# VEGETABLE CROPS HOTLINE

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



Issue 618 - August 4, 2016

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# Fall Armyworms

(Rick Foster, fosterre@purdue.edu, (765) 494-9572) & (John Obermeyer, obe@purdue.edu)

Fall armyworms (Figure 1) are only able to survive the winter in extreme southern US, along the Gulf Coast and in Florida. Fall armyworms tend to migrate northward gradually, with each successive generation moving several hundred miles further north. They reach Indiana every year, but their populations are unpredictable in numbers and location. This week we have received reports of fall armyworm infestation in corn from southwest Indiana and northern Elkhart County, so they are throughout the state. However, infestations tend to be spotty, with individual fields or even portions of a field showing damage, with neighboring fields uninfested.



Figure 1. Fall armyworm larva.



Figure 2. Fall armyworm feeding on kernels.



Figure 3. Fall armyworm damage to whorl.

Fall armyworms will feed on corn at all stages of development and will feed on all above ground plant parts (Figure 2 and 3). However, their late arrival in Indiana (July-August) means that we are mostly concerned about feeding on kernels in the ear. Because of the higher value of the crop, sweet corn, seed corn, and popcorn growers should be particularly observant for possible fall armyworm infestations. Late planted sweet corn can be attacked during the whorl stage and may require an insecticide application in the late whorl/early tassel emergence stage in addition to the normal earworm spray program. Seed corn and popcorn are beyond the whorl stage now but may benefit from an insecticide application if damaging populations are observed. The pyrethroid insecticides still provide good control of fall armyworm

# When to Stop Spraying Fungicide

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

For many vegetable growers, the season is in full swing. All that hard work in season preparation, planting and maintenance is paying off with harvest. One of the on-going season maintenance issues is applying fungicides. In other articles, I have described how and when to spray. In this article, I want to address when to stop. To limit the scope of this article, I will concentrate on tomato, cantaloupe and watermelon crops. These are crops where the fruit is consumed, not the foliage.

For most vegetable crops, there is no need to apply a fungicide shortly before the final harvest. Foliage needs to be protected to preserve fruit quality. A plant with reduced foliage will produce a smaller fruit and/or fruit that have fewer sugars and other desirable compounds. I don't know how much foliage needs to be reduced to affect fruit size or quality. However, I do know that for many foliar diseases, symptoms will not be obvious for a week to 10 days. It will take even longer for the foliar disease to significantly reduce foliage. Therefore, for many diseases, it doesn't make much sense to spend good money for a fungicide on a crop that is 2 to 3 weeks before the final harvest.

Examples of diseases that affect foliage, but not fruit directly include: powdery mildew of cantaloupe or tomato, early blight of tomato, Septoria leaf blight of tomato, gummy stem blight of watermelon or cantaloupe, Alternaria leaf blight of cantaloupe. With some rare exceptions, these diseases reduce yield or fruit quality by affecting foliage, not by attacking fruit directly.

Diseases that affect fruit directly may need fungicide applications closer to harvest. A disease that can cause a lesion directly on a fruit can ruin the marketability of the fruit or even cause the fruit to begin to rot in transit. However, most fungicides will remain active in or on the plant for 6 to 7 days even during the most conducive weather. Therefore, an application of a fungicide to protect fruit from direct infection from disease is probably not necessary within 7 days of the final harvest.

Examples of diseases that may affect fruit directly include:

- Anthracnose of watermelon-this disease can cause loss of foliage, but also lesions on the fruit. An infection on the day before harvest could, theoretically, cause a lesion in transit. During weather that is conducive to disease, it makes sense to keep a fungicide on the plant surfaces during the last several days before harvest. Growers that are using the MELCAST system will be able better judge when the weather is conducive for anthracnose.
- Phytophthora blight-this disease affects foliage as well as fruit. As with anthracnose above, a lesion that develops before harvest could start to rot the fruit in transit. Specialized fungicides applied 7 to 10 days before

- final harvest should protect the fruit.
- Bacterial spot or speck of tomato-lesions of these diseases that occur on the fruit can ruin marketability. Applications of a copper product should help to protect the fruit during the last week or so. Warm, wet weather shortens the disease cycle and increases the likelihood of infection.
- Bacterial spot of pumpkin-this disease can cause pimple-like lesions that may ruin marketability. However, the disease affects fruit during the first 14 days or so after pollination. After this period, infection is much less likely due to changes in fruit maturity. Therefore, copper applications during the last weeks before harvest make little sense.
- Blossom-end rot-trick term! BER is not a disease at all. Instead, BER is a calcium deficiency often brought about by uneven moisture in the soil around the root. No amount of fungicide at any timing will help to slow BER. The point is to know what the fruit problem is so that you will know what to do-and what not to do-to reduce the problem.

Pre-harvest Interval (PHI) – when applying fungicides close to the final harvest-or any harvest-keep in mind the PHI. Often growers will need to change what fungicide is used when vegetables reach harvest stage. For example, cantaloupe growers may decide to use a fungicide with the active ingredient mancozeb PHI 5 days early in the season (examples include, Dithane®, Manzate®, Penncozeb®, Roper®). As harvest grows near, however, a fungicide with the active ingredient chlorothalonil might be used since it has a 0 day PHI (examples of products with chlorothalonil include Bravo®, Equus®, Initiate®). The PHI for each crop can be found in the fungicide label with the appropriate crop grouping.

Finally, one should be realistic about applying fungicide to a field of vegetables that is severely diseased. The following article discusses the pros and cons of such late season applications <a href="https://vegcropshotline.org/article/to-spray-or-not-to-spray/">https://vegcropshotline.org/article/to-spray-or-not-to-spray/</a> Remember, no fungicide will turn brown plant tissue back to green.

I am glad to discuss any special circumstances about deciding when to make the final fungicide application.

### Corn Earworm

(Rick Foster, fosterre@purdue.edu, (765) 494-9572)

Corn earworm moth catches continue to be quite low in most areas of the state. Typically, we see an upsurge in activity during the first two weeks of August. With populations as low as they are and most field corn still with attractive silks, sweet corn growers can get by with minimal spray programs now. However, growers should be diligently watching their pheromone traps for the next generation to arrive. It is not unusual for trap catches to go from near zero to in the hundreds per night literally overnight. This type increase if usually associated with some sort of tropical disturbance in the Gulf of Mexico but can also occur when storm fronts move up from southern locations.

## Cross Stitch of Watermelons

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198) & (Dan Egel, egel@purdue.edu, (812) 886-0198)

Cross stitch of watermelons is a physiological disorder (not caused by an infectious disease) first reported in 1990s on watermelon fruit. It received the name because the symptom looks like cross stitch. One or more rows of oval-shaped lesions lie along with the longitudinal axis of the fruit. These lesions are normally more close to the stem end of the fruit (Figure 1). Sizes of the lesions range from a quarter inch to more than 2 inches. When the lesions are small, it normally does not affect interior flesh quality. However, if lesions develop into large gaps, it could lead to fruit rot (Figure 2).



Figure 1. Cross stitch on watermelon fruit.

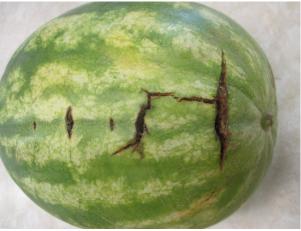


Figure 2. Cross stitch with large lesions.

Cross-stitch symptom has been noticed in several watermelon production areas, however, causes of the symptom is still largely unknown. In most of the years, this is a minor problem. However, we have received more reports of cross-stitch on watermelon fruit this year. In one case, more than 10% of fruit were affected. While we are gathering more information to better understand the physiological disorder, we would appreciate it if you would let us know if you see the symptom on your watermelons.

# A Case Study: What Cover Crops Could Achieve in High Tunnels in the Middle of Summer?

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

We have grown strawberries from Aug, 2015 to May, 2016 in one of our high tunnels at Southwest Purdue Agricultural Center. After taking the strawberry plants out of the high tunnel in the end of May, we did have enough time to grow a warm-season crop, like cucumbers. However, because for most of us June is such a busy time working in the field, we decided to put cover crops inside the high tunnel in the summer months and plant cool-season crops in the fall.

Our primary goal of growing cover crops is to provide nitrogen for the following crops and increase soil organic matter. We decided to use a legume cover crop cowpea in this case because it has excellent drought and heat tolerance. Cowpea at a rate of 100 lbs per acre was sowed on June 17th. With the high temperatures inside the high tunnel, cowpea reached 30" high after 5 weeks (Figure 1). Decomposition of the biomass normally takes 3 to 4 weeks after they are incorporated into the soil. We tilled the cover crops on July 25th when they are still in vegetative growth (Figure 2), with the hope that most of the biomass will be decomposed by the end of August at the time we plant fall crops.



Figure 1. Cowpea grown for 5 weeks inside a high tunnel in the summer.

An important question now to ask is how much nitrogen (N) will be contributed by cowpea to the following crops? It should be clear that not all the N in the cover crop is available for the next crops after the cover crops being incorporated into the soil. Part of the N is tied up with carbon to form soil organic matter. The remaining N that is readily available for the following crop is called plant available nitrogen. We used a tool developed by Oregon State University to estimate the plant available nitrogen (https://catalog.extension.oregonstate.edu/sites/catalog/files/proje ct/pdf/pnw636.pdf). About 40 lb/a N was provided by cowpea in the five-week period inside the high tunnel, which is about one third of the nitrogen needed for a cool-season crop.



Figure 2. Cowpea was worked into the soil.

A point that might be raised is that summer is a valuable time to grow cash crops, not cover crops. This statement might be true for field production. However, temperatures inside of high tunnel in the summer can easily reach 100 °F, which make the traditional crop growing season a little too hot for some vegetable crops. In this case study, we demonstrated that a large amount of nitrogen could be provided by legume cover crops growing in high tunnels in a relatively short period of time, indicating summer might be a window for high tunnel growers to work on improving soil fertility by growing legume cover crops. Furthermore, studies have shown that legume cover crops could be a more economic source of N compared with organic fertilizers, an important consideration, particularly for organic growers.

# Purdue Needs Growers for Pollinator Health Study

(Rick Foster, fosterre@purdue.edu, (765) 494-9572)

A group of entomologists and others, led by Dr. Ian Kaplan from the Department of Entomology, recently received funding from the Specialty Crop Research Initiative from USDA/NIFA for \$3,673,611 to study "Navigating the Trade-off Between Pest Management and Pollinator Conservation in Cucurbits." The grant will begin September 1, 2016 and run for 5 years. The work will be done in collaboration with scientists from Michigan and Ohio. The objectives of the study are: Objective 1: Identify insecticide management strategies that simultaneously optimize pest suppression while minimizing non-target exposure to cucurbit pollinators. Objective 2: Determine the consequences of within-and extra-field neonic exposure for honey and wild bee health using large-scale field manipulations. Objective 3: Assess the ecological and socioeconomic trade-offs among pollinators, pests,

crop yield, and farm profitability resulting from alternative pesticide regimes. Purdue's portion of the study will focus on watermelons and muskmelons, with Michigan focusing on cucumbers and Ohio studying pumpkin and squash. The research will require the use of growers' fields. A number of melon growers have already expressed their willingness to participate in the research and we will be contacting others in the near future. For more information about the funded SCRI grants see https://nifa.usda.gov/press-release/secretary-vilsack-announces-3 65-million-specialty-crop-research-and-extension.

## **Upcoming Events**

(Wenjing Guan, guan40@purdue.edu, (812) 886-0198)

### **High Tunnel Tour at SWPAC**

Date: August 22, 2016 7:00 PM to 8:30 PM

Location: Southwest Purdue Agricultural Center, 4369 North Purdue Road, Vincennes, IN 47591

Please join us for a high tunnel tour at the Southwest Purdue Ag Center. You will learn about high tunnel tomato diseases and management, end of season field sanitation, potential of grafting in high tunnel tomato production, use of shade clothe and sprayer calibration. The tour is free, to register please call (812) 886-0198. For more information please contact Dan Egel at egel@purdue.edu or Wenjing Guan at guan40@purdue.edu.

### **Beginning Farmer Southeast Regional Workshop**

Date: August 20, 2016, noon -7:30 pm

Location: Purdue Polytechnic-New Albany, 3000 Technology Ave, New Albany, IN 47150

The workshop will cover a wide range of topics including high tunnel and hoop houses, food safety, vegetable production, pricing products, beginning farmer resources and beekeeping. A southern style barbecue will be provided. The workshop is free, register online at the Purdue Extension Education Store (https://edustore.purdue.edu/wk\_rules.asp?itemID=22539) or call (765) 494-6795.

#### Illinois Pumpkin Field Day

Date: August 31, 2016

Location: Ewing Demonstration Center, 16132 N. Ewing Rd;

Ewing, IL 62836

For more information, contact Nathan Johanning at (618)

687-1727 or njohann@illinois.edu

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