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IN THIS ISSUE

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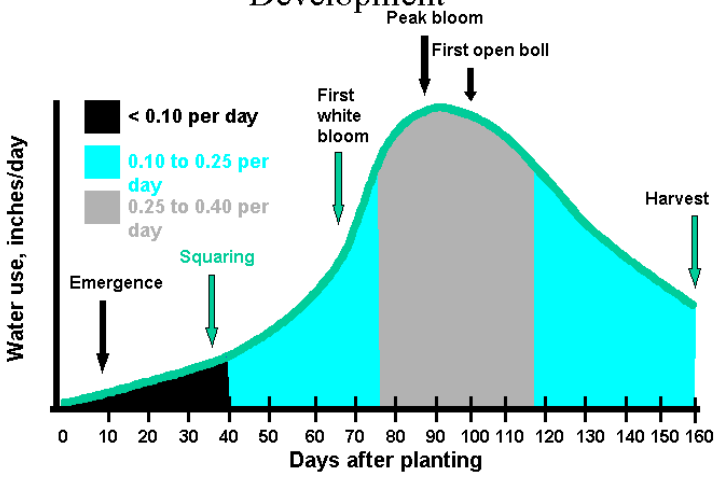
COTTON SITUATION UPDATE

Continued hot, dry weather conditions are putting the crop into stress. We haven't had an area wide rain event for a month. Sure, we have had scattered showers in some areas recently, as much as 2 inches in some cases, but this has not provided much relief to most of the crop.

The dryland crop stands to lose the most if not receiving relief real soon. Plentiful June rains provided excellent startup conditions for the dryland crop but also produced two undesirable side effects---a shallow root system and a plant with a greater leaf surface area and fruit load than it can handle under moisture stress conditions. I expect the promising dryland crop to start falling apart soon if rain doesn't bless us with its presence quickly. The only positive side to this situation is that much of the dryland crop is late and therefore not in its peak water demand period. This will change quickly as more of this crop enters bloom and rushes toward peak bloom.

Rate of Water Use In Relation To Cotton Development



The irrigated crop isn't immune to moisture stress either. Poor economics have tended to encourage many producers to delay or even withhold some crucial irrigations. This will cause premature cutout and significantly reduce yield potential. Once cotton plants are moisture limited they will have a hard time regulating their temperature during our hot, dry days. This will severely limit development.

Is the late crop catching up? It sure looks good from the road but a walk in the field will reveal just how late some of this cotton really is. Hot, dry conditions have pushed this crop to the limit, as long as moisture was available. But you can only push it so far. Fruit development can be delayed by certain

conditions such as cold temperatures but optimal conditions will only result in typical boll development times. COTMAN would indicate that a flower the end of July would have a 50% chance of making a quality boll for harvest in the northern areas (Dimmitt, Hereford) of the High Plains. This date would move later to the end of the first week of August for the central area (Lubbock, Plainview) and the end of the second week of August for the southern areas (Lamesa, Seminole). Older bloom tagging studies by USDA scientist Don Wanjura indicated August 10th as the last bloom day for the north, August 15 for Lubbock and August 20 for Lamesa. Forget about those September 1 blooms.

Even if we make a few bolls in these late fields, we are not looking at exceptional yields. Some fields will be lucky to get 1-3 weeks of blooms matured to harvestable bolls. This will produce below average yields (under good moisture conditions). What does this all have to do with insect management? Well it means we don't need to be protecting fruit that won't contribute to yield.

Northern producers should not worry about protecting squares after this week. Central High Plains producers have one week and southern High Plains producers two weeks to worry about square protection. Bolls will need protection for at least 250 heat units (HU) past last effective bloom dates for Lygus and 450 HUs for bollworms. After this the crop is insect safe. See our Managing Late Cotton publication for more information.

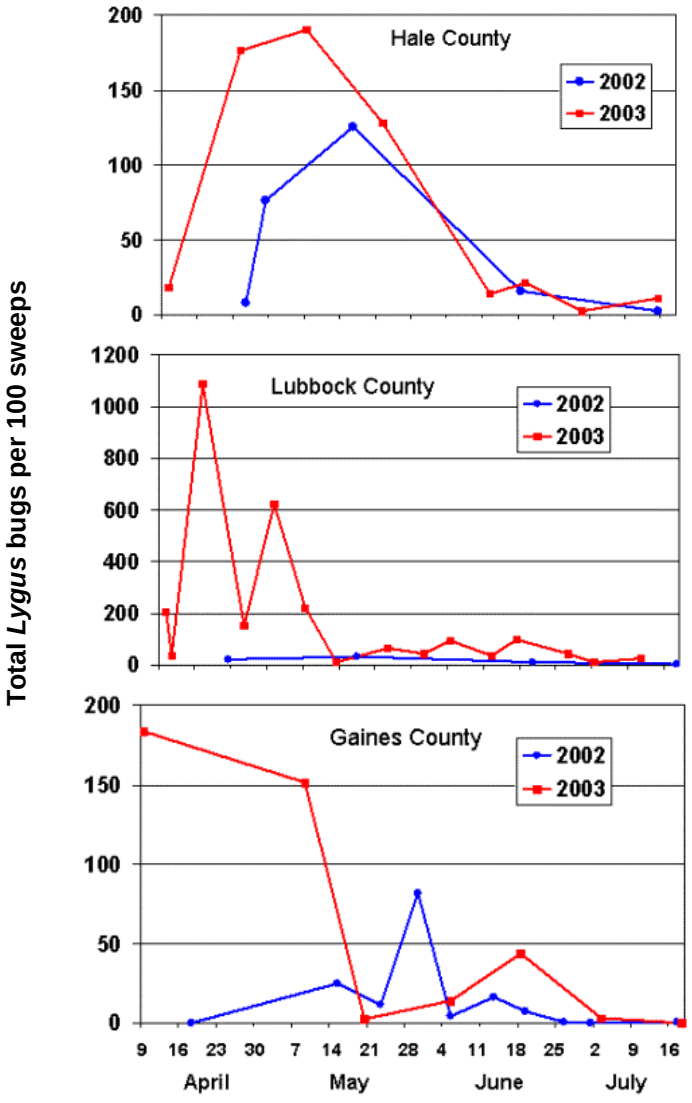
The insect activity increased this week. As with previous weeks, pest numbers have been increasing more incrementally rather than in big steps. There have been peaks and valleys but these have not been very big.

The bollworm egg-laying flurry has increased this week with more eggs found in fields, especially south of corn growing areas. Heat and beneficial insects are still helping us out a lot. But watch out for older fields once canopy closure occurs. Survival from heat will be much higher here. Late planted cotton fields will also need to be watched. These are just beginning to bloom and have really no time left for damage compensation. Bollworms that survive will consume lots of squares in the absence of bolls. Damage and loss could be extensive if enough caterpillars survive the heat.

Beet armyworm activity is up in some fields in the central High Plains but again heat and beneficial insects are taking their toll. Much of this activity is in stressed fields. According to Lubbock County IPM Agent Brant Baugh, most feeding damage is to squares in young cotton with more leaf feeding in the older cotton. Intrepid would be my insecticide choice if needed but remember that another insecticide would be needed if bollworms were in the treatment decision.

Cotton fleahopper and Lygus bug numbers have been quite high in a number of fields but fruit retention has also remained high. Thus far, square retention has averaged above 85% for the most part as fields enter bloom. It is

hard to get excided about bugs under these conditions. With our generally late crop, it is also hard to get overly aggressive when our insect-safe yield potential is more than our growing conditions can support. In general I would stop worrying about protecting pinhead-size squares and fleahoppers. Lygus on the other hand do need to be monitored closely. Some rather large numbers have developed in several fields and many of these required treatment.



Number *Lygus* collected from hosts other than cotton.

Low level cotton aphid infestations remain in most fields but have yet to become a problem. High numbers of natural enemies and heat mortality are limiting their population development.

Boll weevil trap catches are at very low levels or have declined significantly. Since much of our cotton is blooming, traps are no longer as attractive as our cotton fields. But this is the lull before the storm. Later, as more fields cut out, traps will again start picking up more of these previously "hidden" boll weevils and spraying activity will increase.

Average accumulative number of boll weevils caught per trap through the week ending July 27.

Zone	2003	2002	2001	2000
Northwest Plains	0.00001	0.0001	0.0111	0.1319
Western High Plains	0.00001	0.0003	0.0175	0.4905
Permian Basin	0.0023	0.0001	0.0169	0.5229
Northern High Plains	0.00005	0.0038	-------	-------
Southern High Plains	0.00003	0.0023	-------	-------

My only concern about eradication in our area remains the Permian Basin zone. Trap catches are falling off but activity remains at levels we saw in the Northern High Plains and Southern High Plains zones their first full season program year. It may take more than a season to undo the problems we had with the program in the Permian Basin last year.

I have included two new tables this week to provide maybe a clear picture of actual boll weevil trap activity in our five zones. The first table provides historical trap catches for 6 previous weeks and will not appear again. The second table provides the latest week's actual trap catches and the number of traps inspected by zone. I hope this information helps you visualize the boll weevil situation more clearly. **JFL**

Total number of boll weevils trapped by week and zone. Texas High Plains. 2003.*

	Week ending					
Zone	**7/20**	**7/13**	**7/6**	**6/29**	**6/22**	**6/15**
Northwest Plains	0	2	0	0	0	0
Western High Plains	0	0	0	0	1	1
Permian Basin	60	167	171	201	500	101
Northern High Plains	1	3	8	6	6	0
Southern High Plains	1	3	4	5	12	1

*Unequal trap inspection numbers between dates and zones does not allow direct zone comparisons.

Total number of boll weevils trapped the week ending July 27, 2003 Texas High Plains.

Zone	Number of traps checked	Total number boll weevils
Northwest Plains	42,019	1
Western High Plains	75,691	0
Permian Basin	87,530	35
Northern High Plains	64,294	1
Southern High Plains	146,616	2

COTTON RESEARCH BRIEFS

Why are cotton aphids not distributed uniformly throughout the field? Irrigation water level is one of the many physical factors that affect aphid abundance in the field, with the high water level supporting significantly higher aphid numbers compared to supplemental and deficient irrigation water levels. A study at the AGCARES farm in Lamesa showed that the irrigation water level significantly affected leaf water content of cotton plants. The high level of irrigation water (watered at 100% ET) resulted in significantly higher leaf moisture content than the supplemental (75% ET) and deficient (50% ET) water levels. Cotton aphid abundance was significantly correlated with the leaf moisture content. Together, these results indicate that irrigation water level has a significant influence on cotton aphid population dynamics, mediated through differential leaf moisture content.

Leaf nitrogen content was significantly influenced by nitrogen treatments. Cotton plots that received 120 lbs per acre nitrogen had significantly higher aphid numbers than the plots receiving zero nitrogen. Average leaf nitrogen contents were 3.5 and 3.1% on 120 lb and no nitrogen treatments, respectively. The correlation between leaf nitrogen and cotton aphid abundance was not significant. However, there appears to be an interaction between leaf moisture and leaf nitrogen in influencing cotton aphid abundance. Although a cotton field looks uniform, there is a tremendous within-field variation in nitrogen availability and soil moisture, resulting in plant quality variation. That is, some plants have a higher level of moisture and nitrogen than others, and that's where we believe aphids begin to colonize and then disperse through the field as their population increases. Skippy stands can also affect a plant's nitrogen and leaf moisture level.

Because of this inherent variability between plants and areas of plants within a field, sampling aphids for control decisions must be done across the entire field. This form of sampling is necessary to capture the natural clumping that takes place with most insect infestations (aphids, bollworms, Lygus, etc.). Only at the highest density levels does this clumping begin to disappear. **MP**

SORGHUM AGRONOMY

The crop needs a drink right now! Many of us have assumed with the ample soil moisture that we would be in good shape for a while, even if we planned to irrigate grain sorghum at a later date. However, numerous Panhandle and South Plains fields we have observed now appear to be very dry in the top 9" to even 12". Hot weather has made this condition worse. Normally we think that sorghum can reach the boot stage of development with minimal stress simply from stored soil moisture. However, 100° F days have caused the top 12 " or so of soil to dry out. The roots have not had time to grow enough to take advantage of deeper soil moisture. This problem appears exacerbated, at least in the South Plains, by soil compaction that may have occurred under the gauge wheels in several cases. The problem appears to be less with sorghum replanted with a traditional buster planter. In some cases compaction and quick drying along the disk openers has lead to 'ribbon roots' for sorghum up and down the seed furrow (see below).

When sorghum is suffering from water stress the first symptom is rolled leaves. If this symptom is present in young grain sorghum water must be received quickly. We suggest that producers consider at least 0.75". If the depth of dry dirt appears to be more than 8-9", then at least 1" is recommended. For growers who have limited irrigation available or who had simply planned to use limited but timely irrigation at key stages of growth and development, we suggest that it would be appropriate to "borrow" from future irrigation in this situation. In addition, if soil compaction is also present, immediate irrigation may help additional sorghum roots penetrate the compacted zone.

Sorghum switches from a vegetative to a reproductive state at about 30-35 days after emergence. Stress at this time can severely reduce yield by reducing the potential number of spikelets (flowers) that will be present later at heading. This switch from a vegetative to a reproductive state usually occurs at about 7 to 8 mature leaves, or when plants are about 12-14" tall. Irrigation to relieve drought stress at this time will retain the capacity of the growing point to set a high number of spikelets, which then can lead to a higher number of flowers. Water stress as well as minimal nutrient status at this time will reduce, often considerably, the size of head the sorghum plant can produce.

Water and sorghum yield potential—managing irrigation timing. The following comments borrow heavily from "Grain Sorghum Irrigation for the Texas High Plains," a draft sorghum irrigation document prepared by Professor Leon New, Texas Cooperative Extension Irrigation Specialist, Amarillo:

Research by Leon New and others such as Dr. Dan Krieg, Texas Tech University, indicates that it generally requires about 6" of soil moisture, rainfall, or effective irrigation to bring a typical grain sorghum crop to the point of grain production. Note that this fact is an additional reason to target limited sorghum plant populations on dryland fields. A lower plant population of sorghum in dryland fields might require 1" or even 2" less "vegetative water" before additional water contributes to grain yield rather than maintaining a too-high number of plants. This is one reason why we often see lower plant population grain sorghum crops out yield higher plant population fields in drier years. When water is limited what water you have matters more on a relative basis!

Further research suggests that grain sorghum irrigation normally produces about 350 to

perhaps as much as 450 lbs./A additional grain sorghum yield per 1" of irrigation. This of course depends on the hybrid, timing of irrigation, and method of application (furrow irrigation vs. spray vs. drag hoses, etc.).

The most critical stage of irrigation for maximizing grain sorghum yield is boot stage, followed by flowering and then grain fill. We have sometimes stated, perhaps too simply, that "if you could water grain sorghum only once, then water at boot stage, in advance of flowering and grain fill". The caveat to this, however, is that this is the optimum time for irrigation provided you can get to that point without undue moisture stress. We are seeing that this might not be the case in 2003. What will boot stage irrigation be worth if our crop is heavily stressed in mid- to late July near growing point differentiation? Certainly less.

As Leon New notes, sorghum is a drought tolerant crop and it can tolerate short periods of drought stress, but extended moisture stress will slow any plant's growth and development and reduce yields, especially during critical growth stages. Grain sorghum can preserve a degree of yield potential relative to most other crops hence its suitability in dryland production and its responsiveness to even limited but timely irrigation.

Sorghum water use is highest just before and during boot stage. Higher plant population sorghum crops may require as much as 3 or 4" of moisture in a 10-day period for unrestricted growth. Depending on maturity this period of water use may commence 40 to 50 days after emergence. As noted above, boot stage irrigation prepares the plant for heading and the yield-potential determining stage of flowering. According to Kansas State University's "How a Sorghum Plant Develops" (available at http://lubbock.tamu.edu/sorghum/) water use declines as grain filling begins, and as sorghum reaches mature size in terms of biomass. The early soft dough stage has minimal water requirement. If soil moisture is good as the grain sorghum crop reaches soft dough then nominal response to additional irrigation is expected. This may coincide with the general development of grain color over the field. If the sorghum plant is stressed during grain fill, seed size will likely be smaller and grain on branches of the head may not develop.

Miscellaneous rules of thumb for sorghum irrigation. Having discussed growth stages, optimum irrigation and timing, etc. here's a few additional points to remember:

If you are having doubts about whether to start watering, ask for help making your decision. Your doubts are probably based on low soil moisture and heat. How does the crop look at 4:30 PM in the afternoon in late July or August? Does it appear to recover near sunset? If you continue to have doubts and there is no favorable forecast for rain in the next 5 days you are probably justified in irrigating sooner rather than later. Keep in mind that if you start a pivot for irrigation today because your sorghum appears stressed, some of your crop won't get irrigation for 2-3 days as the pivot makes its way around the field.

Furthermore, if you have substantial inputs such as fertilizer on your ground, you could be losing some of that fertility's potential to foster yield if you are withholding key irrigation.

A rock-solid commitment to only low maximum amounts of irrigation "no matter what" in limited irrigation sorghum production will probably limit your economic return. Potential yield response in limited but timely irrigation will generally be higher than in full irrigation. You can bank on that. **CT**

ALFALFA WORKSHOPS

Alfalfa production is the focus of three August half-day regional workshops scheduled on the Texas High Plains. The times and locations are:

August 7th, Lamb Co. Ag. Expo. Center, U.S. 385 two blocks north of U.S. 84, Littlefield (Contact: Kent Lewis, Lamb Co. Ag. Ext. Agent, 806-385-4222)

August 12th, Dawson Co. Community Bldg., South 8th and Houston, Lamesa (Contact: John Farris, Dawson Co. Ag. Ext. Agent, 806-872-3444)

August 13th, Bar-H Restaurant, 1010 East Hwy. 54, Dalhart (Contact: Mike Bragg, Dallam Co. Ag. Ext. Agent, 806-244-4434)

Registration begins at 8:00 AM. The program, organized by Texas Cooperative Extension, begins at 8:30 AM and will conclude at 1:00 PM. Topics include variety selection, fertility, irrigation, weed control, and entomology. A field visit will review insect scouting techniques and discuss insects present in the field. In addition dairy and custom hay industry personnel will share observations on achieving desired hay quality. All participants will receive a book of alfalfa publications from Extension, Alfalfa Council, etc. As lunch will be provided, pre-registration is recommended one day in advance. A $10 registration fee will cover cost of materials. 2.5 CEUs (1.0 in IPM) will be provided. **CT**

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