WEEKLY CROP UPDATE
UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

Volume 24, Issue 21 **August 12, 2016**

Vegetable Crops

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

Cole Crops
As soon as plants are set in the field, be sure to sample for cabbage looper and diamondback larvae. A treatment will be needed before larvae move into the hearts of the plants. You should also watch for the first Harlequin bugs in cole crops. In general, most of the "worm" materials are not effective on Harlequin bugs. The pyrethroids have provided control in years past.

Lima Beans
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 if you find 15 plant bug adults and/or nymphs per 50 sweeps. If stink bugs are in the mix, the threshold should be reduced by one half. Also be sure to begin sampling the earliest planted fields for corn earworm. A treatment will be needed for corn earworm if you find one corn earworm larvae per 6 foot-of-row.

Peppers
Depending on local 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. 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
You will need to consider a treatment for corn borer and corn earworm populations in processing and fresh market snap beans. Sprays are 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 (http://agdev.anr.udel.edu/trap/trap.php) or call the Crop Pest Hotline (302-831-8851) for the most recent trap catches to help decide on the spray interval between the pin stage and harvest for processing snap beans. http://extension.udel.edu/ag/insect-management/insect-trapping-program/ecb-and-cew-moth-catch-thresholds-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.

Sweet Corn
Continue to sample all fields through pre-tassel stage for whorl feeders. A treatment should be applied if 12-15% of the plants are infested with larvae (regardless of the species). The predominant whorl feeder continues to be 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 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/. You should also continue to watch for aphids and apply sprays before populations explode. Be sure to refer to the commercial production recommendations for materials labeled on sweet corn for aphid control.

http://extension.udel.edu/ag/vegetable-fruit-resources/commercial-vegetable-production-recommendations/.

Cover Crop Decisions for Vegetable Growers I: Basic Considerations & Winter Killed Cover Crops – *Gordon Johnson, Extension Vegetable & Fruit Specialist;* gcjohn@udel.edu

With cover crop season coming up, vegetable growers will have decisions to make on what cover crops to plant and how best to grow and use them. The following is the first in a series revisiting this topic.

Cover crop acreage has been growing in the region, largely due to nutrient management efforts and cost share programs. In the last 2 years, there has been an emphasis on growing cover crops for soil health benefits and programs are underway from NRCS and Conservation Districts to increase cover crop plantings for soil improvement.

Nutrient management goals and soil health goals are not necessarily the same. In nutrient management based cover crop programs, the goals are to have crops that can take up residual nitrogen and also provide cover to reduce erosion losses. Non-legumes predominate, with most of the acres planted in small grains such as rye with some recent use of radishes (Maryland programs are non-legume based while Delaware conservation district programs allow for the use of legumes). No fertilizer can be used with cover crops in these programs. In this case the answer to the question above is that a cover is being grown. While there will be soil health benefits, they are not maximized.

In contrast, when soil improvement is the primary goal, the cover crops are grown as crops. You are growing plants to maximize the benefits they provide. To increase organic matter and improve soil health the main goal is to produce maximum biomass above ground and below ground. A secondary goal would be to provide different types of organic matter (such as with cover crop mixtures) to support a diverse soil microbial environment.

In other cases the goals will be different. With leguminous cover crops a goal may be to maximize the amount of nitrogen fixed. With soil compaction reducing crops such as radishes, the goal is to maximize the amount of "biodrilling" – the amount of tap roots being produced. With biofumigant crops, the goal is to maximize the production of fumigant-like chemicals the crops produce. With mulch based systems, the goal is to maximize above ground biomass.

What these soil improvement and specific use goals have in common is the need to treat the cover crop as a crop in order to optimize plant growth. This includes seeding at the proper rate to achieve optimal stands, planting at the right time, using seeding methods to get maximum seed germination and plant survival, having sufficient fertility to support good plant growth, providing water during dry periods, managing pests (insects, diseases, weeds), and inoculating legumes. If cover crop mixtures are being used, the ratios of seeds being planted must be considered to have the best balance of plants in the final stand.

The best cover crop stands are obtained with a drill or seeder that places the seed at the proper depth, at the proper seeding rate, with good soil to seed contact. Fertilization and liming programs should be used to support season-long

growth – fertilizers and other soil amendments will be necessary in most cases. Nitrogen will need to be added for non-legumes.

When the crop is terminated is also key. The cover crops should be allowed to grow to the stage that maximizes the benefits they have to offer before killing the crops. Allowing a winter cover to grow for an extra week in the spring can make a large difference in the amount of biomass produced.

Cover crops that put on significant growth in the fall and then die during the winter can be very useful tools for vegetable cropping systems. These winter killed cover crops add organic matter, recycle nutrients, improve soil health, and allow for earlier spring vegetable planting.

Winter killed cover crops that are late summer and fall planted include spring oats, several mustard species, and forage and oilseed radish. Earlier planted summer annuals (millets; sorghums, sudangrasses, and hybrids; annual legumes such as sun hemp or forage soybeans; buckwheat and many others) can also be used as winter killed species. Timing of planting will vary according to the species being used and winter killed species selection will depend on when fields will be available for seeding. Summer annuals should be planted in late July or during August for use in a winter killed system to obtain sufficient growth.

Spring oats and mustard species can be planted from late August through September. For best effect, forage and oilseed radishes should be planted before the middle of September. Spring oats, radishes and mustards are not suited for October or later planting because they will not produce adequate fall growth.

All of the winter killed non-legumes mentioned above will benefit from the addition of 30-60 lbs of nitrogen.

The following are several options for using winter killed species with vegetables:

1) Compaction mitigation for spring planted vegetables. Where there are compacted fields, the use of forage radishes has worked very well as a winter killed cover crop by "biodrilling". The extremely large taproot penetrates deep into the soil, and after winterkilling, will leave a large hole where future crop roots can grow. Oilseed radish also provides considerable "biodrilling". Winter killed radishes works well with spring planted crops such as spinach, peas, early sweet corn, and early snap beans. One issue with radishes is that in mild winters they may not fully winter kill.

2) Early planted vegetables. A wide range of early planted vegetables may benefit from winter killed cover crops. For example, peas no-till planted or planted using limited vertical tillage after a winter killed cover crop of forage radish, oilseed radish, or winter killed mustard have performed better than those planted after conventional tillage. Early sweet corn also has potential in these systems as do a wide range of spring vegetables including spinach, potatoes, and cabbage. Winter killed radishes and mustards also have the advantage of outcompeting winter annual weeds leaving relatively weed free fields and also in recycling nutrients from the soil so that they are available in the spring for early crops (decomposition has already occurred).

3) Mixed systems with windbreaks for plasticulture. By planting planned plasticulture bed areas with winter killed cover crops and areas in-between with cereal rye you can gain the benefits of these soil improving cover crops and eliminate the need make tillage strips early in the spring. The winter killed areas can be tilled just prior to laying plastic.

4) Bio-strip till. By drilling one row of forage or oilseed radish and other adjacent rows with rye or other small grains, you can create a biodrilled strip that winter kills and that can be no-till planted into the spring without the need for strip-till implements. This opens up dozens of options for strip tilling (seed or transplanted) spring vegetables.

Agronomic Crops

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

Soybeans
We continue to find low levels of defoliators (Japanese beetles, bean leaf beetles, grasshoppers, silver spotted skipper, green

cloverworm, yellow striped armyworm and isolated spots of fall armyworm) in both full season and double crop soybeans. As a general guideline, treatment decisions for defoliators should be based on the following defoliation thresholds:

(a) Full Season Plantings – 30% defoliation pre-bloom; 15% defoliation from bloom through the end of pod fill; 35% - 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.

Another defoliator that we are starting to find is the soybean looper. This insect is a migratory pest and in past years we have seen it cause significant defoliation in outbreak years. It is often a problem in dry years. Since resistance to pyrethroids has been documented in states to our south, a non-pyrethroid option will need to be selected if they become a problem. We also have other looper species in our fields so proper identification is important. The following link from Virginia includes pictures to help with identification

http://blogs.ext.vt.edu/ag-pest-advisory/soybean-loopers-are-infesting-soybeans-in-north-carolina/

Continue to watch for an increase in stinkbug populations. Economic damage from stink bugs is most likely to occur during the pod development and pod fill stages. As far as BMSB, we are only finding a few in fields in New Castle County so far. For management of BMSB in soybeans, please read the following bulletin: http://unitedsoybean.org/brown-marmorated-stink-bugs/.

We continue to survey for Kudzu Bug but have not found any in soybeans or kudzu. In Virginia, kudzu bugs have been found in soybean fields in 22 counties (http://blogs.ext.vt.edu/ag-pest-advisory/) but none have been found near threshold levels. Be sure to scout soybeans for this insect and follow the Kudzu Bug website – www.kudzubug.org -- for identification and treatment information. The treatment threshold is still one nymph per sweep.

If we see a return to cooler temperatures in August, be sure to watch for soybean aphids. Cooler weather patterns favor an increase in populations. The economic threshold for soybean aphid established in the Midwest is 250 aphids per plant. Populations should be increasing and most of the plants should be infested (>80 percent) in order to justify an application. This threshold is appropriate until plants reach mid-seed set (R5.5). Spraying at full seed set (R6) has not produced a consistent yield response in the Midwest. You should also consider beneficial insect activity before making a treatment decision. Most products labeled for soybean aphid will provide effective control

As far as corn earworm, we continue to find low levels of small larvae, mainly in double crop fields. Although trap catches are still moderate, we have seen an increase in a few pheromone traps so it is important to start scouting fields for corn earworm. In making a treatment decision, the use of the Corn Earworm Calculator - developed in VA and NC (http://www.ipm.vt.edu/cew/) will provide the best decision making information since it estimates a threshold based on the actual treatment cost and bushel value you enter.

Basics of Stalk Rots in Corn – *Nathan Kleczewski, Extension Specialist – Plant Pathology*; nkleczew@udel.edu

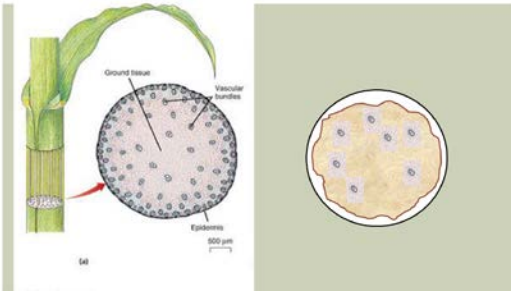
Stalk rots are one of the most frequent and damaging issues for corn production. Corn plants produce sugars (carbon) through photosynthesis. These sugars are used as energy for growth and tissue maintenance. Extra sugars are stored as free sugars and starch in the roots and stalk. Plants move their sugars to areas where they are needed most or, to put it another way, they move from a supply (e.g. foliage) to a demand (e.g. rapidly developing tissues). Keep in mind that sugars are the finances of the plant. Just like our finances, they are finite and limiting in supply. Plants therefore budget their sugars to preserve, protect, and grow tissues. Stalk rots are favored by conditions that alter the overall

sugar budget and carbon allocation patterns in the plant. **Anything that significantly alters the sugar budget of the plant can ultimately have some impact on late season stalk strength**. I will describe why this is the case later in this article.

Common factors that can reduce the carbon budget, ordered by level of importance, include: 1) **water stress,** particularly during grain fill, which limits photosynthesis and nutrient update. Even minimal stress are sufficient to result in issues with stalk rots; 2) **nutrient deficiency**, which can result in inefficient photosynthesis; 3) **pest and pathogen damage**, which can reduce leaf area (pests and necrotrophic pathogens) or pull carbon and nutrients from tissues (rusts). Plants can increase their photosynthetic rates to accommodate pest and damage up to a certain point. Once that point is met, carbon budgets may be affected.

The ear is the major sugar sink after pollination. This means that the plant starts to move sugars from sources (foliage, particularly the ear leaf) to the developing ear. Consequently, the shift in sugar allocation comes at the expense of root and stalk tissue maintenance and defense. If a stressful event occurs, such a drought, the carbon budget is reduced. To meet the resource demands of the ear, additional sugars are diverted and even remobilized from the roots and stalk. This results in stressed roots, which can decay and be colonized by stalk rotting fungi. The colonization further inhibits water uptake, and the plant may not recover, even if plants receive subsequent water. An example of this is evident in research conducted by Schneider (1983) where corn hybrids were exposed to water stress pretassel, post pollination, and during grain fill. Half of the plants had their root zones inoculated with a stalk rotting fungus. When the corn was irrigated several days after the water stress event, those plants that were inoculated with the stalk rotting fungus had twice as much resistance to water movement as uninoculated controls, and behaved as if they were still under drought stress.

After colonizing the roots, stalk rotting fungi may develop and grow into the stalk. The stalk may already be weakened due to a lack of sugar to maintain tissues. As a result, the fungi can easily grow up the length of the stalk and degrade the internal pith and supportive tissues. This effectively turns the stalk from a rod to a tube. This is when you start to see issues with lodging and other factors at harvest.



A healthy stalk will contain healthy, white pith and remain firm (Left). In cases of stalk rot, the pith, which provides support to the stalk, is pulled away from the rind and decayed, resulting in a weakened stalk (Right).

The best time to scout for stalk rot is 40-50 days after pollination. Suspect plants may have "droopy" ears and leaves that may appear flaccid or grey. Over time, you will see the plant prematurely senesce, and the outer rind of the lower stalks will turn a yellow to brown color, whereas surrounding healthy plants will still be green. It is at this time that you may observe the inner stalk pulling away from the rind and weakened stalks.

To determine the lodging potential due to stalk rot, scout multiple sites per field; one site for every 10 acres is a good rule of thumb. Randomly select 10 or more plants per site and either push these plants 30 degrees from vertical or pinch the stalk near the lower node. Alternatively, you could use a pipe or bar of a given length (e.g. 5 ft) and push down a length of plants 30 degrees from vertical, then record the number of lodged plants observed within that length. A final and more time consuming way to assess your plants is to actually split stalks and look for decayed tissues within the stem. Fields with 10-15% of stalks that lodge should be the first fields you harvest.

What can you do to minimize stalk rots?
The first thing is to minimize stress, particularly water and nutrients. This means: 1) planting at a recommended and not excessive plant population; 2) using supplemental irrigation if

possible; 3) ensuring a balanced nutrient program.

The next thing is selecting hybrids with e**xcellent stay green characteristics** and **good resistance ratings to common, residue borne diseases** such as grey leaf spot and northern corn leaf blight. There are also hybrids with resistance to the anthracnose stalk rot pathogen that can be considered. These hybrids by their very nature will have stronger, more durable stalks due to their genetics. In addition, the resistance to grey leaf spot and northern corn leaf blight mean that these diseases, if they develop, will do so very slowly and therefore have minimal impacts on the overall carbon budget. Other diseases, such as common rust, typically arrive late after black layer and are not a major concern in our area. However, you can always minimize risk by avoiding hybrids rated poorly for any foliar disease that we encounter in Delaware and Maryland.

Next, manage insects and foliar diseases if needed. Although fungicides can occasionally, and unpredictably impact lodging potential under minimal disease pressure, you will get the most "bang for your buck" when they are applied and prevent movement of diseases to the ear leaf and above by R5. It's always a good idea to include at least one untreated strip if possible to help with your future management decisions.

Finally, facilitate residue decomposition and rotate. This will help minimize the initial amounts of residue-borne diseases that potentially impact your corn, thereby reducing potential impact to the plant, carbon budget, and ultimately, stalk rots.

Announcements

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

8/24: Food Safety and Liability - Learn about the legal claims a litigant can assert in a food borne illness case, defenses that can be asserted to avoid liability and techniques that can be implemented to reduce the cost and exposure to food borne illness liability. Also included will be an overview of the section of the Food Safety Modernization Act (FSMA) applicable to fruit and vegetable farmers known as the Produce Rule.

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.

Farm Transfer Communication Webinar
The Farm Whisperer
by David Specht

Tuesday, November 29, 2016 7:00 p.m.

More details to follow.

For more information - contact Dan Severson – severson@udel.edu or Laurie Wolinski – lgw@udel.edu.

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of August 4 to August 10, 2016

Readings Taken from Midnight to Midnight

Rainfall:

0.58 inch: August 6

Air Temperature:

Highs ranged from 89°F on August 10 to 82°F on August 4.

Lows ranged from 73°F on August 10 to 61°F on August 5.

Soil Temperature:

80.6°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