SCOUTING REPORT: VEGETABLE DISEASES - (Dan Egel) - Below are some of the vegetable disease problems I have observed recently.

Fusarium crown and root rot of tomato. This disease causes wilting of plants and yellowing of lower leaves. Vascular discoloration can be observed inside the lower stem area, however only a few inches above soil level. A necrotic canker may be observed at soil level.

Management. Practice crop rotation and avoid problem fields. In greenhouse situations, remove symptomatic plants as they appear; remove all plants completely as soon as production is complete for the season. Place all crop debris far away from production areas and do not use the resulting compost for production. Manage crop health by adequate fertilization and fungicide applications.

I am still getting reports of white mold on tomato. This disease causes light-colored necrotic lesions on the stems of affected tomatoes. Often a white mold may be seen growing on the stems. The diagnostic feature is the irregularly shaped, pea sized, black fungal bodies on or inside the stems.

Management. See Fusarium crown rot above.

Several cases of Fusarium wilt of watermelon have been observed recently. Affected plants wilt, often on only one side of a leaf or one vine (see Figure 2). Inside the lower stem, the vascular tissue is often discolored brown. Recent observations have included watermelon cultivars that were thought to have partial resistance. I would like to isolate the Fusarium fungus from such outbreaks, so please contact me about Fusarium wilt of watermelon.

Management. Practice long crop rotations. Partial resistance has been shown in tests conducted at Purdue University and elsewhere. Consult the *Midwest Vegetable Production Guide for Commercial Growers 2013* for details.

Angular leaf spot of cucurbits. The symptoms of this disease include irregularly shaped, dark water soaked lesions. I have never known this bacterial disease to be serious, but it can be confused with bacterial fruit blotch. Therefore, it may be wise to get an official diagnosis.

Management. Usually, no management is required if the disease has been confirmed as angular leaf spot.



Figure 2. Watermelon plants affected with Fusarium wilt often display a wilt of only a portion of the plant. (Photo by Dan Egel)



WEED CONTROL ISSUES IN WET WEATHER - (Liz Maynard) - Wet weather like we've been having can make weed control a challenge. This article discusses some of the issues and herbicide options.

Many herbicides move with soil water, and when there is too much water they often move where they are not wanted. Preemergence herbicides may move deep enough to injure crops with a low margin of tolerance—for instance rain may move Curbit® deep enough to injure seeded pumpkins. And/or the herbicide may move deep enough so that concentration in the weed seed germination zone is not high enough to be effective.

With wet weather, cultivation is often not possible, or is ineffective if uprooted weeds stay moist enough to reroot. Even hand hoeing and handweeding are difficult.

If preemergence herbicides are ineffective, mechanical control isn't possible, and conditions are good for weed germination and growth, a healthy stand of weeds is no surprise.

Weeds that have come up in the early stages of crop growth and remain for weeks are much more damaging to crop yield than later emerging weeds. If the weeds go to flower, they will make much more seed than later-emerging weeds. These are good reasons to make controlling them a priority.

Some general chemical options for postemergence weed control are provided below. Refer to the *Midwest Vegetable Production Guide for Commercial Growers 2013* and product labels for more specific information.

If grasses are a major problem, consider post grass herbicides containing sethoxydim (e.g. Poast®) or clethodim (e.g. Select®). They are labeled for application over the top of many (but not all) vegetable crops.

If broadleaf weeds are the major problem, a nonselective or broadleaf herbicide that is labeled for application between rows only may be the best choice.

Certain glyphosate products are labeled for use between rows of many vegetables with a hooded or shielded sprayer; read the label closely to determine requirements and preharvest interval for your crop. Take care to prevent contacting the crop with the spray; it will injure the crop. Also, take care to avoid spraying glyphosate on plastic mulch. If it is not washed off by rain or irrigation, crop leaves that later contact the mulch can absorb the glyphosate and significant injury may occur.

Some products containing paraquat are labeled for use between rows. Paraquat is nonselective and is a contact herbicide; it moves little in the plant. A disadvantage of the product is that it is highly toxic to people.

Aim® (carfentrazone) kills small broadleaf weeds and may be used with a hooded sprayer between rows of many vegetables.

Selective postemergence broadleaf herbicides are labeled for some crops, including sweet corn, tomatoes, and some cucurbits. Products vary in effectiveness against different weeds so the best control will result if you can identify the major weeds and match a product to them. For instance, Sandea® (active ingredient halo-

sulfuron) applied postemergence doesn't kill common lambsquarters. If that's a major weed in the field, a different herbicide will probably be a better choice.

One benefit of humid and warm conditions is that weeds will absorb postemergence herbicides more readily than if conditions were hot and dry. And those herbicides that are most effective when the weeds are actively growing should perform well while these good growing conditions last.

In some situations it may be desirable to apply a preemergence material between rows to extend weed control further into the season. In pumpkins, for example, Dual Magnum®, Curbit®, Sandea®, Strategy®, or trifluralin products may be applied between rows to help control late-emerging weeds.

Finally, while this article spends a lot of time on herbicides, don't expect them to control everything. Be ready with a plan to get rid of any weeds that survive so they don't go to seed.



STOP THE INVASION! - (*Rebecca Fletcher, NRCS*) - Are you noticing strange and fast growing plants on your property? "Invasive plant" is a name for a species that has become a weed pest, a plant which grows aggressively, spreads, and displaces other plants, and can actually damage existing ecosystems.

Several organizations are working to help private landowners become more knowledgeable of invasive plants and their negative impact on the environment. Here in Indiana several organizations including Cooperative Weed Management Areas (CWMAs), the Indiana Invasive Plant Species Assessment Working Group www.in.gov/dnr/4618.htm and the Midwest Invasive Plant Network mipn.org/ have been established to combat this ever growing and challenging epidemic. The CWMAs are active in educating landowners and tracking invasive plant populations. They hold plant identification workshops and hands-on demonstrations where property owners can become familiar with control methods, tools, and products.

You can prevent the spread of invasive plants by becoming familiar with invasive plants and using control methods quickly. The Natural Resources Conservation Service (NRCS) offers funding to farmers to help control invasive plants through the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentive Program (WHIP). Contact your local USDA NRCS office for more details. Click here for more information about EQIP and WHIP www.in.nrcs.usda.gov/programs/.

In the meantime, here is information on one the most prevalent invasive plants in Indiana, the Asian Bush Honeysuckle.

Bush honeysuckles are upright, deciduous (lose their leaves in winter) shrubs that range from 6 to 15 feet tall

(see Figure 3). Pairs of flowers are seen along stems in leaf axils in late spring to early summer, where the red to orange fruits are produced. Seeds of these shrubs are spread by birds into natural areas where they become invasive, crowding out native plants. They form a dense shrub thicket that competes with native plants for light, water, and nutrients.

Mechanical and chemical methods are the primary means for controlling bush honeysuckles. Hand removal of seedlings or small plants may be useful for light infestations, but care should be taken not to disturb the soil any more than necessary. Hand pulling is best done when the soil is moist to insure removal of the root system. In shaded forest habitats, where exotic bush honeysuckles tend to be less resilient, repeated clippings to ground level, during the growing season are recommended. Clipping must be repeated annually because bush honeysuckles that are cut once and left to grow will often form even denser stands than before cutting.

Seedlings of exotic bush honeysuckles can also be controlled by application of a systemic herbicide, like glyphosate at a 1 percent solution, sprayed onto the foliage or applied by sponge. Well established stands of exotic bush honeysuckles are best managed by cutting the stems to ground level and painting or spraying the stumps with a slightly higher rate of glyphosate (2-3%) or other labeled herbicide (always follow label directions).

Invasive plants are often very beautiful and many are still sold in local nurseries, however there are almost always equally beautiful native plants. Native alternatives to the bush honeysuckle include spicebush, shrub dogwoods, red chokecherry, winterberry and serviceberry.

The West Central Indiana CWMA has developed a series of fact sheets on the most prevalent invasive plants in the area. Click here for more information hhrcd.org/invasives.



Figure 3: Typical Bush Honeysuckle plant growing in a park. (Photo by Bob Eddleman)



HAIL DAMAGE - (This article is modified from one published in issue 537 of this newsletter written by Sarah E. Hulick and Steve Reiners, Department of Horticulture Science, Cornell University, NYSAES. Liz Maynard also contributed to this article.) - Recent storms have brought hail to parts of Indiana. Loss of yield and quality in vegetable crops due to hail depends on the crop, stage of growth, amount of injury, and future growing conditions.

Disease control is absolutely essential after hail damage. Surviving plants will also benefit from a side-dressing of nitrogen about a week after the damage occurred. The following is a summary of all the information we could find relating to hail and vegetable recovery.

Bell Peppers. A study was conducted in North Carolina to determine the impact of hail on the incidence of bacterial spot. The hailstorm occurred 38 days after transplanting when the plants were still young and recovery was possible. Researchers found that a copper plus maneb spray program helped suppress bacterial spot and induce recovery of a young pepper crop from hail damage. Damage from a hailstorm increases a plant's susceptibility to pathogens immensely. Prior to the hailstorm, 53% of unsprayed plants and 13% of weekly and bi-weekly sprayed plants showed symptoms of bacterial spot. After the hail damage all plants showed disease. In unsprayed plots, the combination of hail and early Bacterial spot caused a 6-fold reduction in yield. In sprayed plots the reduction in yield was only 2-fold.

In a jalapeno pepper trial at Pinney-Purdue a few years ago, many of the plants had the main stem broken by hail. Yields from plants with broken stems were about 72% of the yield from plants with undamaged stems.

Tomatoes. Direct damage to fruit can make fruit unmarketable and open fruit up to secondary pathogens. It is best to remove all damaged fruit as keeping unmarketable fruit on the vine wastes the plant's resources. If plant damage is mostly defoliation with some broken stems, recovery can occur. This is especially true for large, indeterminate plants. Harvest may be delayed significantly as it takes about 40-50 days from flowering to ripe fruit. Growers may want to invest in floating row covers to protect the later fruit from an early frost in the fall.

Melons and other vine crops. Defoliation has the greatest negative impact on marketable yield when it occurs just before the canopy covers all bare ground on the plots, or approximately 30-40 days before first harvest. Defoliation decreases the fruit soluble solids concentration, which can make the melons less flavorful. Muskmelons and watermelons have the ability to fully recover from defoliating hail damage if it occurs early in the season, (especially during fast vegetative growth stage) and if the growing season is long enough. Defoliation causes fruit exposure to the sun, sunscalds and premature ripening. All vine crops have some capacity

to compensate for lost leaf area if it happens before vegetative growth slows.

Sweet Corn. In a variety trial hit by hail, sweet corn was at the tasseling stage and suffered shredded leaves. Total yields were reduced by 57% compared to the prior 3-year average. Sweet corn at the 12-18 inch stage experienced the same hail and yields were reduced 42% compared to the 3-year average. In a trial conducted in Delaware, all hail treatments reduced the percentage of marketable ears of sweet corn, except for the light application in the 13th leaf stage (early vegetative) in 1991. In 1992, additional treatments consisting of clipping all leaves were conducted. Clipping leaves at the early silking stage reduced marketable ears, indicating the loss of foliage adversely affected the growth of the ear. Clipping leaves just prior to harvest reduced the yield of Jubilee, but not Silver Queen.

Onions. Defoliation has the greatest impact on total marketable yield and yield of individual market classes when it occurs near the onset of bulbing. The greatest effect the hail damage inflicts on onions is the market class distribution. Jumbos (>3.25") decrease in number and the medium and prepack size distribution increases. Yields of the larger marketable class decrease to a greater extent than the total marketable yield. In a study conducted in Colorado a 67% defoliation at 14, 18, 42, and 56 days before maturity caused a 10%, 52%, 63%, and 51% decrease respectively in jumbo yields. A 33% plant defoliation on the same dates resulted in a 15%, 21%, 17%, and 24% reduction in Jumbo class yields. The medium class makes up for these decreases by increasing in number. Defoliation can delay crop maturity and makes onions more susceptible to disease infection.

Cauliflower. Damage done before budding does not significantly affect the budding process. Later defoliation tends to change the color of the cauliflower heads from white or ivory to a yellowish-white. The yellowing is more pronounced the greater the defoliation and the later the stage at which defoliation occurs. In plants in which the stems get bent back, the heads can be elongated and in some cases deformed. Defects: sunburn, frost damage, warts, and attack by slugs and snails are more frequent in plants with greater defoliation and/or later in the season. Most importantly, defoliation at later stages is going to have a greater adverse effect on number and mass of heads than defoliation at earlier stages. The greatest mass lost from hail damage will occur when heads are between 2-3.8 cm.

Soybeans. We could not find any studies on snap beans but in this Oregon soybean study, 80% defoliation on plants with substantial stem breakage, 5 weeks after planting resulted in a 40% reduction in yield. Plants grew back, but not to full stature.





Food Safety in the Packinghouse: Preparing for a Safe Harvest and Potential Audits in 2013

Indiana Cantaloupe and Watermelon Growers face many challenges as they prepare for the 2013 harvest. The need for a safe harvest and the potential FDA inspections make packinghouse preparation critical.

Workshops will show growers how to better prepare their packinghouses for the upcoming harvest, as well as update them on current FDA inspection activities.

Workshops are offered at three locations:

June 17, 2013
Kamman's Farms
4683 South State Rd. 135
Vallonia, IN 47281
8:00 am – 12:00 pm (EDT)

June 19, 2013
Wonning Farm
3844 S. Decker Rd.
Vincennes, IN 47591
8:00 am – 12:00 pm (EDT)

June 21, 2013
Frey Farms
12090 West 925 South
Poseyville, IN 47633
8:00 am – 12:00 pm (CDT)

***** No high heels. Closed-toe shoes and long pants required at all locations!!!**

If you need a reasonable accommodation to participate in this program, prior to the meeting, contact Scott Monroe at (812) 886-0198 or (888) EXT-INFO.

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CLEAN SWEEP PESTICIDE DISPOSAL - Dates and locations have been set for the 2013 pesticide disposal program. All programs run from 9:00 A.M. to 3:00 P.M. local time.
August 14: Boone County Fairgrounds, Lebanon, IN
August 15: Vanderburgh County Fairgrounds, Evansville, IN

August 20: Miami County Fairgrounds, Peru, IN

August 21: Bartholomew County Fairgrounds, Columbus, IN

August 22: Clark County Fairgrounds, Charlestown, IN

The Clean Sweep project is designed to collect and dispose of unwanted pesticides, whether opened or unopened. It is sponsored by the Office of the Indiana State Chemist (OISC). Disposal is free for up to 250 pounds of material per participant. For amounts over 250 pounds there is a fee of \$2.00 per pound.

To participate, complete the Pesticide Clean Sweep Planning Form and send it in no later than July 29, 2013. Bring the labeled materials, packaged in leak-free and safe-to-transport containers, to the collection site. Do not mix materials.

Complete instructions and forms are available from the OISC website:

www.isco.purdue.edu/pesticide/index_pest1.html. For questions, contact Kevin Neal at (765) 494-1585.



UPCOMING EVENTS

Workshops to Address Food Safety in Packinghouses.

Indiana cantaloupe and watermelon growers face many challenges as they prepare for the 2013 harvest season. Among these challenges is making sure packinghouses are prepared for third party audits and anticipated FDA inspections. During the week of June 17-21, Purdue Extension will be conducting workshops aimed at helping growers to prepare their packinghouses for 2013 season. The workshops will also update growers on current FDA inspection activities and anticipated activities as the cantaloupe harvest moves to Indiana. Speakers will include Drs. Haley Oliver and Amanda Deering from Purdue. The workshops are open to watermelon and cantaloupe growers and will be conducted at the following locations:

June 17: Kamman's Farms, 4683 South State Rd. 135, Vallonia, IN

June 19: Wanning Farm, 3844 S. Decker Rd., Vincennes, IN

June 21: Frey Farms, 12090 West 925 South, Poseyville, IN

Programs are 8:00 A.M. – 12:00 P.M. local time at all locations. Please remember – participants should be sure to wear long pants and closed-toe shoes. No high heels will be permitted. For more information, contact Scott Monroe at (812) 886-0198.

Good Agricultural Practices from A to Z.

Wednesdays, July 10, 17 and 24, 6:30 – 9:00 P.M. Eastern time at the following locations:

Grant County, Ivy Tech Community Rooms #164/165, 261 South Commerce Drive, Marion. Contact: John Woodmansee, jwoodman@purdue.edu, (765) 651-2413.

Hancock County Extension Office, 802 N. Apple St., Greenfield. Contact: Roy Ballard, rballard@purdue.edu, (317) 462-1113.

Johnson County Fairgrounds Education Room, 484 N. Morton St; Franklin. Contact: Sarah Speedy, sspeedy@purdue.edu, (317) 736-3724.

Lake County Extension Office, 880 East 99th Ct, Suite A, Crown Point. Contact: Nicole Witkowski, nikky@purdue.edu, (219) 755-3240.

Monroe County Extension Office, 3400 S. Walnut St., Bloomington. Contact: Amy Thompson, afthompson@purdue.edu, (812) 349-2575.

Hendricks/Morgan County, Hoosier Organic Marketing Education, 8370 S SR 39, Clayton. Contact: Cissy Bowman, cvo@earthlink.net, (317) 539-2753.

Please email jellett@purdue.edu or your host (above) if you are interested in attending, need special accommodations to participate or if you have questions. Registration is due on or before July 5 and costs \$30 per person and \$10 for each additional person from the same farm. Participation at a hosted site is required at all three sessions to receive a certificate of attendance. Those who would like to join from another location with high-speed internet connection are welcome to do so at no charge.

Participants can register online or download a registration form at ag.purdue.edu/hla/fruitveg/Pages/Events.aspx



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