

# VEGETABLE CROPS HOTLINE

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

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### CUCUMBER BEETLES IN SOUTHWESTERN INDIANA -

(Frankie Lam) - The following article was written as a *Vegetable Crops Hotline - BULLETIN*, May 03, 2006.

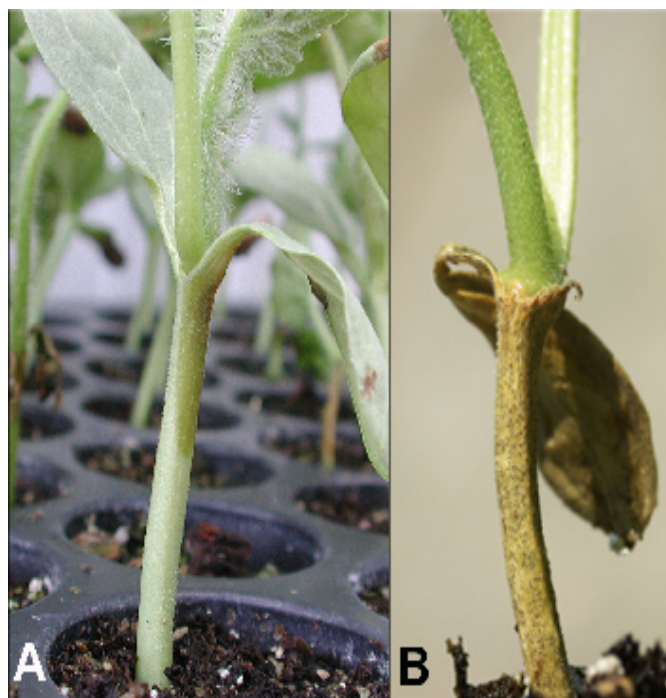
Overwintered cucumber beetle populations were observed on cucurbits on May 3 at the Southwest Purdue Agricultural Center near Vincennes. Both striped and spotted cucumber beetles have been found on plants and on yellow sticky traps. This is one of the earliest years that spotted cucumber beetles were observed in fields in southwestern Indiana. 50 plants of cucumber (Calypso), muskmelon (Eclipse), Summer squash (Cash-Flow F1), and watermelon (Royal Sweet) were randomly scouted for cucumber beetles at the Center, the average number of beetles per plant were 0.64, 0.52, 1.16, and 0.14, respectively. Furthermore, five yellow sticky traps, which were placed in between rows of cucurbits, had an average of 4.8 beetles per trap. As we predicted in the article, *Winter Temperatures (2005-2006) and Insect Survival in Indiana*, (VCH issue #462), the overwintered insect populations in this early spring would be relatively higher than those of last spring. Growers should scout more frequently for those insects with early populations that are economically important on crops.

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**EARLY SEASON DISEASE REPORT** - (Dan Egel) - The diseases that I have observed so far this season are described in the following article along with photos.

**Gummy stem blight of muskmelon and watermelon** - This disease has been observed in transplant greenhouses. Leaf lesions come in a variety of shapes. Older lesions may have a ring-like structure. Lesions

on watermelon tend to be darker than those on muskmelon. The diagnostic feature on either crop is a water-soaked region immediately below the seed leaves which eventually turns brown and woody; small, round, black structures about the size of a period develop on the woody stems (Fig. 1). Gummy stem blight may rapidly spread from infected to healthy seedlings, leaving a roughly circular area of infected plants.



**Fig. 1.** The diagnostic feature of plants affected with gummy stem blight in the greenhouse is a water-soaked area just below the seed leaves (A) which turns woody (B). Note the dark fungal structures present in (B). (Photo by Dan Egel)

The fungus that causes gummy stem blight may gain entrance to a greenhouse through contaminated seed or diseased transplants. Alternatively, last year's transplant trays or other implements/tools may harbor the fungus. If the disease is confirmed in the greenhouse, all trays with diseased transplants as well as surrounding trays should be discarded. Remember, the disease has almost surely spread to apparently healthy transplants. Few fungicides are labeled for the greenhouse - read the label carefully.

**Fusarium wilt of watermelon** - I have observed this disease on transplants being hardened off outside the greenhouse. Often the first symptom seen is a wilt. Gradually the true leaves, seed leaves and stem will die-back (Fig. 2). Fusarium wilt usually has limited spread in the greenhouse; therefore wilted seedlings are usually randomly distributed and not found in clusters.

Fusarium wilt of watermelon may be seedborne. Therefore, this disease may be introduced on contaminated seed or diseased transplants. The fungus that causes Fusarium wilt forms resilient spores that will survive well in soil, tools, or old transplant trays.



**Fig. 2.** The true leaves of watermelon plants with Fusarium wilt gradually die-back. (Photo by Dan Egel)

**White mold of tomato** - This disease is not unusual on tomatoes in the field, however, recently this disease was observed on greenhouse transplants. The tomato seedlings I observed had a light brown discoloration on the stem. Many symptomatic seedlings had broken off at the discolored area (Fig. 3). When I incubated portions of the stem, several small, black objects developed. These survival structures of the fungus are diagnostic for the fungus that causes white mold or timber rot of tomatoes.



**Fig. 3.** Tomato transplant with a light brown discoloration on the stem caused by white mold (timber rot). Note the white mold present on the stem. *Inset Left:* The diagnostic feature of white mold are the dark, irregular fungal structures found on or in the stem known as sclerotia. (Photo by Dan Egel)

**Angular leaf spot of watermelon** - I have not observed this disease on muskmelon this year although I have in previous years. Symptoms of this disease include irregular leaf lesions. Often the lesions run down the leaf (Fig. 4).



**Fig. 4.** The dark, irregular lesion typical of angular leaf spot of watermelon. (Photo by Dan Egel)

Fortunately, this disease never seems to cause severe losses. As soon as the plants are planted in the field, the disease disappears. The bacterium that causes angular leaf spot prefers cool weather and will not cause disease when the season warms up. Although a fixed copper application may be warranted in the greenhouse, in most cases, no control options are called for.

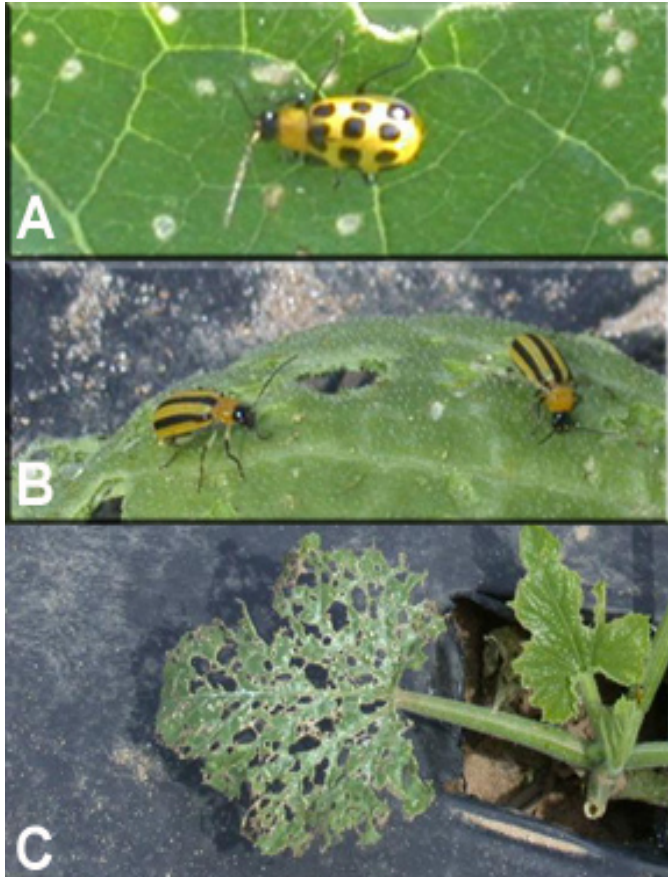
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**INSECT PESTS ON VEGETABLES AND MELONS IN SOUTHWESTERN INDIANA DURING THE EARLY SEASON OF 2006** - (Frankie Lam) - Striped and spotted cucumber beetles, Colorado potato beetle, flea beetles, potato leafhopper,



and aphids were observed on vegetables and melons in southwestern Indiana during early May. Most insect numbers observed on crops were not relatively high, except cucumber beetles which had reached the economic thresholds on cucurbits.

**Cucumber beetles on cucurbits** - Both spotted (Fig. 1a) and striped (Fig. 1b) cucumber beetles were found on cucurbits, including muskmelon, watermelon, cucumber, and summer squash at Southwest Purdue Agricultural Center on May 3. Adult cucumber beetles feed on cotyledons, leaves (Fig. 1c), and stems of cucurbits. A relatively high number of beetles with an average of 10.5 beetles per plant were counted on muskmelons the next



**Fig. 1.** (A) Spotted cucumber beetles feeding on the leaf of a muskmelon, (B) striped cucumber beetles feeding on the cotyledon of summer squash, and (C) leaf damage caused by cucumber beetle feeding. (Photo by Frankie Lam)

day. On May 5, the average number of cucumber beetles on the yellow sticky traps placed at the Center was 140 beetles per trap. The economic threshold for cucumber beetles on muskmelons is 20 beetles per trap or 1 beetle per plant for direct scouting, whereas for watermelon and squash it is 5 beetles per plant. For cucumber the economic threshold may be 1-5 beetles per plant, which depends on the feeding injury on leaves or cutting the stems of transplants. Muskmelon and cucumber are susceptible to bacterial wilt, but watermelon and squash are not. Moreover, the adult beetles highly prefer to feed on the stems of cucumber and decrease the plant stand in fields. About 20% of the cucumber transplants

of my study were killed by the beetles feeding on stems. Growers having cucurbits transplanted in fields should scout frequently for the beetles and manage the pests when their numbers reach the economic threshold.

**Colorado potato beetle and potato leafhopper on potato** - Colorado potato beetle and potato leafhopper were observed on potato. About 0.1 egg masses (Fig. 2 inset) and 0.03 adults (Fig. 2) of Colorado potato beetle were found per potato plant at the Center on May 5. Furthermore, a few adult potato leafhoppers were also observed on plants. Although the numbers of these two insects were not relatively high in fields, growers should pay attention to their numbers on potatoes.



**Fig. 2.** Colorado potato beetle feeding on a potato leaf, Inset left: egg mass on the underside of a potato leaf. (Photo by Frankie Lam)



**Fig. 3.** Flea beetles on eggplant. (Photo by Frankie Lam)

**Flea beetles on vegetables** - Flea beetles (Fig. 3) were found on cabbage, eggplant, and potato. There are many species of flea beetles, including crucifer flea beetle, eggplant flea beetle, potato flea beetle, spinach flea beetle, and striped flea beetle, feeding on veg-

etables; however, all species has enlarged hind legs and jump like a flea when disturbed. There is no economic threshold for flea beetles on Cole crops, but for eggplant, potato, and tomato, insecticide application should be considered if more than 2 beetles per plant were found on transplants or young plants. Adult flea beetles feed on both the upper and lower surfaces of leaves. The beetles usually chew small, circular holes on leaves and give a "shotgun" appearance to leaves.

**Aphids on vegetables and melons** - Winged and wingless individuals of aphids (Fig. 4) were observed on cabbage, potato, and melons. Green peach aphid and melon aphids are pale to dark green; whereas potato aphids are pink in color. Only small colonies of aphids were found on plants and mummy aphids and lady beetle adults were commonly found in the colonies that I sampled. Careful observation of aphid colonies is recommended before the decision on insecticide applications.



**Fig. 4.** Aphid colony on the underside of a watermelon leaf, note the mummy aphids with large abdomens and tan brown color. (Photo by Frankie Lam)

Since some economically important insect pests were observed on vegetables and melons, sampling the pests and making early decisions on management can preserve yield potential. Insecticides applied for the control of insect pests on vegetables and melons are listed on the Midwest Vegetable Production Guide for Commercial Grower 2006 (ID-56) <[www.entm.purdue.edu/entomology/ext/targets/ID/index.htm](http://www.entm.purdue.edu/entomology/ext/targets/ID/index.htm)>. Follow insecticide label directions carefully before using any pesticides.

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#### **TEMPERATURE IN THE GREENHOUSE - (Liz Maynard)**

- Keeping temperatures within the desired range is important for successful transplant production. Temperatures that are too low can lead to slow germination, increased root disease, and slow growth. Temperatures that are too high can lead to spindly plants (see 'Leggy Transplants' article VCH Issue 419) or faster growth than desired. This article addresses two important components of temperature management.

The placement and housing of thermostats that control heaters, fans, and vents determine what temperature is maintained in the greenhouse. Ideally the temperature sensed by thermostats will be the same as experienced by the seedlings growing in the greenhouse. This requires that thermostats be placed near center of the greenhouse at the same height as the seedlings. A thermostat that is exposed to direct sun can heat up and register a temperature higher than the surrounding air. To avoid this, place thermostats in a shaded area, or better yet, enclose them in a light-colored case with a fan that will pull air from outside the case over the thermostat (Fig. 1).



**Fig. 1.** Example of thermostats in a box with a fan. Box will be painted white. (Photo by Liz Maynard)

A second component of temperature management is periodically checking the temperature. Max-min thermometers are useful for keeping a record of the extremes. Thermometers should be placed near plants and out of direct sun. Temperatures vary in different areas of the greenhouse, so consider having several thermometers.

For more information on heating and cooling greenhouses, see articles by J. Bartok from Univ. of Massachusetts on "Selecting and Maintaining Thermostats" and "Greenhouse Ventilation", available at <[www.umass.edu/umext/floriculture/fact\\_sheets/greenhouse\\_management.html](http://www.umass.edu/umext/floriculture/fact_sheets/greenhouse_management.html)>.

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**FARM MANAGEMENT TOUR - (Announcement)** - The Indiana Farm Management Tour in Hamilton and Madison Counties will be held on June 28 and 29, 2006. See details below.

#### **Wednesday June 28, 2006**

1) Smith Family Farm, Madison County - Registration at the farm beginning at 12:30 p.m. (Eastern Daylight Savings Time [EDST]). Interview at 1:00 p.m. Mini-tours starting at 1:45 p.m. on developing and marketing an agri-tourism enterprise; dairy replacement heifers as a specialized livestock enterprise; and pumpkin cropping in Indiana.

The Smiths have combined their location on the rural-urban fringe with family member expertise in agriculture and education to create a complementary



and growing enterprise in agricultural tourism. The educational agri-tourism enterprise has provided a means of rewarding family members' entrepreneurial and education skills at a competitive level. This is thanks to past decisions by the management, for whom careful assessment of returns to available assets, including personnel skills, has been a guiding principle for enterprise changes. Learn how the Smiths converted an 80-year tradition of milking to a profitable dairy replacement heifer operation and used the knowledge gained from a small agri-tourism-related pumpkin patch to expand pumpkin production into a large alternative crop enterprise.

2) Flanders A-Maizing Grain, Inc.; F & L Farms, Inc., Hamilton County - Interview at 3:00 p.m. (EDST). Mini-tours starting at 3:40 p.m. on on-farm quality assurance; choosing the right business entity for your farm; and vertical tillage, residue management, and land leveling in no-till.

Perhaps the biggest challenge facing farm operators is how to operate profitably in an environment where farmland values and rents continue to increase. Flanders A-Maizing Grain is a successful mid-sized, multi-generational family farm located near Indianapolis that has positioned itself strategically to address this challenge. During the visit, we'll learn how the Flanders have chosen to pursue quality-focused production rather than quantity-focused production by having 100% of their acres under contract. Another challenge is planning for a child to return to the farm when there is limited opportunity to expand crop acreage. We'll learn about how the Flanders planned Jim Jr.'s entry into the farm business.

3) Evening Program, Hamilton County 4-H Center, 7:00 p.m. (EDST). Visit with Heartland Growers, a family-owned wholesale greenhouse located in Westfield, IN that specializes in geraniums in the spring and poinsettias in the fall.

#### **Thursday June 29, 2006**

4) Shuter Sunset Farms, Inc., Madison County - Registration at the farm begins at 8:00 a.m. (EDST). Mini-tours starting at 8:15 a.m. on strip tillage; beef production, financing swine production with FSA's Loan Programs; contract production of popcorn and seed beans; precision farming technologies; and combine leasing.

Shuter Sunset Farms, Inc. has the appearance of a traditional operation, raising corn and soybeans and feeding cattle and hogs, the mainstays of Midwest agriculture. But a closer look reveals that innovation is being applied in each of these enterprises to add value, control costs, and reduce risks. Long-time no-tillers, Shuters are now using a strip tillage system in corn to accurately place nutrients, save soil, and increase yields. Inputs are applied precisely based on site-specific information. This year corn will replace some of the soybeans on Shuter land, prompting changes in combine ownership and their grain handling system. In their livestock operation, the Shuters have been active in promot-

ing the Indiana Farm Fresh Beef program. Experience how the four families and three generations of Shuters keep all of these and other enterprises moving forward.

5) Rulon Enterprises, Hamilton County - Mini-tours starting at 10:45 a.m. (EDST) on the real economics of no-till; smart drainage; and preparing the next generation to be even more successful than you were.

Rulon Enterprises, a partnership, is the umbrella organization for seven different business units or profit centers. Every business unit has to make money, and every asset must pay its own way. The Rulons believe that there are tremendous opportunities in agriculture, but that the best profit opportunities in a farm business aren't necessarily in those activities that large numbers of people can do well, like growing corn. According to the Rulons, one thing that really distinguishes them is their focus on business planning and analysis. This focus has led the partners to useful insights about what makes their business successful. Don't miss this opportunity to explore their management philosophy.

Lunch, Rulon Enterprises - 12 noon (EDST). Lunch may be purchased for \$10 per person (\$4 for children 3-12 years old). Please bring cash or a check (no credit cards). Pre-register for lunch (and an optional Beck's Hybrids tour described below) by Wednesday June 21 by calling 1-888-EXT-INFO, or by calling Purdue Extension in either Hamilton County (317) 776-0854 or Madison County (765) 641-9514. Dr. Chris Hurt, Purdue Extension Marketing Specialist, will update the market outlook for grains, soybeans, and livestock after lunch is served. The tour of Rulon Enterprises ends at 2:30 p.m.

6) Join Purdue Extension Farm Management Specialist Alan Miller and Indiana Farm Management Association Director Steve Gauck for a post-farm-tour visit to Beck's Hybrids at 3:00 p.m. (EDST).

Hotels in Noblesville, IN: Fairfield Inn, (317) 776-9900; Quality Inn, (317) 770-6772; There are also several Bed & Breakfast Inns and Campgrounds in the Noblesville area. For information call the Hamilton County Convention and Visitors Bureau (800) 776-8687.

The Farm Management Tour will be held rain or shine! Remember to pre-register by June 21!

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**DATABASE PROVIDES PESTICIDE INFORMATION** - (*Announcement*) - Spring means tending yards and gardens as well as crops, and along with these activities comes the task of keeping pests out. "Purdue maintains a database to make the chore of selecting the appropriate pesticide a more manageable task," said Victoria Cassens, systems analyst for the Center for Environmental Regulatory Information Systems (CERIS) at Purdue University.

The National Pesticide Information Retrieval System (NPIRS) database contains information about registered pesticides at the state and federal levels. The Web site is free to access. The database is searchable by active ingredient, site of application, pest to be controlled, Environmental Protection Agency registration number, product

name and company name. For more information read:  
<[www.agriculture.purdue.edu/agcomm/agnews/public/story.asp?newsid=1398](http://www.agriculture.purdue.edu/agcomm/agnews/public/story.asp?newsid=1398)>.

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**DEPARTMENT OF LABOR - (Announcement)** - Are you looking for answers to your labor and wage questions? Don't forget to check out the Department of Labor website at <[www.dol.gov](http://www.dol.gov)>. From there you can navigate to the many divisions within the Department to find answers to your questions.



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**MARK YOUR CALENDAR! - (Announcement)** - Raising vegetables and Civic Values : CSA in the 21<sup>st</sup> Century. A Conference for Community Supported Agriculture (CSA) will be held on November 10-12, 2006. It will be at the Kettunen Center, Tustin, MI (just south of Cadillac).

We are building on the success of the CSA Conference held in 2004 at this location, also sponsored by CSA-MI. Look to the website for the latest news. Workshop planning is underway, and registration pricing and downloadable registration packets will be available soon. Some scholarships will be available to help with cost; applications on the website. We expect another capacity crowd, so register early!

Workshops for experienced and new CSA farmers, CSA wannabes, small farm advocates, community food/health advocates, educators and extension personnel will be held. Speakers like visionary, author and journalist Steven McFadden (*Farms of Tomorrow Revisited*) and farmer/poet/author Scott Chaskey (Quail Hill Farm and *This Common Ground*). PLUS an intensive 1/2 day mini-school for new and prospective CSA growers to learn the basics!

The mini-school will be held before the regular conference begins, for an additional modest cost (yet to be determined). We will bring in experienced growers and teachers for the mini-school. Please let us know if you are interested in this (or know someone who would). Attendance will be limited to 25 or 30, but we will need a minimum number (probably 15) to make it work.

Join in good company to celebrate good soil, good work and good food. In order to get on our mailing list: CSA-MI, 3480 Potter Rd, Bear Lake, MI 49614 or you can call (231) 889-3216 (toll free (877) 526-1441). You can visit us on the web at <[www.csafarms.org](http://www.csafarms.org)>.

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