GAINES COUNTY IPM NEWSLETTER

Manda G. Cattaneo, Extension Agent - IPM
101 S. Main RM B-8
Seminole, TX 79360
(432)758-8193 office
(432)758-2167 fax

http://gaines-co.tamu.edu
http://www.tpma.org
http://ipm.tamu.edu
mgcattaneo@ag.tamu.edu

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General Situation

This cool wet weather means two things for our crops: Increased disease pressure and slower crop development. I have received reports of rain fall amounts ranging from 2 to 5+ inches. During the last week our maximum temperatures ranged from the high 60s to the low 80s. Our minimum temperatures ranged from the upper 50s to low 60s. This cooler wet weather is perfect conditions for disease development. *Sclerotinia*, V*erticillium*, and pod rots (*Pythium* and *Rhizoctonia*) continue to be found in several fields. Growers need to be diligent about scouting fields weekly or more often to monitor disease development.

Since *August 15th* we have accumulated 365 Heat Units (H.U.) on our cotton crop. So what does this mean for our cotton crop? Well it takes approximately 750 to 850 H.U. for a boll to mature. In other words we have accumulated approximately half of the H.U. required to develop those bolls which were flowers around *August 15th*.

Fall Armyworm Control in Grain Sorghum

Fall armyworms and bollworms (a.k.a. corn earworms) continue to be found feeding on sorghum heads. **Growers should continue scouting for headworms through the hard dough stage.** The fields that I have checked in Gaines County have a higher percentage of fall armyworms than bollworms. One thing to keep in mind is that fall armyworms are harder to kill than bollworms. This being said, if your field has a high percentage of fall armyworms than you may want to consider using a higher rate of a pyrethroid.

Growers who are considering adding **Lorsban** (for greenbug or sorghum midge) should note that there is a **30 day pre-harvest** interval for sorghum grown for grain, forage, fodder, hay or silage when Lorsban is used at the 1 pint (or less) per acre rate. There is a 60 day pre-harvest interval when Lorsban is used at a rate higher than 1 pint per acre. This information is from the *September 5th* edition of the *Focus on South Plain Agriculture*, reported by Dr. Patrick Porter.

***Figure 1*. This sorghum head is almost finished blooming. The top portion of the sorghum head has already bloomed and the yellow anthers are near the base of the sorghum head.**

Sorghum Growth and Development

Flowering typically begins when yellow anthers appear at the tip 5 to 7 days after panicle exertion. Over the next 4 to 9 days, anthers appear incrementally and develop down the panicle (See *Figure 1*).

After flowering, plant development centers on grain formation. Sugars, amino acids and proteins produced in the leaves and roots are rapidly transported to the kernel and converted to starch and protein. Seed development progresses from **milk** to **soft dough** to **hard dough** to **physiological maturity** over a 25 (under warm temperatures) to 45 (under cooler temperatures) day period after flowering, depending on variety and environmental conditions

(temperatures). Kernels reach their maximum size (volume) about 10 days after flowering – the **milk stage**. The seed is soft, and a white-like liquid is obtained when kernels are squeezed. The **soft dough** stage occurs 15 to 25 days after flowering, when approximately 50 percent of the grain weight is accumulated – the kernel can be squeezed between the fingers with little or no liquid present. As a rule of thumb, if good soil moisture is still available to the plant – at least 1-2" – then terminate irrigation near soft dough stage. The **hard dough** stage occurs when the grain cannot be compressed between the fingers. The seed is physiologically mature when a **black-layer** appears immediately above the point of kernel attachment in the floret near the kernel base. The kernel is approximately 30 to 35 percent moisture and attains its full dry weight when the black-layer appears.

Gaines County 2008 Grain Sorghum Crop Development

Like cotton, growers can use a **heat unit (H.U.) formula** to monitor grain sorghum development in relation to the amount of useful energy available to plants each day. However, grain sorghum can tolerate lower temperatures and uses 50 degrees as the base temperature in the formula (cotton's base temperature is 60 degrees). The following formula is used to determine the amount of heat units accumulated during a day:

H.U. = (daily max air temp + daily low air temp / 2) – base temperature

***Table 1*. Accumulated H.U. from planting to successive growth stages for a short season grain sorghum variety. The last column depicts the approximate date in which sorghum planted on July 1, 2008 in Gaines County accumulated the corresponding heat units.**

Growth Stage	Accumulated H. U. for short season varieties	Date July 1st planted sorghum reached corresponding H.U.
Planting		
Emergence	200	July 8th
3-leaf	500	July 19th
4-leaf	575	July 21st
5-leaf	660	July 24th
Panicle Initiation	924	August 1st
Flag Leaf Visible	1287	August 13th
Boot	1683	August 29th
Heading	1749	September 1st
Flowering	1849	September 5th
Soft Dough	2211	-
Hard Dough	2508	-
Black Layer	2673	-

Since *September 5th* we have accumulated an average of 19 H.U. per day. At this rate the sorghum planted on *July 1st* should reach the black layer stage in approximately 33 days.

Grain can be harvested at 20% moisture without mechanical damage but must be dried to below 14 percent. Grain can be harvested at **13 to 14% to avoid dockage** depending on the delivery point.

Harvest Aid Applications

Nodes above cracked boll (NACB) is a tool that can be used to time harvest aid applications. If the uppermost first position-cracked boll is within three nodes of the uppermost harvestable first position boll then no lint weight will be lost if a defoliant-type harvest aid is applied at that time.

However, if the uppermost harvestable first position boll is four or more nodes above the uppermost first position cracked boll, then potential for some lint loss exists. The lint loss potential increase as the NACB increases. Micronaire reduction generally follows a similar pattern when using the nodes above cracked boll criterion. When defoliant type chemical are applied, some slight subsequent fiber development may occur before defoliation. If applying desiccants, more bolls must be mature in order to reduce the risk of fiber weight loss or reduction of micronaire, thus two to three NACB would be a better target.

Harvest aids are basically classed in three categories – desiccants, defoliants, and boll openers. **Desiccants** (paraquat formulations such as Gramoxone Inteon, Firestorm, and various tank-mixes) dry down the plant by causing the cells to rupture. The old "rule of thumb" is that desiccants are normally applied when approximately 80 percent of the productive bolls are open, or at 2-3 nodes above cracked boll. Gramoxone Inteon and Firestorm are similar products that have paraquat as the active ingredient, however, they differ in the pounds of active ingredient per gallon. **Defoliants** (Ginstar, Def/Folex, Harvade, Aim 2EC, Blizzard, ET 2.5%EC, Resource, Dropp, FreeFAll, sodium chlorates, paraquat at low rates and other products) result in initiation of an abscission layer at the base of the leaf petiole where it attaches to the stem. The natural abscission layer formation process is enhanced by the defoliant, which results in leaf drop. In order to obtain maximum leaf drop, defoliants require fairly healthy and active leaves which still properly function and are not severly drought stressed (tough and leathery). **Boll openers** (Prep and other generic products such as Ethephon 6, SuperBoll, Boll'd) and boll openers-defoliants (such as Finish 6 Pro and FirstPick which are ethephon products with additional synergists cyclanilide and AMADS, respectively) enhance boll opening to allow for more timely harvesting of the crop. These chemical affect natural plant processes associated with boll opening, but do not increase the rate of boll or fiber maturation. This information was obtained from the *2008 High Plains and Northern Rolling Plains Cotton Harvest-Aid Guide*.

Cotton Lint Development

The greatest impact of premature crop termination and cold weather is not on seed but on lint. The primary effect on lint is on thickening rather than lengthening. Since fibers elongate before they thicken, staple length is minimally influenced by premature crop termination or cold pre-harvest weather. Additionally, fiber lengthening can occur at colder temperatures because the optimum temperature for lengthening is 10 degrees colder than for fiber thickening. Once fibers reach their final length they thicken with daily rings of cellulose. Unlike a tree that grows outward by depositing new rings on the outside of the previous year's growth, cotton fibers deposit new daily rings inwards. The daily rings alternate in direction as they fill in the hollow part of the fiber or lumen. When the lint is mature, the lumen is a small hallow core. The last stage of boll development starts with the formation of the abscission zone between the burs. Drying then causes strands in the boll wall or carpel to tighten and subsequently bend backwards opening the boll. As the boll opens, the lint dries and crimps due to collapse of the lumen and constriction in alternating layers of cellulose. Crimping of the lint causes it to fluff and intertwine allowing it to be spun into yarn. Boll drying can occur without leaves on the plant and under cold temperatures.

Cutting short the deposition of growth rings has several important quality implications. The most apparent effect is reduced maturity. With reduced maturity fibers, will be lighter and the 50 grain micronaire sample will therefore be composed of many more fibers. Thus air movement through the chamber will be reduced causing a low micronaire reading. This information is from the *Cotton Physiology Today Newsletter*.

Information for this newsletter was obtained from the following publications:

- *Cotton Physiology Today*, Newsletter of the Cotton Physiology Education Program – National Cotton Council, October 1989.
- September 5, 2008 *Focus on South Plains Agriculture*, Volume 47, No. 16
- Texas AgriLife Extension Service, "2008 High Plains and Northern Rolling Plains Cotton Harvest-Aid Guide"
- Texas AgriLife Extension Service, "Sorghum Growth and Development"
- Texas AgriLife Extension Service, " Texas Peanut Production Guide"
- Texas AgriLife Extension Service, "Managing Cotton Insects in the High Plains, Rolling Plains, and Trans Pecos Areas of Texas"

These publications can be found on the web at http://agrilifebookstore.org

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