



WEEKLY CROP UPDATE

UNIVERSITY OF DELAWARE COOPERATIVE EXTENSION

Volume 19, Issue 12

June 10, 2011

Vegetable Crops

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

Cucumbers

Cucumber beetles continue to be active so be sure to scout for beetles as well as aphids. Fresh market cucumbers are susceptible to bacterial wilt, so treatments should be applied before beetles feed extensively on cotyledons and the first true leaves. Although pickling cucumbers have a tolerance to wilt, a treatment may still be needed for machine-harvested pickling cucumbers when 5% of plants are infested with beetles and/or plants are showing fresh feeding injury. A treatment should be applied for aphids if 10 to 20 percent of the plants are infested with aphids with 5 or more aphids per leaf.

Melons

Continue to scout all melons for aphids, cucumber beetles, and spider mites. Although aphid populations are still relatively low, populations can quickly explode. The treatment threshold for aphids is 20% infested plants with at least 5 aphids per leaf. We continue to find fields with spider mites at economic levels. The threshold for mites is 20-30% infested crowns with 1-2 mites per leaf. Cucumber beetles continue to be an economic problem. Since beetles can continue to re-infest fields as well as hide under the plastic, be sure to check carefully for beetles as well as their feeding damage. Multiple applications are often needed

to achieve effective control. Now that most fields are blooming, it is important to consider pollinators when making an insecticide application:

<http://extension.oregonstate.edu/catalog/pdf/pnw/pnw591.pdf>.

Peppers

As soon as the first flowers can be found, be sure to consider a corn borer treatment. Depending on local corn borer trap catches, sprays should be applied on a 7 to 10-day schedule once pepper fruit is ¼ - ½ inch in diameter. Be sure to check local moth catches in your area by calling the Crop Pest Hotline (in state: 800-345-7544; out of state: 302-831-8851) or visiting our website at (<http://ag.udel.edu/extension/IPM/traps/latestblt.html>). You should also watch for an increase in aphid populations. A treatment may be needed prior to fruit set if you find 1-2 aphids per leaf for at least 2 consecutive weeks and beneficial activity is low.

Potatoes

Continue to scout fields for Colorado potato beetle (CPB) and leafhoppers. Adult CPB as well as the small and large larvae can now be found. A treatment should be considered for adults when you find 25 beetles per 50 plants and defoliation has reached the 10% level. Once CPB larvae are detected, the threshold is 4 small larvae per plant or 1.5 large larvae per plant. As a general guideline, controls should be applied for leafhoppers if you find ½ to one adult per sweep and/or one nymph per every 10 leaves.

Snap Beans

Continue to sample all seedling stage fields for leafhopper and thrips activity. The thrips threshold is 5-6 per leaflet and the leafhopper threshold is 5 per sweep. If both insects are present, the threshold for each should be reduced by one third. In addition, continue to watch for bean leaf beetle. Damage appears as circular holes in leaves and significant defoliation can quickly occur. As a general guideline, a treatment should be considered if defoliation exceeds 20% prebloom. As a general guideline, once corn borer catches reach 2 per night, fresh market and processing snap beans in the bud to pin stages should be sprayed for corn borer. Sprays will be needed at the bud and pin stages on processing beans. After the pin spray on processing beans, the spray schedule will be determined by a combination of both moth catches and field scouting. With the recent hot weather, beetles in the traps have made moth ID more difficult:

<http://ag.udel.edu/extension/IPM/traps/latestblt.html>

and

<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 2 per night, a 7 to 10-day schedule should be maintained for corn borer control.

Sweet Corn

Continue to sample seedling stage fields for cutworms and flea beetles. You should also sample whorl through pre-tassel stage corn for corn borers and corn earworms. A treatment should be applied if 15% of the plants are infested with larvae. The first silk sprays will be needed for corn earworm as soon as ear shanks are visible. Be sure to check both black light and pheromone trap catches since the spray schedules can quickly change. With the recent hot weather, beetles in the light traps have made moth ID more difficult. Trap catches are generally updated on Tuesday and Friday mornings

(<http://ag.udel.edu/extension/IPM/traps/latestblt.html> and

<http://ag.udel.edu/extension/IPM/thresh/silksp raythresh.html>). You can also call the Crop Pest Hotline for the most recent trap catches (in

state: 800-345-7544; out of state: 302-831-8851).

Results of the 2010 On-Farm Cucurbit Powdery Mildew Fungicide Resistance Trial

- Bob Mulrooney, Extension Plant Pathologist; bobmul@udel.edu

In 2010 a multi-state project including DE, PA, MD, VA, NY and NJ was undertaken to determine the extent of resistance to fungicides for powdery mildew control in cucurbits. Plants of a susceptible pumpkin variety were grown to the 2-3 leaf stage, sprayed with different fungicides at varying rates and placed in commercial cucurbit fields with powdery mildew for 1-2 days. The plants were collected and allowed to continue to grow and develop symptoms in a greenhouse, then evaluated for the amount of powdery mildew on the leaves compared to the untreated plants exposed at the same time. The results from the two fields in DE showed that at least for these two fields that there is resistance in the powdery mildew populations to Topsin M, Flint, Endura, and Rally. The resistance to Rally at the high rate was very low indicating that some control would be expected at the highest label rate of Rally. No resistance was detected to Quintec, either in DE or any other state. I did not include Inspire or Folicur. No resistance was found to Inspire, but NY and PA did see some resistance to tebuconazole (Folicur). Cucurbit growers in DE and MD should not expect to see control of powdery mildew from thiophanate-methyl (TopsinM), or a stand-alone strobilurin fungicide like Flint, Quadris or Cabrio. The results of this trial indicate that the high rate of Pristine (Endura plus Cabrio) may still provide some control but there is resistance to the boscalid (Endura) component occurring in the region.

Growers Guide to Understanding the DMI or SI Fungicides - Bob Mulrooney, Extension Plant Pathologist; bobmul@udel.edu

The following article by Andy Wyenandt, Ph.D., Specialist in Vegetable Pathology at Rutgers University is particularly timely since many

vegetable growers are spraying fungicides to prevent many foliar diseases at this time of year especially on vine crops where DMI or SI fungicides are used very frequently.

The DMI (DeMethylation Inhibitors) or Sterol biosynthesis Inhibiting (SI's) fungicides belong to FRAC code 3, which include the triazoles and imidazoles. Some of these fungicides are commonly known as Tilt (propiconazole), Rally (myclobutanil), Folicur (tebuconazole), and Procure (triflumizole). SIs work by inhibiting the biosynthesis of ergosterol, which is a major component of the plasma membrane of certain fungi and needed for fungal growth.

Resistance by fungi to the SI fungicides has been characterized and is generally known to be controlled by the accumulation of several independent mutations, or what is known as 'continuous selection' or 'shifting', in the fungus. Such that, in any given field population the sensitivity to the SI fungicide by the fungus may range from extremely high (highly sensitive, i.e. will be controlled by fungicide) to moderate (partially sensitive) or low (mostly resistant to fungicide). This type of resistance is also known as quantitative resistance. With quantitative resistance there are different levels of resistance to the fungicide due to independent mutations, which is unlike the target mutations that occur in qualitative resistance associated with the QoI fungicides (FRAC code 11).

Because different levels of resistance to the SI fungicide may exist in the field, the fungal population may behave differently to different rates of the SI fungicide being applied. If that is the case, it is suggested that using a higher rate of a SI fungicide, may improve control when lower rates have failed. For example, let's say that a powdery mildew population on pumpkin has 25% high, 50% moderate, and 25% low sensitivity to a SI fungicide. If fungicide is applied at the low rate, only 25% of the population (highly sensitive) may be controlled. Whereas, if the high rate was used 75% of population may have been controlled.

The main point is that if low rates of SI fungicides have been used and control seems to be weakening, bumping to a higher rate may improve control. Unfortunately, it is difficult to

determine what proportion of the powdery mildew population is sensitive or not sensitive by looking at the field until you have begun spraying. The best advice, if you are using low rates and think those rates are not working like you feel the rate should be bumped up to the high rate the next time the fungicide is sprayed, and if the high rate doesn't work, it may be safe to assume the fungal population has grown mostly resistant. Importantly, if the high rate fails, whether you bumped up to a high rate or started with one, and control does not seem adequate, do not continue to use the fungicide.

Recognizing if and when fungicide chemistries are failing and when fungicide resistance is developing is critical to producing successful crops and why scouting on a regular basis, at least before and after each fungicide application, is important. Regular scouting can help reduce unwarranted and ineffective fungicide applications and help reduce wasted costs. Remember to always tank mix SI fungicides with protectant (M) fungicides (i.e., chlorothalonil) to help reduce the chances for fungicide resistance developing. Always apply SI fungicides according to label rates and resistant management recommendations and always be aware of the fungicide rates you are applying.

Heat Damage to Vegetable Transplants -
Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

Watch for heat damage in transplants on black plastic mulch planted recently. This is a common problem in later plantings of peppers and tomatoes in particular.

Vegetable transplants are exposed to high soil temperatures at the soil line around the transplant hole. I took soil surface temperatures in black, white and metalized plastic mulch in mid-afternoon this Thursday (June 9). The air temperature was 97°F. In open planting holes at the soil line, the temperature was >130°F in the black plastic mulch, near 120°F in the white plastic, and less than 110°F in the metalized (aluminum) mulch.

The stem tissue just at or above the level of the plastic will be killed at these high temperatures and the transplants will then collapse and die. Small transplants do not have the ability to dissipate heat around the stem as roots are not yet grown out into the soil and water uptake is limited. Another factor in heat damage is that there is little or no shading of the mulch with the leaves of small transplants.

In addition, high bed temperatures have the potential to damage roots.

There are a number of practices that can reduce heat damage in later planted vegetable transplants:

- Delay planting until a cold front goes through if possible.
- Use larger transplants with greater stem diameters and more leaves to shade.
- Make a larger planting hole, cutting or burning out the plastic.

- When transplanting into the plastic, make sure the stems of transplants do not touch the plastic once set.

- Water sufficiently in the hole to reduce heat load, the more water the better.

- Plant in the evening, once the plastic has cooled down, or in the very early morning.

- Switch to white or aluminized plastic mulch for later plantings. This will reduce the heat loading significantly.

- In smaller plantings you may paint the planting zone on the black plastic mulch white with latex paint and then plant through this white strip once dry. You can also mulch around the planting holes with wet straw to reduce heat loading.

- Use overhead irrigation after planting to keep the plastic cooler.

Potato Disease Advisory #7 - June 9, 2011 - *Bob Mulrooney, Extension Plant Pathologist;*
bobmul@udel.edu

Late blight Advisory

*Location: Art and Keith Wicks Farm, Rt 9, Little Creek, Kent County.
 Greenrow: May 3*

Date	Late Blight		Early Blight	Spray Interval Recommendation
	DSV	Total DSV	Accumulated P-days*	
5/27 - 5/28	2	54	175	5-days
5/28 - 5/29	2	56	183	7-days
5/29 - 5/30	1	57	191	5-days
5/30	0	57	197	7-days
5/31 - 6/1	0	57	207	10-days
6/1 - 6/5	0	57	232	10-days
6/6	1	58	251	10-days
6/6 - 6/8	0	58	263	10-days

The forecasted hot weather will reduce the risk and slow any development of late blight. Continue to scout fields for symptoms of late blight. Conditions will continue to favor early blight with the increased temperatures and high humidity. Heat stress will make the oldest leaves more susceptible. We should reach 300 P-days this weekend.

P days

We use the predictive model WISDOM to determine the first fungicide application for prevention of early blight as well. The model predicts the first seasonal rise in the number of spores of the early blight fungus based on the accumulation of 300 physiological days (a type of degree-day unit, referred to as P-days) from green row. To date, 263 P-days have accumulated at the site. Once 300 P-days have accumulated, the first fungicide for early blight control should be applied. This usually occurs when rows are touching.

If pink rot or leak is a concern and no pink rot fungicide was applied at planting consider applying one of the following when potatoes are nickel-sized and repeating 14 days later. Apply in as much water as possible (20-30 gal/A): Mefanoxam/chlorothalonil (Ridomil/Bravo) 2 lb/A, or Ridomil Gold/MZ 2.5 lb/A, or Ridomil Gold/Copper 2 lb/A. If Platinum/ Ridomil Gold was applied at planting the label allows one foliar application of one of those products at tuber initiation if conditions warrant. Presidio was also labeled this spring for pink rot control. The label uses for pink rot control include an in-furrow application at planting with a follow-up application between hilling and tuber initiation. There is no labeled use for a foliage application for pink rot control. It is labeled for late blight control at 4.0 fl oz/A.

More Heat - *Gordon Johnson, Extension Vegetable & Fruit Specialist*; gcjohn@udel.edu

A second early heat wave has growers concerned about effects on vegetables. As stated last week, peas will have reduced yields and will mature more quickly. Moisture deficit portions of pea fields in field corners, sandy knolls, compacted, and low organic matter areas have been hard hit.

Providing adequate moisture through irrigation is critical in these high heat periods. However, water cannot completely compensate for extreme heat.

All vegetables will have reduced photosynthesis once temperatures reach a critical point. Plant stomates will close earlier in the day thus limiting gas exchange. Respiration increases with temperature, and high night temperatures can be a major factor in limiting yield. Because of this increased respiration the plant uses up photosynthates that do not go into yield components.

High air temperatures may result in high leaf temperatures, especially where water is deficient. High leaf temperature may result in heat damage to proteins. Very high leaf temperatures may result in sunburn and scorching. Sunscald of fruits will increase,

especially where leaves wilt and reduce fruit cover.

In flowering and fruiting crops, high heat will affect pollen production, often reducing viable pollen numbers. Reproductive parts in plants (anthers, stigmas) may not form properly or function properly. If pollen is transferred to stigmas, pollen germination may be reduced or halted due to heat and desiccation. Reduced pollination can result in smaller fruit or misshapen fruit. Reduced pollination will also reduce seed set in pod crops and sweet corn.

If pollination is successful, early fruit abortion may occur due to lack of photosynthates or heat damage. In heat stressed plants, the hormone balance is affected and there is an increase in abscisic acid that is involved in these abortions.

High soil temperatures can damage surface roots, limiting water and nutrient uptake. This is particularly an issue in crops grown on black plastic mulch. High temperatures affect root crops such as potatoes, especially near the soil surface, by damaging tubers and roots.

Fruit

Update on Brown Marmorated Stink Bug in Fruit - Joanne Whalen, Extension IPM Specialist; jwhalen@udel.edu

Although we are not able to scout orchards in Delaware, a consultant working with fruit growers in Delaware detected the first damage in peaches and nectarines this week. It appears that the damage is confined to edges near woods; however, they can quickly move into orchards so early detection is important. We do have BLT traps at 3 orchard locations but so far none have been detected in traps. We did find a significant increase in black light trap catches at our Newark farm this past week - but populations were very high in crops on the Newark farm in 2010. It is being shown in other fruit areas that orchard scouting is critical and you should not rely on traps alone for detection. In states where numbers were high last season (WV, Western MD and VA and NJ), they are able to find populations and damage in orchards well before detection in traps this season. Please see the attached [“Grower Alert”](#) concerning brown marmorated stink bug that was sent last week by the U.S. Apple Association to US Apple members in the Mid Atlantic region.

Agronomic Crops

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

Alfalfa

Continue to sample for potato leafhoppers on a weekly basis. We are now finding adults and nymphs in fields. Although both life stages can damage alfalfa, the nymphs can cause damage very quickly. Once plants are yellow, yield loss has already occurred. The treatment thresholds are 20 per 100 sweeps on alfalfa 3 inches or less in height, 50 per 100 sweeps in 4-6 inch tall alfalfa and 100 per 100 sweeps in 7-11 inch tall alfalfa.

Field Corn

We have received reports of cereal leaf beetle adults moving out of small grains and feeding on

the edge of corn fields. Although we do not have any firm thresholds for this insect on corn, as a general guideline controls may be needed on corn for feeding damage if you find an average of 10 beetles per plant and 50% of the plants exhibit feeding damage. In the Midwest, it has been reported that the adult beetle is a vector of maize chlorotic mottle virus (MCMV) that causes corn lethal necrosis disease. Thresholds would be much lower if this disease is an issue. To date, I am not aware of this occurring in Delaware; however, be sure to let us know if you find potential problems.

Soybeans

Be sure to sample seedling stage beans for bean leaf beetles, grasshoppers, thrips and spider mites. We are seeing an increase in the population levels of all three insects in soybeans.

(a) Grasshoppers: We can find significant numbers in many fields but the highest populations are being found in full season no-till soybeans. As barley is harvested and soybeans are planted, these fields will be especially susceptible to attack by grasshoppers which can often cause stand loss. If stand reductions are occurring from plant emergence to the second trifoliolate, a treatment should be applied. Although no precise thresholds are available, a treatment may be needed if you find one grasshopper per sweep and 30% defoliation from plant emergence through the pre-bloom stage.

(b) Bean Leaf Beetle: As a general guideline, a treatment may be needed for bean leaf beetle if you observe a 20 - 25% stand reduction and/or 2 beetles per plant from cotyledon to the second trifoliolate stages. These treatment thresholds should be reduced if bean pod mottle virus is present or you suspected this virus was present in previous seasons.

(c) Thrips: Populations levels have increased on soybeans throughout the region and Ames Herbert at Virginia Tech is currently doing research on this insect in soybeans. In the past, information from North Carolina indicated that “soybean thrips and other thrips species can feed and reproduce on the leaves and buds of soybean seedlings. Their feeding creates bleached-out lesions along the leaf veins and

gives a silvery/bronzed appearance to the leaf surface when damage is severe. These insects are very small (less than 1/10 inch) and are torpedo shaped. While thrips always occur on soybean seedlings, it is only during outbreak years that they cause concern. In particular, during dry weather and on earlier planted full-season soybeans, thrips populations can explode when plants are growing slowly. Under these circumstances thrips injury will occasionally kill seedlings. Other stressors, such as nutrient deficiencies and herbicide injury, can add to thrips damage and cause plant loss.” Yellowing can occur from thrips but there are also a number of other factors that can cause yellowing so it is important to scout fields to identify what is causing the yellowing. Although no precise thresholds are available, as a general guideline, treatment may be needed if you find 4-8 thrips per leaflet and plant damage is observed.

(d) Spider Mites: With the continued hot, dry weather, it comes as no surprise that we are starting to find the first spider mites in seedling stage soybeans. Early detection and control is needed to achieve spider mite suppression. Dimethoate, Lorsban (chlorpyrifos), Hero (zeta-cypermethrin + bifenthrin) as well as a number of bifenthrin products (such as Sniper and Bifenture) are available for spider mite control in soybeans. All of these products need to be applied before mites explode. Be sure to read the labels for use rates and restrictions - there is a limit on the number of applications as well as the time between applications on all of the materials labeled for spider mite control.

Head Scab and the Relationship to Saved Seed and Vomitoxin Production - Bob Mulrooney, *Extension Plant Pathologist*; bobmul@udel.edu

Head scab has been observed in barley and wheat this season in varying amounts. Barley is just now arriving at the grain elevators. The amount of scab that occurs is dependent on the flowering time, the presence of the scab spores that infect the heads during flowering and the weather conditions during flowering. Most of the barley and wheat varieties that we grow have little or no resistance to head scab. The fungus

can be present on old corn stover, and residues of old barley and wheat crops. What drives this disease is wet, warm weather during the flowering period. If the heads of barley or wheat are infected with the fungus (*Fusarium graminearum*) that cause head scab, that fungus can produce several toxins that can contaminate the grain. These toxins are often referred to as vomitoxins because they can cause feed refusal in non-ruminant animals. The most common vomitoxin that is produced by the head scab fungus is deoxynivalenol or DON for short. DON production by the fungus is extremely variable depending on environmental conditions. The presence of scab on the grain does not mean that the grain has to have DON nor does high or low levels of scab relate to the amount of DON present. A high level of scabby kernels in the harvested grain means that DON will likely be present.

What about the saving or using seed from scab infected fields? As much scabby wheat kernels as possible should be removed from good seed during combining and seed cleaning. This is not easily done with barley or may not be possible because barley does not get as light as wheat. Saved seed kernels can be infected with *Fusarium*, and seed treatments can reduce the effects of *Fusarium* on seed. *Fusarium* on seed can cause a seedling blight of barley and wheat but the seedling infections do not result in head scab or DON in fields that might be planted with infected seed. In fact some studies have shown a reduction of scab infections in seed during storage. Low levels of scab infected wheat or barley can be saved for seed if properly handled and treated without any risk of scab occurring in the crop from that seed.

Another issue for barley producers is that the threshold levels of DON in wheat may not be the same compared to barley presuming that the barley is not intended for human consumption. The DON threshold for wheat is 1 ppm because of human consumption concerns. Barley for feed can have up to 10 ppm without harmful effects depending on the animals being fed and the proportion of infected grain being fed. In my opinion barley should not be held to the same threshold as wheat depending on its destination or final use. See the following information on DON levels in food and feed.

What are the critical levels of DON for use in food and feed?

The concentrations of DON in grain are expressed as parts per million (ppm). One ppm is equivalent to 1 pound in 1 million pounds, 1 penny in \$10,000, 1 minute in two years, or 1 wheat kernel in 80 pounds of wheat. The U.S. Food and Drug Administration (FDA) has established DON advisory levels to provide safe food and feed. Unlike aflatoxin in corn, DON is not a known carcinogen. Furthermore, grain with DON would have to be ingested in very high amounts to pose a health risk to humans, but it can affect flavors in foods and processing performance. Human food products are restricted to a 1-ppm level established by the FDA. This level is considered safe for human consumption. The food industry often sets standards that are more restrictive. DON causes feed refusal and poor weight gain in some livestock if fed above the advisory levels. FDA advisory levels are as follows:

- 1 ppm: Finished wheat products, such as flour, bran and germ that potentially may be consumed by humans. The FDA does not set an advisory level for raw grain intended for milling because normal manufacturing practices and additional technology available to millers can substantially reduce DON levels in the finished wheat product. However, individual millers or food industries may have stricter requirements than 1 ppm.
- 10 ppm: Grains and byproducts destined for ruminating beef and feedlot cattle older than 4 months and for poultry, providing that these ingredients don't exceed 50 percent of the diet.
- 5 ppm: Grains and grain byproducts destined for swine, providing that these ingredients don't exceed 20 percent of the diet.
- 5 ppm: Grains and grain byproducts destined for all other animals, providing that these ingredients don't exceed 40 percent of the diet.

Taken from NDSU Fact sheet PP-1302, *DON (Vomitoxin) in Wheat*.
<http://www.ag.ndsu.edu/pubs/plantsci/pests/pp1302.pdf>

Emergency Forages for Feed - *Richard Taylor*,
Extension Agronomist; rtaylor@udel.edu

With the very hot weather upon us and many areas of the state very short of available soil water, it is time to think about possible emergency forages for those producers with livestock. The traditional cool-season pasture and hay grasses such as orchardgrass, timothy, and tall fescue are not very productive during the summer months when high temperatures and drought limit their productivity and quality. On the other hand, the warm-season grasses do not reach their maximum growth rates until daytime temperatures rise into the 90°F. Summer annual grasses such as forage sorghum, sudangrass, sorghum-sudangrass hybrids, pearl millet, and teff can provide high quality summer grazing and sometimes emergency hay for livestock in our region. Many of these species even germinate when soil moisture conditions seem to be too dry for successful establishment although it often is difficult to know for certain if they will germinate and establish in a given situation. Although late planting limits their yield potential, many of these grasses can be planted up until late July and still produce valuable and needed animal feed although the cost of production will make the feed expensive.

The term "millet" is loosely used to refer to a variety of grass crops whose seeds can be harvested for human or animal feed. The term is used differently depending on local customs and sometimes continental influences. For example in many parts of Asia and Africa, sorghums are called millet whereas in Australia the species called broomcorn in the U.S. is called broom millet. When compared with the more commonly grown cereal grains such as corn, wheat, barley, and milo (grain sorghum), the millets are generally suited to less fertile soils and areas of drought or excess heat.

Foxtail, Italian, or German Millet
Foxtail millet can be planted when it is too late in the season to make most other crops. It takes about 65 to 70 days to mature with summer temperatures and enough moisture to establish the crop. The crop requires warm to hot weather and matures quickly under warm conditions. It has a low water requirement although it can't stand severe drought since it is characterized by

a shallow root system. This annual grass forms slender, erect but leafy stems that vary in height from 1 to 5 feet. Foxtail millet usually won't regrow following a harvest, unlike pearl millet. It's been used in our region for a single harvest hay crop. Millets should be planted about two weeks after ideal corn planting time. Millets also have smaller stems and tend to be leafier than the forage sorghums, sudangrass, and sorghum-sudangrass crosses.

The primary use for foxtail millet hay is for sheep and cattle. This grass can cause problems if used as a major part of a horse's diet so as hay it should not be sold as horse hay. Problems include a laxative effect, excessive urination (cystitis), and kidney and bone or joint problems. The chemical, glucoside setaria, is found in foxtail and proso millet and is reported to cause illness and even death in horses. Foxtail or German millet also can cause oral mechanical lesions.

Pearl Millet

Pearl millet is considered the most suitable millet species for horse grazing or hay. It has moderate to good nutritional quality if kept short (about 2.5 feet or less). Pearl millet is leafy, with an upright growth habit, and grows from 4 to 8 feet tall. There are dwarf or semidwarf types such as Tifleaf I, II, and III that are leafier and have less stem than the taller types. Although the taller types produce more dry matter than the dwarf types, the stems make hay making more difficult. Although still requiring a mower-conditioner to crush the stems to hasten drying, the newer and leafier pearl millets are far superior to the older tall-type pearl millets. Pearl millet is more tolerant of lower pH and low fertility than the sorghum species.

Pearl millet does not contain glucoside setaria as does foxtail or proso millet and unlike the sorghums does not have the potential to cause prussic-acid (HCN) poisoning in animals. If raising pearl millet to feed horses, do not allow it to go to seed since a fungus can infect the seed and causes an accumulation of a toxic alkaloid (similar to alfatoxins in corn). Since pearl millet should not be harvested for hay when seeds are present (due to the very low quality of the

forage), alkaloid toxicity should not be of concern to horse hay buyers.

Japanese Millet

Also called barnyard millet or billion dollar grass, Japanese millet is grown principally as a forage grass. It resembles barnyardgrass and probably originated from that species. It makes the most rapid growth of all the millets when conditions are favorable and can ripen grain in as little as 45 days. It should be cut for hay before heading to be palatable and to make curing easier since the plant can have thick stems. Usually it is from 2 to 4 feet tall and does best on the better soils.

Teff

Teff is the common name for an annual lovegrass that is primarily used for grain in Africa and Europe but is also used for hay in South Africa and parts of Europe. It has excellent seedling vigor and good production and quality traits although it is somewhat shallow rooted so there is concern about grazing animals (especially horses) pulling it out of the soil. A couple of reports from this region suggest that it can be successfully grazed by horses if seeded in an existing pasture.

It has been grown as a summer annual on Delmarva and has been sold here as grass horse hay. Teff's palatability and quality vary greatly perhaps due to our lack of experience as to when to harvest the crop. As a hay crop, it can be cut and windrowed at early head (flower or seed head) emergence but you should not wait until the head is completely emerged and flowering has occurred since quality and palatability will be very much reduced.

Sorghum, Sudangrass, Sorghum-Sudangrass Crosses

For sorghum, sudangrass, sorghum-sudangrass crosses, hybrid sorghums, and other sorghum species, horses should not be allowed to graze and should not be fed hay from these species. Forage cystitis, an inflammation of the bladder can result. Sorghum species also contain prussic acid that can be metabolized or converted into cyanide. Cyanide poisoning can cause muscle weakness, urinary tract failure, neural degeneration, and death. This generally happens if the sorghum is grazed when young immature

growth is present (plant height under 18 to 24 inches or regrowth occurs following a period of stress conditions or regrowth occurs during a grazing cycle) or the crop is damaged by frost or freezing weather. After a frost or freeze and until the foliage dries out (about 1 week), it should not be grazed. Regrowth after a frost or non-killing freeze should not be grazed.

It is very important to consider not only the expected yield potential from the many species and varieties of sorghum but also the digestibility of the varieties. Some BMR (brown mid-rib) sorghum varieties are now available and these have been shown to differ in daily average gains by as much as 0.75 lb/day. This difference in quality can translate to huge differences in the cost of producing a pound of beef. Many companies tout the high yield potential for the various sorghums and millets and may show yields in the 6 to 7 tons/acre range. In excellent production years (plenty of heat and rainfall), these yields can be achieved but in drought years a more realistic yield expectation of 2 to 3 tons/acre (using the entire summer growing season) should be the basis of your decision. Dr. Chris Teutsch at Virginia Tech's Southern Piedmont AREC has conducted yield trials on many of these varieties so when making decisions refer to his results.

Kleingrass is also not recommended for horse since it produces a condition known as photosensitization. This is similar to that seen with alsike clover where sensitive horses can become severely sunburned.

Other Potential Problems

Nitrate toxicity following heavy nitrogen applications can occur especially during periods of summer drought. If urea or ammonium-based fertilizers are applied to the crop, it is only a matter of time before the nitrogen fertilizer is converted by soil bacteria into the nitrate form. After nitrate is taken up by the plant, stress conditions such as dry weather can lead to the accumulation of nitrate in the lower stems of grass plants. Stress conditions include not only drought but also cloudy, cool weather following the rapid uptake of nitrates since both situations prevent the plant from transforming the accumulated nitrate into amines, amino acids, and proteins. This is generally slightly less of a

concern with horses than with ruminants but nitrate levels can be in high enough concentrations that a potential toxicity problems can occur in horses.

Some species of millet can cause problems when grazed as lush pastures because they can contain significant levels of oxalates. The oxalates interfere with calcium absorption and horses can develop bone malformation and lameness. To date, this problem has primarily been seen in Australia and not in the U.S.

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

USDA June Supply and Demand Highlights

Corn Analysis

The importance of today's report is likely to be short lived due to the uncertainty facing U.S. farmers in getting this year's corn and soybean crops planted. The report will be short lived due to the likelihood that trader attention will now turn to U.S. and world weather and its resulting impact upon the 2011 growing season. Surprisingly, USDA made a downward adjustment to 2011 U.S. corn acres. This is surprising because USDA doesn't release actual planting numbers until June 30. Ending corn stocks for the current marketing year were left unchanged, however, the ending stocks estimate for the '11/'12 marketing year was reduced. World corn ending stocks were also reduced for the current and next marketing years. The estimate for the season average farm price, now placed at \$6.00 to \$7.00 per bushel, was increased 50 cents per bushel on both ends of the price range.

Soybean Analysis

Ending stocks for U.S. soybeans were increased for the current and next marketing years. World soybean stocks were reduced for the current and increased slightly for the next marketing year. There were no adjustments made to U.S. soybean acreage nor production in this month's report. World production numbers were left unchanged. The projection for the season average farm price, now estimated at \$13.00 to \$15.00 per bushel, was increased \$1.00 per bushel from last month.

Wheat Analysis

U.S. wheat ending stocks were reduced 30 million bushels from last month for the current marketing year and 15 million bushels for the '11/'12 marketing year. World ending stocks for all wheat are expected to increase for the

current and next marketing years. The projected season average farm price for all wheat was increased 20 cents per bushel on both ends of the price range, now estimated at \$7.00 to \$8.40 per bushel.

U.S. ENDING STOCKS (Million bushels) 2010-2011

	June	Avg	High	Low	May	2009-10
Corn	730	706	780	565	730	1,708
Soybeans	180	176	195	142	170	151
Grain sorghum	32	31	34	28	32	41
Wheat	809	842	868	824	839	976

U.S. ENDING STOCKS (Million bushels) 2011-12

	June	Avg	High	Low	May
Corn	695	771	950	520	900
Soybeans	190	170	214	124	160
Grain sorghum	32	34	39	29	37
Wheat	687	659	742	495	702

WINTER WHEAT PRODUCTION (Million bushels) 2011-2012

	June	Avg	High	Low	May	2010-11
All Wheat	NA	2,009	2,100	1,905	2,043	2,208
All Winter Wheat	1,450	1,392	1,447	1,305	1,424	1,485
HRW	777	743	777	690	762	1,018
SRW	434	417	440	385	427	238
White	239	234	242	225	235	229

WORLD ENDING STOCKS (Million metric tons)

	2011-2012		2010-2011	
	June	May	June	May
Wheat	184.26	181.26	187.12	182.20
Corn	111.89	129.14	117.44	122.19
Soybeans	61.59	61.85	64.53	63.81

WORLD PRODUCTION (Million metric tons)

	2011-2012		2010-2011	
	June	May	June	May
FSU-12 wheat	100.6	100.6	81.0	81.0
EU-27 wheat	131.5	138.6	135.7	135.8
Brazil corn	55.0	55.0	55.0	55.0
Argentina corn	26.0	26.0	22.8	22.0
Brazil soybeans	72.5	72.5	74.5	73.0
Argentine soybeans	53.0	53.0	49.5	49.5

Market Strategy

The overall impact of the June report is price positive for corn, neutral for soybeans, and bearish for wheat. However, as is the case with most USDA reports that are issued before planted acres become known, the report in and of itself will be considered by traders to be incomplete and tentative, particularly for corn and soybeans. Considering that corn is the current leader in these markets it is probably a good idea to hold off on advancing further sales, as long as pre-harvest sales objectives have been met. For those needing to catch up on forward cash sales this is a good time to make scale up sales. Currently, Dec '11 corn futures are trading at \$7.17; Nov '11 soybean futures at \$13.92; and July '11 SRW wheat is at \$7.58 per bushel.

For technical assistance on making grain marketing decisions contact Carl L. German, Extension Crops Marketing Specialist.

Announcements

New Castle County Small Grains Meeting

Monday, June 13, 2011 5:30-9:00 p.m.
Middletown UD Coop. Ext. Demonstration Site
Marl Pit Road, approx. 1 mile East of Rt. 301/71
Middletown, DE

- 5:30 **Sign-in**
- 6:00 **Tour Small Grain Variety Trial Plots** Bob Uniatowski
- 6:45 **Small Grain Disease Update**
Bob Mulrooney
- 7:00 **Insect Management Update for 2011**
Joanne Whalen
- 7:30 **Weed Control Issues to Consider**
Dr. Mark VanGessel
- 8:00 **Market Update**
Carl German
- 8:15 **Fertility Issues and Reminders**
Dr. Richard Taylor
- 8:30 **Refreshments and General Discussion**

Special Note: Bob Uniatowski will again be conducting the "Guess the Top Yielding Wheat" contest this year for NCC. The winner will receive 50 bushels of the wheat variety that comes out tops in the Middletown Wheat Variety Trials in 2011.

Please Join Us for a Summer Pasture Walk

Monday, June 20, 2011 6:00 - 8:00 p.m.

1201 Bullock Road, Harrington, DE 19952

(From Harrington: Route 14 West, go 1.8 miles. Turn right on Whiteleysburg Road, go 6.2 miles. Turn left onto Bullock Road. Michael Bullock Farm is on right.)

A summer pasture walk is being held by the University of Delaware Cooperative Extension for those interested in pasture management. Learn pasture management information including pasture nutrient needs, grazing management for livestock, identifying and controlling weeds, evaluating pasture stands as well as pasture establishment and maintenance. A variety of specialists from the University of Delaware will be on hand for discussion and to help answer your questions! This meeting is free and everyone interested in attending is welcome. Participants are encouraged to bring a lawn chair and comfortable walking shoes.

Please RSVP by calling (302) 730-4000 by **June 15th** or email Carol Hrupsa carolm@udel.edu.

Nutrient Management and CCA Credits will be available

If you have special needs in accessing this meeting, please notify Carol two weeks in advance. It is the policy of the Delaware Cooperative Extension System that no person shall be subjected to discrimination on the grounds of race, color, sex, disability, age or national origin.

2011 Weed Science Field Day

Wednesday, June 22 8:30 a.m.

UD Research and Education Center,
16483 County Seat Highway, Georgetown, DE.

The day will begin with **registration beginning at 8:30** at the Grove near the farm buildings and new office building on the north side of the road. We will start to view the plots at 9:00 am. Coffee, juices, and donuts will be provided. We will also provide sandwiches for lunch.

A variety of herbicide programs for conventional tillage and no-till are being evaluated. Many of the registered corn and soybean herbicides are being tested, herbicide evaluation for watermelons, weed control programs for snap and lima bean, and a number of studies with traditional soybean herbicide programs are included. Credits are available for Pesticide Credits and Certified Crop Advisors (CCA).

Weather Summary

Carvel Research and Education Center Georgetown, DE

Week of June 2 to June 8, 2011

Readings Taken from Midnight to Midnight

Rainfall:

0.08 inch: June 4

0.02 inch: June 5

Air Temperature:

Highs ranged from 95°F on June 8 to 77°F on June 5.

Lows ranged from 68°F on June 8 to 49°F on June 4.

Soil Temperature:

76.9°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
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 Crops*

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