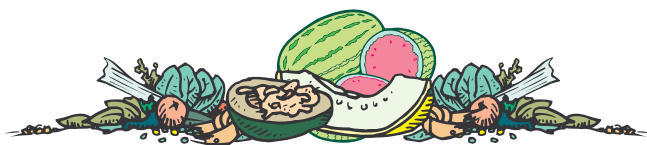


# VEGETABLE CROPS HOTLINE

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

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**BACTERIAL FRUIT BLOTCH** - (Dan Egel) - The disease bacterial fruit blotch has been associated with a lot of the hybrid triploid variety Genesis (Lot. # 01174). Shamrock Seed Company has recalled this lot of seed.

If you have planted this lot number and the seedlings have not or just barely emerged, destroy the seedlings and flats. A good way to destroy the seedlings would be to bury them. It may be desirable to destroy any seedlings in flats that border the contaminated seedlings. If the seedlings have leaves and have been watered overhead several times, there is a chance that seedlings in the remainder of the greenhouse are contaminated. In such a case, it will probably be necessary to destroy the rest of the seedlings in the greenhouse.

Disinfect areas of greenhouses or entire greenhouses by first cleaning them of any soil or plant debris. Use a disinfectant such as 10% bleach or a quaternary ammonia compound such as Greenshield or Physan 20. Be sure to wear protective gear and follow the directions. Greenhouse sanitation methods and seedling health are discussed in BP-61 <<http://www.agcom.purdue.edu/AgCom/Pubs/botany.htm>> available from Media Distribution 1-888-EXT-INFO (398-4636).

Bacterial fruit blotch spreads by water splashed from seedling to seedling. Greenhouses, especially those that are watered overhead, provide perfect conditions for the spread of the disease. Unfortunately, the symptoms of the disease are not

always obvious until fruit are present.

Lesions on seedling leaves include water soaked, brown necrotic areas, often with a yellow halo. Older lesions will have a necrotic area in the center of the lesion. The primary symptom is a dark green irregular blotch that occurs on the top of the watermelon fruit. Watermelons are the only host with economically important damage. Sometimes the rind will crack and white ooze will come out of the fruit. Al-

though bacterial fruit blotch will seldom invade the fruit farther than the rind, the fruit may start to rot from other organisms.

Copper applications may be appropriate for managing bacterial fruit blotch once the plants are in the field, but copper products are not registered for use in the greenhouse on watermelon.



**GREENHOUSE SANITATION** - (Dan Egel) - Every year about this time I receive questions regarding greenhouse sanitation. Below are my recommendations:

- If trays or pots were used last year, they should be cleaned well before use. Clean trays or pots with water and then disinfected with a 10 minute soak in a 10 % bleach solution (0.5 % Sodium Hypochlorite) or 10 minutes in a quaternary ammonium solution such as Green-Shield or Physan 20. Always use gloves when using these products as severe skin irritation can occur. Be sure to read the labels carefully before using. My research shows that Green-Shield or Physan 20 is as effective as 10% bleach in disinfecting transplant trays. My research also shows that it is beneficial to leave trays in for the entire 10 minutes.

- Always use sterile soil mix. Use only clean tools. Do not dump your clean sterile mix onto a dirty surface.
- Greenhouses are easier to keep clean if the greenhouse floor is gravel or plastic that can be cleaned or replaced between transplant generations. Keep transplants off dirt floors where disease causing microbes may survive.
- Water early enough in the day to allow plant surfaces to dry out before nightfall. Water only when needed on cloudy days when the soil surface is wet-let the hose rest!
- Scout greenhouses regularly for problems. Transplant trays with diseases should be thrown-out. Neighboring trays may look healthy but are very likely diseased and should be trashed.
- It may be helpful to keep specific lots of seeds in one area of a greenhouse so that if seed-borne problems arise, the lot involved can be identified. Keep good records of which lots were planted when.

Growers spend a lot on seed these days it only makes sense to give those seeds the best start possible.



**PHEROMONES AND PHEROMONE TRAPS** - (Rick Foster) - One way insects communicate with individuals of the same species is with pheromones. Pheromones are volatile chemicals released by an insect that usually can be detected only by individuals of the same species. There are a number of different types of pheromones, but the most common type is the sex pheromone. Usually the females will emit a tiny amount of a chemical that attracts the male to her and increases the likelihood of mating. Because the chemical is volatile, air currents carry it. The male detects the pheromone in the air with receptors on his antennae. He then flies upwind to find the source of the pheromone, a prospective mate. The chemical compositions of pheromones for a number of pest species have been identified and synthetic copies can be produced in the laboratory. Synthetic pheromones can be used in conjunction with traps to catch male insects.



There are a number of vegetable insect pests that can be monitored with pheromone traps. I would recommend that any serious sweet corn grower purchase traps and lures for corn earworms, European corn borers, and possible even fall armyworms. Pepper and snap bean growers could benefit from knowing when corn borers are flying as well.

Listed below are some, but certainly not all, of the suppliers of pheromones and traps.

**Consep Membranes, Inc.;** 213 S.W. Columbia; Bend OR 97702-1013; 800-367-8727; <[www.consep.com](http://www.consep.com)>

**Gempler's;** P. O. Box 270; 100 Countryside Dr.; Belleville, WI 53508; 800-382-8473; <[www.gemplers.com](http://www.gemplers.com)>

**Great Lakes IPM;** 10220 Church Rd., NE; Vestaburg, MI 48891; 517-268-5693; <[www.greatlakesipm.com](http://www.greatlakesipm.com)>

**Insects Limited Inc.;** 16950 Westfield Park Rd.; Westfield IN 46074-9374; 317-846-3399; <[www.insectslimited.com](http://www.insectslimited.com)>

**Scentry Biologicals Inc.;** 610 Central Ave.; Billings MT 59102; 800-735-5323; <[www.scentry.com](http://www.scentry.com)>

**Trece Incorporated;** P. O. Box 6278. 1031 Industrial St.; Salinas, CA 93901; 408-758-0205; <[www.trece.com](http://www.trece.com)>

To get the most from your pheromone traps, they must be used properly:

- Place the traps and the pheromones out before you would normally expect the insect pest to be active. That way you can monitor the adult activity, which will warn you that damage from the larvae may be coming soon.
- Be careful how you store pheromones. Ideally, they should be frozen until ready for use. At the very least, they should be refrigerated. If you keep them on the dashboard of your truck, they won't work well when you place them in the trap.
- When handling pheromone lures, do not touch them with your hands. Use a pair of forceps or wear latex gloves. This is especially important when you are using pheromones for more than one pest. Contamination of a lure with another pheromone will likely reduce the effectiveness.
- Lures usually should be changed every 3-4 weeks, although this will vary for individual lures.
- Check traps regularly, at least weekly. Daily would be better.



**SEED AND ROOT MAGGOTS - (Rick Foster)** - Three species of seed and root maggots attack vegetables in Indiana. The seedcorn maggot feeds on seeds and seedlings of sweet corn, cucurbits, lima and snap beans, peas, and other crops. Cabbage maggots can cause serious damage to transplants of cabbage, broccoli, cauliflower, and Brussels sprouts and make the fleshy roots of radishes, turnips, and rutabagas unmarketable. Onion maggots are pests of seedling onions, developing bulbs and onions intended for storage.

Seedcorn maggot flies emerge in April and May and lay eggs preferentially in areas with decaying organic matter. Fields that are heavily manured or planted to a cover crop are more likely to have seedcorn maggot injury. Maggots burrow into the seed and feed within, often destroying the germ. The seeds fail to germinate and plants do not emerge from the soil, leaving gaps in the stand. When infested seeds germinate, the seedlings are weak and may die. Maggots also will feed within the stems of transplants.

Any condition that delays germination may increase damage from this pest. Planting into a well-prepared seedbed, sufficiently late to get rapid germination can reduce damage. The slower the rate of growth, the greater the likelihood of seedcorn maggot injury. Seed treatments are an inexpensive method of reducing

seedcorn maggot damage. For any type of early season transplant, soil temperatures should reach at least 72° F or more for 4-5 days in a row to avoid maggot injury. Anything that raises soil temperature (black or clear plastic mulch) will increase soil warming and decrease the possibility of seedcorn maggot injury.

Soil insecticides applied to control other pests may also give moderate levels of seedcorn maggot control. Once damage is observed, the only management strategy available is the decision to replant or not. If you decide to replant, be sure to use treated seed. When resetting transplants be sure to wait 5 days from the first evidence of wilted plants before you reset.

Cabbage maggot injury is also favored by cool, wet conditions. The flies, slightly smaller than a housefly, emerge in late April or early May and lay white eggs at the base of newly set plants. Larvae from this first generation tunnel in the roots of small plants, causing the plants to appear sickly, off color or stunted, and may cause them to die. Early cabbage and turnips are particularly vulnerable to damage. Control of first generation maggots can be achieved using soil insecticides such as Lorsban or diazinon at planting or transplanting. For short season crops such as radishes and turnips, long-residual insecticides cannot be used. Cabbage maggots usually do not affect later planted crucifers.

Onion maggot flies emerge throughout May and lay eggs at the base of onion plants. The maggots attack the underground portions of the onion plants and cause plants to wilt and die. Seeded onions are more susceptible than transplanted onions. Do not overseed to compensate for losses to onion maggots. The flies do not space their eggs evenly, so you may end up with smaller bulbs because the plant spacing is too close. The second-generation flies emerge during July and the third generation emerges during late August and early September. Each generation will damage onions.

Removing cull onions after harvest and planting as far as possible from fields planted to onion the previous year can reduce damage. Soil drenches of Lorsban at planting will effectively control first generation maggots and provide some control of the second generation. As the onions begin to mature, they become physically resistant to attack from onion maggots, unless they have been injured in some way. Be careful during field operations not to damage the growing plants in any way. A nick in an onion bulb allows the maggots to enter and begin feeding. Also, the flies are attracted to damaged onions to lay eggs. Reducing the amount of physical damage to the onions at harvest as much as possible will also reduce the amount of injury from the third generation. Do not apply foliar sprays to kill flies before they lay eggs.



**MAAHS MOVES FORWARD TO MEET EMPLOYER NEEDS IN OHIO AND INDIANA** - John Wargowsky, Executive Director, Mid American Ag and Hort Services, 614-677-4530 or <[labor@ofbf.org](mailto:labor@ofbf.org)> - (edited by Liz Maynard) - Members of Mid American Agriculture and Horticulture Services (MAAHS) combined educational sessions and their organization's annual meeting held recently in Findlay, Ohio. According to John Wargowsky, the new organization's executive director, MAAHS is a consortium of associations, organizations and employers organized to meet the educational, regulatory compliance assistance, and labor recruiting needs of agricultural and other employers in Ohio and Indiana. Associations and organizations are sponsor members. Employers who are members of sponsoring organizations may become employer members. In Indiana, Farm Bureau is a sponsor member and any grower who is a member of the Indiana Farm Bureau may join MAAHS as an employer member.

Employer members receive a copy of Gempler's Ag & Hort Employers Labor Law Compliance Manual with a state-specific section, Gempler's Alert newsletter of ag/hort safety and employment law compliance, the MAAHS Messenger newsletter, educational seminars, twenty (20) percent discount on Gempler's educational materials, and one-time fifteen (15) percent on all Gempler's products, Spanish Phrases for Landscaping Professionals at Ohio Nursery & Landscape Association member price of \$25.00 (\$25 savings) and basic phone consultation billed in 30-minute increments. For an additional fee, employer members receive premium services including phone consultations at no charge, fee-based foreign labor advice for H-1B specialty / professional workers, H-2A program for temporary or seasonal agricultural work, and H-2B program for temporary non- agricultural work. Employer premium members may also access MAAHS' service to develop legally correct disclosure forms translated into the language of the workers as required by the Migrant and Seasonal Agricultural Worker Protection Act disclosure requirements on a fee-basis.

"We are excited with the initial response of employers to our services with vegetable, nursery, fruit, greenhouse, florists, landscaping, food processing, and other industries being represented in our membership," Wargowsky said. "We look forward to serving the needs of many more agricultural, horticultural, and other employers and evolving our services and as our membership grows. Another quickly growing aspect of MAAHS, value is building cooperative relationships with government officials and other stakeholders dealing with employment-related laws, regulations, and services."

If you would like more information about MAAHS, contact Wargowsky at P.O. Box 479, Columbus, Ohio, 43216 or 614-677-4530 (voice) or 614-249-2200 (fax) or <labor@ofbf.org>.



**NEW RESOURCE FOR REGULATORY COMPLIANCE** - (*Liz Maynard*) - "The Complete Federal and State Compliance Guide for Hoosier Businesses" by Fred Whitford was published last summer. This 440-page book is designed as a reference to assist Indiana farms and businesses in following state and federal laws. It is written for people who manage businesses. It covers regulations related to employees, pesticides, equipment maintenance, surface and ground water, driving and vehicles, safety, tanks and more. A handy questionnaire at the start helps the reader decide which regulations apply to his or her business. Revisions and updates will be available on the Web. More information is available at the following Web site, which has a link to the 23-page questionnaire and also to an order form: <[www.btny.purdue.edu/PPP/CGB/ComplianceGuide.html](http://www.btny.purdue.edu/PPP/CGB/ComplianceGuide.html)>. The book may be ordered from Purdue University Press at 800-247-6553, list price \$175.00.



**QUADRIS UPDATE** - (*Mohammad Babadoost, University of Illinois*) - Azoxystrobin (Quadris) is a strobilurin fungicide manufactured by Syngenta. This fungicide is registered for use on many crops. Quadris was recently registered for control of white rust, black spot, and Rhizoctonia diseases of Brassica leafy greens; rust, powdery mildew, and Rhizoctonia diseases of mints; powdery mildew and anthracnose of peppers, eggplant, and okra. No more than four applications of Quadris can be made per acre per year. No more than two sequential applications of Quadris can be made without alternating with another fungicide with different mode of action.



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### Marketing

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URL: <<http://www.btny.purdue.edu/PPP/pestprog.html>>

### Pesticides: Regulations, Drift Complaints

Office of the Indiana State Chemist, 765-494-1492,

URL: <<http://www.isco.purdue.edu/>>

### Insect Identification and Plant Disease Diagnosis

Plant and Pest Diagnostic Lab, Dept. of Botany and Plant Pathology, 765-494-7071,

URL: <<http://www.ppdl.purdue.edu/ppdl/>>

### Commercial Vegetable and Speciality Crops - Purdue University Web Page

URL: <<http://www.hort.purdue.edu/hort/ext/veg/>>

### Vegetable Insects and Their Management - Purdue University Web Page

URL: <<http://www.entm.purdue.edu/entomology/vegisite>>

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**WINTER SURVIVAL AND MANAGEMENT OF INSECTS AND RELATED SPECIES** - (*Frankie Lam and Rick Foster*) - Can we predict the population number of insect pests in the next season? Having this mild winter will most of the insect pests in the coming season reach the economic thresholds? What should we do to avoid the pest outbreak in the early season? Most of us want to know the answers, however, there are no simple answers for these questions.

The following table lists the over-wintering stages and habitats of insects and related species in vegetables and melons in Indiana. Most of the over-wintering habitats are protected areas, such as under leaf litter, crop residue, trash, or in soil. These environments are the buffering microhabitats that maintained a relatively stable condition for the over-wintering insects and enhanced their survival. With this mild winter, generally we estimated that there is a higher than normal insect survival rate.

Insects and related species	Over-wintering stage	Over-wintering habitat
Aphids	Egg	On stems and nodes of perennial plants
Asparagus beetles	Adult	Under protected shelters <sup>1</sup>
Black cutworm	—	Not in the Midwest
Colorado potato beetle	Adult	In soil
Cucumber beetles	Adult	Under leaf litter of woody areas
European corn borer	Larva	Inside corn or weed stalks
Flea beetles	Adult	Under protected shelters
Hornworms	Pupa	In soil
Japanese beetle	Larva (grub)	In soil
Lacewings	Adult	Under protected shelters
Lady beetles	Adult	Under leaf litter of woody areas
Onion thrips	Nymph and adult	On plants or under leaf litter
Potato leafhopper	—	Not in the Midwest
Seedcorn maggot	Larva	In soil
Squash bug	Adult	Under protected shelters
Squash Vine Borer	Larva	In soil
Tarnished plant bug	Nymph and adult	Under protected shelters
Tomato fruitworm	Pupa	In soil (south of I-80)
Twospotted spider mite	Female adult	Under protected shelters
Wireworms	Larva and adult	In soil

<sup>1</sup>Under leaves, grass, residue or trash in the field and woody areas, along ditch banks, and similar protected places.

Winter survival of insects depends on both physical and biological factors. Physical factors include temperature, precipitation, and relative humidity of the over-wintering habitats, whereas the biological factors include diseases and predation on the over-wintering populations. Although winter temperature is usually regarded as one of the most important factors affecting the over-wintering populations, insect pathogens are also essential on affecting the fitness of an individual through winter. Furthermore, spring temperature and precipitation and date of planting are equally important in affecting insect infestation during the early season.

It is possible that the insect numbers in the coming season would be relatively higher than a normal year. But now it is too early to say that the insect pest populations will reach the economic thresholds. We still need to “wait and see” the weather in spring. If the spring weather is relatively normal, management strategies we recommend include plant the crop later than a normal year and scout the field frequently after the crop was planted or transplanted. Consult the county educators and extension entomologists as soon as insect infestation was found in the field and make a management decision before the pest population builds up.



**WINNER OF IVGA FALL PRODUCE DISPLAY CONTEST** - (*Liz Maynard*) - The Indiana Vegetable Growers’ Association sponsored a Fall Produce Display Contest at the 2002 Indiana Horticultural Congress held in January. Six farms entered photos in the contest. Engelbrecht Orchards of Evansville won the contest and a one-year free membership in IVGA. Entries received before the Congress may be viewed on the web at [www.hort.purdue.edu/hort/ext/veg/displaycontest/index.htm](http://www.hort.purdue.edu/hort/ext/veg/displaycontest/index.htm). Many thanks to all who entered photos in the contest, to volunteer judges Jane Eckert, Jeff Burbrink and Bob Yoder, and to Chris Gunter who prepared the entries for display at the Congress.

It is the policy of the Purdue University Cooperative Extension Service, David C. Petritz, Director, that all persons shall have equal opportunity and access to the programs and facilities without regard to race, color, sex, religion, national origin, age, marital status, parental status, sexual orientation, or disability. Purdue University is an Affirmative Action employer. 1-888-EXT-INFO <http://www.agcom.purdue.edu/AgCom/Pubs/index.htm> Disclaimer: Reference to products in this publication is not intended to be an endorsement to the exclusion of others which may have similar uses. Any person using products listed in this publication assumes full responsibility for their use in accordance with current directions of the manufacturer.

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