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IN THIS ISSUE

NEWSLETTER CONTRIBUTORS

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COTTON INSECTS

Insect activity remains generally light with many fields yet to begin squaring and few fields blooming at this time. According to reports from Plains Cotton Growers, only 35% of our fields were squaring as of July 6 compared to 62% for the 5-year average. Thrips are for the most part a problem of the past while cotton fleahopper numbers are beginning to make their presence known. Aphid numbers have increased a little but are far from being a problem in any field. A light bollworm egg lay occurred in some areas but small cotton; lack of shade and high-reflected soil temperatures did most of the emerging caterpillars in. Boll weevil emergence slowed this past week with some acreage sprayed in all but the North West Plains Zone. All in all it is still pretty quiet out there in the trenches.

Our generally late crop will require a more aggressive management style if average to above average yields are to be expected. This will be especially true in the northern areas where most cotton may not bloom until mid to late July. This could represent a delay of 1 to 3 weeks. Long-term weather records would indicate that some of this cotton will be lucky to have 1-3 weeks of blooms available for harvest. Short-term weather patterns would provide a more favorable outlook with 3-5 weeks available to produce harvestable fruit. What the fall will bring is anybodies guess. The risk is yours to take.

All of the rains in June have fostered a veritable cornucopia of weed hosts for both cotton fleahoppers and Lygus bugs. This doesn't necessarily mean that we will see elevated numbers of these two pests across area fields anytime soon. However, surveys of various weed hosts continue to indicate the potential for fleahopper and Lygus problems. Thus far Lygus bugs have pretty much remained in non-cotton hosts while fleahoppers are beginning to

Potential fleahopper problem field.

move into some cotton fields. What really could get the situation rolling in the wrong direction is if it continues to be hot and dry and weed hosts dry down, forcing these bugs to move to cotton. Also, when field borders and bar ditches are mowed, this too can force these bad bugs to move to cotton.

Because many of our fields have gone through considerable environmental stress and some fields have recently been exposed to winds and blowing sand, you can expect square retention to fall in the absence of any insect activity. Be reasonable in your assessment of each field situation. It is easy to walk into a field and find an unacceptable square set and assume that insects are responsible, especially when one or two of the culprits are found. Too many folks assume that because they are not good at finding these tiny pests that they are overlooking the cause of the retention problem. Often the absence of pests during scouting is BECAUSE THEY ARE NOT THERE!

Fleahopper numbers are increasing in some of the squaring fields with levels as high as 20 per 100 terminals inspected. Square sets have still remained on average in the 85% or so range---entirely acceptable for our area and typical of what we see every year. The biggest curiosity and perhaps concern is that some fields have a growing population of fleahopper nymphs without any adults being detected. This is unusual for fleahoppers, which usually stay in a field for a while once they move into the field. Lygus bug adults, on the other hand, do often move into and out of fields with great frequency. I know I am advocating a more aggressive management style for square retention this year, but this does not mean to ignore good scouting practices and economic thresholds.

Adult Fleahopper

Emerging overwintered boll weevil numbers have declined this past week. No weevils were caught again this past week in the NWP zone and none were caught in the WHP zone, but 4 were caught in the NHP zone and 5 in the SHP zone, down from the previous week's catch. Weevils caught in the PB Zone were also down this past week but still were the highest of all of our High Plains zones at 201. Almost all of these were caught in the Stanton area south of Lamesa.

Average accumulative number of boll weevils caught per trap through the week ending June 29.

Zone	2003	2002	2001	2000
Northwest Plains	0	0.0001	0.0195	0.1614
Western High Plains	0.000017	0.0003	0.0272	0.7246
Permian Basin	0.0033	0.0001	0.0254	0.531
Northern High Plains	0.00004	0.0048	-------	-------
Southern High Plains	0.00005	0.0024	-------	-------

Treatments continue as more fields begin to square and become hostable. No acreage has been treated in the NWP Zone. For the WHP zone, 394 acres were treated this past week based on fields across the adjacent SHP Zone line (accumulative 2003 total 527 acres). For the PB Zone, 4,832 acres were treated this past week (accumulative 2003 total 6,005 acres). For the NHP Zone, 696 acres were treated this past week (accumulative 2003 total 1,194

acres). For the SHP Zone, 2,332 acres were treated this past week (accumulative 2003 total 3,372 acres).

A few aphids are showing up but generally average only 1-2 per plant with less than 5% of the plants examined infested. Beneficial insects appear to be keeping this pest in check. Aphid numbers are reported to be higher in some fields, both in the south Texas eradication zones and the Lower Rio Grand Valley, where late maturing fields have required multiple applications for weevil control by producers. Insecticidal control has been good with our currently registered products. Beet armyworms have also increased to treatment levels under these same circumstances, prompting insecticidal control. There are also reports of treatable infestations of beet armyworms in the Uvalde area. I bring up the beet armyworm situation because this pest can develop in other areas of the state and then fly up to our area as moths. I will continue to monitor this situation to give you an early "heads up" for any potential problems with this pest.

Speaking of beneficial insects, the minute pirate bug is staging a significant increase. This will be good for when bollworm problems begin to develop, as this is the best bollworm predator we have in the High Plains area.

Adult Minute Pirate Bug

A little black beetle has been reported in some numbers in several fields across the area. This ¼ inch beetle is probably a darkling beetle, the adult stage of the false wireworm we had trouble with earlier in cotton fields following grain crops. The adult should pose no problem. **JFL**

COTTON AGRONOMY

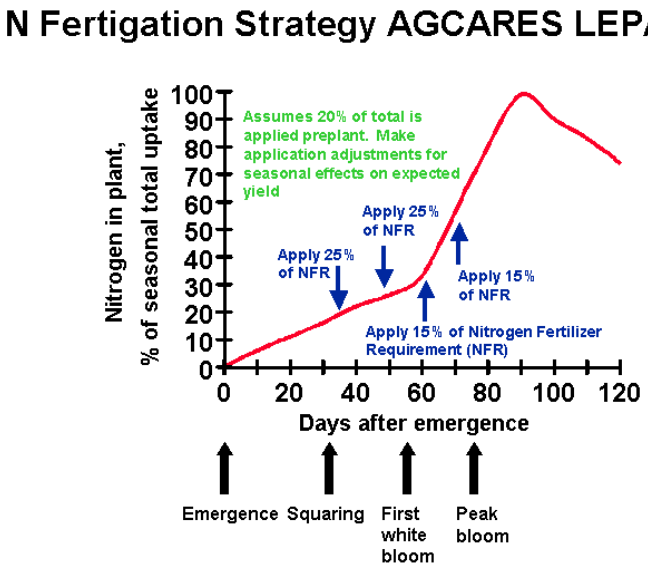
The excellent growing conditions over the last several days have really helped the cotton crop. I even heard a rumor that a field of cotton near Seagraves was blooming in the middle of last week. Hopefully July will make up for some lost time that we encountered during June. June 2003 heat units for Lubbock totaled 433 compared to 514 for the long-term average. That is about 84% of normal. For the first week of July we accumulated near normal heat units. Cooler temperatures for the last couple of days have been encountered, but the forecast for the next week or so is 90's for highs and upper 60's to lower 70's for lows. This should help to really get this crop moving. Some producers were irrigating in Gaines County last week, and I suspect others who have not had a lot of the beneficial June rainfall will soon be "cranking up."

Crop losses are still being tallied, and I venture to say that we are in the neighborhood of 1.1 million or so acres of lost production, mostly in the high production irrigated region north of Lubbock. Based on our Extension agent survey conducted the last week of June, it appears that perhaps as much as 400 thousand acres were replanted to cotton after the initial stands were destroyed. Apparently, we have somewhere around 2.4 million standing acres out there. After the Texas Boll Weevil Eradication Foundation sizes up our acres in preparation for billing producers, we will know what the actual standing acre count is.

N fertilization considerations for irrigated cotton. Nitrogen fertilization should be considered in irrigated fields making good

progress. A one-bale cotton crop will actually remove about 45 lb of actual N per acre, but due to inefficiencies in uptake and in the soil, about 50-60 lb N/acre are actually required. It is important to not over fertilize with N if reduced yield potential is anticipated. **This is due to the fact that it makes late cotton more difficult to manage on the backside of the season and can lead to more aphid problems.**

Fertigation is a practice that is gaining in popularity in the High Plains. A typical N uptake curve for cotton and corresponding crop development stages is shown in this graphic. Suggestions for applications of approximate percentages of total N are also shown. These have been slightly modified compared to previous years' newsletters due to recent data, which have become available from Dr. Kevin Bronson's (Lubbock Experiment Station Scientist) nitrogen uptake studies. Where possible, nitrogen fertilizer (UAN, 32-0-0) can be applied through center pivots or "fertigated". This results in lower application costs. One should consider whether a LEPA system with drop hoses is used vs. a spray system. If a pivot rigged with spray nozzles has marginal water quality and extremely hot, dry conditions are encountered, then some salt burn may be encountered on foliage. This type of N management fertigation scenario has been used and validated for the last several years at the Lamesa AGCARES facility using alternate furrow LEPA irrigation. To obtain maximum utilization of applied N, the total amount of N should probably be applied prior to peak bloom.



Dryland cotton fertilization. We are getting some questions about fertilizing the dryland crop. Many dryland producers have opted to sidedress or topdress N fertilizer after stand establishment in order to reduce front-loading of expenses. Applications of N are more likely to stimulate growth and promote fruit retention. Adjust N rates to fit yield potential. With all of the moisture stored in the soil profile, one should seriously consider N fertilization. Generally speaking, about 30-50 pounds of actual N per acre are adequate for dryland cotton. The higher rates should definitely be considered if the yield potential (stored soil moisture) is adequate for higher lint yields. Sidedressing /topdressing should be completed before blooming, with extreme care taken to not prune roots during the application. If the fertilizer is broadcast, rainfall will be required to move the fertilizer into the root zone. Here lies the challenge. Many producers do not use preplant applications in dryland fields due to "weather unknowns" and sometimes have no rainfall after N fertilizer application. **Benefits from low rates of foliar fertilizers are questionable.**

High Plains Nitrogen Fertility Calculator. For those High Plains producers interested in the potential to fine-tune N management, there is a new Microsoft Excel spreadsheet available on the Lubbock Center Web site. The Calculator was developed by Dr. Kevin Bronson and is based upon the latest soil fertility research conducted in the Texas High Plains region. NOTE THAT THIS CALCULATOR HAS NOT BEEN EVALUATED OUTSIDE OF THE TEXAS

HIGH PLAINS REGION. The program can be accessed at: http://lubbock.tamu.edu/cotton/calcinstructions.html

Users enter a realistic yield goal in bales/acre, and then enter results from the soil nitrate-N test. Soil samples should ideally be tested for nitrate-N to a depth of 24 inches. Soil texture is also an input for the program. Irrigation water analysis results for nitrate-N can also be added, as well as the estimated amount of irrigation water that will be applied during the growing season. Manure applications can also be factored into the overall N management scheme. Manure should be analyzed at a commercial laboratory for N. The total (seasonal) nitrogen fertilizer amount needed in lb/ac is calculated. For dryland, this amount can be applied with a ground rig all in one dose, shortly after stand establishment. For center-pivots, the results indicate the number of 30 lb nitrogen/ac doses needed. Typical 1000 gallon tanks used to inject 32-0-0 (urea-ammonium nitrate solution) through a 120 acre center-pivot will provide about 30 lb nitrogen/ac. For subsurface drip systems, the Nitrogen Fertilizer Calculator provides a daily injection rate in lb nitrogen/ac for mid-June to mid-August. Dividing this number by 3.5 (lb nitrogen/gallon of 32-0-0) gives the gallons of 32-0-0/ac required to inject each day.

Available N fertilizer sources. Anhydrous ammonia (82-0-0) contains more N per ton than any other source. It is the basic building block for the manufacture of other N sources. Overall, in terms of price per pound of actual N, it is the least expensive. Problems with handling, safety, application, and toxicity concerns combine to make this a less than desirable N source.

Urea (46-0-0) is manufactured using ammonia and carbon monoxide, a by-product of ammonia synthesis. It is generally the least expensive solid N source. It has excellent shipping and handling characteristics. Some problems are encountered from an agronomic standpoint. In order to reduce possible N losses, it is important that urea be applied properly.

Ammonium nitrate (34-0-0) is manufactured by reacting anhydrous ammonia and nitric acid. It has excellent agronomic properties. It can be explosive if carbon source is added (used in the making of the 1995 Oklahoma City bomb). Its hygroscopic properties cause handling problems (prills melt and "brick up"). This material is generally more expensive on a per pound of actual N basis, and is getting hard to find in most areas.

Ammonium sulfate (21-0-0-22S) is one of the oldest forms of N fertilizer, and is many times more expensive per pound of actual N than other sources. It can be manufactured from coke oven gas from steel and other metallurgical industries. It can also be manufactured by reacting anhydrous ammonia with sulfuric acid. The added benefit of sulfur may be important if that essential nutrient is required in low testing soils.

Urea-ammonium nitrate or UAN is the main fluid nitrogen source commonly marketed as 28-0-0 in winter months and 32-0-0 during the warm season. It is corrosive to many metals, and corrosion inhibitors are generally added. It is a mixture of 35% urea, 45% ammonium nitrate, and 20% water (by weight).

Ammonium thiosulfate (12-0-0-26S) or ATS is the main fluid fertilizer source of sulfur. It is compatible with fluid N sources and many times is blended with UAN to supply sulfur.

Ammonia loss problems from N fertilizers are mostly associated with anhydrous ammonia, urea, and urea-based fluids (UAN). Ammonium nitrate does not generally have a significant problem with ammonia loss.

Factors favoring ammonia volatilization from urea-based materials include:

1. High soil pH conditions
2. Low cation exchange capacity (such as in low organic matter sandy soils)
3. Large amounts of plant residues (urease enzyme present)
4. High temperatures
5. Moist conditions followed by rapid drying

Some producers apply urea. In order to reduce ammonia loss from urea-based materials (this would also apply to broadcast or "dribbled" fluid UAN), the following strategies are suggested:

1. Incorporate into the soil by cultivation or at least by rotary hoeing after application.
2. Lightly irrigate immediately following a broadcast application if other soil incorporation is not used.

Broadcast applications increase exposure to urease enzyme, so if possible inject or knife fluid UAN into soil.

Roundup WeatherMax application past the 4-leaf stage on Roundup Ready cotton.
Even some of the later replanted Roundup Ready cotton is nearing the end of the over the top window for Roundup applications. We have been getting questions concerning Roundup applications on cotton that is past the 4-leaf over-the-top (OT) window. If late applications are made, then significant yield losses can be encountered. With all of the rainfall across the region, the technological bottleneck has posed some serious weed control challenges.

June rains bring weed problems.

If an OT application of 22 oz/acre is made past the 4-leaf stage, one would still be "on label," but into what is considered a "salvage-type" application. Based on various experiences, it is possible that fruit retention on 3 nodes will be affected when making over-the-top applications of Roundup past the 4-leaf cutoff. One can expect fruit on the next 3 nodes (which would currently be in the terminal) to be most affected, with poor pollination, and perhaps boll shed from these sites.

Some questions pertaining to the potential of over-the-top applications past the 4-leaf cutoff affecting square retention have also been asked. Most problems reported from across the Cotton Belt relative to late Roundup applications generally have been poor pollination causing so-called parrot beaked bolls and possibly subsequent boll shed, NOT SMALL SQUARE LOSS. With the lush cotton and high humidity, we have very little "barking over" of cotton plants in most fields. This situation may likely contribute to increased yield problems with "salvage applications" this year. Of course one has to factor in weed population effects on yield, the "harvestabilty" of the field due to large weeds, etc. into an "economic analysis" of each field-specific situation.

The Monsanto Roundup WeatherMax label for use in Roundup Ready cotton states: "Salvage treatments will result in significant boll loss, delayed maturity and/or yield loss. No more than one salvage treatment should be used per growing season." Field research conducted in the High and Rolling Plains indicated that anywhere from 0 to 50% yield reduction might be encountered with salvage type applications past the 4-leaf stage.

A trial kept "weed free" which included several Roundup Ready varieties was conducted at the Lubbock Center over a three-year period (1999, 2000, and 2001). In these tests, Roundup applications were made at various crop stages, and a non-sprayed check was included as a reference point. The take-home message from that study indicated that when Roundup was applied over-the-top (OT) after the window closure, lint yields were decreased in 2 of 3 years from 5 to 19%. Plant condition, as affected by environmental factors, appeared to influence potential yield loss. The critical issue is the crop's ultimate environment and the ability to compensate for the losses of the fruiting sites by retention of bolls up the plant and out on the fruiting branches. For the past several years, the fall has been fairly kind to us and has allowed later set bolls to fully mature, perhaps masking any potential yield losses due to crop compensation. I guess the disclaimer: "Your results may vary" may be in order here.

With cotton development rapidly progressing, it is important to also consider the requirements for a successful post-directed or hooded Roundup WeatherMax application program. The Roundup label states that herbicide applications may be made using precision post-directed or hooded sprayers through layby. The spray should be directed to the bottom of the plants, with minimal contact of the spray with the leaves. Nozzles should be placed in a low position with a horizontal spray pattern directed under the cotton leaves to contact weeds in the row, and low spray pressure – less than 30 psi, should be used.

Mepiquat chloride issues. Questions concerning mepiquat chloride (Pix, Pix Plus, and others) applications have been asked. Pix Plus is a mepiquat chloride (MC) material formulated with a *Bacillus cereus* (BC) strain BP01 bacteria, which reportedly increases plant uptake of MC. Some lower cost MC generic materials are also available. Pentia is a new product and is a formulation of mepiquat pentaborate – a different molecular structure than MC. Its physiological effect is reportedly "hotter" ounce for ounce than MC, however, the BASF suggested use rates are equivalent to MC.

MC reduces production of gibberellic acid in plant cells, which in turn reduces cell expansion ultimately resulting in shorter internode length. MC will not help the plants compensate for earlier weather or disease damage by increasing growth rate. It may under good growing conditions increase fruit retention, control growth and promote earliness. MC should not be applied if crop is under any stresses including moisture; weather; severe mite, insect, or nematode damage; disease stress; herbicide injury; or fertility stress.

Results from our replicated testing indicates that we got from 5 to 15% reduction in plant height (compared to the control) from 16 oz of 4.2% a.i. MC material applied in up to 4 sequential 4-oz/acre applications starting at matchhead square and ending at early bloom. We have been able to "shave" about 1 node from the growth of the main stem at some locations, which can result in about 3-5 days earlier cutout. We have not observed consistent yield increases from any of the MC materials we have investigated, including those with the BC additive. A good boll load will normally help control plant growth. Fields with poor early-season fruit retention, excellent soil moisture, and high nitrogen fertility status may be candidates for poor vegetative/fruiting balance and should be watched carefully.

Growers who have planted picker varieties (many of which are more indeterminate than most of our stripper types) and have conditions resulting in high growth potential may be concerned. Growth potential of some of these varieties is considerably greater than many of our stripper types. For brush roll header stripper harvest, 28 - 32 inch tall plants optimize stripper-harvesting efficiency. If possible, target a maximum plant size of about 32 inches for picker varieties under high input irrigation (drip or high capacity pivots). If

plants get larger than 36 inches, harvest efficiency and productivity drop significantly.

Some decision tools are available, including the Pix Stik from BASF, which is used to measure the uppermost 5 nodes (down from the terminal which is counted as zero). The Pix Stik suggests use rates for various average internode lengths beginning at the 50% matchhead square stage and in the absence of stress. For an average of 1.5 to 1.8 inches, 4 - 8 oz /acre are suggested. For average internode lengths greater than 1.8 inches, 8 -16 oz /acre are suggested. Follow up assessments every 7-14 days are also suggested.

If poor fruit retention is encountered and the cause is addressed, then the mepiquat chloride rate could be increased, especially under high water, fertility, and good growth conditions. Producers should target fields with high growth potential – including picker varieties such as Deltapine 555 BG/RR, which may need aggressive management under high irrigation capacity. Applications must begin no earlier than 50% matchhead square. Know the history of the field, and watch picker varieties and fruit retention. One can adjust sequential applications to meet crop conditions and growth potential. The best PGR is a well-fruited crop.

Labels for Pix, Pix Plus, and other MC materials are available via the internet at http://www.greenbook.net/. **RB**

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