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FOCUS on Entomology

For South Plains Agriculture

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IN THIS ISSUE

COTTON INSECTS

Bollworm infestations blossomed in scattered fields in the Lubbock and surrounding area. This was the result of what appears to be a migration of moths riding the winds from the southeast over the last 3 weeks. Usually our summer winds are mainly out of the southwest. Infestations in most fields have been below my nominal threshold for this stage of cotton of 8,000 small larvae per acre. A few fields have required treatment. Especially those that hit the 38,000-43,000 per acre mark. Unfortunately, once planes hit the skies to spray the scattered legitimate targets, the whole world appeared to go on the offensive. Now there appears to be a bunch of spraying going on that is a "knee-jerk" reaction to seeing spray planes in the air. Remember that field-by-field scouting is needed for sound control decisions since not all fields received heavy egg lays or had conditions to support high egg and worm survival.

Medium bollworm on large square

Where are these infestations? They are in the older, lusher fields that generally have one or more bolls per plant. Not only are these fields more attractive to moths that are selecting fields for egg laying purposes but survival would also be highest there. Geographically, the majority of infested fields (as of this time---10: 30 A. M., July 17) are not much further west of University Avenue or north of the Petersburg area, or south of Wolfforth. Much of the problem is east of Lubbock and toward the Slaton area. Outside of the High Plains area, increased bollworm activity is reported in the Concho Valley and Wilbarger County in the northern Rolling Plains area.

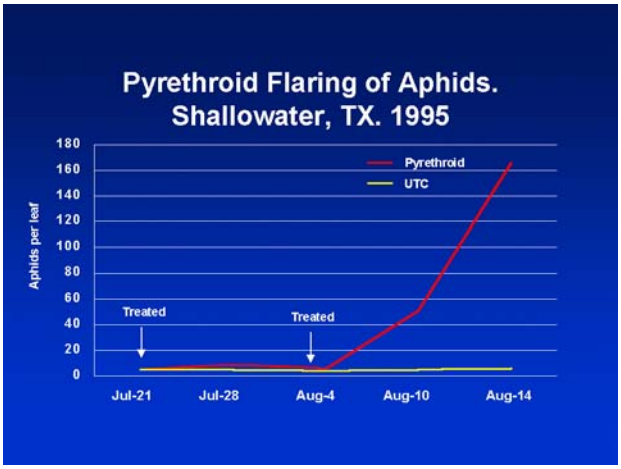
The unusual bollworm activity in this area is a product of several factors. The migration I mentioned early is key to the situation, but our recent weather has contributed as well. High temperatures in the high 80's and lower 90's (instead of upper 90's and 100's) coupled with unusually high humidity levels have probably increased survival substantially. Also, once cotton begins to bloom it provides a totally

different environment for bollworms. Their survival goes up dramatically.

While moth trap catches have remained high (as much 1,000 moths per trap per week), it does appear that egg numbers are dropping down. I know I said this last week and was wrong, but truthfully, I really think this time we should be winding down on egg laying activity. This means our beneficial insects and spiders can now catch up and gain the upper hand on these pests. I know some fields have had a recent reduction in natural enemy numbers due to the multiple applications of malathion needed to keep the weevils in check. But these fields are few and far between.

What concerns me the most is the widespread use of one of the registered pyrethroids for bollworm control and what might develop with our aphid population. Thus far, with few exceptions, our aphid numbers have remained very low and have infested mainly the terminal area with little honeydew in evidence. As you already know, the application of pyrethroids to aphid-infested fields can cause outbreaks of this pest, requiring the additional expense of spraying for aphids later on. Work by Phillip Kidd (formally IPM Agent in Crosbyton), Dr. Megha Parajulee (TAES cotton entomologist at Lubbock) and others have shown that pyrethroids can increase aphid numbers by reducing natural enemy numbers, keeping these beneficial insects out of fields for long periods of time. More importantly, they can increase the reproductive rate of aphids. The result can be bad news. I also believe that aphids that are the result of pyrethroid applications are harder to kill (an untested hypothesis).

While pyrethroids are comparatively inexpensive, provide some of the best residual activity, are highly effective, and can help control other pests such as fleahoppers and Lygus, there are the above downsides. Alternative insecticides would include the more expensive Steward or Tracer. Coverage issues are our main concern with Tracer. I would reserve this material for situations where



coverage can be assured and at least 3 gallons total spray volume is used by air. Steward does not appear to have this coverage problem but does have an adverse affect on lady beetles, much like Larvin does. So evaluate your plant architecture, bollworm, aphid, and beneficial insect situation before selecting an insecticide.

When checking a field for bollworms make sure you are scouting the field and not just hunting for bollworms. There is a difference! The latter method will often result in spraying fields that don't warrant control. Check several whole plants across the field selected at random for eggs, worms, natural enemies, and aphids. Check at least 24 plants per field. Forty would be much better. Don't look at only the taller plants. These plants are selected more often than not by egg-laying bollworm moths and will have higher infestation levels than average plants. The result of looking only at taller plants? -- an overly inflated estimate of bollworm activity. If infestations are around 8,000-10,000 ¼" long or smaller worms per acre then consider using a pyrethroid alternative if natural enemy preservation and/or aphid flaring is a concern. This level is for those that can easily find tiny worms. If you are not one of these people then consider hiring someone that is or reduce your threshold no lower than ½ mine. Once numbers reach into the 15,000 per acre or greater levels, pyrethroids become the overriding favorite. Pyrethroids include Capture, Baythroid,

Leverage, Karate, Ammo, Decis, Asana, Scout and Fury.

If you have one of the Bollgard cottons then you have plants that produce the Bt toxin that is detrimental to many caterpillar pests. Expression of this toxin would be relatively high at this stage of crop development. While this product is most effective against pyrethroid-resistant tobacco budworms it does have good activity against bollworms. However, this does not mean that these Bollgard fields do not need to be scouted---they do! Under heavy pressure, supplemental insecticide applications will be necessary. When making a control decision for Bollgard cotton, base thresholds on larvae that are larger than ¼" long. Otherwise you will not give the toxin enough of an opportunity to operate. You can still make some money controlling worms up to the ½ inch size. By the way, in fields of conventional cotton I often wait for worms to reach ¼ to 3/8 inch size when natural enemies are abundant and infestation levels are around the threshold. After all, you need to give these beneficial insects and spiders a chance to do their jobs.

Aphid numbers remain generally low with only a few exceptions. Most aphids are found in the terminal area and can be counted on the fingers of two hands. Under these conditions, our natural enemy populations appear to be keeping them in check. There are some fields where aphids now infest more of the plant, producing noticeable honeydew deposits. These field spots are generally small and have attracted lots of predators. My advice has been to ignore these situations and let the "beneficials" build up in these spots. Once more of the field is involved and aphid infestations have moved down to the middle or bottom leaves, then it is time to think about control. I am concerned that the widespread use of pyrethroids for bollworm control will result in the development of aphid problems in the near future.

Aphids on underside of leaf

If you must control aphids there are several products that are very effective. Bidrin at 8 ounces per acre can provide good control but more often in recent years this product has not performed as consistently as we would like and has not provided as good a residual control as needed. Maximizing coverage usually improves performance. Furadan, available again this year on a section 18 and our usual standard of excellence, is still generally working well but is showing evidence that it too is declining in performance (mostly manifested as a decline in residual activity and control consistency across many field applications). Syngenta's Centric returns as a good alternative but is not as effective as Furadan used to be. Bayer CropScience (formally of Aventis) Intruder (Assail) is the only material we have tested that looks like a true Furadan performance replace. It looks very good, is priced reasonably, in softer on "beneficials" and has excellent residual activity. Remember our threshold is 50 aphids per leaf in an increasing infestation situation. This number must be derived from checking several representative plants across the entire field and averaging counts on an expanded top and middle-of-the-plant mainstem leaf.

Trading bollworms for boll weevils. An unfortunate coincidence?

With the increased bollworm activity occurring in some areas of the High Plains there have been a vocal minority pointing fingers at the boll weevil eradication program as the most likely culprit for this upsurge of bollworm problems. As is usually the case, their concerns are generally emotionally based and without scientific basis. Some of these individuals do have a legitimate concern while others enjoy "stirring the pot" in an effort to discredit the Texas Boll Weevil Eradication Foundation's efforts.

Their concerns are for one of two reasons. The first is that the blanket, weekly spraying late last season during the fall diapause phase of the eradication program might have adversely impacted on beneficial insect and spider populations resulting in a reduction of available natural enemies this year to handle current pest problems. The second reason for increased bollworm problems has been that current applications of malathion are reducing the beneficial insect numbers in treated fields and that these are the fields that have the bollworm problems.

In the early years of the original High Plains fall diapause program, Texas Tech University entomologists conducted a 3 year study to see if the above concern was legitimate. They found that while the malathion applications had an adverse affect on populations of some beneficial insects at the time of applications, this effect did not carry over to the next year. Beneficial insect numbers had recovered by this time. Also, they found that malathion had little effect on spiders during the spraying. There would be the possibility that decreases in beneficial insects during the fall program could lead to larger overwintering populations of bollworms that could pose an increased risk the following season. (*Huddleston, E. W., D. Ashdown and T. H. Hills. 1967. A comparison of the effects of the 1964, 1965 and 1966 High Plains boll weevil control program on population trends of non-target arthropods. Texas Tech. Coll. Agr. Ind. Entomol. Rep. No. 66-1*)

Another study conducted by Bottrell and Almand in 1968 looked at the effects of the fall diapause program on the combined populations of cotton bollworms and tobacco budworms. They found that in the spring and summer of 1968, larval populations of these caterpillar pests were about equal in size whether sprayed or not sprayed with malathion in the diapause program the previous fall. But during the 1968 fall program, malathion applications did increase bollworm and budworm numbers after several applications of malathion. These applications were made in September through early November for a total of six. The result was a 6-fold increase in the late season total of bollworms/budworms per acre (2,685/acre in the malathion treated fields and 408/acre in the untreated fields). These entomologists concluded that the multiple applications of malathion killed many beneficial insects, which would have held the pests in check. (*Bottrell, D. G. and L. K. Almand. 1969. The effects of reproductive-diapause boll weevil control programs on populations of the bollworm and the tobacco budworm in cotton, 1968. Texas A&M Univ. PR-2702. 6 pp.*)

I believe the scientific evidence reported above would not support the supposition that last year's diapause program is the cause of this year's bollworm problems. There were very few bollworms around last year toward the end of the season so it is doubtful that we overwintered very many bollworms. Further, the pattern of heaviest bollworm infestation problems does not coincide well with the application schedule for malathion during this year's program. There is no doubt that some fields are receiving multiple applications of malathion for boll weevil eradication. These fields are in the minority. Most acreage has received no sprays for boll weevils in the Southern High Plains or Northern High Plains zones. There is also no doubt that where multiple applications of malathion have been applied to a field, beneficial numbers have been reduced. But what we are finding is a different pattern of infestation where the highest bollworm numbers and also the highest survival is associated with the older, lusher cotton, which may or may not have been sprayed. This July bollworm problem is unusual for our area, at least the level of larval populations we are finding. A migration into our area appears to be to blame, not the eradication program.

Jim Leser, Chair, Technical Advisory Committee, Texas Boll Weevil Eradication Foundation

Both fleahopper and Lygus bug numbers remain below treatment levels for the most part. Square retention has also been better this year than in recent memory. Some fields did have some retention problems but these problems could often be traced to inclement weather and not bugs. Even so, many more fields were treated for these pests this year than would have been justified based on sound scouting reports and use of economic thresholds. Once cotton is blooming, the threat from fleahopper damage is all but over. In fact, this pest now can be counted as an ally as it will also feed on eggs and other pest stages while continuing to pick off pinhead-size squares that are no longer needed to hit yield targets. Unfortunately, Lygus will become more of a nuisance and a pest as cotton moves through July and into August. Later developing fields could be most vulnerable to yield losses from this pest. I'll discuss more fully the management of Lygus in future issues of *FOCUS*.

The boll weevil situation remains relatively unchanged from last week. I challenge you to find a weevil or damaged square in any of your fields. By maintaining the pressure on the few fields that have trapped weevils, the Texas Boll Weevil Eradication Foundation has kept reproduction down to a minimum if not stopped it in its tracks and has prevented the dispersal of this pest to more fields. This has unfortunately resulted in a few fields that have been sprayed multiple times with the result of a significant reduction in natural enemy numbers. Whether this has resulted in more bollworm problems is certainly debatable. See my boxed comments on this issue.

The following tables provide the current statistics on the eradication program's efforts:

Average number of boll weevils per trap per week accumulated over 13 weeks. (Week ending July 14, 2002)

Zone	2002	2001	2000
NWP	0.00013	0.014	0.158
WHP	0.00029	0.021	0.585
PB	0.00007	0.021	0.622
NHP	0.004	--------	--------
SHP	0.002	--------	--------

Acres sprayed this past program week (ending July 14) and accumulative acres sprayed to this date.

Zone	Week ending 7/14	Accumulative	Acres in zone
NWP	745	3,494	488,415
WHP	3,693	6,675	744,870
PB	1,050	3,090	574,248
NHP	19,775	70,914	553,402
SHP	53,836	193,473	1,084,174

Some questions have arisen about the AgriPartner's GRID trapping program. The first was whether it was up and running this year? It is and has been running for several weeks now in all five eradication zones. How many weevils have been caught? Only one thus far and this one was trapped in early June. If this is the case, why is the TBWEF catching so many more weevils than the GRID? Well, actually they are not. Since the GRID was initiated this year there has been a total of 3,900 trap checks versus 4,960,008 for the TBWEF. They have 413,334 traps out for our 650. When you look at it this way, it becomes clear that the Foundation's trapping program would have a much higher probability of catching a weevil than our GRID system. But our low trap catches do in fact mirror what are actually very low trap catches by the TBWEF. If one makes some rough adjustments for the trap and checking period discrepancies, then we would have had to catch 3 weevils instead of 1 to be equal in trapping efficiency as the Foundation has been. **JFL**

COTMAN PLANT MONITORING TOOL

Last week I promised I would start discussing SQUAREMAN data and interpretation of Target Development Curves. But because of the current problem with bollworms and the need to provide a fairly lengthy discussion of the issues involved in bollworm management and the relationship between the boll weevil spraying and the bollworm problem, I have opted to delay this till next time.

I will begin discussing the BOLLMAN component of COTMAN. Since most fields are either blooming or rapidly approaching first flower, it is probably wise to tell you how to use this program for this period of cotton development. Remember that BOLLMAN is used once the crop is flowering and will monitor boll-loading stress (after the apogee of the Target Development curve) and assist in making end of season insecticide termination and crop termination decisions. All that is necessary is to make weekly counts of Nodes Above White Flowers (NAWF).

Once flowers appear, switch from SQUAREMAN data collection to BOLLMAN data collection. In each of 4 locations per field count the number of nodes above the uppermost 1st position white flower from 5 plants in on row and then 5 more from the adjacent row. When the field begins to flower you may need to look at a lot of plants before finding your 5 plants with a bloom. When counting, stop at the uppermost unfurled leaf in the terminal (leaf edges not touching). Stop collecting BOLLMAN data once NAWF reaches 5. But make sure that it stays there or drops further down. Sometimes the NAWF value will vacillate between 5-6 for 5-10 days before the plant finally makes up its mind to "cut out".

At the point that NAWF stabilizes at or below 5, start recording daily highs and lows. We will use this data to determine heat units accumulated since cutout. These accumulated heat unit values will eventually tell us when we can stop spraying for bollworms, Lygus and leaf feeding caterpillars. They will also tell us when our crop is ready for a harvest aid chemical. Next week we will continue our discussion of BOLLMAN but also start interpreting some actual growth curves from both SQUAREMAN and BOLLMAN data collections. **JFL**

CORN AND SUNFLOWER INSECTS

Here we go. Corn should be monitored for southwestern corn borer (SWCB), European corn borer (ECB), spider mites, and corn earworm (CEW) in some cases. The second flight of SWCB has started and trap captures of adults are on the increase. The ECB flight has started as well, but they are not as numerous as SWCB. These pests are a threat to non-transgenic corn. The SWCB threshold is 20 – 25% of plants infested with eggs or newly-hatched larvae. If the threshold is reached, don't wait to apply insecticides. Older larvae tunnel into the stalk and are essentially uncontrollable. If you do decide to treat SWCB, be aware of the mite infestations in the field. Many SWCB insecticides have the potential to "flare" mite populations, so choose a SWCB product that also has miticidal effects. You can also tank mix a miticide with the SWCB treatment.

Southwestern corn borer adult

Spider mite numbers are increasing and moving up the plant in many areas. Most fields have 15 to 45% of the leaves with mite colonies. The last electronic edition of FOCUS had a lengthy segment on spider mites, so I won't repeat myself this week. Beware of the return of hot weather for it will stimulate mite populations and they could rapidly get out of hand. This photo illustrates a typical Banks grass mite colony on the underside of a leaf.

Banks grass mite colony

Corn earworm larvae are quite common in many areas, especially east of a Lubbock to Plainview line. This does not pose a problem for field corn per se, but food corn and sweet corn should be watched closely. The relatively high numbers of CEW in this generation suggest that we may have an active sorghum headworm season, especially in the next generation of CEW.

Sunflower bloom is well underway. Fields should be scouted daily for sunflower moth as they enter bloom. Scouting is best done in the early morning or late evening because the small, 3/8-inch silver-grey moths rest on the sunflower face at this time. Please refer to the June 28 issue of FOCUS for information on timing sunflower bloom and insecticide applications. **RPP**

Sunflower moth

STEWARD INSECTICIDE APPROVED FOR PEANUT, ALFALFA AND SOYBEAN

Finally, Steward insecticide has been approved by EPA for use on peanut, alfalfa, and soybean in Texas, Oklahoma, New Mexico, and other states. Steward (and Avuant) are in the new oxidiazine class of insecticides and have the active ingredient Indoxacarb. Steward is effective on lepidopteran (worm) pests, alfalfa weevil larvae, and some plant bug species. Because this registration happened last week, labels for Steward are in short supply. We are reprinting the label here. **RPP**

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