WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

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Vegetable Crops

Vegetable Crop Insects – *Joanne Whalen, Extension IPM Specialist*; jwhalen@udel.edu

Lima Beans
Continue to sample for mites since early detection is necessary to achieve effective control. We are starting to see an increase in stinkbug and plant bug populations. As soon as pin pods are present, be sure to watch carefully for plant bug and stinkbug adults and nymphs. As a general guideline, treatment should be considered for lygus if you find 15 adults and/or nymphs per 50 sweeps. For stink bugs, the threshold should be reduced by one half.

Melons
Continue to scout all melons for aphids, cucumber beetles, and spider mites. It is also the time of year to start watching for caterpillars that feed on rinds which can include beet armyworm, yellow striped armyworm, and cabbage looper larvae. If beet armyworm is in the mix, it is important to select a material that is effective on this insect (refer to the Commercial Vegetable Recommendations) – the pyrethroids do not provide effective control. ***Be sure to read all labels carefully for pollinator protection statements, rates and restrictions. Some materials are restricted to only one application as well as ground application only***.

Peppers
Depending on local corn borer trap catches, sprays should be applied on a 7 to 10-day schedule once pepper fruit is ¼ - ½ inch in diameter. Be sure to check local moth catches in your area by calling the Crop Pest Hotline (302-831-8851) or visit our website at http://agdev.anr.udel.edu/trap/trap.php. At this time, you will also need to consider a treatment for pepper maggot. Be sure to also watch carefully for beet armyworm larvae since they can quickly defoliate plants. In addition, be sure to use a material that provides beet armyworm control – the pyrethroids have not provided control of this insect in past years.

Snap Beans
Depending on local trap catches, sprays may be needed at the bud and pin stages on processing beans for corn borer control. As earworm trap catches increase, an earworm spray may also be needed at the pin stage. You will need to check our website for the most recent trap catches to help decide on the spray interval between the pin stage and harvest for processing snap beans. Once pin pods are present on fresh market snap beans, a 7 to 10-day schedule should be maintained for corn borer and corn earworm control.
http://agdev.anr.udel.edu/trap/trap.php

http://extension.udel.edu/ag/insect-management/insect-trapping-program/ecb-and-cew-moth-catch-thresholds-for-processing-snap-beans/

Sweet Corn
Continue to sample all fields through pre-tassel stage for whorl feeders (corn borer, corn earworm and fall armyworm). A treatment should be applied if 12-15% of the plants are

infested with larvae (regardless of the species). The predominant whorl feeder being found at this time is the fall armyworm. Since fall armyworm (FAW) feed deep in the whorls, sprays should be directed into the whorls and multiple applications are often needed to achieve control. FAW can also be a problem in silk stage sweet corn, especially in outbreak years. The first silk sprays will be needed for corn earworm as soon as ear shanks are visible. Be sure to check both blacklight and pheromone trap catches since the spray schedules can quickly change. Trap catches are generally updated on Tuesday and Friday mornings on our website (http://agdev.anr.udel.edu/trap/trap.php) and the Crop Pest Hotline (302-831-8851). Information on scouting sweet corn and how to use the trap catch information can be found at http://extension.udel.edu/ag/insect-management/insect-trapping-program/action-thresholds-for-silk-stage-sweet-corn/.

Sunburn in Fruiting Vegetables and Fruit Crops and Sunburn Protection

– *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

With the expected high temperatures this weekend and next week, there is high potential for sunburn in fruits and fruiting vegetables. Growers may need to consider ways to protect against sunburn. Sunburn is most prevalent on days with high temperatures, clear skies and high light radiation. We commonly see sunburn in watermelons, tomatoes, peppers, eggplants, cucumbers, apples, strawberries, and brambles (raspberries and blackberries).

There are three types of sunburn which may have effects on the fruits. The first, sunburn necrosis, is where skin, peel, or fruit tissue dies on the sun exposed side of the fruit (Figure 1). Cell membrane integrity is lost in this type of sunburn and cells start leaking their contents. The critical fruit tissue temperature for sunburn necrosis varies with type of fruit. Research has shown that the fruit skin temperature threshold for sunburn necrosis is 100 to 104°F for cucumbers; 105 to 108°F for peppers, and 125 to 127°F for apples. Fruits with sunburn necrosis are not marketable. Injury may be white to brown in color.

Figure 1. Sunburn necrosis on pepper fruit.

The second type of sunburn injury is sunburn browning. This sunburn does not cause tissue death but does cause loss of pigmentation resulting in a yellow, bronze, or brown spot on the sun exposed side of the fruit. Cells remain alive, cell membranes retain their integrity, cells do not leak, but pigments such as chlorophyll, carotenes, and xanthophylls are denatured or destroyed. This type of sunburn browning occurs at a temperature about 5°F lower than sunburn necrosis (i.e. 115 to 120°F in apples). Light is required for sunburn browning. Fruits may be marketable but will be a lower grade.

The third type of sunburn is photooxidative sunburn (Figure 2). This is where shaded fruit are suddenly exposed to sunlight as might occur with late pruning, after storms where leaf cover is suddenly lost, or when vines are turned in drive rows. In this type of sunburn, the fruits will become photobleached by the excess light because the fruit is not acclimatized to high light levels, and fruit tissue will die. This bleaching will occur at much lower fruit temperatures than the other types of sunburn. Damaged tissue is often white in color.

Figure 2. Photooxidative sunburn on pepper fruit.

Recent storms have caused canopies in vine crops to be more open, exposing fruits to a high risk of both sunburn necrosis and photooxidative sunburn.

Genetics also play a role in sunburn and some varieties are more susceptible to sunburn. Varieties with darker colored fruit, those with more open canopies, and those with more open fruit clusters have higher risk of sunburn. Some varieties have other genetic properties that predispose them to sunburn, for example, some blackberries are more susceptible to fruit damage from UV light.

Control of sunburn in fruits starts with developing good leaf cover in the canopy to shade the fruit. Fruits most susceptible to sunburn will be those that are most exposed, especially those that are not shaded in the afternoon. Anything that reduces canopy cover will increase sunburn, such as foliar diseases, wilting due to inadequate irrigation, and excessive or late pruning. Physiological leaf roll, common in some solanaceous crops such as tomato, can also increase sunburn.

In crops with large percentages of exposed fruits at risk of sunburn, fruits can be protected by artificial shading using shade cloth (10-30% shade). However, this is not practical for large acreages.

For sunburn protection at a field scale, use of film spray-on materials can reduce or eliminate sunburn. These materials are kaolin clay based, calcium carbonate (lime) based, or talc based and leave a white particle film on the fruit (such as Surround, Screen Duo, Purshade and many others). There are also film products that protect fruits from sunburn but do not leave a white residue, such as Raynox. Apply these materials at the manufacturer's rates for sunburn protection. They may have to be reapplied after heavy rains or multiple overhead irrigation events.

While particle films have gained use in tree fruits, their usefulness in vegetables is still unclear. Research in a number of states has shown reduced fruit disorders such as sunburn in peppers and white tissue in tomatoes when applied over those crops. Watermelon growers have used clay and lime based products for many years to reduce sunburn in that crop in southern states.

There are some drawbacks to the use of particle films. If used for sunburn protection on fruits, there is added cost to wash or brush the material off at harvest. Where overhead irrigation is used, or during rainy weather, the material can be partially washed off of plants, reducing effectiveness and requiring additional applications. Produce buyers can also have standards relating to the use or particle films and may not accept products with visible residues. For example, some watermelon brokers will accept watermelons where calcium carbonate protectants have been used but will not accept watermelons sprayed with clay based products.

Potato Late Blight Update #20: July 21, 2016 – *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu

Note that we have continued to have reports of Dickeya in Vivaldi potatoes. **Dickeya is almost always a seed piece issue. If you have questions about how Dickeya spreads, or how it got to your farm, please contact me directly.**

Green row: April 29th, 2016

	Townsend		Camden		Leipsic		Kenton	
Date	**DSV**	**Total DSV**	**DSV**	**Total DSV**	**DSV**	**Total DSV**	**DSV**	**Total DSV**
5/30-6/2	2	22	4	28	5	31	3	29
6/2-6/6	6	28	4	32	5	36	5	34
6/6-6/9	0	28	0	32	0	36	0	34
6/9-6/15	0	28	0	32	0	36	0	34
6/15-6/24	11	39	5	37	6	42	4	38
6/24-6/30	1	40	0	37	3	45	3	41
6/30-7/5	2	42	2	39	1	46	2	43
7/5-7/8	1	43	0	39	0	46	0	43
7/8-7/11	3	46	2	41	2	48	2	45
7/11-7/14	8	54	2	43	4	52	3	48
7/14-7/19	4	58	2	45	17	69	2	50
7/19-7/21	1	59	0	45	0	69	1	51

Notes: Season severity of **18 severity values** indicates the need for the first fungicide application. An accumulated severity of 7 after fungicide application identifies the need for a subsequent fungicide application.

You can personalize your late blight forecasts for specific fields, sign up for email or text alerts, and enter in management information at http://blight.eas.cornell.edu/blight/. Real time fungicide application timing tables for locations within Delaware can be accessed at http://blight.eas.cornell.edu/blight/DE

See the 2016 Commercial Vegetable Production Recommendations-Delaware for recommended fungicides.

Any suspect samples can be sent to the Plant Diagnostic Clinic or dropped off at your local extension office. Dr. Nathan Kleczewski can also be contacted at nkleczew@udel.edu or 302-300-6962.

The website USABlight tracks tomato and potato late blight across the nation and can be found here: http://usablight.org/. Information on scouting, symptomology, and management can also be found on this website.

Agronomic Crops

Agronomic Crop Insects – *Joanne Whalen, Extension IPM Specialist*; jwhalen@udel.edu

Alfalfa

Continue to scout fields on a weekly basis for leafhoppers. In past years, we have also seen an increase in thrips when weather conditions turn hot and dry. Reports from other areas of the country indicate that thrips feeding on the developing leaf tissue can cause the leaves to distort as they emerge. Leaves may also be curled, with a cupped or puckered appearance. Although there are no thresholds for thrips in alfalfa, the following information from other areas of the country may be helpful when

considering the need for thrips management: "(a) high populations of bean or onion thrips may cause damage, especially in dryland conditions and (b) if a thrips treatment is contemplated, it is best to cut as soon as possible and treat the regrowth if the infestation persists. Thrips are very difficult to control in alfalfa, so excellent coverage is important and two applications may be required for satisfactory results."

Field Corn
As expected, Japanese beetle populations have increased in fields that are in the silk stage. As discussed in previous newsletters, damage from silk clipping generally occurs before 50% pollination. The following link to a fact sheet from Purdue provides good information on scouting and decision making. There is also an IPM tip at the end from Bob Nielsen about how to determine what percent of the pollen has been released.

http://extension.entm.purdue.edu/fieldcropsipm/insects/corn-japanese-beetles.php

As a general rule, treatment for Japanese beetle may be needed if silks are clipped back to less than half an inch when less than 50% of the plants have been pollinated and Japanese beetles are still present and actively feeding. Pollen shed for an individual tassel generally takes 2-7 days to complete and 1-2 weeks for an entire field (information from Bob Nielson, Purdue University).

Additional information and research from states to our south can be found at the following link: http://news.utcrops.com/2013/06/japanese-beetles-on-corn-silks/ .

Soybeans
We continue to see a mix of defoliators (grasshoppers, Japanese beetles, yellow striped armyworm and green cloverworm) in full season and double crop soybeans. As a general guideline, treatment decisions for defoliators should be based on the following thresholds:

(a) Full Season Plantings – 30% defoliation pre-bloom; 15% defoliation from bloom through the end of pod fill; 35% defoliation- once fully developed seeds are present

(b) Double Crop Plantings (especially if growth is poor) – 20% defoliation pre-bloom, 10% defoliation from bloom through pod fill; 15% defoliation - once fully developed seeds are present.

We are starting to see soybean fields in Kent and Sussex counties with economic damage from spider mites. Early detection and control before populations are exploded is necessary to achieve effective control. Although edge treatments can be effective in some cases, in other cases mites have already been transported into the field interiors on wind current so you still need to sample the entire field for mites. We can often find economic levels starting in field interiors.

We are also starting to see an increase in native stinkbug populations (native green and brown) in soybeans. Economic damage from stinkbug occurs during the pod development and pod fill stages. You will need to sample for both adults and nymphs when making a treatment decision. Available thresholds are based on beans that are in the pod development and fill stages.

Decision Making for Fungicide Applications in Field Corn

– *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu

Corn in many parts of the state is at approaching tasseling through silk. Now is a good time to scout fields to see if there are any disease issues that may need attention. With recent wet weather, diseases such as Grey leaf spot (GLS) have started to pop up in some places. GLS lesions are often small, 1.5 inches or less in length, and blocky in appearance. These symptoms differ from the large, cigar shaped lesions produced by Northern Corn Leaf Blight under cooler conditions.

Symptoms of GLS may be more pronounced in areas such as tree lines or low lying parts of the field, where high humidity levels may persist for longer periods of time. Hybrid selection plays a key role in managing GLS as does residue management and crop rotation. Understanding how these factors reduce risk is important when deciding if a fungicide application might be beneficial for managing GLS, which is our most common foliar corn disease in Delaware.

Figure 1. Left: small, blocky lesions caused by the Grey Leaf Spot pathogen. Right: large, cigar shaped lesions caused by Northern Corn Leaf blight.

Think of your risk for yield limiting disease as a set of stairs, with each factor that contributes to risk moving you another level higher on the "riskcase."

(Use the handrail on the riskcase at all times.)

The first step (and maybe even 2) is **hybrid** selection. Hybrids with good to excellent ratings for GLS resistance can do two things, all the time, regardless of weather, year, or other factors: 1) they reduce the ability of the GLS pathogen to infect and grow on foliage and 2) they can reduce amount of spores produced by lesions, thereby reducing the amount of disease pressure experienced over time. Disease pressure concerns us when it reaches an economic threshold, meaning that it will significantly reduce yields and profitability (Figure 2). This means that it needs to reach some crucial point before the crop is made. In corn with GLS (and Northern corn leaf blight) research has shown that number tends to be around 5% of the flag leaf affected by R5 (Figure 3).

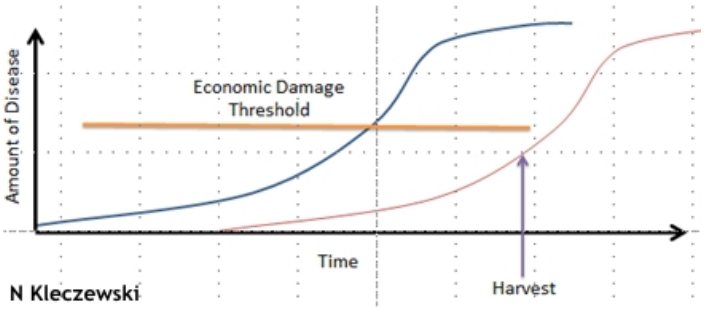

Figure 2. A graph showing the relationship between a hybrid with a poor rating for Grey leaf spot (blue line) and a hybrid with a good rating for Grey leaf spot. The ability for the hybrid to slow the disease reduces the total amount of damage caused by the time of harvest.

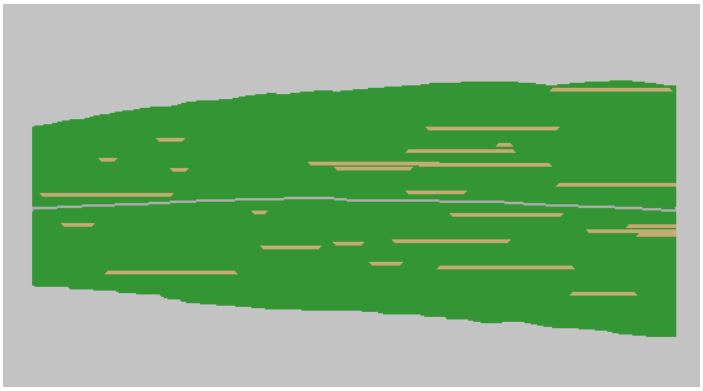
Figure 3. A diagram showing what a section of a corn ear leaf would look like with 5% GLS-affected leaf area.

The second step that impacts disease is **cropping history**. Is the field continuous corn? GLS grows and reproduces on corn residue. Continuous production of corn in the same field means that there is a consistent source of food available for the GLS pathogen to survive from season to season, reproduce, grow, and sporulate. Rotation allows for breakdown of corn residue via decomposition, limiting the amount of pathogen present in the field at the start of the growing season. If we again look at Figure 2, consider the blue line to be the disease caused in a corn-corn field and the red line to be a field with a corn-soy rotated field. If you do not rotate your fields, take another step on the riskcase.

The third step is **residue.** Do you practice no till farming or minimal till farming? More residue on the soil surface means an increased source of

food for the GLS pathogen, and improved ability for spores to move into the crop canopy. Is this your situation? Take a step up. Hopefully your legs aren't burning too badly.

The forth step is **disease history** in the field. Do you have records of what you saw in the field in years past? GLS (and NCLB) can persist in residue for several seasons. If you had these diseases at significant levels in the past, chances are they are present in the residue. Take one more step if you have a history of these common diseases.

The fifth step is **environment** and in particular, **water**. Has it been an excessively wet season? Are you **irrigating heavily**? GLS needs water for spores to germinate and grow into tissues. Wet years increase disease development.

There you have it, the five big steps. There are some additional factors, such as fertility and planting density that can also play a role, but by and large, the steps above are going to give you an idea of what level of risk you may have in a particular field. That being said, what about additional management this season? Do you need to apply a fungicide? First, scout your fields just before tassel. Do you see GLS at significant levels (5-10% or more) on the 2 leaves below the ear leaf? Are you standing high on the riskcase? If yes, then research indicates that a foliar fungicide at VT-R3 could be beneficial. The greatest probability for a fungicide to pay will be when you are standing high on the riskcase and you see disease on the 2 leaves below the ear leaf by VT. Are you low on the riskcase and you don't see disease? Perhaps a fungicide isn't needed.

With all that climbing, it's time for a burger and fries.

Announcements

Free Webinars in July, Sponsored by the Mid-Atlantic Women in Agriculture

7/27: Farm Diversification - Ideas on alternative crops - Farm diversification opens opportunity and increases potential profitability! Adding specialty fruit and vegetable crops to your farm can increase profit margins in several ways. Like diversifying in the stock market, engaging in more than one enterprise and adding value to what you already grow will spread profit risk, not to mention "growing" interest in locally produced foods. This webinar will introduce participants to some new potential specialty crops, discuss new federal regulations to be aware of and regional research that has been done with specialty crops over the past few years.

To register:
http://www.eventbrite.com/e/wednesday-webinars-registration-11452674257

Webinars begin at noon EST. Duration is approximately 1 hour. For optimal performance we suggest using Internet Explorer as your web browser and connecting via Ethernet connection instead of wireless (wireless will work, but a hard line is more stable)

See website for more information and other upcoming topics: https://extension.umd.edu/womeninag/webinars

If you do not have access to high speed internet and would like to participate in one of the above webinars, contact Tracy Wootten at wootten@udel.edu.

Beginning Farmer Workshop Series
Laurel Farmers Auction Market Tour

Wednesday, July 27, 2016 8:30 – 10:00 a.m.

Meet at Main Auction Sales Area
10667 Georgetown Rd, Laurel, DE

Participants who attend this tour will have an opportunity to visit the Laurel Farmers Auction with Auction Manager Calvin Musser, UD Fruit/Vegetable Specialist Dr. Gordon Johnson, and Sussex County Extension Horticulture Agent, Tracy Wootten to learn more about the auction and its services. You will see produce as it enters and is displayed, learn how to sell at the auction, view the auction process, and see produce supplies available at the auction store.

To register for the tour, please contact Tracy Wootten at 302-236-0298 cell or email wootten@udel.edu

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of July 14 to July 20, 2016

Readings Taken from Midnight to Midnight

Rainfall:

0.44 inch: July 18
0.45 inch: July 20

Air Temperature:

Highs ranged from 92°F on July 14 and July 18 to 84°F on July 20.

Lows ranged from 75°F on July 14 and July 15 to 66°F on July 20.

Soil Temperature:

83.6°F average

Additional Delaware weather data is available at http://www.deos.udel.edu/monthly_retrieval.html and http://www.rec.udel.edu/TopLevel/Weather.htm

Weekly Crop Update is compiled and edited by Emmalea Ernest, Associate Scientist – Vegetable Crops