

VEGETABLE CROPS HOTLINE

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

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No. 487
November 09, 2007

<http://www.entm.purdue.edu/entomology/ext/targets/newslett.htm>

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ETHYLENE - (Liz Maynard and Dan Egel) -The cold weather of Fall means that most vegetables produced in Indiana will come from a greenhouse. While greenhouses will keep out the cold weather, greenhouse heaters may produce combustion by-products that cause plant damage. One common by-product is ethylene. Perhaps the most sensitive vegetable to ethylene is the tomato plant.

Ethylene concentrations sufficiently high to cause plant damage can result from heaters that are burning dirty (incomplete combustion), cracks or leaks in the heater block, inadequate air supply to the heater, and heater exhaust getting back into the greenhouse. (Ethylene can also be produced by decaying plant parts and ripening fruit in relatively small amounts.) Symptoms of ethylene damage include downward growth of leaves (epinasty), leaf drop and fading flowers.

We recently observed ethylene damage in a greenhouse where the heaters were malfunctioning (the heaters were set up for natural gas when they should have been set up for LP). The key symptom was poor growth of tomato seedlings (Figure 1). A portable gas detector was used to measure ethylene concentrations of 1 to 5 ppm (parts per million). Ethylene damage has been reported at as low as 100 ppb (parts per billion). It is likely that ethylene was present in the greenhouse over a period of several days. Damage caused by ethylene is influenced by both the concentration and period of time plants have been exposed to ethylene. In addition, some plants are more sensitive to ethylene than others.

To avoid damage from ethylene and other air pollutants:

1. Have unit heaters checked by a professional and follow maintenance recommendations.
2. Assure adequate air supply for complete combustion. For each 2500 BTU's of heater output, 1 sq. in. of vent cross section is needed.

3. Prevent back drafts. Make sure the chimney extends 2 ft. above the ridge of the greenhouse, or 2 ft. above a 10-ft. line to any part of the structure.
4. Install an inexpensive carbon monoxide detector. If carbon monoxide levels rise it's likely ethylene and other pollutants are present also. And if carbon monoxide levels are high it is a significant human health hazard.
5. Scout for possible growth effects of ethylene and investigate right away if you see anything.

Additional Resources: Bartok, J.W. 1999. Reduce Air Pollution from Your Heating System. Yankee Grower, Volume 1 - 5, September/October issue, 1999. Online at: www.hort.uconn.edu/IPM/greenhs/htms/reducepoll.htm.



Figure 1: These tomato plants are exhibiting epinasty or a downward growth of the leaves in response to ethylene produced from a malfunctioning heater in a greenhouse. The topmost leaves are growing normally because the plants were moved to a separate greenhouse after exposure to ethylene. Inset: Closeup of leaf growth at downward angle. (Photo by Dan Egel)



PUMPKIN VIRUS SYMPTOMS - (Dan Egel) - There are several related virus diseases of pumpkin which cause similar symptoms. Those symptoms include a mosaic on foliage and malformed fruit (Figure 1). This fall, symptoms on pumpkin that were unfamiliar were observed in southwestern Indiana. The observed symptoms were an etching or cell collapse that appeared in an almost

circular pattern (Figure 2). The viruses *watermelon mosaic 2* and *zucchini yellowing mosaic virus* were detected serologically by Agdia, Inc. in these samples.

Despite the unusual symptoms, neither of these diseases is unusual for Indiana. Aphids spread both viruses. To avoid yield losses from these virus diseases, it is recommended that growers plant by 20 June (in southern Indiana) so that fruit are set before virus disease pressure becomes too severe. Although insecticides can be used to manage aphid infestations in pumpkins, insecticides will not stop the spread of these pumpkin viruses. This is because aphids will spread the virus particles before the insecticides have a chance to work.



Figure 1: Typical symptoms of an aphid borne virus on pumpkin. Note Mosaic on foliage and deformed fruit. (Photo by Dan Egel)



Figure 2: Infection of a pumpkin fruit caused by *watermelon mosaic 2* and *zucchini yellowing mosaic virus* observed this fall. (Photo by Dan Egel)

USDA SEEKS COMMENTS ON PROPOSED NATIONAL LEAFY GREENS HANDLING REGULATIONS - WASHINGTON, Oct. 10, 2007 - The U.S. Department of Agriculture is seeking comments on a proposed federal marketing program to regulate the handling of leafy green vegetables throughout the country. The public, growers, handlers, buyers, sellers and consumers of leafy greens, is invited to submit comments and information that would help USDA evaluate the need and support for a nationwide program.

USDA is considering implementation of a marketing program in response to public and industry concern about reducing the risk of pathogenic contamination during the production and handling of leafy greens. Options being considered: a marketing agreement that requires handlers to comply with the agreement's regulations after voluntarily entering the program; and a marketing order that would be implemented following a grower referendum, requiring mandatory compliance for all handlers.

USDA believes that a marketing agreement is most likely to meet the needs of the national industry. In the program under consideration, packers, processors, shippers and marketers, as signatories under a marketing agreement of leafy greens, could be required to certify, and for USDA to verify, that their products are produced and handled according to best practices specified under the agreement.

If the response to this request is favorable, USDA will proceed with the development of the marketing program in cooperation with the industry and a notice of public hearing will be published in the Federal Register. Public comment and rulemaking will precede implementation of the proposed marketing agreement.

The request for comments, including a list of specific topics of interest to USDA, was published in the Oct. 4, 2007, Federal Register. Comments must be received by Dec. 3, 2007. Copies may be obtained from Laurel May or Kathy Finn, 1400 Independence Avenue SW, Stop 0237, Washington, DC 20250-0237; by calling (202) 720-2491; or faxing (202) 720-8938.

An electronic version of this news release can be obtained via the Internet at: www.ams.usda.gov/news/newsrel.htm.

Additional Resources

The advance notice of proposed rulemaking is available online in text www.ams.usda.gov/fv/modockets/fv079621an.htm and PDF www.ams.usda.gov/fv/modockets/fv079621an.pdf formats.

Background information about marketing orders is available online at: www.ams.usda.gov/fv/moab.html.



VIRTUAL GROWER: SOFTWARE FOR ESTIMATING GREENHOUSE HEATING COSTS, AND MORE - (Liz Maynard) - Virtual Grower is a free software program developed by USDA researchers that allows users to estimate heating costs based on greenhouse design, materials, heating system, fuel, and location within the U.S. One of the developers, Dr. Jonathan Frantz from USDA/ARS in Toledo, gave a demonstration of the software to Indiana Flower Growers at their recent meeting in Lafayette. Several greenhouse operators took the opportunity to input information about their greenhouses and get estimates for how much money they might save if they increased the efficiency of the heating system, or reduced the leakiness of the greenhouse. If you're thinking of building a new greenhouse, the software can be used to compare heating costs for different designs. Future versions of the program will include predictions of plant growth. The software is free and may be downloaded from <www.ars.usda.gov/services/software/download.htm?softwareid=108>

Advanced Design Options

Name:

Materials

Roof:

Floor:

Siding Materials

North:

South:

East:

West:

Knee Wall Material

North:

South:

East:

West:

Dimensions and Orientation

Number of Spans:

Length of Spans: feet

Width of Spans: feet

Roof Shape:

Kneewall Height: feet

Height on the Edge: feet

Height in the Middle: feet

Orientation:

Fuel Type

Fuel Type:

Fuel Price: per gallon

Heater Efficiency: percent

OK Cancel

Diagram labels: Height at Edge, Height of Middle, Width of Span, Number of Spans

Figure 1: Screen shot from Virtual Grower showing the type of information a user can supply in order to estimate greenhouse heating costs. Source: Virtual Grower 1.1 Manual, USDA/ARS. Available online <www.ars.usda.gov/services/software/download.htm?softwareid=108>.

Internet Video Viewing Sites for the **Vegetable Variety Trial Showcase**

Thursday, November 29, 2007

5:45 – 8:00 p.m. CST

6:45 – 9:00 p.m. EST

Allen County Extension Gonzalee Martin marting@purdue.edu 260-481-6826	Bartholomew County Ext. Mike Ferree ferreel@purdue.edu 812-379-1665	Clark County Extension David Trotter dtrotter@purdue.edu 812-987-5139
Howard County Extension Allen Ullom ullomg@purdue.edu 765-456-2313	Lake County Extension Nicole Witkowski nikky@purdue.edu 219-755-3240	Washington County Ext. Brad Shelton sheltonb@purdue.edu 812-883-4601
Southwest Purdue Ag Ctr. Brenda Nowaskie nowaskieb@purdue.edu 812-886-0198	Pinney Purdue Ag Ctr. Liz Maynard emaynard@purdue.edu 219-785-5673	This event will be available live online as a streaming video, at: < mms://video.dis.purdue.edu/agcomm > (Windows Media® Player required)

Please pre-register with the site you wish to attend.

Program

**Trial Results from the Southwest
Purdue Ag. Center**

**Muskmelon
Seedless Watermelon
Seedless Watermelon Pollenizer**

**Chris Gunter, North Carolina
State University (formerly at SW
Purdue Ag. Program), presenting
from SWPAP**

**Trial Results from Pinney-Purdue
Ag. Center and Northern Indiana**

**Pumpkin
Sweet Corn
Tomato**

**Liz Maynard, NW Commercial
Horticulture Program, Purdue
University, presenting from PPAC**

Indiana Vegetable Growers Association

Membership Renewal/ Application for 2008

Benefits of IVGA Membership

- Midwest Vegetable Production Guide for Commercial Growers, 2008 edition (ID-56) (available Jan. '08)
- Vegetable Crops Hotline subscription
- Listing in IVGA Directory of Wholesale Vegetable Producers (optional)
- Your web site linked on www.ivga.org
- Corporate members only: free ad on www.ivga.org
- Networking with other vegetable growers

To renew or join, correct or fill out the form below and send in with your check payable to IVGA.

The information below will be printed in the membership directory that is sent to members only. It will also be used to mail you the Vegetable Crops Hotline, to fax or e-mail the Hotline Bulletin, and for IVGA correspondence. Please complete or correct if necessary. If you would like anything omitted from the directory, please indicate below.

First _____ Last _____
 Company _____
 Address 1 _____
 Address 2 _____
 City, State, Zip _____
 tel. _____ fax _____
 e-mail _____
 website _____

ID-56 Delivery: Please indicate whether you will pick up your copy of the ID-56 at one of the following meetings: IHC (Indiana Hort Congress 1/28-30/08), IVGS (Illiana Veg Growers' School 1/3/08), SW In. Melon Mtg (3/08). If you do not pick it up it will be mailed in March.

☐ IHC ☐ IVGS ☐ SW ☐ MAIL ☐ OTHER

Would you like to receive **free subscriptions** to trade magazines that may be offered to IVGA members?

☐ yes ☐ no

Check here to OPT OUT of hard copy Vegetable Crops Hotline. Announcements will be sent to email address above but no paper copy will be sent. **O** yes. **OPT OUT**

Membership Type

- ☐ Regular, \$35.00/year
☐ Industry/Corporate, \$75.00/year

Make Check Payable to: Indiana Vegetable Growers' Association (IVGA)

Return to:
 Indiana Vegetable Growers' Association
 c/o L. Maynard, Purdue North Central
 1401 U.S. Highway 421
 Westville, IN 46391

Office Use Only

Check no. _____ Date Rec'd. _____
 Check Date _____ Rec'd. by _____

The **Indiana Vegetable Growers' Association Directory of Wholesale Vegetable Producers** will be updated for 2008. To be included, please review your information below and make any necessary changes or additions. The wholesale directory is available to anyone who requests it and will be posted on the web. Indicate quantity of each item: S=small quantities; X=wholesale quantities; T=semi truckload quantities. Indicate certified organic: O.

Contact information for Wholesale Directory, if different from elsewhere on this form:

contacts _____
 phone1 _____ phone2 _____
 fax _____ phone3 _____
 business/address _____
 e-mail _____
 website _____

asparagus _____	onions_bulb _____
beet _____	onions_green _____
blackberries_raspberries _____	peppers_bell _____
broccoli _____	peppers_hot _____
cabbage _____	potatoes _____
cantaloupe_muskmelon _____	pumpkin _____
cauliflower _____	radishes _____
chrysanthemums _____	snap_bean _____
collards_mustard_turnipgreens _____	squash_summer _____
corn_stalks _____	squash_winter _____
corn_ornamental _____	strawberries _____
cucumber _____	sweet_corn_bicolor _____
eggplant _____	sweet_corn_yellow _____
gourds_ornamental _____	sweet_corn_white _____
herbs _____	tomato _____
other_crops _____	turnips _____
kale_1 _____	watermelon _____
pumpkin_mini_2 _____	daylilies_6 _____
spinach_3 _____	apples_7 _____
straw_4 _____	peaches_8 _____
lettuce_5 _____	tomatillo_9 _____



Here's
what's
coming
up.

UPCOMING EVENTS

Nov. 15, 2007, 6:00 - 8:30 p.m. EST / 5 - 7:30 p.m. CST. Introduction to Organic Markets and Certification. Participants can view the program from sites in Indiana, Illinois, Michigan and Ohio. To sign up for the Indiana location nearest you, go to www.osec.purdue.edu/. Follow link to 'Upcoming Programs' and search for 'Tri-State.' Contact: Jerry Nelson (812) 886-9582 or jnelson@purdue.edu. This event will also be available live online as a streaming video. Point your browser to mms://video.dis.purdue.edu/agcomm (Windows Media® Player required). Note that this link will not be active until the program has begun.

Nov. 27, 2007, 1 - 4 p.m. EST. Fulton County Vegetable Program, Rochester, IN. PARP credit available. Contact: Mark Kepler, (574) 223-3397 or mkepler@purdue.edu.

Nov. 29, 2007, 6:45 p.m. - 9:00 p.m. EST (5:45 p.m. - 8 p.m. CST). Vegetable Variety Showcase. SW Purdue Ag Center, Vincennes, Pinney-Purdue Ag Center, Wanatah, and other locations via IP video. See flyer in this issue or at www.hort.purdue.edu/fruitveg/events/events.shtml. This event will also be available live online as a streaming video. Point your browser to mms://video.dis.purdue.edu/agcomm (Windows Media® Player required). Note that this link will not be active until the program has begun.

Dec. 4-6, 2007, Great Lakes Fruit, Vegetable and Farm Market Expo, Grand Rapids, MI. Cucurbit IPM workshop on Dec. 6. www.glexpo.com Registration Info: (810) 234-4126.

Jan. 3, 2008, Illiana Vegetable Growers' School, Schererville, IN. Program available early December. www.hort.purdue.edu/fruitveg/events/events.shtml. Contact Liz Maynard, (219) 785-5673 or emaynard@purdue.edu.

Jan. 9-12, 2008, Illinois Specialty Crops and Agritourism Conference, Springfield, IL. Pre-conference workshops will be offered Wednesday, January 9 on "High Tunnels and Greenhouse for Extending Seasons and Increasing Markets," and "Growing Grapes in Illinois." www.specialtygrowers.org/confagenda.htm or contact Diane Handley at (309) 557-2107 or handley@ilfb.org.

Jan. 16-19, 2008, Practical Tools and Solutions for Sustaining Family Farms Conference, Louisville, KY. www.ssawg.org/conference-.html.

Jan. 17-18, 2008, Midwest Organic Production and Marketing Conference and Trade Show, Urbana, IL. <http://orgconf.sustainability.uiuc.edu/>. Contact: Elaine Wolff, wolff1@uiuc.edu.

Jan. 28-30, 2008, Indiana Horticultural Congress, Indianapolis, IN. www.inhortcongress.org. Contact: Colleen Martin, martinck@purdue.edu.

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