VEGETABLE CROPS HOTLINE

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

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BLISTER BEETLES ON VEGETABLES - (*Frankie Lam*) - Blister beetles were found on vegetables in southern Indiana during the past two weeks. The adult populations of blister beetles usually appear in fields from mid-July to mid-August. The most common species in the Midwest are the striped (Fig. 1), margined (Fig. 2), and black blister beetles.

Blister beetles receive their common name from their ability to produce blistering on human skin. The blister-causing chemical, which is known as cantharidin, is commonly found in the blood (hemolymph) of the adults. The chemical is highly toxic to mammals, when ingested by livestock serious illness or even death may result. The reaction to the toxin depends upon the dosage; however, horses are most susceptible and sheep and cattle are more tolerant to the toxin. Research has determined that ingesting 30 to 50 striped blister beetles in hay could be potentially lethal to horses. Symptoms of sublethal poisoning on livestock include depression, diarrhea, elevated temperatures, increased pulse and breathing rates, dehydration, and frequent urination with blood (hematuria). Although the beetles are not mobile on plants and can be picked easily, hand picking is strongly not recommended because of the toxicity of the chemical.

The blister beetle is elongate, slender and about 1/2 to 3/4 inch long. The adult is soft-bodied, long-legged, and has narrow neck (thorax) between the head and abdomen (Figs. 1 and 2). The adult beetle attack many vegetable crops, including bean, beet, cabbage, Chinese cabbage, carrot, eggplant, melon, mustard, pea, pepper, potato, radish, spinach, squash, sweet corn, sweet potato, Swiss chard, and tomato. However, the beetle also

Fig. 1. Striped blistered beetle. *(Photo by F. Lam)*

Fig. 2. Margined blister beetle. *(Photo by F. Lam)*

feeds on soybean, clover, and pigweed. On the other hand, the blister beetle larvae are considered beneficial because they feed on the eggs of grasshoppers. Due to their gregarious behavior, the adult beetles can be catastrophic to gardens or small fields. No economic thresholds have been developed for the adults on different crops. If a high number of beetles were causing direct damage on crops in a certain area, spot treatment with insecticide is recommended. Baythroid, Endosulfan, Mustang, Sevin, and Warrior are labeled for the control of blister beetles. Read the label carefully before the application of insecticides.

Purdue Offers Research Experience - *(Kelli Ann Shelby)* - The Purdue University Cooperative Extension Service is offering a new program for Indiana residents to participate in an international research opportunity. It is a two-part program designed to increase cross-cultural understanding and agribusiness networks between Indiana and Latin America.

The program is open to graduate students, Extension educators, agriculture teachers in Indiana and those who are interested in the field of agribusiness. The program is funded through a U.S. Department of Agriculture grant and comprises an online spring class and a 10-day summer travel course. There are 25 spaces available for the spring class and 15 spaces open for the summer travel course.

"With this program, we hope to positively impact Indiana's food and agriculture economy," said Kelli Selby, International coordinator for Purdue Extension.

Purdue Extension will use distance education to teach the 2006 spring semester course so participants need not come to campus. Participants will learn the importance of building relationships with Indiana agribusinesses, cross-cultural understanding and market research basics for their 10-day international experience. Although the summer research course study is not required, the online spring class serves as an introduction for the trip.

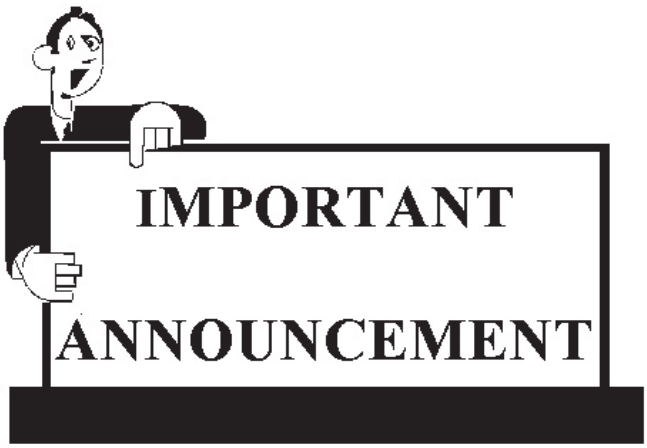
Participants will consult with businesses prior to traveling to Costa Rica and collect necessary information regarding individual companies and their objectives. Each participant will then represent an Indiana business as a market researcher and conduct research for that company using information obtained in the courses.

"Participants will collect data from food and agriculture-related businesses including restaurants and grocery stores in Costa Rica. They will gather information from professionals who are involved with importing goods and investigate the Latino culture through residents and university students," Selby said.

Upon their return, students will compile information in a report and present their company with a market analysis. This will help companies gain perspective about market potentials, barriers and issues surrounding international trade.

"Businesses will better understand the potential for their product in the Latin American market and with Latinos domestically," Selby said.

Participants can choose to earn three graduate-level credits for each course they finish. All participants will receive a certificate of completion for being a member of the spring course and summer travel. Those interested may sign up for the course through Purdue's International Programs in Agriculture office. Contact Selby at (765) 494-9831 or cameronselby@purdue.edu.



Water Quality Knowledge - (*Announcement*) - Water quality knowledge and expertise at Purdue University is now organized and easily accessible on-line through a new web site <www.ces.purdue.edu/waterquality/index.htm>.

The Web site is organized by major themes coinciding with the United States Department of Agriculture - Cooperative State Research, Education, and Extension Service (USDA-CSREES) water quality priority areas. Connected in one place through the Web site are informative publications, diverse management tools, research and education programs, as well as expertise found throughout many departments at Purdue.

Workshops, events, and other news items related to water quality are updated on the index page of the site. The site will feature a new topic each month, with the current topic highlighting a new septic system publication series. Please send your event items and suggestions for featured topics to Brent Ladd at laddb@purdue.edu for posting on the site. Questions regarding the Purdue Extension Water Quality Program can be directed to Jane Frankenberger, Associate Professor and State Extension Water Quality Coordinator at frankenb@purdue.edu.

Farm Marketing Survey - *(Jennifer Dennis)* - The North American Farmers' Direct Marketing Association (NAFDMA) is conducting an extensive survey of farm direct marketers and agritourism operations. Dr. Ed Mahoney from Michigan State University is conducting this survey in partnership with NAFDMA. The organiza-

tion would like any grower/retailer that does Pick Your Own, has a farm stand, travels to Farmers' Markets, has an on-site operation, or engages in any related direct marketing activity. This is a web survey and has gone through extensive review to make sure all respondents are protected from having their names sold. Results entered into the survey are confidential. This is very important information to Indiana. The results of the survey will: provide a realistic impact of the industry, make broad based benchmarks that have never been captured before making information available to the industry for expansion, make it easier to give information to financial institutions about the industry, help growers and farmers with pertinent information for zoning and insurance, document facts that help represent your interests and issues relevant to the industry and give communities a realistic analysis of the importance of direct marketing and agritourism. The first 777 responses received will be entered into a drawing for $1900 towards attending the NAFDMA convention in San Antonio, TX or $1000 cash. We encourage you to participate even if you are not a member of NAFDMA. To complete the survey, go to <www.farmmarketresearch.com>. You will need to register first by providing email, zip/postal code and name of your operation. If you have any questions, you may contact Dr. Jennifer Dennis at Purdue University at jhdennis@purdue.edu or (765) 494-1352 or contact Dr. Ed Mahoney at Michigan State University (survey coordinator) by email at rirc@msu.edu or phone (517) 432-0285. If you have any questions or concerns about your rights as a study participant or you are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish - Peter Vasilenko, Ph.D., Chair of the University Committee on Research Involving Human Subjects by phone (517) 355-2180, fax (517) 432-4503, or email uchris@msu.edu.

Downy Mildew of Pumpkin - *(Dan Egel)* - This disease has been observed in Washington County IN. Since downy mildew can spread rapidly, all cucurbit growers in Indiana should take precautions. Fungicide applications may be warranted (see below).

What does downy mildew look like on pumkins? Downy mildew is primarily a leaf disease. Often, the first symptoms one observes are yellow, angular or square looking spots on leaves (Fig. 1). The underside of the leaves may be covered with a black fuzzy looking growth-this is the fungus that causes the disease (Fig. 2). Leaves may eventually, turn brown and crinkle. The leaves may turn upwards as they dry (Fig. 3). Severe outbreaks may result in the rapid death of vines, which in turn may cause handles on pumpkins to become brown.

Weather conditions that favor downy mildew: Downy mildew requires a period of leaf wetness and high humidity for successful infection. Heavy dews can provide adequate moisture to get this disease going.

Fig. 1. Close up of downy mildew on upper surface of pumpkin leaf. *(Photo by D. Egel)*

Fig. 2. Lower surface of pumpkin leaf with downy mildew. Black fuzz is present on lesions. *(Photo by D. Egel)*

Fig. 3. Leaf curl caused by downy mildew. *(Photo by D. Egel)*

Recent rains have likely spread the disease considerably. Although the fungal spores may land in your field, there has to be leaf wetness for the disease to cause problems. The optimum temperature for downy mildew is 59 to 68^0 F.

What other crops are affected by downy mildew? A wide variety of organisms cause downy mildew on plants as varied as soybeans and pumpkins. However, the fungal organisms involved are usually specific for a particular plant family. Thus, the fungus that causes downy mildew of pumpkin can also affect cucumbers, muskmelons and watermelons.

Managing downy mildew: Since downy mildew does not over-winter in Indiana, rotation and tillage will not help to reduce the severity of downy mildew. (Growers will want to use these practices to manage black rot, bacterial spot and powdery mildew.) Any cultural practice, which allows good aeration between leaves, can lessen the impact of downy mildew. An example would be wider spacing between plants. Although some resistance is present in cucumbers and melons, there is no resistance among pumpkins and squashes.

Will the fungicide treatments I have been applying for black rot and Plectosporium blight also control downy mildew? For the most part, fungicide schedules designed to control common pumpkin diseases of Indiana will help to slow the spread of downy mildew. Protectant fungicides such as chlorothalonil (e.g., Agronil, Bravo, Echo, Equus), maneb (e.g., Maneb and Manex) and fixed coppers will provide moderate control of downy mildew if applied at weekly intervals.

Growers with high value crops may want to try systemic products. The strobilurin products (e.g., Cabrio, Flint, Amistar, Quadris and Pristine) should provide good control of downy and powdery mildew. Flint is not labeled against black rot. Ridomil Bravo Gold, Acrobat, Aliette and Previcur Flex contain active ingredients specific for the control of downy mildew and will not control powdery mildew or black rot. Tanos and Reason will help control downy mildew, however, it is important to remember that they are not labeled for black rot or powdery mildew. Nova, Procure and Topsin are primarily powdery mildew fungicides. Page 40 of the ID-56 lists the MOA or Frac codes of all of these fungicides.

The decision as to whether to apply fungicides for downy mildew will be influenced by several factors.

1) How soon before pumpkin harvest? Pumpkins that will be harvested in a few weeks will probably not suffer from a mild case of downy mildew. Growers who plan to pick into October shoul be more concerned.
2) How many green pumpkins are present and will ripen in time to be sold? A grower who is trying to protect young fruit should be more concerned with downy mildew than a grower with primarily mature fruit. Downy mildew does not affect fruit directly.
3) Other factors include the expense of the fungicide, recent and predicted weather patterns, and one's willingness to apply fungicides. For example, a grower who has a school children U-pick operation will probably be less willing to apply fungicides than a grower with a commercial shipping operation. Finally, be realistic as to the yields and prices expected and the amount of protection any fungicide can offer. Remember, the application of any fungicide is to protect the healthy growth-the diseased foliage can not be "cured" of the disease.

For recommendations on fungicides to control downy mildew, consult the Midwest vegetable production guide for 2005 (ID-56). It is available online at <www.entm.purdue.edu/entomology/ext/targets/ID/index.htm>. Always read the label carefully.

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