

# FOCUS on Entomology

For South Plains Agriculture

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## **COTTON INSECTS**

Recent rains will help late sprinkler irrigators and wash away any aphid honeydew present on open bolls but could pose some problems down the road. Fields with cotton not fully loaded with fruit may produce excessive regrowth, which not only can affect harvest aids and harvest but also could provide a late substrate for aphid population development. This could lead to a sticky cotton problem. I'm not saying August 30, 2002

this will happen or that it is even likely to happen but I am saying to be prepared if it does develop.

The "bug" season is all but over for High Plains cotton farmers. Continued high temperatures, and moisture stress in some cases, has resulted in rapid boll opening. Most fields planted in a timely manner not only have accumulated over 450 heat units since physiological cutout, but also are within striking range of hitting the 850 HU level needed for timing harvest aid applications. The only problems left are late fields and fields in pink bollworm infested areas where over 600 HU's will be needed to "safen" the bolls. This information all comes from a crop-monitoring tool known as COTMAN. We have conducted extensive research to validate and tweak COTMAN since it was developed in Arkansas several years ago. There is still some work to do to fine tune this tool but the present version is probably the best simple monitoring tool we have at our disposal. COTMAN also provided the best graphical representation of the data you collect which in turn makes it easier to interpret your results and make sound management decisions.

**Bollworm moths continue to lay eggs in the lusher fields** but egg numbers are much reduced compared to previous weeks. That does not mean we are no longer catching very many moths, because we are! Dr. Megha Parajulee's trap catches are 742, 900, and 1225 per week for traps in Hale, Lubbock and Gaines counties, respectively for the week ending August 19<sup>th</sup>. Survival has also dropped off, especially in fields that are wilting during the mid-day heat. There is an old rule of thumb that states that when there are less than an average of 5 squares per foot of row, bollworm infestations can no longer become established. Once this square density is reached, harvestable bolls are generally safe anyway. At this time of year, we often find bollworm moths laying eggs on flowers and even dried bloom tags. This makes scouting very tough. Remember that once bollworms gain some size feeding on smaller fruit, they can now attack larger bolls that would normally be considered "safe". Safe is a relative term and applies to <sup>1</sup>/4" or smaller worms, not the larger ones.

There has been a rash of reports of control problems with bollworm-infested fields treated with one of the pyrethroids. These reports have originated in Terry, Hockley, Lamb, Lubbock and Hale counties. No one pyrethroid brand has been implicated. Surviving worms have been examined in many instances but all have been cotton bollworms and not the pyrethroidresistant tobacco budworm. Is resistance implicated here? There are a number of plausible explanations for some of these control failures including: distribution of infestation in mainly unexposed locations, insufficient spray volume, too windy during application, and rain wash-off issues.

But there also could be some tolerance developing in our populations as well. This isn't the first year I have heard these concerns expressed. I plan to contact our toxicologist at Texas A&M University and see whether we can implement a resistance-screening program next year, subject to funding of course.

I will say that we are catching a lot of tobacco budworm moths in Lubbock County traps (ranging from 110 to 242 per week during the period 7/29 through 8/19). Hale County traps are only catching 17-64 per week for the same period and Gaines County traps, 17-108. So far this increased trap catch has not translated into increased worms in fields, at least not the ones we have dealt with.

There have also been several instances where Bollgard variety-planted fields needed help with bollworm control, requiring an application of a foliar insecticide. This is not unheard of, especially when bollworms infest older cotton. Also, if the bollworm egg lay is predominately on flowers and dried bloom tags and larvae feed into the boll, you can expect less than satisfactory control from a Bollgard variety. Toxin expression may not be high enough in older leaves or flower parts.

Like bollworms, beet armyworms and fall armyworms are hanging around like unwanted relatives. Trap catches of beet armyworm moths continue to run high the week of August 19; 224 per week for Hale County, 708 for Lubbock County and 337 for Gaines County. Actually, infestations of these two species of armyworms appear to be the most problems around the Lubbock area while bollworm problems remain the focus up in corn country. Intrepid continues to be my choice for armyworm control in general. Both fall armyworms and bollworms will still focus on fruiting forms but beet armyworm feeding at this time of year often involves boll bracts and grazing on the outside surface of the boll wall. Insecticide selection will be important when addressing these three caterpillar species, especially if bollworms and armyworms are mixed in together.

I am providing a chart of insecticide performance on caterpillar pests that was developed by a group of research and extension cotton entomologists at the National Cotton

Insecticide	Bollworm	Budworm	Beet armyworm	Fall armyworm
Pyrethroids	Good +	Poor -	Poor -	Fair
Tracer	Fair	Good	Good -	Fair +
Denim	Fair	Fair +	Good	Fair +
Steward	Fair +	Good -	Good	Fair +
Intrepid	Poor +	Poor +	Good +	Good -
Bollgard	Fair	Good +	Poor +	Poor +
Bollgard II	Good	Good +	Good	Good

# **Caterpillar Control Rating**

Pest Management Seminar held each year in October. We revise the chart each year. I think you will find it useful in devising your control strategy for caterpillar pests of cotton.

# Most aphid infestations have declined

**precipitously** the last 10 days. Some fields have had good predator activity, mainly from lady beetles and lacewing larvae. Parasitism has been unusually high in some

instances too. The parasitic wasp is the same one we find in grain sorghum. In recent years we have had very little movement of this wasp out of sorghum and into our cotton fields. This year has been different. This wasp lays its eggs in the aphid itself. A wasp

grub develops in the aphid resulting in a tan, swollen mummy. If you find a hole in this mummy then the wasp has emerged as an adult already. A rule of thumb would be if mummies represent 20% of the aphids counted in a field, then it probably will be unnecessary to control the infestation.



#### Aphid mummies

There were many more fields in which this "crash" in numbers occurred without the help of weather or natural enemies. None of us have an explanation for this. But we will take the benefit in spite of the mystery.



Twice-stabbed lady beetle adult



Lacewing larva drinking from leaf nectory

My only concern with aphids now would be if they persisted into the boll-opening period. This could result in sticky cotton problems at the mills. I have heard no reports of any

> problems at this time and the fact that most infestations have declined, natural enemy numbers are increasing and honeydew-rinsing rains have occurred recently leads me to be optimistic about this situation.

# **Lygus bugs have remained spotty across the area** with really no

changes over the past week. There are fields out there that have experienced Lygus bug problems but they have been few and far between. If you've had one of these fields, you know how tough it can be managing this pest. Orthene for non-migrating situations and one of the pyrethroids for migrating scenarios would still be my picks. You will need the pyrethroid residual activity for fields under

constant pressure. Most of the problem fields have been near CRP acreage, implicating them as a source of the problem. Unless you are dealing with a late field, I would think the threat from Lygus bug damage is basically over. Bolls are pretty safe after they have collected 350 HU's past white flower.

### **Pink bollworm trap catches continue to escalate south of Lubbock** to levels that indicate a potential threat to adjacent cotton fields. Traps averaging 50 moths per day are a harbinger of damaging field infestations. Most activity has been in the Gaines County and surrounding area. A Foundation trap caught

350 last week in the Tahoka area. Crop consultant, Dana Palmer, reported a field with as much as 50-60% of its bottom crop damaged from pinkies. He speculated that this was from an early August cycle. This could mean an even heavier wave as we enter into September. Remember that bolls up to 30 days or so old can be vulnerable to pinkie damage. This would represent over 600 HU's past white flower.

The boll weevil eradication program trap catches have remained static this past week except for the Permian Basin Zone where numbers went up slightly. Weekly trap catches have remained at very low, stable levels except for a little blip for the Western High Plains Zone last week and the Permian Basin zone this week. Make sure you notice that the numbers on this chart are per 10,000 traps checked, not per single trap. The numbers were so small I needed to make this adjustment for visual purposes.



Accumulative trap catches for the five zones continue at very low levels. Instead of a table presenting this data I have elected to show you a more dramatic bar chart. This chart speaks louder than words (see chart at top of this page.)

Sprayed acreage was down in the Northwest Plains and Southern High Plains zones, remained about the same as last week in the Northern High Plains and Western High Plains zones, but increased significantly in the Permian Basin Zone (remember the increased weekly trap catch here). This probably is a



reflection of the dryland crop "burning up" and leaving fewer fields for weevils to feed in. This

would have resulted in a wholesale movement of the local boll weevil population. **JFL** 

Acres sprayed this past program week (ending August 25, 2002) and accumulative acres sprayed to this date.

Zone	Week ending 8/25	Accumulative	Acres in zone
NWP	202	9,511	480,217
WHP	1,768	46,151	694,501
PB	5,449	18,255	479,414
NHP	13,690	149,991	441,655
SHP	9,328	305,730	1,197,507

#### **COTTON AGRONOMY**

**Overview.** During the month of August, our temperatures have been considerably above normal (see graph on next page). We are now running nearly 110 DD60s above normal for August (618 for 2002 vs. 508 for the long-term average). Seasonal total heat unit accumulation has been about 2094 for Lubbock for a May 1 planting, based on National Weather Service data, which is considerably above the 1934 DD60s for the 30-year long-term average.



Some additional significant regional rainfall occurred across the region Thursday morning.

Areas that received rainfall obtained anywhere from a few tenths up to about 2 inches. Again, the dry-slotted "L" region (Cochran, Yoakum, Gaines, Terry, and Dawson) generally missed the rainfall. With the good rainfall obtained in places, some producers are shutting pivots down in fields that have open bolls. Again, it appears that we are heading toward another early harvest for many fields in the region. Bolls have been opening for the last several days in many fields across the area, which means that the harvest-aid run is just around the corner."

Finishing irrigation. Daily crop water use values as determined by the Reference ET Network have been about 0.25 to 0.30 inches per day across the area for the last few days. Once we get into September, hopefully, the crop will begin using about 0.20 inches per day, or about 1.4 inches per week (0.20 x 7 days). The value of continued center pivot irrigation after bolls begin to open is probably questionable, unless record high temperatures and high reference ET is encountered and the field has a depleted profile and late boll load. Generally, we can observe about 2-5 percent boll opening per day once bolls begin to open. This implies that if the last irrigation is made at a few percent open bolls, then it should take about 10 days to reach 30-60 percent open bolls. With the depleted soil profiles in many

fields that have missed the rainfall, the rate of boll opening may be on the high side this year.\_

Where are we with accumulated heat units after cutout? Identification of cutout is one of the key components of COTMAN for determination of insecticide termination and crop termination. COTMAN uses 850 heat units past bloom as a point at which a bloom can make a "normal" boll. In the High Plains, heat unit accumulations of 750 past bloom will probably make an "acceptable boll" that may not have "normal" lint production or may be of lower quality (low micronaire).

The following table indicates where we are as of August 28. It is based on actual Lubbock heat units from August 1 through 28, and from that point forward, it uses the 30-year longterm average for each day. For example, the table shows that for a field that reached cutout (here defined as 5 NAWF) on August 1, we should have obtained 350 heat units by about August 18. For the 450 total, it should be around August 21. For cutout at August 10, we obtained 350 heat units by August 25, and should hit 450 heat units by August 30. This table also indicates the likelihood of obtaining maturity of late season bolls.

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James F. Leser, Extension Entomologist, Lubbock Randy Boman, Extension Agronomist, Lubbock Calvin Trostle, Extension Agronomist, Lubbock DD60 heat unit events based on date of cutout (5 NAWF) and actual Lubbock August 1-28, 2002 temperatures with subsequent long-term average values for the remainder of the season.

	Date When Crop Achieved Cutout (5 NAWF)						
DD60 Heat Unit Accumu -lation	Aug 1	Aug 5	Aug 10	Aug 15	Aug 20	Aug 25	
+350 HU (safe from lygus)	Aug. 18	Aug. 21	Aug. 25	Aug. 30	Sept. 7	Sept. 16	
+ 450 HU (safe from bollworm egg lay)	Aug. 21	Aug. 25	Aug. 30	Sept. 6	Sept. 15	Sept. 27	
Total HU through Sept. 30	999	909	805	711	590	475	
Total HU through Oct. 15	1085	996	892	798	677	541	
Total HU through Oct. 31	1131	1041	937	843	722	586	

Since it appears that we are again in a warmer than normal late summer (at least thus far), it is possible that the targeted maturity levels (750 and 850 heat units past NAWF=4) will be obtained earlier than projected using the longterm data after August 28.

#### **2002 High Plains Cotton Harvest Aid Guide.** The **2002 High Plains Cotton Harvest Aid**

Guide has been updated with only minor changes to the 2001 model. The only real changes that have occurred are related to the FMC Aim 2EC product. Last year, this product was available as Aim 40DF, a dry flowable

formulation. The equivalent active ingredient for 2/3 oz of 40DF is now 1.0 oz of the Aim 2EC. We will be working with this material this harvest aid run and hopefully will have more info as we get into the season. Aim 2EC belongs to a new chemical class (protoporphyrinogen oxidase inhibitor or POP). Aim 2EC causes disruption of cell membranes, which in turn triggers increased levels of ethylene in leaves. Recent research trials have indicated that Aim 2EC at lower rates (1.0 oz/acre) is an effective defoliant. To obtain adequate desiccation, a sequential Aim EC or paraquat-based material treatment may be required. Aim 2EC can be tank mixed with other defoliants, desiccants, and boll opening materials. A 1% volume/volume crop oil concentrate (COC) is needed for the spray mixture.

**Estimating Lint Yields**. Dr. Will McCarty, Extension Cotton Specialist at Mississippi State University, has developed an excellent publication on yield estimation. It was previously available at another website, but you can <u>view it here</u>.

Basically it indicates that it takes about 155,700 normal bolls (High Plains average of 4.0 g seedcotton/boll = 1.4 g lint assuming a lint percent for seedcotton of 35%) to produce a 480-lb bale of cotton. This is equivalent to about 325 bolls/lb of lint. For 40-inch rows this calculates to 11.9 bolls per row-ft for a one bale/acre yield (155,700 bolls/13,068 rowft/acre for 40-inch rows). This is very close to the "one boll per inch = one bale per acre" number that many folks use to estimate yields in 40-inch rows.

To help determine a "worst case scenario" I checked the report from our 1998 High Plains Cotton Survey we conducted for Plains Cotton Growers and which was submitted to FCIC and USDA-RMA. One of the worst locations (in terms of boll size and lint yield) was the Lamesa dryland replicated variety test site. It averaged about 480 bolls/lb of lint across several varieties. This implies that it would take about 230,500 bolls/acre of that size (about 2.7 g seedcotton/boll) to produce a 480lb bale of cotton. This works out to about 17.6 bolls per row-ft for a one bale per acre yield. It is possible that the numbers could be worse, but I still think this may be a good number to use for a worst-case scenario. The highest number of bolls/lb of lint for dryland samples in the survey was just over 600. This translates to 288,000 bolls/bale, or 22 bolls/row-ft in 40inch rows. **RB** 

### WHEAT VARIETY SELECTION AND AGRONOMICS

With August 29<sup>th</sup> rains improving soil moisture, producers looking to plant small grains for forage production will be seeding soon, especially north and east of Lubbock. In past years, some producers plant in August, often when temperatures are still hot. I do not believe that these early plantings, in spite of the rush to get early grazing forage, produce more economical forage because of their higher water use even if irrigated.

Insect and disease considerations. Greenbugs have been our small grains' worst enemy too much of the time. Many producers have successfully used TAM 110, one of our best all around wheat varieties, to combat greenbug (biotype E, I, and K) infestations in both fall and late winter/early spring. TAM 110 is greenbug resistant, but keep in mind that resistance does not mean immunity. Amarillo Extension Entomologist, Dr. Carl Patrick, notes that we usually find half the number of greenbugs in TAM 110 as in another wheat right beside it. Also, TAM 110 has a longer coleoptile than many other wheat varieties, making it a good choice for poorer planting conditions where the seed may end up deep. TAM 110 has survived greenbug infestations when other varieties, including its parent line TAM 107, have died. It is a variety choice for some of wheat production acreage over a wide range of conditions. For more information about TAM 110 consult the article in the wheat

section of the A&M-Lubbock website, http://lubbock.tamu.edu/othercrops/index.html

<u>Russian wheat aphid</u>. Two varieties, Halt and Prairie Red, have shown good resistance. The Prairie Red variety has done fairly well in grain yield trial tests in the Panhandle since 2000.

Wheat Streak Mosaic Virus. Some resistance may be found in 2137, Longhorn, Ogallala, TAM 107, TAM 110, and Thunderbolt.

<u>Leaf Rust</u>. Consider planting Thunderbolt, Tomahawk, Tonkawa, or Hondo.

<u>Soil Borne Mosaic Virus</u>. If you anticipate this disease could be a problem, consider using 2137, 2174, Jagger, Karl 92, Pecos, Tomahawk, TAM 302, and Tonkawa.

For additional information on wheat varieties including grain yield trial results and varietal descriptions, consult http://lubbock.tamu.edu/othercrops/index.html

Wheat Varieties for Forage Production. I am often asked about which wheat varieties are best for grazing and forage production. In my opinion, beardless varieties, particularly the older russian beardless and its derivatives are overrated. First, if we are concerned about a wheat being beardless, then we neglected to consider the issue of forage quality, which declines rapidly as the forage progresses from boot stage (usually near 18% crude protein, or CP) to milk stage (~13-14% CP), to soft dough (<10% CP). Of course forage pounds are increasing, but for hay harvest growers need to examine their hay market or type of animal they are feeding.

Among the beardless wheat varieties the modern varieties of Longhorn, Lockett, and TAM 109 (parentage is TAM 101) are available. Longhorn has a long coleoptile, and may establish better in fluffy soils where control of seeding depth is poor. Longhorn, however, should not be planted when weather and soil is still hot as it expresses some dormancy and does not germinate as well under warm conditions. Longhorn and Lockett appear to tiller more than the conventional russian beardless wheats, and for that reason a russian beardless type might require a higher seeding rate to equal Longhorn or Lockett. In general, Lockett performs very well in the Rolling Plains, but to the west of the Caprock it occasionally disappoints in forage yield relative to Longhorn.

Sometimes Longhorn, Lockett, or TAM 109 will be taken to grain. Over the past four years we have seen a yield drag of about 10-12%, on these varieties for both irrigated and dryland, relative to conventional grain wheat varieties such as Jagger, TAM 110, Ogallala, etc.

What Seed Quality. Insist on wheat seed with a minimum test weight of 56 lbs./bushel and a germination of 85% or more.

**Small Grains Forage Production and** Phosphorus. Ample dryland research in the Rolling Plains has indicated that P banded about 6-8" deep at rates near 30 lbs. P<sub>2</sub>O<sub>5</sub>/A have increased forage production on average by over 40%. The key is deep placement of the P with a knife rig (as compared to surface broadcast then incorporation). This maintains P availability during dry conditions. P is very important for forage production as forage is removed then regenerated in grazing conditions and also for tiller growth. Results from the Panhandle area demonstrate that knife application of P is also quite advantageous for irrigated forage production. Consult the article by Dr. Travis Miller on Deep P placement on the Lubbock Center website mentioned earlier. CT

#### ALFALFA VARIETY UPDATE

I have received many more calls this year on seeding alfalfa this fall. Texas does not have any variety testing information and so I regularly refer growers to New Mexico State University and Oklahoma State University information. Alfalfa varieties should be selected for appropriate fall dormancy (FD), probably 4-6 around Lubbock, maybe up to a 7 near I-20 to the south. Once a target FD rating is identified, growers should look for proven varieties that demonstrate a minimum rating of MR or moderately resistance to a series of insect and disease pests. These include blue alfalfa aphid, pea aphid, spotted alfalfa aphid, Fusarium wilt, phytophthora root rot, bacterial wilt, and anthracnose. NMSU publishes multiple ratings, which include observations at Clovis, Tucumcari, and Artesia in their 2001 New Mexico Alfalfa Variety Test Report on the web at

http://www.cahe.nmsu.edu/pubs/research/

Producers should choose alfalfa varieties that have broad adaptation and a package of good resistance to insects and disease. This is often more important than individual yield results provided that varieties are at least in the top half of among listed yield results. **CT** 

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