VEGETABLE CROPS HOTLINE

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

Dan Egel, Editor
(812) 886-0198
egel@purdue.edu

No. 519
April 8, 2010

<http://www.btny.purdue.edu/pubs/vegcrop>

IN THIS ISSUE

THIS COULD BE YOUR LAST NEWSLETTER - *(Announcement)* - If your address label has a

"VCH/IVGA/IVGA Corp expires 12/31/09"

like the example below, this will be your last mailed copy of the ***Vegetable Crops Hotline (VCH)***. To renew your subscription to the VCH please call our office (812) 886-0198.

If you are an ***Indiana Vegetable Growers Association (IVGA)*** member, and wish to renew your membership, you should contact Liz Maynard at (219) 785-5673 or <**emaynard@purdue.edu**>.

VCH expires 12/31/09
John Grower
1234 N. Hollywood Ave.
Anywhere, USA 56789

NEW PURDUE UNIVERSITY SPECIALTY CROPS POSITION - Lori Hoagland is a native of Nebraska and earned her bachelor's degree in Natural Resource Sciences with an emphasis in Agroecology from the University of Nebraska-Lincoln (UNL). After three years working for a Midwestern seed cooperative, she returned to UNL to pursue an interdisciplinary master's degree focused on Agricultural Systems. Her research at UNL identified opportunities for integrating supplementary specialty crop enterprises into corn-soybeans systems to improve economic and environmental sustainability. After receiving her master's degree, Lori moved to Washington where she earned her doctorate in Soil Science and served as a Post-Doctoral Research Associate at Washington State University (WSU). Her research at WSU evaluated the capacity for cover crops, mulches and biological amendments to enhance soil health, supplement fertility needs and suppress weeds in apple and hop production systems. She also evaluated wheat cultivars for their ability to interact with beneficial soil microbes, resulting in enhanced nutrient uptake and suppression of soil-borne pathogens in newly planted apple orchards.

Lori relocated to West Lafayette this spring to take the position of Assistant Professor of Horticulture and Landscape Architecture and to develop a new research and teaching program focused on Specialty Crop Production Systems. The goal of her new program is to develop production strategies that will help specialty crop growers lower input costs and improve plant health and productivity. She is interested in working with growers to identify specific research needs, as well as to conduct on-farm participatory research to help facilitate development of site-specific sustainable management plans. Lori can be contacted at (765) 494-1426, or via e-mail at: <**lhoaglan@purdue.edu**>.

DAMPING-OFF FUNGICIDES - *(Dan Egel)* - In issue 517 of the ***Vegetable Crops Hotline***, I wrote about how to recognize and manage damping-off of vegetable seedlings (Figure 1). I did not discuss fungicides for possible use in managing damping-off. Below find information about fungicides labeled for damping-off.

Figure 1: A muskmelon plant that has damped off. Note the discolored, wet appearance of the lower stem (hypocotyl). *(Photo by Dan Egel)*

Some years ago, a systemic fungicide specific to *Pythium* and *Phytopthora* diseases was labeled for use in the greenhouse for damping-off. However, some phytotoxicity was observed and that use of the fungicide was withdrawn. So, if you have used a product in the past for damping off, be sure to check the label carefully before using it again.

More recently, the fungicide Previcur Flex® has been labeled for damping-off in the greenhouse. Crops on the greenhouse Previcur Flex® label are tomato, leaf lettuce, cucurbits and peppers. It is important to note that *Pythium* and *Phytophthora* damping-off diseases are listed on the Previcur Flex® label. However, other microorganisms such as *Rhizoctonia* may case damping-off. Previcur Flex® will be effective only against damping-off caused by *Pythium* and *Phytophthora.*

Previcur Flex® may be used before or after transplanting. The label warns against applying Previcur Flex® on dry growing media, especially in intense sunlight. Be sure to follow the label carefully. I do not have direct experience using Previcur Flex® for damping-off, however, I will be glad to talk with anyone who wants to try.

Cucurbit growers may be familiar with Previcur Flex® as a fungicide for downy mildew of cucurbits. Previcur Flex® has proven useful against downy mildew. But I will discuss this disease later in the season.

Oxidate® is another product that may be used for damping off in the greenhouse. This product may be certified for use by organic growers (check with your certifying agency). Oxidate® may be used on seed, transplants, cuttings or soil mixes. Unlike Previcur Flex®, Oxidate® may be used as a general biocide. It is active against all microorganisms, not just *Pythium* or *Phytophthora*. Oxidate® kills microorganisms on contact-it does not have any residual action.

Damping-off cannot occur in the absence of microorganisms like *Pythium*. Therefore, the best prevention is to avoid using contaminated transplant media. For more information on this subject, see the ***Vegetable Crops Hotline*** article in issue #517 or give me a call at (812) 886-0198 or send an email to <**egel@purdue.edu**>.

Fungicide Spray Tips - *(Dan Egel)* – Most vegetable growers have not started applying fungicides to their crops yet. However, the time has arrived for growers to check their spray equipment. While making adjustments to spray equipment, it might be a good idea to start thinking about how to apply fungicides effectively.

One factor to consider in applying fungicides is spray pressures and nozzle types. In experiments conducted here at the Southwest Purdue Agricultural Center (SWPAC), we tested spray pressures from 30 to 150 pounds per square inch (psi) with either flat fan or hollow cone nozzles. (Thanks to Dennis Nowaskie, SWPAC Superintendant for engineering the spray equipment.) Our experiment involved applying chlorothalonil (trade names include Agronil®, Bravo®, Echo®, and Terranil®) to manage Alternaria leaf blight of muskmelon.

We expected to find that higher spray pressures and hollow cone nozzles were necessary to adequately control disease in our experimental plots. We did observe plenty of disease in the plots that remained unsprayed (controls). However, we found no differences in disease ratings or yield due to spray pressure or nozzle type in three years of experiments. All spray pressures and nozzle types provided excellent control. In addition, we applied the same treatments to water sensitive strips. We did not find differences in the percent of the water sensitive strips covered by the spray with any of the treatments (Figure 1).

Figure 1: Water sensitive strips have been attached to wooden platforms so that the spray coverage can be evaluated. Note that the areas of the strips that are violet have been in contact with water (the spray). *(Photo by Dan Egel)*

Our results apply to Alternaria leaf blight of muskmelon management with chlorothalonil. However, similar results from the University of Florida have been obtained with systems as dissimilar as early leaf spot of peanut, bacterial spot of pepper or purple blotch of onions. The University of Florida research on peanut just cited could find no difference between spray pressures ranging from 50 to 250 psi.

My message is not that spray pressures and nozzle types are unimportant. The take home message is that spray pressure and nozzle types are not as important as other factors when it comes to applying fungicides to vegetable crops. (See ***Vegetable Crops Hotline*** issue #518 for more information on fungicide applications.) Other factors to consider are spray volume (gallons per acre), timing of fungicides, calibration and choice of fungicide. Let's consider these other factors briefly below.

- Spray volume - In general, fungicide coverage increases with increased gallons per acre (GPA). Effective amounts of water used per acre range from about 20 to 50 GPA. The Purdue University studies cited above were conducted with 20 gallons per acre. The amount of water applied per acre is sometimes specified in the label.
- Spray timing - Fungicides applied before disease is observed or at least before disease becomes severe are more effective than applications that arrive after the disease is well established. In general, applications

should be more frequent when the crop canopy has had prolonged periods of wetness. The Purdue University MELCAST program is designed to tell muskmelon and watermelon growers when to apply fungicides.

- Calibration - Spray rigs that are not properly calibrated may end up putting the wrong amount of fungicide on the crop wasting product and dollars.
- Choice of fungicide - What product to apply at what time seems to be getting more complex with each year. New products often specify particular diseases and not others. Many fungicide labels specify how they must be alternated with other fungicides. In some areas, fungicide resistance has made particular products obsolete.

The time to consider the when, how and what of fungicide applications is now. Hopefully the information above plus the article in ***Vegetable Crops Hotline*** issue #518 will help in the planning process. I welcome comments or questions.

Tomato Greenhouse Diseases - *(Dan Egel and Scott Monroe)* - Although it is too early to plant tomatoes out in the field, many growers are growing tomatoes in the greenhouse for early production. Greenhouse production sometimes causes a different set of diseases. Below I discuss two different diseases that often affect the foliage of greenhouse grown tomatoes.

Gray mold (sometimes called Botrytis gray mold) - Lesions of gray mold may be observed on stems, leaves or even old flower petals. Lesions on leaves are light tan, often wedge-shaped and may affect a large area of the leaf (Figure 1). Lesions on fruit may start as a 'ghost spot'. Lesions on petals may girdle the stem. It may be possible to see the fungal growth with a hand lens.

Leaf mold - This disease is also common in greenhouse production of mature tomatoes. The disease is often first observed as chlorotic lesions on the tops of leaves. If the leaf is flipped over, the sporulation of the fungus is easily seen (Figure 2). Generally, only leaves are affected.

Figure 1: Light tan lesions of gray mold on tomato leaves. *(Photo by Dan Egel)*

Figure 2: The fungus that causes leaf mold can be observed on the bottom of affected leaves. *(Photo by Dan Egel)*

Control of both diseases requires the reduction of leaf wetness and overall humidity in the greenhouse. Venting greenhouses, especially in the early evening, can be important in managing both diseases. Both diseases may survive as residue in the soil. Therefore, crop rotation can help disease management if tomatoes are grown in the soil. Even if plants are grown in greenhouse media, all plant parts should be removed from the greenhouse between cropping generations. There are several fungicides that are labeled for both diseases, but check to see if they can be applied in the greenhouse. The fungus that causes gray mold affects hosts as diverse as strawberries and flowers. Therefore, growing vegetables with other possible hosts may promote gray mold problems. Liming soils and keeping fertility levels up can help to manage gray mold. Host resistance is listed in some seed catalogs for leaf mold, however, several races of the fungus exist. More information can be found in the ***Midwest Vegetable Production Guide for Commercial Growers 2010*** <**www.btny.purdue.edu/Pubs/ID/ID-56/**> page 88.

Tomato transplants have a different set of diseases that are important. These will be discussed at a later date.

Wondering About Starter Fertilizer for Transplants? - (*Liz Maynard)* - Starter fertilizer is a small amount of fertilizer placed near a transplant or seed, usually at the time of planting in the field. The purpose is to promote rapid growth by making key nutrients available close to the root zone of the small plant or germinating seed. With the ready supply of nutrients, plants take off quickly. For conventional production, current recommendations in the ***Midwest Vegetable Production Guide for Commercial Growes 2010*** <**www.btny.purdue.edu/Pubs/ID/ID-56/**> (page 8) suggest using special blended fertilizers like 14-28-14, 10-52-10, and 23-21-17 mixed at 3 lbs. per 50 gallons of water. Or, the high phosphorus liquid 10-34-0 can be used at the

rate of 2 quarts per 50 gallons of water. These solutions are then applied at about 1 cup per plant. If it is dry, irrigation is recommended after transplanting to avoid salt injury.

Because phosphorus uptake is reduced in cool soils and because phosphorus is not very mobile in the soil, phosphorus (P) is usually included in starter fertilizers, often at a higher rate than nitrogen (N) or potassium (K). Nitrogen is frequently included in the fertilizer. Potassium may or may not be in the starter fertilizer.

For transplanted crops, benefits from starter fertilizer are generally agreed to be most likely when the soil is cool and/or soil P levels are low. This assumes that the main nutrient needs of the crop are supplied by other fertilizer applications (e.g. preplant, sidedressing, fertigation) or existing soil reserves. An experiment was conducted in New York to test the usefulness of starter fertilizers in a tomato system. Yield benefits of the starter fertilizer were observed only when soil P levels were low and no P fertilizer was broadcast. Similar results were observed whether tomatoes were grown on bare ground or on plastic mulch.

In an organic system, there is reason to believe that benefits of starter fertilizer for transplanted crops may be seen over a wider range of soil P levels, but published research to confirm that isn't readily available. In organic production, most of the soluble N available for plant roots to take up comes from organic material (including organic fertilizers and legume green manures) in the soil. Much of the N in that material is not available to plants until microbes break the material down. P is also released as organic matter breaks down. Microbial activity is low when the soil is cool and speeds up as the soil warms. During the early part of the season when the soil is cool, release of N from organic matter may not occur fast enough to meet crop needs. An organic starter fertilizer could help by supplying some soluble N and P, and/or nutrient-rich organic material that will be readily decomposed by microbes. Materials permitted in organic production that would be suitable for use as starter fertilizers include fish emulsion, seed meals, blended organic fertilizers, animal byproducts, and high quality compost. Nitrogen and phosphorus are likely to be the most limiting nutrients and so selecting materials that contain those nutrients is recommended. Note that the growing media for the transplant may continue to be a source of nutrients once the seedling is put in the field. If the growing media contains compost or an organic fertilizer, it will likely continue to provide nutrients for a while.

There can be some drawbacks to using starter fertilizer. Of course, if there is no benefit to the crop, it is a waste of money and resources. If too high a rate is applied, it can cause salt injury to the seedling. If the seedling isn't killed, the injury may result in delayed or reduced yield. If a starter fertilizer is not thoroughly dissolved or mixed in the transplant tank, high rates may be accidentally applied to a portion of the crop.

Starter fertilizers are just one of the many details of vegetable production that should be fine tuned on each farm. For those who are still tuning their starter fertilizer plan, I hope this article has been helpful. Please get in touch if you have particular questions. If we don't find the answer they provide us with ideas for future research.

An Introduction to Starting a Specialty Food Business in Indiana - *(Announcement)* – Thursday, April 15, 2010, Indiana Farm Bureau, Inc., 225 S. East Street, Indianapolis, IN. The registration fee for the workshop is $100 per registrant, the **deadline is April 9, 2010**. This includes a three-ring binder of information, lunch, and refreshments in the morning and afternoon.

About the Workshop - Developing and selling specialty ingredients and foods is one alternative for homemakers and farmers to add value to Indiana commodities.

The overall purpose of this workshop is to provide knowledge, contacts, and resources about starting a new food business in Indiana through formal lectures with question and answer sessions with speakers and entrepreneurs, as well as written materials with information and resources.

Who should attend - This workshop was developed for people interested in developing a specialty food or food ingredient business. Participants may be small farmers interested in vertically integrating, homemakers, and current/former entrepreneurs who need a comprehensive overview of the topics to be covered when starting a new food business in Indiana.

For interested individuals, participation in this workshop will allow an easier start-up at Ohio River Valley Food Venture, the shared-use commercial kitchen facility at the Small Business Development Center in Madison, Indiana.

Program participants are Dr. Kevin Keener, Dr. Maria Marshall, Dr. Steve Smith, Purdue University; Sharon Farrell, Indiana State Department of Health; Annie Schmelzer, Indiana State Department of Agriculture.

For information about registration, contact:
Marsha Pritchard, Dept. of Agricultural Economics, Purdue University, West Lafayette, IN, (765) 494-0889, <**mpricha@purdue.edu**>.
About program content, contact:
Kevin Keener, Dept. of Food Science, Purdue University, West Lafayette, IN, (765) 494-6648, <**kkeener@purdue.edu**> OR
Maria Marshall, Dept. of Agricultural Economics, Purdue University, West Lafayette, IN, (765) 494-4268, <**mimarsha@purdue.edu**>.