

# VEGETABLE CROPS HOTLINE

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

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**HORNWORMS ON TOMATOES -** (Frankie Lam) - Hornworms have been found on tomatoes during early July at Vincennes. Sixty hornworms were found on 550 tomato plants scouted on July 12 at the Southwest Purdue Agricultural Center. Most of the caterpillars found were medium to large size. Hornworms are one of the most destructive and widely distributed insect pests of tobacco and tomato plants. The caterpillars consume large amounts of foliage and occasionally feed on tomato fruits.

Two species of hornworms occur throughout most of the United States. The tobacco hornworm has seven diagonal stripes on each side of the body and the horn is slightly curved and red, whereas the tomato hornworm has eight curved stripes and the horn is straight and black. Their horns are unable to sting a person in any way. Both species attack tomato, tobacco, eggplant, pepper, potato, and related weeds. All the hornworms found at the Center feeding on the tomato plants were tobacco hornworms. The caterpillars are usually green, and attain a length of 3-4 inches when fully grown. The hornworms pupate in soil. Their adults are swift-flying hawk moths or hummingbird moths. They fly at dusk and suck nectar by hovering about beds of flowers.

Although hornworms may cause severe damage on some plants in the field, they usually do not occur in large numbers. During mid season and in home gardens, the best management tactic for hornworms is by handpicking. A parasitic wasp is an important natural enemy of the hornworms. The wasps lay their eggs inside the body of the caterpillars. After feeding within the cater-

pillar body, the larvae of the wasps eat out through the skin and spin the cocoons on the caterpillar surface. The adult wasps later cut out circular lids and escape from the cocoons to attack other hornworms. Hornworms with cocoons of parasitic wasps on their back should not be killed.

To avoid hornworm damage, you need to examine your tomatoes for the presence of hornworms,

feeding damage, or worm frass (worm excrement). During a warm day the caterpillars usually hide under the leaves in the lower portion of the tomato plant or in the plant debris. However, their frass can be seen easily on leaves or fruit. The best time to sample the caterpillars is in the morning or in the evening when the temperature is cool. The economic threshold for hornworms is 0.5 larva per plant. Warrior, Baythroid, Guthion, Sevin, Asana, and some *Bacillus thuringiensis* insecticides (Agree, Biobit, Dipel, Javelin, and XenTari) are labeled for the control of hornworms. Follow label directions carefully before using any pesticides. Furthermore, fall plowing may destroy many of the overwintering hornworm pupae in the soil.



**SPECIALTY BLOCK GRANTS AWARDED -** (Chris Gunter) - The following is a partial list of the organizations and groups that received USDA block grants for specialty crops and agricultural promotion of interest to vegetable growers. The grants are the result of a 2001 decision by Congress to authorize supplemental funding in response to the continuing economic crisis adversely affecting American agricultural producers. Special assistance was targeted to specialty crops in proportion to each state's percentage of total U.S.

production of fruits, vegetables and nuts. In Indiana, \$660,000 was made available for specialty crops and \$500,000 for the promotion of agriculture.

USDA allowed states to choose how they would handle the supplemental funds. Indiana's Office of the Commissioner of Agriculture (OCA) decided a grant program that directly benefited the state's agricultural industry was the best way to go. A group coordinated by OCA selected the winning projects through a competitive process. The grant awards will go to farmers, commodity groups, cooperatives, not-for-profits and other initiatives. A complete list can be found in the News section of the Indiana Commissioner of Agriculture website at <http://www.in.gov/oca/>.

Develop alternative uses for small tobacco acreage in southeastern Indiana - \$3,247.00 - Denise L. Dailey, Deputy, IN. This project will serve as a model for other Indiana growers seeking to diversify and expand production from tobacco to specialty crops such as lettuce, ethnic vegetables, specialty greens and microgreens.

Establish a specialty growers production and marketing initiative - \$35,100.00 - Historic Hoosier Hills RC&D/Jennings County Growers Cooperative Inc., North Vernon, IN. This initiative will create a comprehensive education and market development program in Jennings County by providing local growers with coordinated state-of-the-art production, marketing and business training.

Develop educational seminars entitled "Organics on the Road: Bringing the New Organic Regulations HOME to Hoosiers" - \$18,200.00 - Hoosier Organic Marketing Education, Clayton, IN. "On the road" educational seminars will be developed to educate Indiana's certified (and potential) organic farmers on regulatory compliance with the new national and Indiana organic regulations.

Develop an Indiana agriculture/horticulture labor law compliance manual - \$11,100.00 - Mid America Ag and Hort Services, Inc., Columbus, IN. This project will provide Indiana specialty crop producers with a comprehensive Indiana agriculture/horticulture labor law compliance manual and Web site.



Research honeybee breeding for mite resistance - \$43,304.00 - Purdue University, West Lafayette, IN. Research will be done to breed bees resistant to parasitic mites that have decimated bee populations in the state. Honeybees are critical for pollination of Indiana blueberries, cantaloupes, watermelon and cucumbers, and other crops.

Establish an Indiana fruit and vegetable Web site - \$28,879.00 - Purdue University, West Lafayette, IN. Education is the goal of this project that will establish and maintain a Web site for fruit and vegetable growers. The purpose is to strengthen the Indiana fruit and vegetable industry by making it easier to access relevant technical information and communicate with others in the industry.

Research site specific weed management for Indiana mint production - \$39,927.00 - Purdue University, West Lafayette, IN. Research will be done to develop weed management programs for mint. The results will present an opportunity to provide outreach and education programs to ensure the stability of Indiana mint production.

Educate Indiana Specialty Crop Growers - \$15,751.00 - Purdue University, West Lafayette, IN. This project will increase the quality and availability of information concerning specialty crop production, marketing and regulatory compliance through expansion and enhancement of the Indiana Horticultural Congress' (IHC) speakers.

Switch from bulk to specialty crop production - Huffman & Hawbaker Cabbage Farms - \$8,995.00 - TriBond Farms, Inc. - Levi J. Huffman, Lafayette, IN. The goal is to establish a model that can be used by other producers as some farmers switch from bulk commodity production to specialty crops.

Create a specialty crop direct marketing interactive Web portal - \$50,000.00 - Truitt Communications LLC, Indianapolis, IN. The purpose of this project is to develop, build and operate an interactive web portal that matches Indiana specialty crop producers who want to direct market their products to consumers - with those consumers interested in buying directly from the farm.

Support Abundant Harvest of Indiana - \$25,000.00 - Abundant Harvest of Indiana, Inc., Fountaintown, IN. Bringing fresh fruits and vegetables to Indiana food banks is the goal of this project. This will be done by offering to pay expenses for harvest, grading, packing and delivery of produce to food banks.

Establish a community farmers' market - \$45,332.00 - Center for Agricultural Science & Heritage, Inc., Indianapolis, IN. A comprehensive statewide resource network will be developed to explore establishing a community farmers' market. A staff person hired by the center will develop forums, networks, databases and materials for an infrastructure on community farmers' markets.

Develop and promote a tri-state horticultural growers' conference - \$10,000.00 - Historic Hoosier Hills RC&D, Versailles, IN. A tri-state horticultural growers conference will be developed to promote the use of horticultural specialty crops, and to bring together growers from southeastern Indiana, southwestern Ohio and north central Kentucky to discuss ways to improve production and develop multi-state regional marketing initiatives.



**SPREAD THE WORD - ID Required** - (*Cheri Janssen*) - A government issued photo ID is required at all pesticide exam sites - at Purdue University campus, at regional sites for private applicators, and at remote exam-by-computer sites. A photo-exempt ID from the Bureau of Motor Vehicles will be accepted if religious beliefs do not allow personal photographs.

People needing a private pesticide applicator permit for the first time or to reinstate an expired permit will need to take the pesticide core exam. A private applicator permit allows you to purchase and apply restricted-use pesticides to property you own or control. If you, or family members, employees, or neighbors need a private applicator permit (or commercial license) and need to take the pesticide exam, let them know of the ID requirement or direct them to the Purdue Pesticide Programs at 765/496-7499.



**PURDUE AGRICULTURE NEEDS YOUR HELP!** - (*Prudie Miller*) - We are desperately looking for families willing to host a student from Japan for about 4 weeks from Aug 6- Sept. 5. They are coming on a Purdue Exchange. We currently have 7 students in Japan for 2 months with families. It is important to uphold our end of the exchange so that our Indiana Ag. students can continue to have this experience.

They are coming to stay with agricultural families. So we are looking for families involved in any type of agricultural experiences: farms, orchards, vineyards, extension officers etc. In the past, the students have stayed on a wide variety of farms from small family farms to much larger farms. In particular, we think the Farmers Market would be a great experience!

They are nice students and often become like a member of the family enjoying the same activities you enjoy. We have both male and female students unplaced. They want to learn about agriculture, so are expected to pitch in and help out like everyone else. If your family would like more information, I can be reached at 765-494-8458 or by email at <prudie@purdue.edu>.



**SECOND-GENERATION SOUTHWESTERN CORN BORER IN SOUTHERN INDIANA** - (*Frankie Lam*) - Adults of southwestern corn borer were collected by black-light traps at Southwest Purdue Agricultural Center in Knox County on July 12. These adults will soon lay the second-generation eggs on corn. The second-generation larva is economically the most important population.

The eggs of southwestern corn borers are initially creamy white and 3 red transverse bars develop about 36 hours after laid. The second-generation larvae, which are white with distinct dark brown to black spots, feed on both ear and leaf sheath tissues for 10-14 days, and begin boring into the stalks. In the fall, the borers migrate to the base of the plants and girdle the corn stalks, which leads to lodging of plants and interferes with harvesting practices. The second-generation larvae over-winter in the stalk base and pupate in the following spring.

Scout your fields and examine 20 consecutive plants from 10 locations within the field and record the number of damaged plants. Due to the relatively low population numbers in Indiana, no study has been conducted on the infestation of southwestern corn borer in sweet corn. However, in Missouri control practices are justified for the second-generation borer if 25% of plants infested with egg masses or show the presence of larvae and whorl damage. Similar to European corn borer, larvae of southwestern corn borer can only be effectively controlled while they are feeding within the whorl. Insecticides recommended for the control of southwestern corn borer are Baythroid, Capture, and Warrior. Deep tillage in fall and destruction of corn stubble are recommended for the management of the borer, however this is not an option for no-till practices.



**WHAT'S WRONG WITH THESE PEPPERS?** - (Liz Maynard) -

These green bell peppers have developed soft tan areas on the side or bottom of the fruit, ranging from 1/2 inch to 1-1/2 inch across. In the case of the pepper on the left of the picture, the area has developed brown, black and reddish coloration (see Fig. 1). The peppers are the first set on the plants, which were transplanted May 29. Jalapeno peppers growing right next to these plants do not show the problem.



E. Maynard

Figure 1. Peppers with a problem.

If you identified blossom end rot (BER), that's right. The fast-growing pepper fruit did not get enough calcium as it grew, and so cells in one area of the fruit towards the blossom end died and developed into the dead areas seen in the photo. The area of BER on the pepper on the left has probably been invaded by opportunistic organisms responsible for the red, brown and black colors. Eventually the affected area may turn black and leathery. Pepper types and cultivars differ in susceptibility to BER, so it is not surprising that the jalapeno peppers show no problems. The name of the disorder can be a bit confusing, because in peppers it does not necessarily occur on the blossom end: it may occur anywhere on the fruit. Once BER has started on a pepper fruit, there is nothing that can be done to prevent it. Usually BER is more common on the early fruit and less common on fruit that develops later on the same plant. Tomatoes, especially roma types, also are susceptible to BER. On tomatoes BER is usually confined to the blossom end. Affected tomatoes are the first to ripen (see Fig. 2).



E. Maynard

Figure 2. Tomatoes with blossom end rot.

Although BER is a result of localized calcium deficiency, there are a number of factors other than soil calcium levels that influence its occurrence. In this case, I suspect the problem might have been reduced if irrigation had been applied more frequently at the start of the period of hot weather so that the soil did not dry down as much. Other preventive measures suggested for blossom end rot include promoting root development by avoiding soil compaction, maintaining adequate soil calcium, and avoiding excess nitrogen because it stimulates vegetative growth that competes with fruit for calcium. Some experts also recommend foliar application of calcium during early fruit development.

The peppers in the photo are growing in a demonstration area that includes varying rates of applied nitrogen and plots with and without added calcium. At harvest the amount of blossom end rot in different plots will be noted. The results will provide some information about whether nitrogen rate or additional calcium have a large influence on BER in this field.



**PUMPKIN FLOWERING AND FRUIT SET** - (Liz Maynard) - This

is a good time to check for female flowers and fruit set in pumpkins. Find the main stem and follow it out from the base of the plant. Beginning about 10 leaves out, look near the base of each leaf where it attaches to the main stem: there should be a flower bud in the leaf axil. Most of the flower buds will be male with a narrow stalk leading to a cone-shaped flower bud. If the male flower has already bloomed, only the flower stalk may remain. Healthy female flower buds are easy to tell from the male buds. The flower stalk is thicker and already has ridges like the 'handle' on the pumpkin (which it will become). Before bloom the round ovary that will become the pumpkin sits right behind the cone-shaped form of the closed petals (see Fig. 1). After the flower has opened for one morning, the petals close, wilt, and eventually fall off. If the fruit sets, within a week the pumpkin will be several inches across. Female flower buds that abort before opening gradually turn yellow and shrink in size. Eventually they turn brown, dry out, and fall off.



E. Maynard

Figure 1. Female pumpkin flower.

Pumpkins planted at the end of May in northern Indiana began flowering at the end of the first week of July. In research plots at the Pinney-Purdue Ag Center, the first female flower buds usually formed at the 9<sup>th</sup> to 13<sup>th</sup> node on the main stem. On a large-vined cultivar, the first two female buds on the main stem stopped growing and dried up before the flowers opened. By July 15, no more than three-quarters of the plants had a pumpkin developing, and nearly half of the visible female flower buds had aborted prior to opening. It is likely that the high temperatures of the past month caused the abortion of female buds. On a short-vined, bushier cultivar also growing at Pinney-Purdue, most of the plants had more than one fruit developing on the main stem by July 15. On this cultivar, less than one quarter of the visible female buds on the main stem had aborted before opening. This bushy cultivar also developed flowers on branches: by July 15 most plants had more than one pumpkin developing on a branch.

The main reason to check pumpkins for flowers now is to compare cultivars and get an idea of when your crop will be ready. Cultivars that are aborting flowers now still have time to set fruit and ripen a crop if temperatures moderate in the next several weeks. To minimize the chance that other stresses will prevent fruit set, minimize shading by weeds and, if possible, provide irrigation if necessary to prevent drought stress. Cultivars that have set pumpkins by this time should have mature fruit by early September.



**AREA VEGETABLE GROWERS TO HOLD TWILIGHT TOUR OF STUMLER FARM - (Roy Ballard)** - Probably no one would dispute that the 2002 growing season has been challenging for vegetable growers of the Ohio Valley Region. Whether you are a home gardener nurturing a half dozen tomato plants or a commercial producer with many acres committed to vegetables, it is easy to see the combined impact of the delayed planting due to persistent spring rains and the more recent prolonged lack of rainfall on young crops.

While the weather is still one factor that impacts yield and quality that growers have minimal impact over (aside from mulches, crop selection and irrigation where available), there are other factors such as insects, disease and weed control where good control options do exist. On the evening of Thursday, August 15, 2002 Vegetable Growers are invited to attend a twilight tour to discuss some of these options with Extension specialists from Purdue University and the Southwest Purdue Agriculture Program (SWPAP) at the Dean Stumler Farm in Fredericksburg, IN. The program will begin at 6:00 p.m. local (slow) time or 7:00 p.m. Louisville (fast) time.

The purpose of this meeting is to offer vegetable growers of the Ohio River Valley a chance to gather, discuss current growing conditions and learn of pest pressures (insects, weeds, and disease) that their crops are experiencing and how to reduce the impact of these on the yield/value of their crops. Participants will have a unique opportunity to tour parts of the Stumler production and packing facilities and to learn from Dean Stumler about his experiences with "no till" pumpkin production. At the end of the evening a forum will also be provided for interested growers to discuss in what ways the local extension offices and Purdue University may be able to assist them in their future production and marketing needs and how they may begin to work cooperatively to better their economic situation and enhance/sustain their place in the markets they serve.

Presenters will include:

**Steve Weller** - Extension Horticulture Weed Specialist- Purdue University - *What's New in 2002 Weed Control for Vegetable Crops*

**Dan Egel** - Extension Plant Pathologist for Vegetable Crops- Southwest Purdue Agriculture Program (SWPAP) - *A Disease Forecast for All of those Late Planted Crops*

**Frankie Lam** - Extension Entomologist- Southwest Purdue Agriculture Program (SWPAP) - *Insect and Mite Control Options for the Ohio River Valley- An Update*

Growers are encouraged to bring samples of plant problems that they are experiencing and to dress appropriately for the weather as much of this program will be held outdoors in the field. The Stumler Farm is located at 7500 west U.S. 150 just west of Fredericksburg Indiana.

This educational program is sponsored by the Floyd and Washington County Offices of the Purdue Cooperative Extension Service. While the program is free to anyone with an interest in vegetable culture it is requested that you pre register to assist with planning.

Anyone that would like to preregister or who has questions about this program or vegetable production in general is welcome to contact Roy Ballard, Purdue Extension Educator, ANR, Floyd County by calling 812-948-5470 or by e-mail at <roy.ballard@ces.purdue.edu>.



**PESTICIDE SPRAY SCHEDULES - (Dan Egel and Frankie Lam)** - This time of year, vegetable growers are applying fungicides or insecticides to control or prevent problems in their fields. Fungicides and insecticides were developed for very different types of pests. Therefore, it only makes sense that the spray schedule should be different for these two types of pesticides.

Vegetable growers often see leaf spots this time of year and wonder what fungicide should be applied to take care of it. The idea behind managing most vegetable diseases is to always have a protectant/systemic fungicide on the foliage. Most fungicides should be applied on a 7 to 14 day schedule. Muskmelon or watermelon growers in southwest Indiana can use the Melcast system to time their applications accurately. The presence of a few new lesions does not mean that the system has broken down. Nor should one wait to for lesions to appear before applying fungicides.

Applying insecticides is different than the system outlined above for diseases. In most cases, it is not necessary to apply insecticides routinely. Routine application of insecticides may result in the elimination of beneficial insects that can help control insect pests. Insecticides are applied when pests are observed. Often, insecticides are applied only when insect pests reach a certain number per plant (threshold).

Disease and insect pests differ in their biology and how they damage plants. Understand how to apply pesticides to these very different pests.



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