Soybean Rust Update

National Soybean Rust Commentary (07/19/06)
The latest find of soybean rust was on kudzu in Brooks County, Georgia, on July 17th. Currently rust has only been found on this year’s soybeans in three different sentinel plots, the rest of the finds have been on kudzu. A total of 25 counties have reported rust this year and include five in Alabama, 12 in Florida, five in Georgia, two in Louisiana, and one in Texas. Spore trapping continues throughout the U.S. using both active and passive traps. Dry to very dry conditions prevail in the spore source regions and movement to new areas has been slow. There still have been no reports of soybean rust on commercial soybeans this season. This is good news for soybean growers.

Locally, our combination of 25 sentinel plots and soybean fields are being scouted weekly. Septoria brown spot continues to be the most prevalent disease with some frogeye leafspot and downy mildew beginning to be seen. Fifty leaves from each of the five sentinel plots are being checked under the dissecting microscope in the Diagnostic Lab each week. If soybean rust threatens later in the season the Soybean Board plots will be checked using the same procedures as the sentinel plots. For a map of the Delaware sites check the PIPE Website at www.sbrusa.net or this direct link http://www.rec.udel.edu/Update06/DEsentinal.htm.

Bob Mulrooney

Vegetables

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

Cucurbits
As a result of the recent hot weather, aphid populations have significantly increased in many cucurbits. Be sure to check carefully for aphids in all cucurbits including cucumbers, melons, pumpkins and squash. The best control is achieved before populations explode and leaf curling occurs. Be sure to check all labels for maximum application amounts and days to harvest.

Lima Beans
Continue to scout fields for lygus and stinkbugs. Stinkbug populations continue to increase and multiple sprays may be needed this year. Treatment should be considered if you find 15 adults and/or nymphs per 50 sweeps. The higher labeled rates of insecticides will be needed if stinkbugs are the predominant insect present. As earworm trap catches start to increase, be sure to scout fields for earworms as soon as pin pods are present. A treatment will be needed if you find one corn earworm larvae per 6 ft-of-row.

Melons
Be sure to scout carefully for spider mites and aphids, especially in your later planted fields. Economic levels of both can be found and populations will explode quickly during this hot weather. As harvest continues, be sure to watch
for cucumber beetles and beet armyworm larvae feeding on rinds.

**Peppers**

In areas where corn borers are being caught in local traps and pepper fruit is ¼ inch or more in diameter, fields should be sprayed on a 7-day schedule for corn borer control. Be sure to check local moth catches in your area at [http://ag.udel.edu/extension/IPM/traps/latestblt.html](http://ag.udel.edu/extension/IPM/traps/latestblt.html). You will also need to consider a treatment for pepper maggot. In addition to beet armyworm feeding on leaves you should also watch for an increase in aphid populations. We are starting to see an increase in green peach aphid populations and aphid populations can explode quickly, especially where beneficial insect activity is low. As a general guideline, treatment may be needed if you find one or more aphids per leaf and beneficial activity is low. Actara, Assail, Fulfill, Lannate and Provado are labeled for aphid control on peppers. Be sure to check the label for rates, restrictions and days from last application to harvest.

**Snap Beans**

We are starting to see an increase in corn borer and corn earworm moth catches. As corn borer and corn earworm populations start to increase, you will need to consider treatments for both insect pests. 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. Since corn borer trap catches have started to increase, 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 ([http://ag.udel.edu/extension/IPM/traps/latestblt.html](http://ag.udel.edu/extension/IPM/traps/latestblt.html) and [http://ag.udel.edu/extension/IPM/thresh/snapbeanecbthresh.html](http://ag.udel.edu/extension/IPM/thresh/snapbeanecbthresh.html)). Once pins are present on fresh market snap beans and corn borer trap catches are above two per night, a 7 to 10-day schedule should be maintained for corn borer control.

**Sweet Corn**

In general, fresh market silking sweet corn should be sprayed on a 3-day schedule except in the Seaford area where a 2-3 day schedule is needed. However, be sure to check trap catches for the current spray schedule since trap catches quickly change. Trap catches are generally updated on Tuesday and Friday mornings. ([http://ag.udel.edu/extension/IPM/traps/latestblt.html](http://ag.udel.edu/extension/IPM/traps/latestblt.html) and [http://ag.udel.edu/extension/IPM/thresh/silkspraythresh.html](http://ag.udel.edu/extension/IPM/thresh/silkspraythresh.html)). You can also call the Crop Pest Hotline for current trap catches (in state: (800) 345-7544; out of state: (302) 831-8851).

**Vegetable Crop Diseases** - Bob Mulrooney; Extension Plant Pathologist; [bobmul@udel.edu](mailto:bobmul@udel.edu)

**Processing Cucumbers**

Low levels of downy mildew are being seen, and are presumed to be widespread throughout DE and MD now. The hot weather on Monday and Tuesday should have slowed it considerably but growers need to continue scouting and applying preventative sprays depending on crop stage and days to harvest. Anthracnose was identified this week as well, on leaves of plants that were flowering. We generally do not see anthracnose in pickling cucumbers since there are high levels of resistance bred into the cultivars. Given the amount of rain prior to this disease appearing, it may not be so surprising. So keep an eye out for anthracnose. Bravo and mancozeb are effective and 0.5 lb/A of Topsin M can be combined with either for added control if needed. If Quadris is applied for belly rot control that application would be very effective for anthracnose as well. Control of foliar infections prevents fruit infection.

![Anthracnose on pickling cucumber leaf](image)

Vegetable Crop Diseases - Bob Mulrooney; Extension Plant Pathologist; [bobmul@udel.edu](mailto:bobmul@udel.edu)
**Tomato Fruit Disorders** - *Gerald Brust, Extension IPM Vegetable Specialist, University of Maryland; jbrust@umd.edu*

While out looking at tomato fields the past two weeks there were many concerns and questions about various markings or misshaped fruit and the cause and possible prevention of the problems. This is a shortened version of a much longer article that goes into more detail published at Pest Net:  

**Blossom-end rot** begins with tan, water-soaked areas at or near the blossom end of fruit, which usually enlarge and turn black and leathery (Fig. 1). This malady is caused by a localized shortage of available calcium as the fruit develops. While the problem usually occurs externally at the blossom end of the fruit it may also occur internally with no visible symptoms on the outside of the fruit. There are several conditions that may increase the likelihood of blossom-end rot. These include:

- Widely fluctuating soil moisture, which can temporarily reduce calcium concentrations in expanding fruit. Any moisture stress will reduce calcium uptake and therefore concentration in plants
- Nitrogen in the form of ammonium can cause a reduction in calcium absorption and concentration in the tomato plant
- Damage to the root system

![Blossom end rot on tomato fruit](http://66.54.153.89/CSUag.ASP?WCI=Select_View1&WCE=CD;60;0069;1;3;::0069;&WCU=7/12/20048:22:57%20PM;TT;5;4;1)

**Blotchy ripening/yellow shoulders** of tomato is characterized by areas of the fruit that fail to ripen or do so after the rest of the fruit is ripe. White or yellow blotches can also appear on the surface of ripening fruit while the tissue inside remains hard. The affected area is usually on the upper portion of the fruit. This problem is more prevalent in cool, wet, often cloudy conditions. This problem is exacerbated by too much or too little water. Soils high in nitrogen and/or low in potassium will increase its severity. Blotchy ripening appears more frequently on older cultivars. Studies at UC-Davis demonstrate that for uniform color development, more available potassium than is necessary for yield alone is needed. Their studies show the incidence of yellow shoulder was lower in fields with a high potassium status of both soil and plant. Foliar applications of potassium, however, were not effective in relieving this disorder. Work in the Great Lakes region has suggested the importance of soil organic matter and pH. Tomatoes grown on soils containing greater than 3.5% organic matter produced fruit with a low incidence of blotchy ripening/yellow shoulder, while tomatoes grown on soils with organic matter below 2.5% produced fruit with a high incidence of the disorder. Tomatoes produced on soils at a pH of 6.4 had a low incidence of yellow shoulder while tomatoes grown on soils in excess of 6.7 had a high incidence.

**Other disorders I have seen include:**

**Catfacing** which results in fruit with deep indentations in the blossom end or fruit with significant distortions. It is caused by a problem during the formation of the flower that results in the fruit not developing normally (Fig. 2). While catfacing is seen every year there is little information as to its exact cause. Temperatures below 50°F that occur at flowering and fruit set, which results in poor pollination can increase the amount of catfacing.
Growth Cracking in tomato fruit can occur as radial cracking that originates from the stem end down toward the blossom end and as concentric cracking, which occurs as rings around the stem scar. Cracking occurs when internal expansion is faster than the expansion of the epidermis and the outer skin splits. Varieties differ greatly in their susceptibility to cracking.

Dimpling is characterized most commonly by a small depression or dimple in the fruit (Fig. 3). The injury is caused by female thrips inserting an egg into the fruit just below the cuticle with their ovipositor when the fruit is very small. Dimpling occurs very early during fruit formation, usually while the flower is still attached.

Gold Fleck, or fleck, is included here because some tomato workers believe fleck is caused by thrips or other sucking insect feeding, while others believe its cause is genetic or environmental. Fleck develops as small irregular green spots found randomly on the surface of green fruit which become yellow (gold) as the fruit ripens (Fig. 4). Spots can vary from few to many. Certain varieties show a predisposition to developing fleck, whatever its cause.

Cloudy spot can be characterized as pale, yellow, or white spots on the fruit surface with shallow, white spongy areas in the flesh (Fig. 5a). When the spots are cut open they do not go very deep into the flesh of the tomato (Fig. 5b). Cloudy spot is caused by stinkbug feeding. Stinkbugs insert their syringe-like mouth parts into green fruit and withdraw cell contents. This results in empty cells filled with air that are spongy and white. Stinkbug feeding rarely results in deformed growth of the fruit.
Sunscald appears as yellow, sunken, wrinkled, areas usually on the shoulder of the fruit. It occurs when tissue temperature rises above 86°F. The high temperature causes yellow pigments to develop, but not red pigments.

**Agronomic Crops**

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

Soybeans
Continue to scout fields for defoliators including Japanese beetles, green cloverworm and grasshoppers. Once fields are in the blossom stage, the defoliation threshold drops to 15% defoliated plants. Spider mites can still be found in fields; however, in some cases populations have crashed due to diseases so be sure to watch for diseased mites before making a treatment decision. Although soybean aphids can be found in fields throughout the state, populations remain low. You should also start watching for an increase in stinkbug populations in the earliest planted fields. In a previous newsletter, Ames Herbert from VA indicated that “overwintered adults laid eggs in wheat which hatched into nymphs that developed into adults. As grain was harvested, those adults were driven to search for new hosts including soybeans. The current thinking is not to worry too much about this until after bloom and pods begin forming. Stinkbugs are attracted to pods and prefer feeding on seed.”

**Agronomic Crop Diseases** - Bob Mulrooney; Extension Plant Pathologist; bobmul@udel.edu

Corn
We have had several corn leaf samples come into the Diagnostic Lab that have been infected with a combination of gray leaf spot and Northern corn leaf spot. Northern corn leaf spot is caused by several races of the fungus *Bipolaris zeicola*. We often see race 3 which is referred to as *Helminthosporium carbonum* race 3, which is another name for *B. zeicola*. The spots (as you can see from the picture) are rather large, the largest being approximately 1 in. x ¼ in. Carbonum race 3 produces long, very narrow lesions that look like beads on a string. This is another race of the same fungus as best we can tell at this point. Generally the number of lesions is low and all the infected leaves are some of the oldest leaves low on the plants. These levels of infection do not warrant concern. Low levels of leaf spots or blights occur on the lower leaves even when the fields may have been sprayed with strobilurin fungicides for “plant health” benefits. It is hard to get good coverage of the lower leaves with the gallonage applied by air and the weather has been ideal for infection. This is especially true for gray leafspot, if the fields have been in corn for many seasons and corn debris is present. The following information from Ohio State gives some guidelines for fungicide application for corn for disease control only.

“Foliar fungicides rarely are used to control leaf blight diseases of field corn. The cost of the fungicide plus application usually exceeds the profit from increased yield except under severe disease pressure when susceptible hybrids are grown. Foliar diseases can cause significant yield losses if infection occurs between two weeks before to three to four weeks after tasseling. The earlier the disease starts in the field the greater the yield loss. It is important to keep the upper leaves and husks of the plant as disease-free as possible during the grain filling growth stage. Large yield losses only occur when foliar diseases attack the leaves above the ear leaf before mid-dent growth stage. Sweet corn growers routinely use fungicides, and seed producers growing susceptible inbreds have shown large yield increases by controlling leaf diseases with fungicides.

“Fungicides are registered for the control of northern corn leaf blight, southern corn leaf blight, northern leaf spot, common rust and gray leaf spot. Before spraying, consider the following factors: the developmental stage of the grain, the amount of disease in the field, the potential yield, the prevailing weather, and the market price of the grain. Spray applications should begin before the fungus attacks the ear leaf. Greatest yield responses occur when the plants become diseased before tasseling and the plants
Northern corn leaf spot is the elliptical spot above the center of the leaf in view. Gray leaf spot lesions are the two rectangular spots above and below the NCLS lesion.

Yellowed Soybeans and Standing Water - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

The rains of the past few weeks have resulted in yellowing soybeans in a number of fields across the state. The amount of damage to the beans depends on how long water stood, the soybean growth stage, and the number of times water stood in the spots. For severely damaged areas the beans will recover very little and are likely to die over the next week or two. In areas with less severe damage there could be some slow recovery as the root system reestablishes and top or vegetative growth begins again. In many cases, yields will be significantly reduced because of the injury to the plants. On the outer borders of ponded areas or in fields where water stood for only a couple of days, the beans will recover, although yields may be reduced a little. Some work Dr. James Griffin and I did in Louisiana many years ago indicated that the yield reduction will be small.

The yellowing often seemed associated with less effective nitrogen (N) fixation by the root nodules. Application of small amounts of N (15 to 20 lb/A) sometimes can help these less severely damaged plants recover more quickly, although, since they often will recover anyway, the economics of the practice are probably questionable. The practice is most appropriate for growers who prefer to be proactive and, although concerned about economic return, may be more willing to risk the cost of N and application with less assurance of a return. The other problem is that application can be difficult since severely damaged areas often are centered in the less damaged areas. If you have to do something about such areas of yellowing beans, use small rates of N (enough to support the reestablishment of the root system and more leaf area production but not too much that would interfere with nodule recolonization or reactivation) and limit N application, if possible, to areas that did not have water standing more than three days.

Hot and Humid Conditions and Corn Pollination - Richard Taylor, Extension Agronomist; rtaylor@udel.edu

The recent influx of hot and very humid weather from the central U.S. may be leading some growers to wonder about the health of their corn crop. Over the past several weeks, many areas on the Delmarva received enough rain to recharge the top and subsoil so the high temperatures will occur during a period of ample soil moisture. For others, irrigation will be used to ensure adequate soil moisture during pollination and early grain fill. In both instances, temperatures in the low to mid-nineties will not be overtly stressful on corn even for fields that might be in the middle of the pollination phase. In school, I spent summers helping to pollinate corn and found that at least in one year temperatures of 105° F did not adversely affect pollen viability when adequate soil moisture was available. In fields where root growth has been severely limited because of soil compaction or rootworm larval feeding (I found enough of this one of my corn silage studies to cause economic yield losses) and where standing water has caused severe injury to corn root systems, temperatures in the low 90s can cause harm to the pollinating crop.
In a number of fields, I’ve also noticed insect feeding (Japanese beetles and corn rootworm adults) on the emerging silks. Treatment should be considered during tasseling and silking when pollination is not complete if there are sufficient numbers of insects to keep silks clipped during pollen-shedding time. If the injury occurs after the silks have lengthened and possibly turned brown, there likely is not an impact on kernel set. The time this is important is when the insects keep emerging silks from lengthening enough to allow pollen to stick to the sides of moist and receptive silks. Silks grow from 1 to 2 inches per day and pollen grains become attached to the sides of the silk, germinate, and then produce a pollen tube that grows rapidly down the silk to the female ovule or flower where fertilization occurs and eventually a kernel of corn forms. If you remove an ear and shake the ear carefully, you will find that by gently shaking the ear many of the silks will become detached indicating successful pollination/fertilization. Non-fertilized ovules will have a silk still attached.


**Understanding Soybean Growth Stages: VII. R3 and R4 - Beginning Pod and Full Pod -**

*R. Taylor, Extension Agronomist; rtaylor@udel.edu*

The R3 or Beginning Pod stage is illustrated in Photo 1. Beginning Pod occurs when a pod \(\frac{3}{16}\) in. (about 5 mm) has formed at one of the four uppermost nodes on the main stem with a fully developed leaf. At least half the plants in the field must be at this stage for the field to be called in the Beginning Pod stage. Drought and other stresses at this stage can cause pod abortion or lead to pods with fewer seeds per pod than would have occurred without the stress. Some flowers are still blooming and can replace dropped pods if the stress causing pod drop is eliminated.

![Photo 1. Soybean pod about \(\frac{3}{16}\) in. long (about 5 mm) at one of the four uppermost nodes on the main stem with a fully developed leaf looks very small](image1)

![Photo 2. Soybean plant in the R3 or Beginning Pod stage, at which time a pod \(\frac{3}{16}\) in. long (about 5 mm) has formed at one of the four uppermost nodes on the main stem with a fully developed leaf.](image2)
The Full Pod stage (R4) occurs when half the plants in the field have a pod ¾ in. long (about 19 mm) at one of the four uppermost nodes on the main stem with a fully developed leaf. Flowering is about complete at this stage so stresses that cause serious pod drop and potential yield loss are unlikely to be made up other than by an increase in average seed size if the stress is removed. This limits the potential for yield recovery from stress conditions at this and later growth stages.

Frequently, fungicide applications for soybean health and yield enhancement are applied at either the R3 or R4 growth stage. Yield response to this type of fungicide application usually averages from 3 to 6 bu/A; but, in demonstration and research trials across the country, the range has been from yield loss to large yield increases depending on the individual situation. In these trials, the frequency of yield responses and the actual yield responses suggests that this type of application under good growing conditions can usually return enough to cover the costs involved. In trials in this region, we have found about a 3 to 5 bu/A increase in each of the trials we’ve conducted. A possible downside has been a delay in maturity and increase in the number of green stems on beans at the time they reach harvest moisture. Although the fungicide applications should help soybean health at harvest, this factor was improved in only one of the three site-years in our studies.

In some trials we have out with the Delaware Soybean Board, the maturity stage of beans currently ranges from non-blooming (still in the V-stages) for late group IV and group V beans to the R4 or the full pod stage for group II beans. Many double-crop beans are either just emerging (VE, VC, or V1 stage) if planted in early July or are near the critical V4 stage when blooming occurs and may actually be at R1 or the R2 stage.

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**Grain Marketing Highlights** - Carl German, *Extension Crops Marketing Specialist; clgerman@udel.edu*

**Will Commodity Prices Rally?**
An old adage in the grain markets states that rain makes grain. A tour of the Corn Belt would suggest that the rains thus far have been good overall, with some areas experiencing dry conditions. Remember, going into the current growing season the subsoil moisture levels in the Midwest were very low. Generally, growing seasons that begin with low subsoil moisture levels need timely rains throughout the growing season to produce a crop that will turn out to be at trend line or better. The question remains, “Have the rains been and will they continue to be good enough to produce a normal or better ’06 U.S. corn and soybean crop?” A general soaking rain is presently needed in order to
produce normal or better U.S. crops. If good soaking rains occur over the next two to three weeks, corn and soybean prices are headed much lower from their current levels. If general rains do not occur, then commodity prices are likely to rally.

Corn and soybean prices have moved lower this week at the Chicago Board of Trade. Dec corn is now trading at $2.56 per bushel and Nov soybeans are trading at $6.07 per bushel. Considering the recent sell off, it is likely that the lows are in for the day and possibly the week. Non-commercial fund selling, which has been heavy the past two weeks, may well be running its course, meaning that the corn and soybean markets may be getting oversold at the present time. A correction may be forthcoming until more is known concerning ’06 U.S. corn and soybean crop development. The critical period for U.S. soybean crop development isn’t until August. Heat is in the forecast and it is presently being felt in varying corn growing regions throughout the nation. The next three to four weeks will give us a good handle on the crop sizes that we can expect in the U.S. this season. This time period will also determine whether there are any more pre-harvest sales opportunities presented to corn and soybean marketers. For technical assistance on grain marketing decisions contact Carl L. German, Extension Crops Marketing Specialist.

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**Weather Summary**

http://www.rec.udel.edu/TopLevel/Weather.htm

**Week of July 13 to July 19, 2006**

**Readings Taken from Midnight to Midnight**

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<th>Rainfall:</th>
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<tr>
<td>0.25 inch on July 14</td>
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<tr>
<td>0.06 inch on July 15</td>
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<tr>
<td>0.01 inch on July 18</td>
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<table>
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<th>Air Temperature:</th>
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<tr>
<td>Highs ranged from 97°F on July 18 to 83°F on July 14.</td>
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<tr>
<td>Lows ranged from 74°F on July 13 and to 69°F on July 19.</td>
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<table>
<thead>
<tr>
<th>Soil Temperature:</th>
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<tbody>
<tr>
<td>84°F average.</td>
</tr>
<tr>
<td>(Soil temperature taken at a 2” depth, under sod)</td>
</tr>
</tbody>
</table>
Potato Disease Advisory #21 - July 20, 2006, Bob Mulrooney, Extension Plant Pathologist

Late Blight Advisory

Disease Severity Value (DSV) Accumulation as of July 19, 2006 is as follows:
Location: Byfield Farms field east of Magnolia, DE. Greenrow: April 23, flower buds present May 24.

<table>
<thead>
<tr>
<th>Date</th>
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<th>EARLY BLIGHT</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>6/18-6/20</td>
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<td>7/16-7/19</td>
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- Many if not most of the early season varieties have gone down, for later potatoes continue to make fungicide applications for late blight and early blight control.
- Fungicide rates should be at the high end of the rate range at this time of the season.

Early blight is the disease of concern now; if you have potatoes with foliage keep up your fungicide sprays at this time. There have been no new reports of late blight on potato or tomato in the region.

The Weekly Crop Update is available online at http://www.rec.udel.edu/TopLevel/Publicat.htm

Weekly Crop Update is compiled and edited by Emmalea Ernest, Extension Associate - Vegetable Crops

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