

VEGETABLE CROPS HOTLINE

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

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CORRECTIONS FOR THE MIDWEST VEGETABLE PRODUCTION GUIDE - (Dan Egel) - See below for important corrections to be made to the *Midwest Vegetable Production Guide for Commercial Growers 2009* (ID-56).

A rate correction should be made to page 75. The correct rate should be 8 fl. oz. of Folicur 3.6F® per acre for gummy stem blight of cucurbits.

On page 86, for use of chlorothalonil (eg. Bravo®, Echo®, Equus®) on pepper for anthracnose, the user must be in possession of the full fungicide label and the supplemental label that specifies pepper.

On page 90, the product Presidio® should be added to the list of products labeled for use on fruiting vegetables at 3-4 fl. oz. per acre. Presidio® must be tank mixed with a product of a different mode of action. 2 day PHI.

These corrections have already been made to the on-line version of the *Production Guide*, which can be found at [<www.btny.purdue.edu/Pubs/ID/ID-56/>](http://www.btny.purdue.edu/Pubs/ID/ID-56/). Please consult the on-line version for corrections and updates as the season progresses. All corrections will be listed on-line as "Change History" found below the table of contents.

All extension specialists and County Educators emphasize the need to 'read the pesticide label' before any use. The above article is a good example of one reason why it is important to read the label. Always consult the label to make sure!



HAND SPRAYERS IN THE GREENHOUSE - (Dan Egel) - Many growers will think about applying pesticides in the greenhouse in the next few weeks. Some of these same growers might have questions about how to translate the product label into such hand held equipment.

This article will cover some of the important aspects to remember in such cases.

Is it labeled for the greenhouse? In Indiana, the pesticide label must specify greenhouse use in order to be legal. Off label use also risks human and plant safety (see also *Vegetable Crops Hotline*, Issue 415, January 17, 2003).

Choose the sprayer - I like to avoid sprayers that have adjustable nozzles. Such sprayers are difficult to calibrate (see below) since the amount of water that the sprayer puts on is likely to change depending on the sprayer adjustment. If the nozzle is changed (or even bumped) since the sprayer was calibrated, the amount of pesticide applied will change. Choose a sprayer with a hollow cone or flat fan nozzle.

I prefer a sprayer with a pressure gauge built into the wand. Such sprayers are readily available from several catalog supply houses for about \$100. It is critical to keep a constant pressure for calibration purposes. Applying pesticide with constant pressure is as important in the greenhouse as it is in the field.

Know the area to be sprayed - Some greenhouse labels give instructions in 1,000 sq. ft. Other labels give amounts on a per acre basis. In either case, it is necessary to measure the square feet of the area to be treated. Then it will be possible to calculate the proportion of 1,000 sq. ft or of an acre that is to be treated. If this step is skipped, the wrong amount of pesticide will be applied, plant damage may result, the pesticide may not work properly and you will be using the pesticide off label.

Figure the amount of water necessary - Fill your sprayer with a known amount of water. (Often the graduations marked on the side of sprayer are not accurate.) Determine the amount of water needed to spray a specific amount. You might know this from experience or you can apply water to the area as practice. Just as the speed with which your tractor moves impacts the amount of pesticide you apply in the field, the speed you move while spraying in the greenhouse will affect the amount of pesticide applied.

You may choose to overlap the area sprayed with each swipe. Or you may choose to cover each area twice. Either method is fine as long as you are consistent.

Calculate the amount of pesticide - If one knows the area to be treated, it is a straightforward calculation to determine how much pesticide to add to the amount

of water you already determined above. Some products specifically labeled for greenhouse use have hints such as the number of tablespoons that are equivalent to 1 pound per acre.

Some growers may want to use a hand sprayer in the field; most of the above steps apply.

The misapplication of a pesticide could result in plant damage, an ineffective pesticide application, safety problems and the very real possibility that you will be using the pesticide off label.



STEWART'S WILT OF SWEET CORN - (Rick Foster, Dan Egel, Liz Maynard, and John Obermeyer) - Corn flea beetle is a sporadic pest in Indiana. Winter temperatures in regions where beetles were abundant last season will determine if there is cause to be concerned this season. This is especially important since this insect can transmit the bacterium that causes Stewart's wilt in sweet corn. The severity of the disease correlates well with winter temperatures because the organism survives in the gut of the overwintering beetles. Warmer temperatures result in higher beetle survival, and therefore a greater potential for Stewart's wilt. To determine the potential severity of Stewart's disease, add the average daily temperatures for the months of December, January, and February. If the sum is below 90, the potential for disease problems to develop is low. If between 90 and 100, moderate disease activity is a possibility. Sums above 100 indicate a high probability that severe problems will develop for susceptible corn (See Table 1). To help you better gauge the potential for corn flea beetle activity in

Table 1: Winter temperatures, presented as the sum of average daily temperatures for the months of December, January and February, and the threat level of Stewart's wilt of sweet corn in several location around Indiana.

Site	Sum of Temperatures	Disease Threat
Angola	66.0	Low
Wanatah	63.1	Low
Bluffton	73.6	Low
W. Lafayette	73.3	Low
Tipton	75.1	Low
Farmland	72.2	Low
Crawfordsville	73.3	Low
Greenfield	79.1	Low
Terre Haute	92.3	Moderate
Brookville	89.7	Moderate
Bloomington	87.1	Low
Freelanville	89.9	Moderate
Vincennes	91.6	Moderate
Mt. Vernon	103.0	High

your area in 2009, and thus the potential severity of the threat of the disease, we have created the following state map (Figure 1). According to the temperature model, there is low probability of corn flea beetle activity and subsequent disease in most of the state, north of US 50. Susceptible varieties of sweet corn grown below that line have a moderate chance of developing Stewart's wilt. This year, according to the model, only the very southern tip of Indiana has a high probability of developing problems with Stewart's wilt.

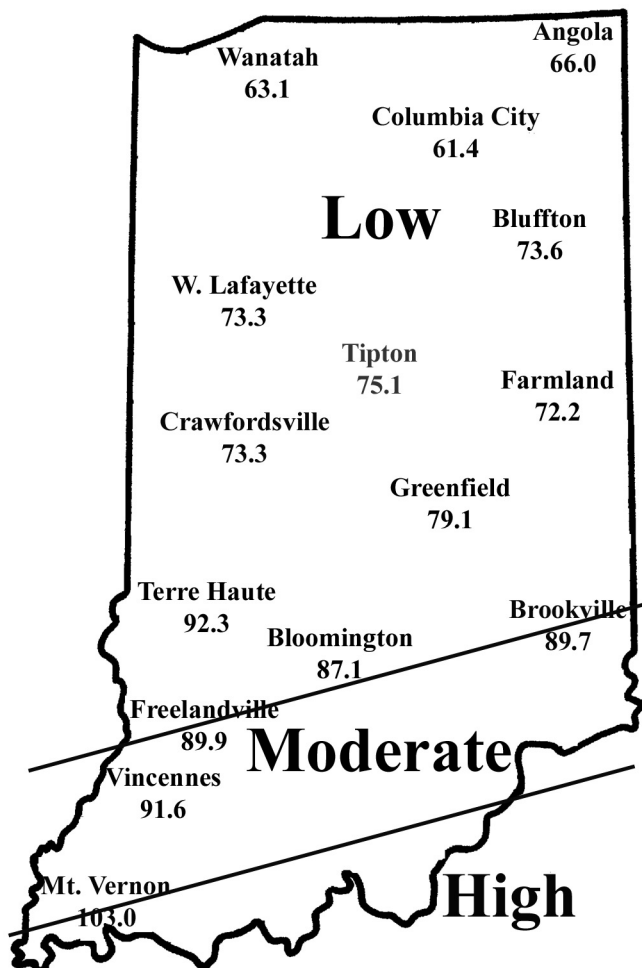


Figure 1: A graphic representation of the threat level of Stewart's wilt of sweet corn in several locations around Indiana (compare with Table 1).

This temperature model for corn flea beetle has been around many years and has been fairly accurate in predicting the activity of this pest the following spring. However one inherent flaw is that the model is based on ambient air temperatures, not temperatures under leaf litter and grass clumps where this pest overwinters. Also, snow cover, which can provide an excellent insulating blanket for the insect, may protect some beetles from winterkill. Snow cover in most areas of the state was not unusually heavy this winter, so we don't think that will be a major factor. We think the 2008/2009 winter was cold enough to have negatively impacted overwintering beetles in most of Indiana. Also, flea beetle numbers have been low statewide, in general, for the last several years.

There are two phases of Stewart's wilt: a wilt phase and a leaf blight phase. In the wilt phase, plants wilt rapidly, usually at an early stage of growth (Figure 2). Leaves emerging from the whorl of infected plants are often the first to wilt. Internal tissues at the growing point are discolored or hollowed out. Faint green to yellow streaks containing corn flea beetle feeding marks are visible on one or more leaves (Figures 3 and 4). If stalks of wilted plants are cut, it may be possible to see yellow, moist beads of bacterial ooze. The leaf blight phase can occur at any time during the growing season, but often does not appear until after tasseling. Lesions are long and narrow, with pale green to yellow streaks and irregular or wavy margins. Streaked areas die and become straw-colored. Severely infected leaves may die prematurely. Lesions on leaves of older plants may be confused with northern corn leaf blight. It is usually possible to see beetle feeding tracks in Stewart's wilt lesions.

Sweet corn growers should choose varieties that are resistant if they are growing in high-risk areas. See Table 2 for a list of varieties with high levels of resistance to Stewart's wilt. In areas with a moderate or high risk for flea beetles and Stewart's wilt, growers should consider planting the varieties on this list if they meet the desires of your customers.

Table 2: Resistance of common bi-color sweet corn cultivars to Stewart's Wilt.

Sugar Enhanced and Synergistic		Supersweet and Augmented Supersweet	
Cultivar	Stewart's Wilt Resistance*	Cultivar	Stewart's Wilt Resistance*
Ambrosia	R-MR	XT2170	MS
BC 0805	MS	XT 2171	M-MS
BC 0808	M	274A	M-MS
Kristine	M	277A	MR-M
Lucius	M	Awesome	R-RM
Providence	M-MS	BSS 0982	MS
Revelation	MS	Fantastic	R-MR
Temptation	M-MS	Mirai 336BC	R
		Obsession	MR-M
		Optimum	M-MS
		Sweet Surprise	MR

*R=resistant, MR=moderately resistant, M=moderate, MS=moderately susceptible, S=susceptible. Cultivars classified as R, R-MR, or MR are not likely to suffer yield loss due to Stewart's Wilt. Source: Pataky, J.K. 2004. Reactions of Sweet Corn Hybrids to Prevalent Diseases, and Pataky et al., 2005, 2006, 2007, and 2008. Sweet Corn Hybrid Disease Nursery. Available online at <www.sweetcorn.illinois.edu/>.

In areas where the risk of disease is moderate or low, growers may want to purchase sweet corn seed that has been treated with either Cruiser® or Poncho®. These systemic insecticides will provide good control of flea beetles and Stewart's wilt in the early growth stages. The low rate can be expected to provide protection up to the 2-leaf stage and the high rate should work until the 5-leaf stage.

If treated seed are not used in moderate or high risk areas, growers should scout fields and treat with an appropriate foliar insecticide if damage and flea beetles are noticed. Recommended products include Ambush®, Pounce®, Asana®, Capture®/Brigade®, Lannate®, Lorsban®, Mustang Max®, PennCap-M®, Sevin XLR®, and Warrior®.



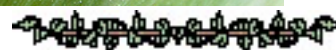
Figure 2: A sweet corn seedling with severe symptoms of Stewart's Wilt. (Photo by Purdue Extension Entomology)



Figure 3: Flea beetle damage on sweet corn. (Photo by Purdue Extension Entomology)



Figure 4: Flea beetle on sweet corn. Note long strip of flea beetle feeding damage in center of photograph. (Photo by Purdue Extension Entomology)

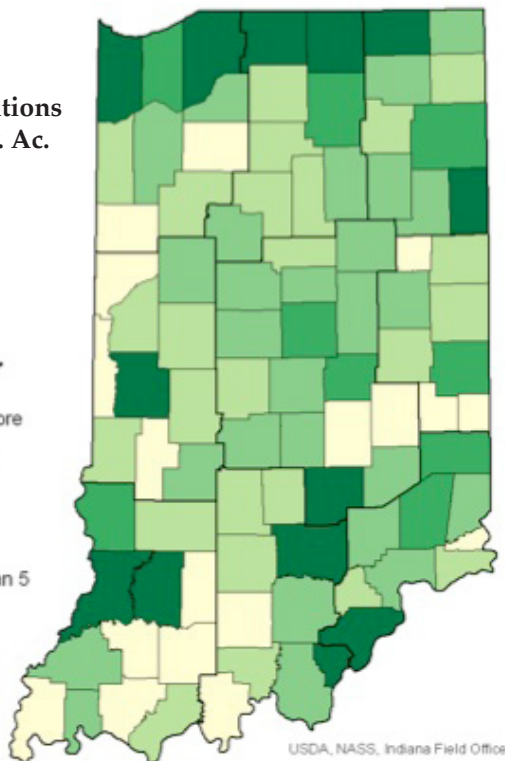
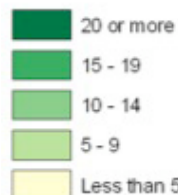


2007 CENSUS OF AGRICULTURE - Data from the 2007 census of agriculture has been released. The number of vegetable operations in Indiana increased almost 20% since the last census in 2002, to 1,363. Vegetable acreage harvested has decreased almost 6% since 2002, to 35,503. In a future issue of this newsletter we'll provide more detailed discussion about these changes in Indiana vegetable production. If you can't wait, browse to your heart's content at www.agcensus.usda.gov/Publications/2007/index.asp.

2002 Vegetable Operations

1,139 Operations
37,682 Harv. Ac.

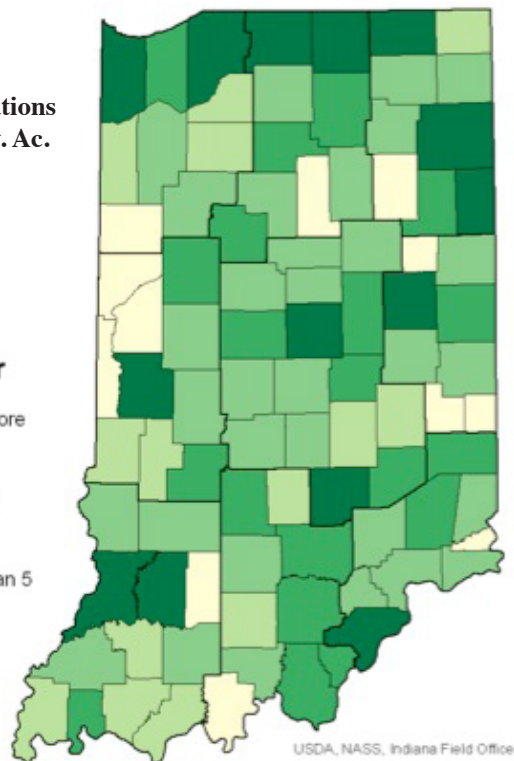
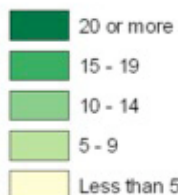
Number



2007 Vegetable Operations

1,363 Operations
35,503 Harv. Ac.

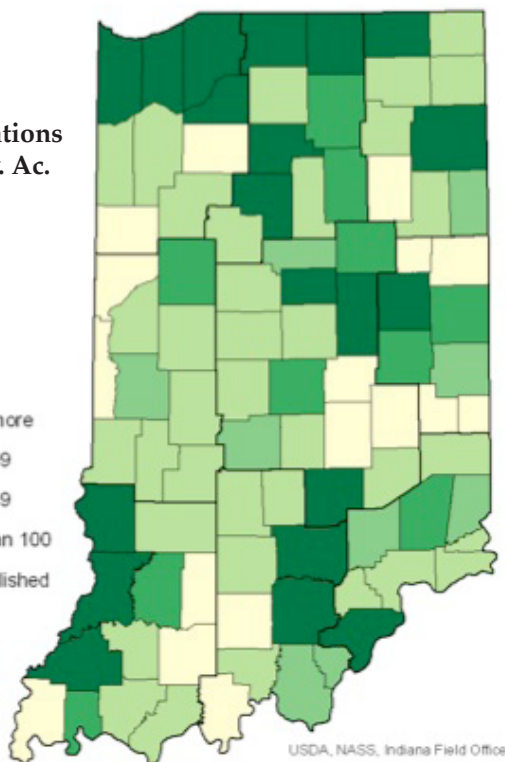
Number



2002 Vegetables: Harvested Acres

1,139 Operations
37,682 Harv. Ac.

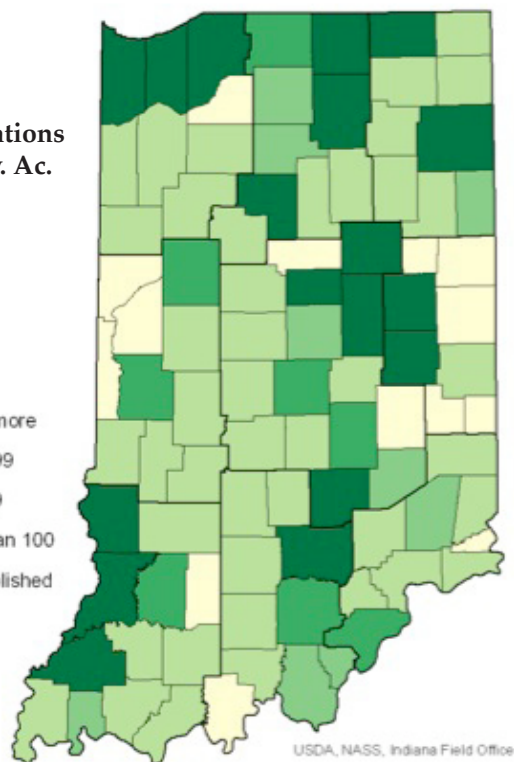
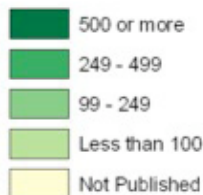
Acres



2007 Vegetables: Harvested Acres

1,363 Operations
35,503 Harv. Ac.

Acres



TOMATO DISEASES IN THE GREENHOUSE - (Dan Egel) - The following article will discuss some of the disease problems that may be observed in the tomato transplant greenhouse.

Bacterial spot - Leaf spots are usually 1/16 inch, black and angular. Spots are more often found on young than old plant tissue (Figure 1). Spots are usually surrounded by yellow plant tissue. Spots on fruit are black, raised and up to 1/3 inch in diameter. The disease prefers warm wet conditions.



Figure 1: Bacterial spot of tomato. Note the yellowing that accompanies the lesions. (Photo by Dan Egel)

Bacterial spot may be seed borne; greenhouse grown transplants should be carefully monitored. Treatment with fixed copper products may reduce spread in the greenhouse. Make sure to consult the *Midwest Vegetable Production Guide for Commercial Growers* (ID-56) <www.btny.purdue.edu/Pubs/ID/ID-56/>.

Bacterial Canker - While symptoms of this disease may become quite obvious in the field, greenhouse symptoms are more difficult to detect. Figure 2 shows a transplant tray with infected seedlings. Figure 3 shows a leaf with slight necrotic etching symptoms that may be mistaken for weather related damage. If bacterial canker can be diagnosed in the greenhouse, infected plants can be culled before planting in the field. When symptomat-



Figure 2: Bacterial canker of tomato on transplants. The necrotic (brown) symptoms can be mistaken for environmental damage. (Photo by Mary Hausback, Michigan State University)



Figure 3: Bacterial canker of tomato on seedlings in a transplant tray. It is important to get suspect symptoms properly diagnosed. (Photo by Mary Hausback, Michigan State University)

ic plants are found in a greenhouse, all seedlings should be considered suspect.

Bacterial canker is another disease that may be seed borne. Copper products may be used to manage the disease in the greenhouse, but these products have had mixed results in the field due to the systemic nature of this disease. Remember to use good sanitation. For example, use only clean transplant trays. Reduce the spread of bacterial canker by working in the greenhouse when the plants are dry.

General suggestions - If seedlings are purchased, they should be inspected upon delivery. If seedlings are grown, they should be scouted regularly. Always use new transplant trays or ones that have been well cleaned and sanitized. Always check the label for mention of greenhouse use before applying anything in the greenhouse (See article this issue). Remember that any pesticide application in a greenhouse is done under much different conditions than in the field; phytotoxicity symptoms and human health issues are more likely in the greenhouse. Follow all reentry periods carefully.



DISTINGUISHED AGRICULTURE ALUMNI AWARD - Steve Smith, Director of Agriculture, Red Gold, Inc., has been named a Distinguished Agriculture Alumnus of the Department of Horticulture and Landscape Architecture at Purdue. Smith works closely with Red Gold's 55 growers in Indiana, Ohio and Michigan who participate in the company's variety development program.

Smith is a member of the Purdue Dean of Agriculture Advisory Board and serves on the Indiana Department of Agriculture Advisory Board. Congratulations, Steve!



EQIP FOR ORGANIC TRANSITION AND MORE - (USDA and NRCS) - EQIP provides payments for farmers to implement conservation practices on working lands. Practices that are already in place on the land are not eligible for payment.

Farmers who want to apply for financial assistance to transition to organic agriculture may receive assistance under a new provision of EQIP program that allows producers to apply for up to \$20,000 per year or \$80,000 over six years. Producers who are currently certified as organic are also eligible for EQIP under the general provisions.

EQIP is a competitive program (one out of every two to three applications is funded on average) and projects are ranked for environmental benefits; producers addressing more resource concerns for the lowest cost have a higher chance of receiving funds.

Steps to take:

- Visit the NRCS office at your local USDA Service Center to discuss resource concerns and develop a conservation plan.
- If you don't have a tract number or farm number, contact the Farm Service Agency office at your local USDA Service center to make an appointment to establish eligibility for USDA programs. (Specific documentation will be required.)

Find local USDA Service Center locations at:

<<http://offices.sc.egov.usda.gov/locator/app>>.

For more information and updates about EQIP and other Farm Bill topics, visit the USDA Web site <www.usda.gov/farmbill> or the Indiana NRCS Web site <www.in.nrcs.usda.gov/programs>.



USDA OFFERS STIMULUS DOLLARS - (Announcement - INDIANAPOLIS) - A portion of the American Recovery and Reinvestment Act (Stimulus Package) is being offered to farmers whose fields have had flood damages. The damages could have happened last June, or could be in fields that have a recurring flood problem. Land qualifies if it has been flooded at least once in the past 12 months, or twice in the past 10 years.

The purpose: To restore floodplain areas to natural conditions; Special allocation through stimulus funding rather than disaster funding. Program still falls under the Emergency Watershed Protection (EWP) program authority; **\$145 million available** nationwide for permanent floodplain easements; A **one-time permanent easement payment** will be offered; Compensation values based on Geographic Area Rate Caps (GARCs), available by county at <www.in.nrcs.usda.gov/programs/FEP/FEHomepage.html>. No appraisals will be used to determine easement values; If restoration work is needed, the program **can pay 100% of restoration costs**.

The timeline: There is a nationwide sign-up from March 9 through March 27, 2009, use application form AD-1153; All easement offers made by May 4, 2009, use Option Agreement to Purchase (AD-1157); Record and close on easements by December 3, 2009; Obligate all project funds by September 30, 2010; Complete all restoration work, if applicable, by December 30, 2010; Interested landowners can get more information and apply by visiting NRCS at the local USDA Service Center. USDA Service Center locations can be found at <<http://offices.sc.egov.usda.gov/locator/app>>.

Contact information: Jane E. Hardisty, NRCS State Conservationist, (317) 290-3200; Michael McGovern, Public Affairs Specialist, (317) 290-3200, ext. 324

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