Wisconsin Crop Manager

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Stink Bugs in Corn and Soybeans

Eileen Cullen, Extension Entomologist, UW Entomology Dept.

Stink bugs are making an appearance in corn and soybean fields this late season, in higher numbers than usual, particularly the green stink bug. Both the green stink bug, *Acrosternum hilare*, and brown stink bugs , *Euschistus spp*. can be found in fields during August. Green stink bug nymphs and adults have been reported from corn and soybean fields in Langlade, Polk, Clark, Portage and Shawno Counties. You have likely observed them in other locations as well.

Stink bugs are unlikely to cause economic damage to corn and soybeans in the Upper Midwest. In fact there are no damage relationships or economic injury levels established for stink bug on field, seed or processing sweet corn at this late stage in the season. On soybeans, the green stink bug is a key pest (feeding on pods and seeds) and typical economic problem in the southern United States, but rarely in the northern states. Scouting and threshold information are provided below for soybeans.

Feeding Behavior and Field Distribution

- Stink bug nymphs and adults feed with piercing-sucking mouthparts. They seek out seed pods, fruits, grain heads, inserting their needle-like mouthpart, injecting enzymes to dissolve plant tissue, then sucking out "pre-digested" plant fluids.
- Stink bugs cannot clip silks in corn (do not have chewing mouthparts).
- Edges/sides of fields adjacent to wooded habitat are likely spots to find stink bugs, rather than throughout the field or in the middle of the field. (During early summer, stink bugs feed on berries, pods, seed heads in uncultivated, wooded areas).
- Males emit a pheromone which signals to other members of the same stink bug species a call to "clump" together (suitable food, mates, habitat).
- Stink bugs aggregate, and it's more common to find them on field edges and in groups on plants or spots in field sides/edges – rather than distributed throughout a field, or in the middle of fields.
- Stink bugs emit a strong odor as a defense mechanism.

Life History

- Stink bugs overwinter as adults under protected areas like leaf litter, wooded areas, river edge vegetation.
- In the Upper Midwest, stink bugs are thought to migrate northward from overwintering sites in their adult stage. There is usually one generation per year in this region.

Identification

- Stink bug adults have a shield shaped body, with pointed "shoulders".
- Green stink bug adults are bright green with black bands on their antennae. Nymphs are multicolored (black/green, and yellow or red), rounder in shape (resembling a "beetle").
- Brown stink bugs are brown, and nymphs are copper/brown. Stink bug nymphs remain clustered near the egg mass after eclosing, and disperse further after molting to 2nd instar. Adults are brown on the upper side, and yellow to light-green on the underside during summer.
- The spined soldier bug, *Podisus maculiventris*, is a beneficial insect – preying on pest insects, especially larval forms of Lepidoptera (pest caterpillars) and

Coleoptera (beetles). Spined soldier bugs are also brown on the upper side, but have more pronounced/pointed "shoulders", a black spot on the abdomen, reddish legs and are cream-colored on the underside.

Green stink bug, *Acrosternum hilare*, nymph (left) and adult (right).
Photo Credits/Source: Dr. Marlin Rice, Prof./Extension Specialist, Iowa State University Entomology Dept.

Brown stink bug, *Euschistus spp.*, nymph (left) and adult (right).
Photo Credits/Source: Dr. Marlin Rice, Prof./Extension Specialist, Iowa State University Entomology Dept.

Feeding and Damage Relationships in Corn and Soybeans

- When economic damage occurs in corn, it is has been reported when feeding occurs on younger plants up to the V15 stage (small ear forming). This work was done in southern states on the southern green stink bug (*Nezara viridula*). Not much has been reported on green stink bug in corn, probably because this species occurs in very low numbers in the south (and north) until late July or August when corn is well on its way to maturity and other crops are more attractive.
- Stink bugs on corn are not an economic concern at this time, and no treatment thresholds are established. Insecticide application in corn for stink bug is not recommended, nor expected to recover yield.
- In Soybeans, stink bug nymphs and adults attack primarily seeds and pods. (They will also feed on soybean stems, foliage and blooms). Punctures can be found as small brown or black spots. Direct feeding can lead to reduced seed quality (young seed deformed, undersized, possibly aborted under heavy stink bug pressure). Older seeds can be discolored or shriveled.
- Stink bug thresholds in seed beans are lower than grain soybeans.
- "Green bean effect" can result. This is an indirect effect of stink bug feeding, delaying plant maturity.
- Again, the damage described above is rarely reported in Wisconsin, - and when noted is likely to be more prevalent in field edges or sides.

Stink Bug Scouting and Thresholds in Soybeans

- Monitor several sites in a given soybean field. This is important due to the aggregated field distribution of stink bugs. (You may have a spot of damage near field (edges) but no where else in the field).
- Check 5 different areas of the field (for example, 20 sweep net samples at each of 5 locations).
- Sweep net or drop cloth samples can be used. Sweeps are more appropriate for drilled, narrow row beans. A "shake sample" to dislodge bugs from the canopy on to a light colored cloth placed between rows is suitable for wide row beans.
- Combine nymphs and adults in sample total. **Calculate stinkbugs per sweep (or per row foot) based on the whole field, and not an infested clump at one field edge or corner.**
- Stink bug thresholds range from 1 to 3 bugs per foot of row as soybean pods begin to fill. Based on sweep net samples, for grain soybean 0.4 bugs per sweep (40 in 100 sweeps), and for seed beans 0.20 bugs per sweep (20 in 100 sweeps). (while pods are still green).

Remember, stink bugs in soybeans will not primarily affect quantity (bushels/acre yield), but potentially quality. Quality impacts are not usually significant in Wisconsin. The information presented here will help you monitor the situation.

Related Extension Links (Stink bugs, Soybeans) – Indiana, Missouri

Green Stink Bug, *Acrosternum hilare* Say – Purdue University Field Crops IPM
http://www.entm.purdue.edu/fieldcropsipm/insects/greenstinkbug.html

Boyd, M.L. and W. C. Bailey. June 2007. Soybean Pest Management: Stink Bugs. University of Missouri Extension.
http://extension.missouri.edu/explore/agguides/pests/g07151.htm

Winter Wheat Seeding Rate, Depth, and Planting Date

Shawn P. Conley, UW-Agronomy Soybean Extension specialist, and John Gaska

The targeted fall stand for wheat seedlings is between 30 and 35 plants per square foot. To achieve this goal, the planting rate for soft red winter wheat is between 1,300,000 and 1,500,000 seeds per acre. Depending upon varietal seed size this equates to a range of between 74 and 119 pounds of seed per acre (Table 1). Growers may choose to use the lower seeding rate if planting conditions are ideal, however increasing the seeding rate under poor planting conditions, in no-till production systems, or when the planting date is significantly delayed may prove beneficial.

Table 1. Wheat seeding rate in pounds per acre based on thousand kernel weight.

	Pounds of seed per acre	
Thousand kernel weight	1,300,000 seeds/a	1,500,000 seeds/a
26.0 grams	74.4	85.9
28.0 grams	80.2	92.5
30.0 grams	85.9	99.1
32.0 grams	91.6	105.7
34.0 grams	97.4	112.3
36.0 grams	103.1	118.9

Wheat should be planted between 0.5 and 1.5 inches deep depending upon soil moisture conditions. Wheat planted less than 0.5 inches deep may result in uneven germination due to seed exposure or dry soil conditions. Shallow planted wheat is also more susceptible to heaving. Wheat planted more than 1.5 inches deep may result in death due to pre-mature leaf opening or poor tiller development and winter survival. Uniform seed placement and seeding depth are important in promoting crop health in the fall.

The optimal planting date window for winter wheat in Wisconsin is September 15th through October 10th. Wheat planted in late August or early September is more susceptible to Barley Yellow Dwarf Virus infection. This virus complex is vectored by several aphids including corn leaf aphid and oat-bird-cherry aphid. Fall infection of this virus complex can substantially reduce yield through decreased tillering and increased winterkill (decreased plant vigor).

Yield loss associated with late planted wheat (late October through November) is due to decreased fall tiller formation and increased winterkill. Research from the 2006-2007 winter wheat growing season did not show any yield loss between October 5th and October 20th planted wheat (Table 2) at any seeding rate. The lack of yield loss may have been due to above normal temperatures in November (+ 4.2 degrees), December (+ 8.0 degrees), and January (+ 6.7 degrees) (Table 3). Under a normal year, some yield loss would be expected.

Table 2. Evaluation of Winter Wheat Planting Date and Seeding Rate, Lancaster WI (2006-2007).

Planting Date	Seeding rate (mill. seeeds/a)	Grain yield (bu/a)	% Stand (9-Apr)	Plant ht. (in.)
5-Oct	1.50	92.1	95.3	31.8
5-Oct	1.75	88.9	96.3	31.0
5-Oct	2.00	91.3	96.8	32.0
20-Oct	1.50	83.3	92.8	30.8
20-Oct	1.75	92.9	96.8	30.5
20-Oct	2.00	88.6	97.8	30.0
Means		89.5	95.9	31.0
LSD (10%)		6.5	NS	NS

Table 3. Temperature Data from Lancaster, WI September 2006 through February 2007.

Temp measure-ment	Sep -06	Oct -06	Nov -06	Dec -06	Jan -07	Feb-07
	---------Temperature (°F) --------					
Monthly mean	57.9	45.1	38.0	28.6	21.1	10.3
Dep. from norm. month	-2.6	-3.8	4.2	8.0	6.7	-10.7
Monthly mean min	48.9	36.0	30.1	21.2	13.4	2.5
Monthly mean max	66.8	54.2	45.8	35.9	28.8	18.0

A Guide to Making Soybean Silage

Dan Undersander, Professor, Kevin Jarek, Tom Anderson, Nick Schneider, and Lee Milligan, Extension Educators, University of Wisconsin, Madison.

Adverse weather such as drought or early frost sometimes raises the issue of harvesting soybean fields for forage due to forage shortage and/or low yield grain yield potential of the soybean crop. Soybean forage can be harvested as either silage or hay. Harvesting as hay requires much longer field drying times, increases shattering losses, and can be very dusty. No information was found concerning production and feeding of soybean silage. Therefore, eight farmers who had made soybean silage in Wisconsin during the fall of 2005 were surveyed and the silage was sampled for analysis. Following are recommendations for making soybean silage as reflected by the farmer experience.

Soybean should be harvested for silage at the R3 stage [when one of the four top nodes with a fully developed leaf has a 3/16 inch long pod (1)] for dairy animals.

It is possible to harvest as late as R7 stage (one pod on main stem has reached mature color; 50% of leaves yellow; physiological maturity, no more dry matter accumulation). Yield at the later stage is increased compared to R3 and R4 stages and plant dry matter is near to that required for ensiling (2,3,5). While overall forage quality at the R7 is similar to the R3 or R4 stage and to alfalfa, the plant is significantly different as far as the animal is concerned. The R3 and R4 stage soybean have high forage quality from green leaves and much more digestible stems. The R7 stage soybean has high forage quality because of seeds in the pods while having fewer leaves and much lower quality stems. Therefore, seed shatter during harvesting at the R7 stage, resulting in loss of forage quality, is a significant issue. Secondly, the high oil content of the beans at the R7 stage may cause erratic fermentation in the silo, reducing palatability and forage intake. Most of the farmers surveyed had harvested the forage at the R3 to R4 stage.

Standing soybean forage at the R3 to R4 stage was generally at about 80% moisture and needed to be mowed and wilted to dry down to 65% moisture for ensiling (Table 1). Farmers were able to mow and condition with their standard mower/conditioners, though they often needed to go slower than normal. Farmers also noted that flail conditioners caused more damage to the soybean than roller conditioners. Drying time to 65% moisture generally took 2 to 3 days in the late fall.

Table 1. Forage quality of soybean silage not mixed with other crops.

Component	Mean	Minimum	Maximum
	(%, dry matter basis)		
DM	37.1	30.8	45.8
CP	20.7	18.1	24.0
ADF	31.9	29.7	36.2
NDF	39.0	33.0	47.5
NDFD	44.3	42.0	48.4

Forage yield averaged 1.5 ton/acre, ranging from 1.0 to 2.25 ton/acre. This is significantly less than many published reports but reasonable when the soybean is stressed from drought or late planting. Silage was made in oxygen limiting silos, plastic bags, and bunkers. Forage should be chopped with a 3/8-inch theoretical length of cut for good packing. Silage produced by the farmers surveyed was generally in the correct moisture range (Table 1) and fermented well. Forage quality was similar to alfalfa haylage as reported by others when soybean is harvested at the R3 stage (2,4).

Some farmers mixed the soybean silage with other crops including 3rd crop alfalfa, corn silage, sorghum-sudangrass, and triticale. Alfalfa mixed with the soybean silage had no effect on forage quality. Sorghum-sudangrass, corn silage, and triticale all lowered the quality of the silage by reducing crude protein content and increasing fiber content (*data not presented*).

The farmer has the choice of mixing forages when ensiling or ensiling forages separately and mixing them when feeding. Forages should only be mixed at ensiling if the mixture will have better fermentation characteristics (proper moisture, better substrate for bacteria, etc.) than either silage alone. When forages are mixed at ensiling, often one is not at the optimum stage for ensiling which reduces overall silage quality and/or yield. Further, ensiling the two forages separately, gives the operator has more flexibility balancing the ration according to needs of the animals being fed and quality of the ensiled material.

Farmers generally fed the soybean silage as 15 to 20% of the ration. They were asked how animals consumed and performed on soybean silage. Of the farms surveyed (Table 2), in only one case was feed intake decreased. Thus, while soybean silage is less palatable than alfalfa or corn silage, it can be used as a significant portion of the ration without influencing animal intake. There was no problem with sorting stems from leaves, likely due to the fine chop used. Most importantly, in no case was there any discernable difference in performance when animals were fed soybean silage. Dairy cows are particularly sensitive to their ration, so feeding soybean silage to other category of animals should be no problem in a balanced ration. Some reports of feed intake problems may have been caused by ensiling soybean at later stages, when high oil content from the seed may have affected palatability.

Table 2. Effect of soybean silage on feed intake and milk production from eight Wisconsin farms.

Number of farms surveyed	Type animals fed	Feed intake	Effect on milk production
6	Milking cows	Stayed same	None
1	Milking cows	decreased	None
4	Dry cows and heifers	Stayed same	N/A

In summary, making soybean silage may be a good opportunity for farmers short of forage due to drought. The following recommendations will provide successful soybean silage experience:

• Talk to your crop insurance adjuster before harvesting any insured soybeans for forage to make sure that all requirements for insurance are met.

• Make sure any herbicides used on the soybeans are cleared for feeding to cattle.

• Harvest soybeans at R3 stage, when one of the four top nodes with a fully-developed leaf has a 3/16-inch-long pod.

• Wilt forage to 35% dry matter before ensiling. Note: producers felt soybean whole-plant moisture was difficult to judge in the field, therefore testing is well worth the expense.

• Chop at 3/8-inch theoretical length of cut, pack well, and seal in airtight, covered pile, tube, bunker, or vertical silo.

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Agricultural Confined Spaces- Silo Gas

Cheryl Skjolass, Agricultural Safety Specialist, UW Madison, Biological Systems Engineering Department

Silo Gas – What is it?

- Shortly after green plant material is ensiled, it begins to ferment. Oxygen used in fermentation combines with nitrates in the plants, and nitric oxide gas is released. This combines with oxygen in the air to form nitrogen dioxide, a heavier-than-air, toxic gas which can injure or kill people or animals.
- Silo gas forms within a few hours up to three weeks after fresh plant material is added to the silo. It is a problem in conventional, non-airtight silos.
- Dry growing conditions may cause an increase in the nitrates in the plant material. Weeds and corn are naturally high in nitrates. Nitrate levels in corn are extremely high after a rain following a dry period. Harvesting the plant high will help to decrease the nitrate level.

Silo-Filler's Disease

- Silo-filler's disease is the term given the injury resulting from exposure to silo gas. Inhaling even a small amount can result in serious, permanent, or fatal lung injury. The nitrogen dioxide combines with water in your lungs to form highly corrosive nitric acid. High concentrations of nitrogen dioxide may make a person helpless in 2-3 minutes.
- Symptoms of silo-filler's disease include coughing, burning, shortness of breath, chills, fever, headaches, nausea, or vomiting. While a person may not immediately experience the symptoms from a mild exposure, in 3-30 hours there is a slow, progressive inflammation of the lungs that results in fluid buildup in the lungs. ***This can be fatal.***
- A unique characteristic of this disease is that there may be a relapse in two to six week after the original episode, which may be milder or more severe than the first episode.

To prevent Silo- Filler's Disease:

1. Stay out of the silo for at least three weeks after filling.
2. Be alert for bleach-like odors and/or yellowish brown gases in or near the silo.
3. If you must enter the silo, e.g., to set up a silo unloader, do so immediately after the last load is in.
4. Do not wait several hours or overnight. Run the blower 15-20 minutes before entering and keep it running while inside.
5. Keep a door open down to the silage surface, and have someone keep in contact with you from the outside.
6. Ventilate the silo room adequately for three weeks after filling, keeping windows and doors open.
7. Keep the door between the silo room and the barn closed to prevent silo gas from killing livestock.
8. If you experience throat irritation or coughing in the silo, get fresh air immediately.
9. ***See your doctor immediately after exposure to silo gas.***

A good medical resources on Silo Filler's Disease:
www.emedicine.com/med/topic2128.htm

For further information contact:
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Wisconsin Farm Technology Days 2007 Green County

Mark Mayer, Associate Professor Agriculture Agent/Department Head

As many of you know Green County is hosting Wisconsin Farm Technology Days this fall on the Plain View Stock Farm located on State Highway 59 just outside of Albany WI. I would appreciate any promotion you can do for this annual event in your upcoming newsletters and local papers. To assist you in doing this I have attached a general news release about the show as well as many of the news releases that were sent out in our media packet last week that deal with some of the highlights of the show. All these are in Word format so that you can easily change and localize them to meet your needs. I have also attached a map of Tent City for your reference and a map of how to get to the site. You can get more information and updates at our web site at greenfarmtech.com

Thanks for your assistance in getting this information out to your producers and constituents and I hope to see many of you at the show on September 18-20, 2007.

Show and Traffic Updates

As you prepare for your trip, check our online updates at www.greenfarmtech.com. As you enter the Green County area on show days, tune in to BIG EASY 93.7 FM, or 1260 AM. If there are any late-breaking traffic details or announcements we'll make sure to have them on the air.

Show Hours: Daily 8:30 a.m. – 4:30 p.m.

Admission: Adults $5, children 12 an under are free.

Information on the Grounds

Looking for maps, daily schedules, or directions? Visit one of the information booths on the show grounds after passing the admission gates, or the "Swiss Cheese Information Trailer" at the center of the show grounds near headquarters (at the intersection of 6th Street East and Central Ave). Volunteers will staff the booths and information trailer throughout the entire show.

Parking

Free parking is available near the show grounds. Twelve trams and four courtesy carts will be making continuous trips from the parking areas to the admission gates.

Handicapped Parking and Transportation

A large area designated as Handicap Parking is available at the north edge of Tent City, with access from Cty. Hwy. E.

Please be aware that show visitors are not allowed to use personal ATVs, scooters, or lawn tractors on the show grounds. Personally owned mobility carts are allowed only for those visitors with disabilities (must be designated on driver's license or by handicap parking hanger in vehicle). Farm Technology Days will also be offering rentals including 3 and 4-wheel mobility carts, manual wheelchairs, children's strollers, and wagons. Advance reservations of mobility carts are available through Mobility Rental Service; visit their web site at www.mobilityrentalservice for information.

Master Schedule of Events:

http://www.greenfarmtech.com/documents/MasterSchedulesforFTD

Contact Information:

Green County UWEX Office: 608.328.9440
Show Headquarters (beginning Sept. 5): 608.862.0101,
Fax: 608.862.0104

Reference materials list, these are in PDF format:

Daily Schedule of All Events.pdf

Field Demonstrations.pdf

Free well water testing and water information.pdf

Heritage Corn Plot Update.pdf

Host Family and Farm.pdf

Mills Fleet Farm.pdf

Old Time Farming Horse & Mule Demos.pdf

Progress Pavilion hosts educational exhibits.pdf

Road Map to FTD Site.pdf

Tent City Final Map August.pdf

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Vegetable Crop Update - #11

Potato and Vegetable Crop Update

Alvin J. Bussan, UW-Madison, Dept of Horticulture

Seems we have received the entire summer's worth of precipitation over the past 5 to 10 days depending on where you are located in Wisconsin. The heavy rains were preceded by some of the warmest conditions of the summer that did cause some stress on crops such as potato. The hot conditions followed by rain has led to rapid fruit development in other crops such as tomato which has led to fruit cracking and other physiological damage to the harvested crop. The rain also poses challenges for storability or shelf life of a number of crops like onions and potatoes. Finally, wet soil conditions make harvest difficult for nearly all crops.

Potato - Vine health varies widely from field to field across Wisconsin. Hot conditions in early August led to rapid senescence of crops nearing maturity or being affected by early dying or other diseases. In contrast other fields still appear to be in good to excellent condition which should continue to promote good tuber bulking through at least the end of the month.

The challenge facing growers for the remainder of the growing season is trying to determine the relative maturity of the current crop to allow for optimum harvest. This is particularly important for chip and process growers as chemical maturity or the concentration of sucrose in the tubers influences the storability of the crop. Estimating the chemical maturity of the current crop will allow for optimal vine kill timing, harvest and storage management necessary to optimizing quality through the winter.

Sucrose concentrations of round white potatoes ranged from 0.80 to 1.5 mg/g fresh wait two weeks ago. The relative sucrose concentration varied by field, variety, and other factors. For Snowden, chemical maturity occurs when tuber sucrose concentrations drop below 1.0 mg/g fresh weight. Newer varieties appear to have slightly lower critical sucrose levels in order to optimize fry quality of potatoes during storage.

One of the issues threatening the storage quality of this year's crop is the potential for over maturation of potatoes. The early development of the crop as well as early senescence of some fields may lead to earlier chemical maturation of potatoes. Delaying harvest will lead to continued aging of the crop in the field and lead to potential over maturation. Over maturation of potatoes can increase sugar concentrations in storage leading to darker chip or fry color, shorter dormancy and earlier sprouting, and increased shrink.

Monitoring chemical maturity can allow for identification of fields that are maturing early and allow for optimal vine-kill and harvest timing to prevent over maturation. In order to help growers estimate current status of sugar levels within their fields we are willing assay chemical maturity status of fields on a limited basis. Chip and process growers interested in participating in a pilot program to monitor crop maturity should contact me directly at my cell phone or e-mail. We simply require 3 - 10 tuber samples per field be delivered to the processing lab at the potato storage research facility between noon on Monday and noon on Tuesday. There will be a small fee for processing the samples as several private labs outside of Wisconsin provide this service.

The other concern is optimal harvest of potatoes based on the wet soil conditions of fields. Saturated soil conditions led to opening of tuber lenticels that could allow for infection by pathogens. In addition, the saturated soil conditions promote anaerobic conditions on the tuber surface that can promote infection by several pathogens. In addition, anaerobic conditions have been linked to development of pink eye on potato. Potatoes and other vegetables harvested and stored even for short durations will require good air circulation around the tubers to promote drying of any free moisture. In addition, oxygen should be managed and minimal carbon dioxide allowed surrounding potatoes to promote wound healing and prevent development of diseases.

Processing Vegetables – Processing vegetables, in particular sweet corn, snap bean, and cucumber have been developing well through much of the summer. Warm conditions have promoted crop maturity 5 to 7 days earlier than predicted in many for many of these crops throughout the summer. Recent rains were critical for many non-irrigated fields, but excess rain could cause issues as well. We have seen a large increase of white mold in snap bean plots. In addition, harvesting fields with excessively wet soils can cause wheel track compaction. Track fields harvested over the next few days and make sure to implement practices to remediate soil compaction including deep tillage, planting of deep rooted green manure crops, and other practices. Pay special attention to headlands or areas that are repeatedly driven over.

Tomato fruit disorders - Now that tomato fruit have begun to ripen, growers are beginning to notice various anomalies in the uniformity of the fruit color. Specific observations include the appearance of blotchy ripening, tomato yellow shoulder, and grey wall. Each of these disorders is characterized by uneven color through the tomato fruit. In each case, the disorder is believed to be a physiological disorder that persists even after the fruit has ripened. More importantly, each disorder causes the fruit to develop a woody and sometimes bitter flavor reducing the salability of the crop. Although the specific cause of blotchy ripening, tomato yellow shoulder, or grey wall is unknown, several factors are believed to contribute to their development. Stressful growing conditions such as drought, warm temperatures, or sudden changes in the environment contribute to the development of all three disorders. However, adequate potassium fertility has been shown to contribute to the development of blotchy ripening, tomato yellow shoulder, and grey wall.

If any one of these disorders is developing and persisting within your tomato crop, evaluate you potassium fertility program closely. Potassium is important for fruit color development in tomato. Tomato requires 180 lb/a K_2O which is much more than is required for other vegetable crops such as sweet corn, pepper, or pumpkin. Potassium deficiencies have occurred in multiple problem fields I have inspected with tomato yellow shoulder or grey wall. Within several of these fields manure was applied to meet the nitrogen demand of tomato, but the application resulted in 1/3 to ½ the required K rate. In one other case, no potassium was applied, even though nitrogen and phosphorous had been applied. Potassium fertility needs in tomato can be met with broadcast applications of potash in the fall or spring prior to planting. If disorders are already occurring, foliar fertilizers containing potassium at appropriate rates can be applied to help alleviate the disorder.

Early maturing pumpkins - Powdery mildew, drought stress, and/or inadequate fertility have led to early vine death and resulting maturation of pumpkin and winter squash in several areas of Wisconsin. The question is what to do with the ripened fruit 5 to 6 weeks prior to the targeted harvest date. I would recommend harvesting the crop and storing fruit in well ventilated building. Cut the fruit off of the vines with a sharp shears. Do not set the fruit directly on the ground or on cement, rather place on racks several feet off of the ground. Keep the fruit out of direct sunlight to minimize potential for sun damage on ripened crop. Fruit setting in direct sunlight can quickly warm to greater than 95 F causing damage to the tissue.

Pumpkins and winter squash can typically be stored for 2 to 4 months. Store whole mature pumpkins in a dry, airy location. Cure pumpkins at 80 to 85 F with 80 to 85% relative humidity for 10 to 14 days after harvest. This allows the fruit to heal any damaged tissues that occurred during handling. Preventing any damage to pumpkins during harvest minimizes potential infection points for pathogens into the fruit. After curing, store the pumpkins and squash at 50 to 55°F with a relative humidity of 60 to 75%. Remove pumpkins showing any signs of spoilage from storage shelves.

Vegetable Insect Update

Russell L. Groves, Vegetable Entomologist, Applied Insect Ecologist, UW-Madison, Department of Entomology

Although populations of the potato leafhopper (PLH) continue to persist in alfalfa, these insects now appear to be declining in other susceptible vegetable crops, including snap beans. Snap bean plots at the Arlington and Hancock Agricultural Experiment Stations averaged 0.25 and 0.2 adult leafhoppers per sweep, respectively; now well below the prescribed action threshold of 1.0 adult PLH / sweep in mature crops. Damage caused in later plantings of snap beans can, in some cases, be easily confused with early symptoms of non-persistently transmitted viruses (e.g. alfalfa mosaic virus and cucumber mosaic virus). Recall that the typical symptoms of 'hopperburn' caused by feeding of both adult and nymphal PLH, include leaf curling, crinkling, and a characteristic V-shaped necrotic area at the leaf tip. Further damage on late-planted snap beans include shortened internodes, fewer flowers, and a stunted plant. Plant disease caused by infection of cucumber mosaic virus often consists of leaf curling, green mottling, and sometimes severe blistering while infection by alfalfa mosaic virus often causes only local lesions widely scattered on leaf surfaces. Both viruses are spread by many aphid species.

Continued captures of adult **European corn borer,** resulting from the second flight, remains under way in several locations of southern and now central Wisconsin. Sweet corn in tassel and beyond, peppers and snap beans with flowers and developing fruit should be protected. European corn borer larvae can be effectively controlled by several insecticides identified in the Wisconsin Guide to Commercial Vegetable Production (A3422). The current degree day accumulations further indicate that peak periods of flight reach as far north as north central Wisconsin along a line extending from Spooner southeast to Manitowoc. Steady increases in the numbers of adult **Corn earworm** continue to occur through the early part of this week with elevated temperatures over last weekend. Trap counts should continually be monitored at this time of year to determine if treatment is necessary. Moth collections greater than 10 moths per night in pheromone traps or 5 moths per night in black light traps suggest that the risk of ovisposition (egg laying) is sufficiently high enough to warrant treatment. In turn, as corn reaches the silking stage and adult counts increase to 100 moths per night in pheromone traps, or 25 moths per night in black light traps, insecticides should be applied 3 - 4 days, or until silks turn brown. Corn earworm is a migratory pest and recent weather conditions over the last two weeks have been conducive for insect migration into Wisconsin from southern areas.

Vegetable Disease 8-18-07

W. R. Stevenson, Dept of Plant Pathology, UW-Madison

Potato: There's roughly three weeks left in the growing season before vine desiccation of storage potatoes. There's significant vine desiccation going on as fresh market potatoes are being harvested and as tubers for processing and seed reach critical size. Still no late blight in Wisconsin, but there are reports of late blight in Maine, Nebraska and Colorado. Keep up your spray program, especially now that cooler nights bring prolonged periods of fog and dew. It sure would be great to go another year without late blight. We don't want to drop our guard this late in the season. Early blight pressure is moderate and fungicide programs on commercial fields seem to be effective. Our plots at Hancock are showing beautiful treatment separation. The next two weeks are prime times for viewing. Remember that Vaughan James will be at Hancock on Monday, August 20 from 10 am to 2 pm that day to help guide you through the plots and answer questions. Data from these plots are being posted on our web site for your examination. I know that you'll want to visit this site to see how your favorite program is faring under heavy disease pressure.

P-Day and Severity Value Accumulations are listed in the table below. I've highlighted those P-Day and Severity Value totals that are above potato treatment thresholds.

Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations

Weather Station Site	Planted:	50% EMERGENCE	P-Days	Severity Values	Calculation Date
Antigo area	Early - May 8	May 31	**519**	**40**	8/13/07
	Mid - May 21	June 10	**444**	**33**	8/13/07
	Late – June 1	June 18	**386**	**33**	8/13/07
Grand Marsh area	Early - Apr 16	May 12	**661**	**54**	8/13/07
	Mid - Apr 20	May 18	**628**	**54**	8/13/07
	Late - Apr 27	May 28	**563**	**54**	8/13/07
Hancock area	Early - Apr 16	May 8	**658**	**37**	8/13/07
	Mid - Apr 24	May 14	**617**	**37**	8/13/07
	Late - May 2	May 23	**564**	**37**	8/13/07
Plover area	Early - Apr 14	May 8	**700**	**59**	8/13/07
	Mid - Apr 20	May 15	**652**	**59**	8/13/07
	Late - May 2	May 22	**608**	**59**	8/13/07
Spooner	Mid - May 4	May 30	**528**	14	8/10/07

Visit our web site at (**http://www.plantpath.wisc.edu/wivegdis/index.htm**) where you can find updated P-Day and Severity Value information throughout the growing season.

Other Vegetable Crops: Cucumbers, Melons, Pumpkins and Other Cucurbits –

Disease Alert – I remain concerned about the threat of downy mildew on cucurbit crops. The disease is still present in Michigan and Illinois and with a strong southerly air flow pattern, my guess is that downy mildew appearance in Wisconsin is only a matter of time. We have seen no samples with verified downy mildew yet in Wisconsin. If and when downy mildew appears, products registered for **downy mildew** control include Previcur Flex, Forum, Ranman, or Tanos, each mixed with chlorothalonil or mancozeb. Gavel (already contains mancozeb) can also be used, but does not need a tank mixed companion product. For **powdery mildew**, consider a long list of materials that includes Flint, Pristine, Nova, Topsin-M, Procure, Quadris, Amistar or Cabrio. Please review reentry intervals, PHI's (preharvest intervals) and worker safety precautions for each material before use. We are still seeing samples of pumpkins, squash and cucumber arriving with symptoms of angular leaf blight, a bacterial disease. Fungicide sprays will not help and even copper sprays are of limited value once there are symptoms of this disease are present.

Virus symptoms are beginning to show up on the new growth of cucurbit crops, likely the end result of aphid flights over the past 2-3 weeks. It's hard to prevent infection, but a few tips include stylet oils applied to the foliage to reduce transmission efficiency and planting green cover crops around fields and in drive rows. Wheat, rye, oats seem to work as a means to confuse the aphids coming into your fields. Aphids tend to key in on sharp boundaries between green plants and brown bare soil. Give them a chance to clean their stylets before aphids enter your fields and you might just see a reduction in virus losses. We've been using this approach at the UW Lelah Starks Elite Foundation Seed Potato Farm in Rhinelander the past few years and it seems to help.

Snap Beans – Symptoms of cucumber mosaic virus are beginning to appear in commercial fields in southern and central WI. So far, we haven't seen reports of blossom drop or "chocolate" pods. Plants that were in the two week period before flowering during the past 2-3 weeks seem to be the most prone to losses.

Sweet Corn – Rust is being reported on sweet corn as far north as central Wisconsin. Many varieties have useful levels of resistance and there are several fungicides labeled for rust management if the level of infection continues to increase.

Vegetable Disease Update 8-21-07

W. R. Stevenson, Department of Plant Pathology, UW-Madison

Potato: Although the past week has brought conditions that are ideal for late blight, we have received NO reports of late blight in Wisconsin, but there are reports of late blight in Maine, Nebraska and Colorado. Keep careful watch on your fields for any symptoms or signs of late blight. At this point in the season, if late blight is identified, the critical thing is to vinekill affected areas in the field as quickly as possible to kill diseased plants – this will diminish the potential for sporulation and dissemination of the pathogen to other areas and to the tubers. Tubers from an affected area should be harvested and processed as quickly as possible to remove them. Tubers from these areas would not be good candidates for storage. With all the rain and high soil moisture, keep an eye out for pink rot, enlarged lenticels, Pythium leak and Erwinia soft rot – all of these can contribute significantly to storage problems.

Early blight pressure has increased, but our plots at Hancock continue to show some great treatment differences.

Current P-Day (Early Blight) and Severity Value (Late Blight) Accumulations

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	Mid - May 21	June 10	**444**	**33**	8/13/07
	Late – June 1	June 18	**386**	**33**	8/13/07
Grand Marsh area	Early - Apr 16	May 12	**734**	**82**	8/22/07
	Mid - Apr 20	May 18	**701**	**82**	8/22/07
	Late - Apr 27	May 28	**637**	**82**	8/22/07
Hancock area	Early - Apr 16	May 8	**731**	**62**	8/22/07
	Mid - Apr 24	May 14	**690**	**62**	8/22/07
	Late - May 2	May 23	**638**	**62**	8/22/07
Plover area	Early - Apr 14	May 8	**771**	**86**	8/22/07
	Mid - Apr 20	May 15	**723**	**86**	8/22/07
	Late - May 2	May 22	**678**	**86**	8/22/07
Spooner	Mid - May 4	May 30	**606**	**19**	8/20/07

The last spray is scheduled for these plots the week of August 20. Final disease rating is scheduled for August 31 with vinekill anticipated that afternoon. Stop by the plots before then if you want see how your favorite program is faring under heavy disease pressure. Data from these plots are being posted on our web site for your examination.

P-Day and Severity Value Accumulations are listed in the table above. I've highlighted those P-Day and Severity Value totals that are above potato treatment thresholds. (We are having problems with solar powered cell phones due to lack of sun, so we don't have all the latest data for some of the sites.)

Visit our web site at **(http://www.plantpath.wisc.edu/wivegdis/index.htm)** where you can find updated P-Day and Severity Value information throughout the growing season.

Other Vegetable Crops: Cucumbers, Melons, Pumpkins and Other Cucurbits –

Disease Alert – Although weather has been ideal for downy mildew on cucurbit crops and the disease is present in Michigan and Illinois, there are still no reports of this disease in Wisconsin. If and when downy mildew appears, products registered for **downy mildew** control include Previcur Flex, Forum, Ranman, or Tanos, each mixed with chlorothalonil or mancozeb. Gavel (already contains mancozeb) can also be used, but does not need a tank mixed companion product. **Powdery mildew** has shown up the last week in our pumpkin variety evaluation trial at the Hancock station. For **powdery mildew** consider a long list of materials that includes Flint, Pristine, Nova, Topsin-M, Procure, Quadris, Amistar or Cabrio. Please review reentry intervals, PHI's (preharvest intervals) and worker safety precautions for each material before use. We are still seeing samples of pumpkins, squash and cucumber arriving with symptoms of angular leaf blight, a bacterial disease. Fungicide sprays will not help and even copper sprays are of limited value once there are symptoms of this disease are present.

Snap Beans – Recent weather has been ideal for white mold development so be on the lookout for it. If you do see it in your fields at harvest, consider applying the biocontrol Contans® after harvest, before crop debris is disked in. We have had good results from application of this product in trials in past years.

Carrots – Alternaria and Cercospora blight are increasing on carrots also due disease-favorable weather so attention to fungicide programs on carrots is also important.

Vegetable disease reports during the last week from Brian Hudelson, Plant Disease Diagnostics Clinic, include a variety of problems on cucurbits (angular leaf spot, Verticillium wilt, Fusarium wilt, Pythium root rot) and Bacterial leaf spot spots on peppers.