

VEGETABLE CROPS HOTLINE

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

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IN THIS ISSUE

- CUCURBIT TRANSPLANT DISEASES
- UNDERSTANDING WAGE AND HOUR REQUIREMENTS FOR AGRICULTURAL EMPLOYERS
- CHILLING INJURY
- BEWARE OF BLACK CUTWORMS
- SWPAC HORTICULTURE SPECIALIST INTERVIEWS

CUCURBIT TRANSPLANT DISEASES - (Dan Egel, egel@purdue.edu, 812-886-0198) - Whether one grows or purchases transplants, it is important to the yield and quality of the crop to start with healthy plants. This article will review some of the common cantaloupe and watermelon diseases of transplants.

Gummy Stem Blight. This fungal disease causes dark brown leaf spots, however, the diagnostic feature of this disease is the water soaked lesion that is often formed under one of the seed leaves (cotyledons). Such lesions often start at the point where the seed leaf joins the stem (hypocotyl) and do not extend to the soil line (see Figure 1). In time, these lesions turn a light brown in color and appear 'woody'. If one inspects the woody stem closely, it is possible to see dark specks imbedded in the stem—these are fruiting bodies of the fungus and will exude copious spores when wet. Gummy stem blight affects both cantaloupe and watermelon.



Figure 1: Gummy stem blight of watermelon may cause a water soaked lesion on the stem (hypocotyl). (Photo by Dan Egel)

The fungus that causes gummy stem blight may be seed borne. The fungus may also survive on the residue left on contaminated transplant trays, the greenhouse floor or bench. Gummy stem blight may spread rapidly from plant to plant under warm, wet conditions.

Anthracnose. The leaf lesions caused by this disease tend to be angular and jagged (see Figure 2). Stem lesions are not common but if present, are often long and may be sunken. Lesions may extend to the soil line and may be mistaken for damping-off symptoms. When moist, lesions caused by anthracnose may become an orange or salmon color. Anthracnose affects both cantaloupe and watermelon.

Anthracnose is easily splashed from seedling to seedling. The causal fungus may be seed borne or, like the gummy stem blight fungus, survive on contaminated surfaces.



Figure 2: Anthracnose lesions of watermelon tend to be jagged and irregular in shape. (Photo by Dan Egel)

Bacterial fruit blotch. The primary difference between the lesions caused by this disease and the fungal diseases described above is that BFB causes a water soaked leaf lesion. Early lesions may appear as water soaked spots. Older lesions may be brown with a water soaked margin. Lesions often start on seed leaves. The symptoms of BFB are similar to angular leaf spot. It is important to get an official diagnosis since BFB is a significant disease, while ALS is of minor importance. Bacterial fruit blotch affects both cantaloupe and watermelon.

Bacterial fruit blotch thrives under warm, wet conditions. Symptoms of BFB on leaves in the field may easily be missed until the dark, water soaked lesions on the fruit are observed. The primary method of introduc-

tion of BFB to the greenhouse or field is through seed contamination.

Fusarium wilt of watermelon. The first symptom of this disease in transplants is that affected seedlings wilt even though the soil is moist. While Fusarium wilt on older plants is often recognized by a one-sided wilt, seedlings seldom exhibit this symptom. Similarly, while older plants with Fusarium wilt can be recognized by a vascular discoloration inside the lower stem, it can be difficult to recognize this symptom in seedlings.

Fusarium wilt of watermelon may be seed borne. However, the resilient spores survive well in the absence of a watermelon host for many years in the field or on unwashed transplant trays. There is preliminary evidence for a limited spread of Fusarium wilt in the transplant greenhouse. See *Vegetable Crops Hotline* issue no. 580 for information about a new fungicide treatment in the field in the article titled *Midwest Vegetable Production Update*.

Damping-off. The classic symptom of damping-off is the constricted, discolored lower stem (see Figure 3). The seedling subsequently collapses and dies. Wilt is another common symptom that results from affected stems and roots. The base of stems may appear red-brown in color. Seedlings may also die before emergence.

There are several fungi which may cause damping-off, all of which have many hosts and survive well in soil. These diseases are not seed borne, but the fungi involved survive well on transplant trays and implements. Damping-off does not spread from plant to plant. Cool, wet conditions favor damping off.



Figure 3: The constricted, discolored stem on this cantaloupe seedling is a symptom of the disease damping-off. (Photo by Dan Egel)

Management. Here are some points to remember for the management of these diseases.

- Purchase seeds tested for seed borne diseases such as gummy stem blight, anthracnose and bacterial fruit blotch.
- Avoid planting diseased transplants in the field. Inspect transplants growing in the greenhouse regularly. If transplants are purchased, inspect them carefully upon delivery. It may be necessary to obtain an official diagnosis if questionable symptoms are observed.

- Good sanitation is key to plant health. Clean and sanitize greenhouse surfaces between transplant generations. Implements used for planting should also be cleaned and sanitized regularly. For many growers, it may be better to purchase new transplant trays than to try to sanitize old ones. Do not contaminate bags of greenhouse (soiless) mix with dirty implements or surfaces. More information on sanitation may be found here: www.extension.purdue.edu/extmedia/HO/HO-250-W.pdf
- The use of fungicides may reduce the spread of some of the diseases mentioned above from plant to plant, but are no substitute for prevention. If fungicides are used, be sure to check the label for information about rate, Restricted Entry Interval etc. Not all fungicides are labeled for greenhouse use. See page 40 in the *Midwest Vegetable Production Guide for Commercial Growers* (mwvegguide.org) for more information on greenhouse fungicides/insecticides.

The list of diseases discussed here is not exhaustive. It is certainly possible to encounter other diseases. For more information contact Dan Egel.



UNDERSTANDING WAGE AND HOUR REQUIREMENTS FOR AGRICULTURAL EMPLOYERS - (provided by Patricia Lewis, US Dept. of Labor, 317-226-6801, www.dol.gov/whd/ag/index.htm) - The U.S. Department of Labor's Wage and Hour Division enforces three separate and distinct federal laws establishing minimally acceptable labor standards for wages and working conditions that may impact agricultural employers or associations. These labor standards are set forth in the Fair Labor Standards Act (minimum wage, overtime pay, child labor and recordkeeping requirements), the Migrant and Seasonal Agricultural Worker Protection Act (vehicle safety, housing safety and health, disclosure of wages and working conditions, farm labor contractor registration and other requirements), and OSHA Field Sanitation (drinking water, toilets and hand-washing for field workers).

This article will explain the very basic provisions of these multi-faceted laws but if more information is desired, please call the Department of Labor's toll-free help line at 1-866-4USWAGE (1-866-487-9243). Information also is available on the Internet at www.wagehour.dol.gov.

The Fair Labor Standards Act (FLSA). Virtually all employees in agriculture are covered by the FLSA since they produce goods for interstate commerce. There are, however, some exemptions which exempt certain employees from the minimum wage provisions, the overtime pay provisions, or both.

Employees that are employed in agriculture, as defined in the FLSA, are exempt from the overtime pay provisions. Thus, they do not have to be paid time and one-half their regular rates of pay for hours worked in excess of forty in a single workweek.

The FLSA's definition of agriculture excludes work performed on a farm that is not incidental to or in conjunction with such farmer's farming operation. It also excludes operations performed off a farm if performed by those employed by someone other than the farmer whose agricultural products are being processed.

Any employer in agriculture who did not utilize more than 500 "man days" of agricultural labor in any calendar quarter of the preceding calendar year is exempt from the minimum wage and overtime pay provisions of the FLSA for the current calendar year. A "man day" is defined as any day during which an employee performs agricultural work for at least one hour.

Although exempt from the overtime requirements of the FLSA, agricultural employees must be paid no less than the minimum wage – currently \$7.25 per hour. There are numerous restrictions on the employment of minors who are less than 16 years of age, particularly in occupations declared hazardous by the Secretary of Labor. Substantial civil money penalties are prescribed for violations of the monetary and child labor provisions of the law. The FLSA also requires that specified records be kept.

The coverage provisions and scope of State laws and regulations may vary significantly with that of the FLSA. Please consult with the appropriate State Department of Labor [Indiana Dept. of Labor: 317-232-2655, www.in.gov/dol] or visit www.dol.gov/whd/state/state.htm.

The Migrant & Seasonal Agricultural Worker Protection Act (MSPA). The Migrant and Seasonal Agricultural Worker Protection Act (MSPA, www.dol.gov/whd/mspa/) protects migrant and seasonal agricultural workers by establishing employment standards related to wages, housing, transportation, disclosures and recordkeeping. MSPA also requires farm labor contractors to register with the U.S. Department of Labor.

A Farm Labor Contractor is someone who, for money or other valuable consideration paid or promised to be paid, recruits, solicits, hires, employs, furnishes or transports migrant and/or seasonal agricultural workers or, provides housing to migrant agricultural workers. Agricultural employers, agricultural associations and their employees are not included in the term.

Certain persons and organizations, such as small businesses, some seed and tobacco operations, labor unions, and their employees, are exempt from the Act.

Before performing any farm labor contracting activity, a farm labor contractor must register with the U.S. Department of Labor and obtain a certificate of registration. A farm labor contractor must be specifically authorized to provide housing or transportation to migrant or seasonal agricultural workers prior to providing the housing or transportation. Persons employed by farm labor contractors to perform farm labor contracting activities must also register with DOL.

Each person or organization that owns or controls a facility or real property used for housing migrant workers must comply with federal and state safety and health

standards. A written statement of the terms and conditions of occupancy must be posted at the housing site where it can be seen or be given to the workers.

Agricultural associations, agricultural employers, and farm labor contractors must assure that vehicles used or caused to be used by a farm labor contractor, agricultural employer, or agricultural association to transport workers are properly insured, are operated by licensed drivers, and meet federal and state safety standards.

Agricultural associations, agricultural employers, and farm labor contractors must inform migrant and seasonal agricultural workers about prospective employment, including the work to be performed, wages to be paid, the period of employment, whether state workers' compensation or state unemployment insurance will be provided.

OSHA Act Field Sanitation. The Occupational Safety and Health Act of 1970 was enacted to assure safe and healthful working conditions for working men and women. In 1987, the Occupational Safety and Health Administration issued regulations establishing minimum standards for field sanitation in covered agricultural settings. Authority for enforcing these field sanitation standards in most states has been delegated to the Wage and Hour Division.

In general, the field sanitation standards apply to any agricultural establishment employing 11 or more workers on any one day during the previous 12 months, to perform "hand labor." "Hand labor" includes hand-cultivation, hand-weeding, hand-planting, and hand-harvesting of vegetables, nuts, fruits, seedlings, or other crops, including mushrooms, and the hand-packing of produce in the field into containers, whether performed on the ground, on moving machinery, or in a shed.

Covered agricultural employers must provide potable drinking water, suitably cool and in sufficient amounts, dispensed in single-use cups or by fountains, located so as to be readily accessible to all employees.

Covered agricultural employers must provide one toilet and hand-washing facility for every 20 employees, located within a quarter-mile walk, or if not feasible, at the closest point of vehicular access. Pre-moistened towelettes, once allowed by some state regulators, cannot be substituted for hand-washing facilities. Toilets and hand-washing facilities are not required for employees who do field work for three hours or less each day, including travel to and from work. [Editors note: if they handle produce, even employees who work three hours or less each day should have access to hand-washing facilities due to food safety concerns. LM]

Employers must maintain such facilities in accordance with public health sanitation practices, including upkeep of water quality through daily change (or more often if necessary); toilets clean, kept sanitary, and operational; hand-washing facilities refilled with potable water as necessary and kept clean, sanitary, and safe; and proper disposal of wastes from the facilities.



CHILLING INJURY - (*Liz Maynard, emaynard@purdue.edu, 219-531-4200*) - Two weeks ago, lows around the state were in the upper 20's for two or three nights in a row (April 15-17). That's certainly low enough to causing freezing injury on tender crops, but aside from sweet corn, I doubt many tender crops were outside and unprotected. I am thinking about tender crops that may be in high tunnels or low tunnels. These structures might maintain temperatures high enough to protect from freezing injury, but not high enough to prevent chilling injury, which can occur below 50°F. The lower the temperature and the longer the exposure the greater the injury. Cucurbits including cantaloupe and watermelon are susceptible to this injury; so are peppers, and to a lesser extent, tomatoes. Symptoms include wilting, watersoaked or necrotic spots on cotyledons and leaves, and stunting. I don't know of a 'cure' for this injury. Minimize any further stress and keep an eye out for other problems that may develop as a result of the weakened plant.



BEWARE OF BLACK CUTWORMS - (*Rick Foster, fosterre@purdue.edu, 765-494-9572*) - Each year we coordinate a trapping network for a number of insect pests, including over 50 traps for black cutworms (see Figure 4). The results of this year's black cutworm trapping efforts can be found in the Pest & Crop Newsletter, found at <http://extension.entm.purdue.edu/pestcrop/2014/index.html>. In recent weeks we have had intensive catches in a number of traps throughout Indiana. Black cutworms are one of the most common cutworms affecting a variety of vegetables in Indiana. They don't overwinter here so they have to fly up from more southern locations each spring. When they arrive, the females will lay their eggs on a wide variety of plants, with a preference for winter annual weeds. When the eggs hatch, the larvae begin feeding on the weeds. When you kill the weeds, either with a herbicide or tillage, their food supply is gone and soon you will have a very hungry caterpillar. If you then plant your crop, that cutworm will likely feed on it even if it isn't a favorite food, because at that point they will eat just about anything. Based on the timing of our first intensive catches and the accumulation of degree days since then, I would predict that we will have larvae large enough to cut your vegetable plants within the next week or two, starting in southern Indiana (see Figure 5). Growers are encouraged to scout their fields and look for signs of cut plants starting with a week or so. The proper selection of an insecticide will depend on

which crop you will be treating, but in general the pyrethroid insecticides provide excellent control. See *ID56, The Midwest Vegetable Production Guide*, for details.



Figure 4. Black cutworm larval stages. (Photo by John Obermeyer)



Figure 5. Black cutworm damage to corn. (Photo by John Obermeyer)



SWPAC HORTICULTURE SPECIALIST INTERVIEWS - (*Dan Egel, egel@purdue.edu, 812-886-0198*) - Last fall, Horticulture Specialist Dr. Shubin Saha left Purdue for a position at the University of Kentucky. While we wish Shubin the best of luck, we also need to hire his replacement. Two individuals remain to be interviewed for the position. The search committee invites interested growers and industry members to meet and talk with the candidates at round table discussion events listed below. To participate, show up at the Southwest Purdue Ag Center (SWPAC), 4369 N. Purdue Rd., Vincennes, IN or call 866-808-9158. The round table discussions are at 9:30 A.M. Eastern time Tuesday, May 6 and Friday, May 9. If you have any questions or concerns, please contact Dan Egel.