AGRONOMY NOTES

UNIVERSITY OF FLORIDA
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DATES TO REMEMBER

August 3: Extension Row Crops Field Day, Jay, Florida.

IN THIS ISSUE

Cotton Nitrogen Needs

Late June or early July is normally the time to sidedress N on cotton. Cotton does not require as much N as many crops and the need is not as critical until the squaring to early bloom stage. Normally 50-60 lbs/A are required to produce a bale of cotton. However, depending on the soil and cropping conditions, there may be 20-50 lbs/A of nitrate N available in the soil and applications of 60-90 lbs/A of N may be adequate for 2-3 bale yields.

Sandy soils do require more N than heavier soils and it should be applied no later than the 3rd week of bloom. Sulfur is especially important on sandy soils and several hundred pounds per acre of cotton can be added with 30 lbs/A of S. Late foliar applications of N are not recommended unless boll set is poor and enough growing season remains to set a crop. Typically, late N applications only stimulate vegetative growth and prolongs blooming with little yield increase, if a good boll set occurred early.

David Wright

July and August are Bloom Time for Cotton

Much of the cotton that was planted in late April and early May should be blooming by early July and will continue to bloom through August. The early squares should be protected from insects and the crop should be irrigated to keep minimize water stress and square shed. Early boll set is very desirable since it helps slow vegetative growth and cuts the amount of growth regulators needed to control plant height. Plant bugs and stinkbugs need to be controlled in the July-August period since they may be coming out of small grains or corn that was cut for grain or silage and they are looking for succulent plants to feed on. Our research in the past has shown that fungicides applied during bloom period can result in yield increases, if flowers are still pollinating during high temperature and humidity periods. These fungicides may be applied with the insecticide applications for stinkbug control. Topsin M is the only fungicide labeled for this use at the current time. Bt cotton often protects the plants from feeding larvae, but does not provide effective protection from stinkbugs. Stinkbugs may need to be sprayed in early July followed by another one to three applications every two weeks as determined by scouting. Recent research in Georgia showed from 50-500 lb/A increase in yield by controlling stinkbugs in Bt cotton in July and August.

David Wright

Asian Soybean Rust Research

Florida has become a leader in research on Asian Soybean Rust (ASR) and there is a web site devoted to the disease and its spread (http://www.sbrusa.net/). The disease has not spread as rapidly as predicted from early models and the kudzu sites that were found to contain ASR have not had a high incidence due to the hot, dry weather this year. It is still early in the season, but if ASR spreads and the disease incidence is severe, fungicides will be recommended for control. Sentinel soybean plots have been planted in each of the soybean producing states and as of late June, only plots in Martin County Florida have tested positive for ASR. Counties will be notified as the disease appears and information will be passed on to county agents and growers as the disease gets close. If fungicide applications are required, these are not normally needed until bloom period which would be in July and August depending on planting date and maturity group.

David Wright and James Marois

How Herbicides Work – BASAGRAN

This is a monthly addition to Agronomy Notes that will cover the mode of action of various herbicides. Each month a different herbicide, or group of similar acting herbicides, will be covered. Currently, there are over 150 individual molecules that comprise several thousand herbicides. Simply stated, this will go on for a while. I will use the most popular trade name for reader familiarity in the title, but will refer to the actual compound name (or common name) in the text. I will use no particular order month by month, but will try to choose an herbicide that might be extensively used during that time of year.

Basagran, common name bentazon, is an herbicide that has been in use for over 30 years. It was first registered for use in soybeans and rice but has subsequently been expanded to cover a wide range of crops, including corn, dry beans, mint, peanuts, sorghum, potatoes, sugarcane, alfalfa and several types of turfgrass. This compound is unique because it is one of the few photosynthetic-inhibiting herbicides that have activity on nutsedges. It also controls several types of broadleaf weeds.

Bentazon is classified as a photosynthesis inhibitor. This herbicide is applied postemergence, over the top of both weeds and crops. It is absorbed by the leaves and diffuses into cells and then into the chloroplasts of cells. Chloroplasts are those green dots within the leaf cells as shown in figure 1. Basically, bentazon follows the same path as the arrow for sunlight.

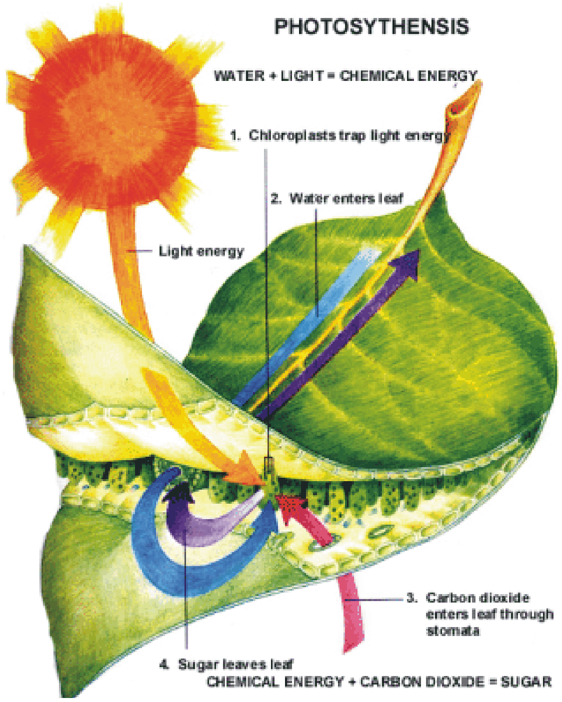

Figure 1 - Adapted from: www.caribbeanedu.com

Once inside the chloroplast, bentazon moves to the thylakoids, which are membranes within the chloroplast (Figure 2).

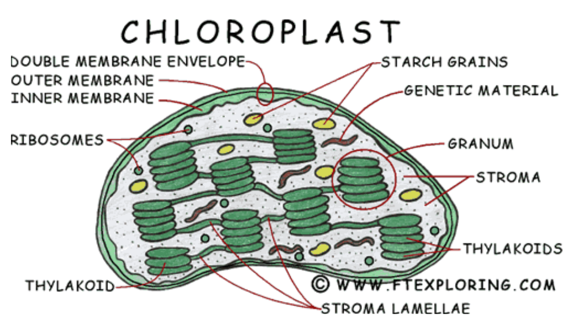

Figure 2 - Adapted from: www.ftexploring.com

Thylakoid membranes contain a series of complex proteins with figure 3 showing a cross-section of a thylakoid membrane. These proteins are embedded within the thylakoid membrane and function to capture light energy. This energy is captured in the form of electrons (e- in the figure below) and are passed through the proteins to form intermediates used for carbon fixation. Bentazon binds to a protein in photosystem II, thereby blocking the flow of electrons.

Figure 3 - Adapted from:
www.icb.ufmg.br

When this electron flow is blocked, intermediates are not formed and the plant cannot fix carbon. Without carbon, the plant cannot continue to grow and perform normal functions. In addition to blocking electron flow, another important problem arises within the chloroplast. Sunlight continues to shine and the chlorophyll molecules continue to absorb light energy. There are approximately 300 chlorophyll molecules feeding energy into each complex shown above in figure 3. With electron flow blocked by bentazon, the chlorophyll molecules cannot dissipate the energy absorbed from sunlight. Unable to dissipate energy, they self-destruct.

This cascade of events helps to explain the symptoms observed after applying bentazon. First, the plant begins to show yellowing of the leaves as the chlorophyll molecules disintegrate. Once the chlorophyll begins destruct, oxygen radicals are formed. Then the chloroplast membranes and eventually outer cell membranes become ruptured. This leads to necrotic tissue, taking on the appearance of a brown paper bag.

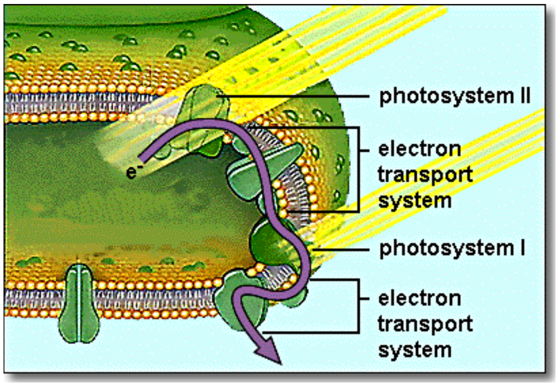

Figure 4 - Image from:
www.ridgetownc.on.ca/services/

Figure 5 - Image from:
www.omafragov.on.ca

Notice that the injury is local and does not appear on the new growth. Bentazon behaves as a contact herbicide and does not move up or down within the plant. Therefore coverage is essential for good control. In addition, an adjuvant is needed to aid in bentazon penetrating the cuticle on the lead surface. The images above are injury to soybean, and bentazon is labeled for use in soybean. Conditions such as high humidity, especially when using crop oil, may sometimes cause injury. Crops tolerate bentazon by breaking down (metabolizing) the herbicide into non-toxic by-products. Bentazon has limited soil persistence and possesses very little to no soil activity.

Greg MacDonald

Time to Start Thinking About Smutgrass Control

It's that time of year again. The rainy season is just beginning, and most everything is turning from brown to green, including our most troublesome grass weed – smutgrass. We get many questions each year concerning different cultural practices for smutgrass control. Should we mow, or burn, or anything?

We know that we can control smutgrass with Velpar. Currently, we recommend 3 pt/acre (0.75 lb ai/acre) for small smutgrass, and 4 pt/acre (1.0 lb ai/acre) for giant smutgrass. Why start thinking about smutgrass control now? Velpar works primarily through root uptake, meaning rainfall is needed to move Velpar into the soil solution so it is available for root uptake.

What about mowing and/or burning smutgrass before Velpar application? Simply speaking, there is no advantage or disadvantage to using these cultural practices before applying Velpar. Furthermore, mowing has been suggested to increase seed spread, and burning has been said to increase smutgrass seed germination. However, these practices will encourage grazing of these plants for 1 to 3 weeks and research has shown that smutgrass has similar forage quality to that of bahiagrass.

When is the best time to apply Velpar? The best time appears to be any time during the rainy season from July through September. Dr. Mislevy's work with small smutgrass showed similar control when Velpar was applied in late July compared to late September. Remember that rainfall is the key to smutgrass control with Velpar.

Do I need to apply an adjuvant with Velpar? This is a good question that we continue to evaluate. Most of the activity from Velpar comes from root uptake, however, there is some foliar activity. The addition of an adjuvant may aid in control if rain does not occur within a week after Velpar application. However, our data from 2005 indicates that the addition of an adjuvant did not increase smutgrass control compared to Velpar alone.

Smutgrass continues to be our most problematic grass weed species in pastures. Applying Velpar will control existing smutgrass plants for at least a year. Management of the pasture after Velpar application may be the key to long-term management of smutgrass. We are currently investigating best management practices for smutgrass control.

Brent A. Sellers

Weed Factsheets in EDIS

As we all know, EDIS is a great place to store useful extension information, but this information can be difficult to find. Additionally, it can be hard to keep track of newly written EDIS publications.

Below is a list of EDIS factsheets that have recently been written or updated for pasture weeds.

- Blackberry and Dewberry: Biology and Control
- Common Pokeweed
- Dogfennel (*Eupatorium capillifolium*): Biology and Control
- Fireweed (Heartleaf nettle) Control in Pastures
- Herbicide Application Techniques for Woody Plant Control
- Managing Bahiagrass in Hybrid Bermudagrass Pastures
- Thistle Control in Pastures
- Tropical Soda Apple (*Solanum viarum* Dunal) in Florida
- Wild Radish: Biology and Control

All of these publications are currently located in one convenient location: www.uflweed.com. By simply clicking on the "factsheets" tab and select "weeds", you will be directed to all these factsheets.

Jason Ferrell

Energy Impacts on Row Crop Farmers

Modern farming practices are impacted to a high degree from price of energy since almost every phase of farming depends on crude oil. Fertilizers and farm chemicals are manufactured through use of petroleum products. Tractors, trucks and harvest equipment all run on fossil fuels. Grain is dried and transported through use of these fuels. Drastic changes need to be made for farming to become less dependent on oil for growing crops. Using crops to produce oil may help growers meet energy demands. Some of the crops with high oil content that can be grown in the SE are soybeans (about 18% oil), peanut (about 48-50% oil), castor bean (about 50% oil), canola (about 35-40% oil). These crops and others may eventually make an impact on oil use in the U.S. However, the infrastructure is just being put in place for use of crops for oil and ethanol production. The longer prices for petroleum stays high, the more energy independent the U.S. will become through development of alternate energy sources.

David Wright

Summer Poses Storage Limitations to Pesticides

With the onset of summer, most think of hurricane season bearing down upon Florida. While hurricanes may wreak havoc on certain areas, soaring temperatures are experienced by the entire state. Extremely hot temperatures can adversely affect the storage life of pesticides – particularly those not stored in a temperature-controlled environment. Most labels of liquid pesticides that contain specific information on adequate storage temperatures for their products will generally state a temperature in the 40 to 100° F range.

What does heat do to liquid pesticides? Heat can cause some pesticides to volatilize and drift from their containers, especially if containers are not adequately sealed. Flammability is a problem with some products in the presence of heat and/or open flame. It is discussed in more detail in UF/IFAS EDIS Extension Document PI-97, "Pesticide Labeling: Physical or Chemical Hazards" http://edis.ifas.ufl.edu/PI134. High temperatures can also adversely affect containers, causing melting of plastic containers and glass to explode. The liquid pesticide contents in metal drums can cause expansion and eventual rupturing.

What does heat do to dry pesticides? Generally, dry pesticide formulations are not adversely affected by high temperature extremes. Their effectiveness is most often reduced by the presence of moisture in storage. These products have a high affinity for water and once absorbed, may solidify into hard masses (tombstone formation). The packaging that surrounds dry products formulated as water-soluble packets can become brittle after taking on moisture.

To learn of storage temperature limitations for individual products, consult the “Storage and Disposal” section of the pesticide’s label; some will have no limitations. Many products will have specific temperature limitations mentioned in this section; others may be more general. The UF/IFAS Pesticide Information Office recently published two guides that specifically address product storage limitations. Many fungicide products registered for use in Florida may be referenced by accessing “Storage Limitation Statements: Temperature – Fungicides” at http://edis.ifas.ufl.edu/PI159. Many herbicide products registered for use in Florida may be referenced by accessing “Storage Limitation Statements: Temperature – Herbicides” at http://edis.ifas.ufl.edu/PI160. Each publication contains tables with specific temperature and other storage statements taken from products’ labels. If you have questions regarding these limitations, consult the product’s manufacturer.

Fred Fishel

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