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FOCUS on Entomology

For South Plains Agriculture

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IN THIS ISSUE

COTTON INSECTS

The return of more favorable cotton growing weather has resulted in higher square retention. Most of the square loss experienced this season occurred early, due to adverse weather and severe thrips infestations in some instances. The good news is that our two square thieves, cotton fleahoppers and plant bugs, have not entered cotton in sufficient numbers to warrant our concern. You can find these pests in alternate weed and crop hosts but they are few and far between in cotton fields.

Most fields that were planted and survived our earlier inclement weather should already be blooming or beginning to bloom this week. These fields should be relatively safe from fleahoppers at this stage unless earlier square set was not satisfactory or your target yield is in the two plus bale range. In which case I would want to protect my crop of squares for another two weeks.

Late planted fields need to be watched very carefully. Not only are they vulnerable to the effects of early fruit loss due to a shortened growing season but they often are the recipients of fleahopper and/or plant bug problems after earlier fields are “safe”. These earlier planted fields can also act as bug nurseries, breeding larger numbers of bugs that eventually move to later planted cotton.

The threshold for fleahoppers is 25 adults or nymphs per 100 plants inspected. Most of the time fleahoppers will be found in the terminal whorl of plant parts. I personally would like to maintain a square retention level of 80-85% through the first three weeks of squaring but down to 75% retention would be adequate. The plant bug threshold at this time is one adult or nymph per three row feet inspected using the drop cloth sampling method. If both pests are present and square set is below par, you will have to arrive at a combined pest threshold if neither pest has sufficient numbers alone to trigger an application.

We appear to be cycling out of our first wave of bollworm activity in cotton. Not much damage was done by this first cotton generation although a few fields took a hit. Most areas, especially from Lubbock north, saw less than 2,500 caterpillars per acre, well below the nominal threshold of 5,000 per acre listed in the guide. Most bollworm infestations in pre-bloom cotton fail to establish because of the activity of natural enemies searching for pray on very small plants and the hot, dry conditions that stress these worms. I must caution readers though that these observations are for the area as a whole. Individual fields or communities might still be experiencing problems with bollworms and a continuing egg lay.

Another wave of activity will surface in another 3-4 weeks. This one could cause more of a problem in our blooming, boll filling cotton fields. By this time there is little time left to compensate for boll loss before the season shuts down.

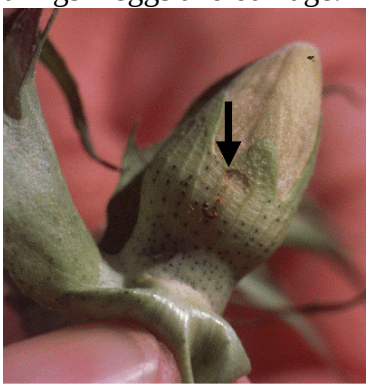
Bollworm management requires good scouting procedures and common sense control decisions. When I scout for bollworm control decisions I check whole plants scattered throughout the field. I don't check just terminals and I don't use the row foot method where 3 or more row feet of cotton are checked in several areas of the field. This latter method insures that a lot of plants are checked, but at the expense of seeing very much of the field. Terminal checking works only when the caterpillars infest the terminal. Obvious answer, huh? Several years ago I did a multi-year study of caterpillar and egg distribution on cotton plants. Cotton terminals typically held no more than 20% of the total infestation. This would vary according to the age of the cotton, age of the infestation and the activity of beneficial insects. Predators typically spend more time searching the upper levels of a cotton plant than the lower levels.

In selecting plants for monitoring it is important to recognize that the taller plants often have higher numbers. Sometimes this can be used to your benefit if you check only these plants but adjust your threshold to reflect the disproportionate number found on these tall plants. By checking taller plants, one could conceivably reduce sample size. There is an art to this method so it is possible to get "burned" using this method.

My minimum plant sample size is 24 per field. Forty plants would be ideal but awfully time consuming. Spend most of your time in marginal fields, those fields near threshold. The least amount of scouting time should be spent in fields that are obviously over run by caterpillars or are virtually devoid of all bollworms. Check plants by starting in the terminal and working your way down the plant. Dissect open the terminal whorl. Also open all blooms, square and boll bracts. I spend little time turning leaves over looking for eggs. By the time you are done, the plant should have sustained some damage. Otherwise you were not thorough enough!

Tearing apart terminal to find small worm

When I check a plant I am looking first for two things---eggs and damage. I usually find the evidence of caterpillar feeding long before I find the actual worm. If one looks very carefully, you probably will find a very small worm near the damage. That is if it isn't old

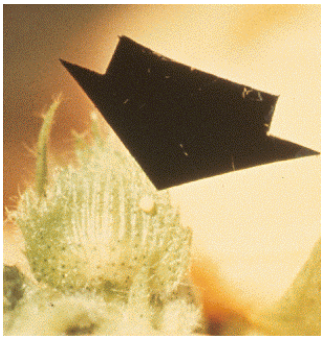


Light feeding on square

damage or large damage. Sometimes you won't find the worm. If so, hopefully it is because a beneficial insect nabbed it rather than it being the result of your myopic eyesight. The key to good bollworm scouting and control decisions is finding the eggs and the very small caterpillars (1/4" or smaller). Larger than this---- the damage is done and you are late!

Damaged flared square

Eggs are found in many locations including but not restricted to the upper surfaces of the newer leaves, leaf petioles, bracts and flowers. These eggs were laid by either the cotton bollworm (alias corn earworm and others) or the tobacco budworm. The budworm is rarely a problem in our area. It arrives late and infests primarily our southern acreage. This species can be very resistant to our current crop of pyrethroid insecticides. Our newer alternatives: Denim (Section 18), Steward, and Tracer will control these problem worms.



Egg on square bract

Eggs on leaf

Tobacco budworm (upper)
Bollworm (lower)

Eggs hatch in about three days and are pearly white until before hatch, when they turn brown. Black eggs can mean that they have been parasitized by a wasp. Newly emerged caterpillars are about 1/16" long and almost colorless with the exception of their black head. Once they feed they will be colored in various shades of yellow, red, brown or black. Over a period of about 2 weeks, these caterpillars will feed on increasingly larger fruit until about 1 ½ to 1 5/8 inches long, at which time they drop to the ground and pupate. Once caterpillars reach ¼" in size, most predators are unable to handle them.

Newly emerged bollworm

While I previously mentioned that our cotton guide lists 5,000 worms per acre as our treatment threshold, I must emphasize that these are small worms, not the 1" snakes some folks find. I also must point out that this threshold is for individuals that have a hard time locating small caterpillars. If you have the experience or ability to easily find the 1/16 to ¼" worms then you must adjust your threshold upwards. I use 10,000 small caterpillars per acre as my starting point. It is a rare field that I will treat at a lesser number.

Aphid numbers continue at low levels although some fields have some plant terminals with heavy numbers. Until aphids spread down the plant we are generally all right. Natural enemies, mainly lady beetles, crab spiders, big-eyed bugs and minute pirate bugs, are also doing their jobs of keeping aphids in check. Our recent cooler weather might have encouraged some aphid infestations to expand. But the real culprit for flaring aphids will be the use of pyrethroids for bollworm or plant bug

control or if the Texas Boll Weevil Eradication Foundation (TBWEF) program begins to spray a lot more acreage. This is an unlikely scenario considering how low weevil numbers and sprayed acreage has been.

I recently talked with my Corpus Christi counterpart, Dr. Roy Parker, about an aphid test he is currently conducting. He created the aphid problem by spraying his field plot area twice with a pyrethroid. His treatments included a low rate of Bidrin (4 ounces/acre), Furadan, Intruder, Trimex and two rates of Centric. All insecticides looked good after a few days but only Intruder and the higher, more expense rate of Centric were still providing good control at 12 days after treatment. This study confirms a number of observations I have made in recent tests. The first is that Trimex (same active ingredient as Provado) is not a top notch aphid material in our area. Second, Bidrin must be used at the maximum labeled rate of 8 ounces per acre to be effective. Third, Furadan does not appear to have as long a residual activity as it once did. Fourth, Centric must be used at higher rates to achieve similar control levels observed with Intruder. And lastly, Intruder appears for now to be the best aphid material on the market. Unfortunately I understand that the newly formed Bayer CropSciences (Bayer and Aventis merger) will sell Intruder and stick with Trimex. Hopefully Intruder will not leave the market place due to this unfortunate set of circumstances.

The boll weevil is going down for the count as the TBWEF continues to spray a limited number of acres in the five High Plains zones for this pest. Trap numbers remain very low with most fields triggering an application located near towns and prime overwintering habitat. **JFL**

Average number of boll weevils per trap per week accumulated over 11 weeks. (Week ending June 30,2002)

Zone	2002	2001	2000
NWP	0.00013	0.019	0.161
WHP	0.0003	0.027	0.724
PB	0.00007	0.026	0.524
NHP	0.005	--------	--------
SHP	0.002	--------	--------

Acres sprayed this past program week (ending June 30) and accumulative acres sprayed to this date.

Zone	Week ending 6/30	Accumulative
NWP	832	1,629
WHP	1,251	1,845
PB	0	0
NHP	11,171	24,824
SHP	24,847	87,277

CORN AND SORGHUM INSECTS

This publication is called FOCUS, but the non-cotton crop insect situation is actually quite blurry. Here is a brief summary of how things stand. Banks grass mites are generally on the increase in corn, but the sporadic recent heavy rains will help a little. Colonies are on the lowest leaves but will spread up the plant. Mites can be very difficult to control, so don't miss a scouting date. I have prepared a supplement on spider mites that includes identification, biology, damage, thresholds, videos on how to scout for them, and photos. If you are reading the PDF or printed version of FOCUS, you will find this supplement in the web version.

Corn earworms are present in fields now, and silking plants are most attractive. Our earworm populations are about average this year. Fall armyworms are also present in sorghum and corn in very countable numbers. These two species are the sorghum headworm complex. It is beginning to look like we may have a slightly worse than normal year for headworms. **RPP**

We need some help with a research project. Greg Cronholm, Pest Management Agent for Hale/ Swisher counties, and I are collecting southwestern and European corn borer moths for a research project. We would like to put pheromone traps around non-Bt corn fields in Hale, Lamb, and possibly Castro counties. If you have a non-Bt field or fields with corn borers and would be willing to let us trap for two weeks, please give me a call at (806) 746-6101. We appreciate the help. **RPP**

SUNFLOWER INSECTS

Sunflower moth season is upon us and I quote from Greg Cronholm's latest newsletter: "As sunflowers enter the bloom stage it is important to scout for sunflower moth movement into the field. We generally target the first application at 20% bloom. The new sunflower varieties are very uniform in their bloom period and can go from 5% bloom to 20% bloom in 1 day. The following table shows the progression of bloom in a confectionary sunflower field recorded in the Edmonson area in 2000."

Sunflower blooming progression

Date	% bloom
June 23	0
June 26	5.5
June 27	21.2
June 28	40.3
June 30	54.0
July 2	67.0
July 5	87.5
July 8	97.5

"From this one can see the total bloom period occurred in about 12 days. Once you see the 1st yellow ray flowers visible scout your field daily for moths and percent bloom. Once you find 3-5% bloom and sunflower moths are present in the field, an insecticide application should be targeted for the following morning when flowering will reach 19 to 21% bloom." Please refer to the last issue of FOCUS for the two short videos on how to estimate bloom and how to time insecticide applications for sunflower moth. **RPP**

COTTON AGRONOMY

Overview. Cotton is beginning to bloom across the region, at least in the earlier planted fields. For Lubbock, June ended with about 557 DD60s, compared to the Long Term Average (LTA) of 514 (Figure 1). Somehow,

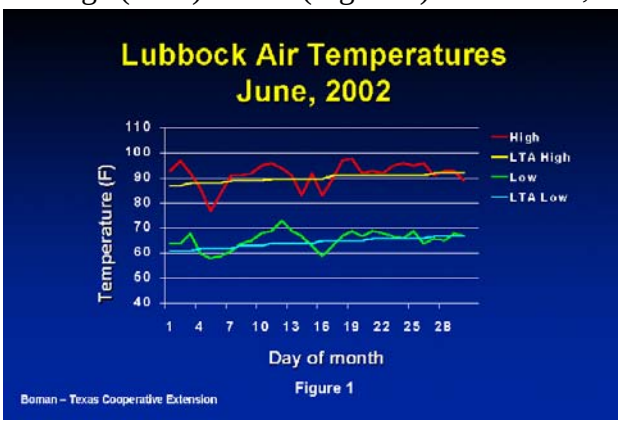


Figure 1

we "gained" an additional 2 days of heat units in June. This 4th of July holiday was one of the coolest I can remember. Normally, we face 100 degree temperatures and lots of sunshine. Because of cooler conditions, our heat unit accumulations are off for the first few days in July. For the first six days of July, we had about 95 DD60s at Lubbock compared to the LTA of 119 (Figure 2).

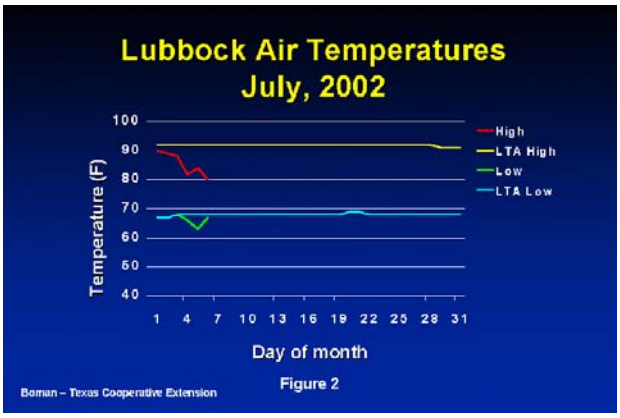


Figure 2

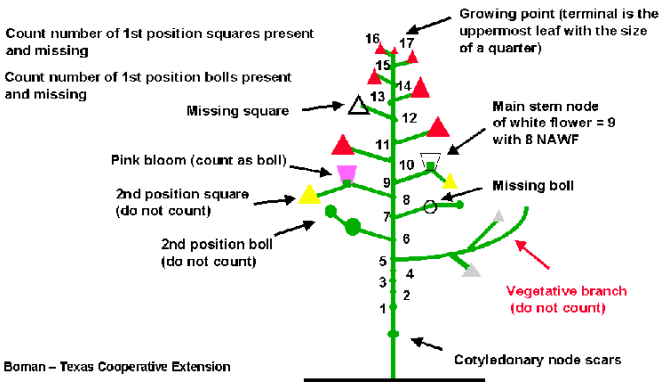
Additional welcomed rainfall has been obtained across the region. It appears that rainfall accumulations through the 6th included over 3 inches at Brownfield, 1.74 inches at Crosbyton,

about 1 inch at Denver City, 1.80 inches at Floydada, 1.82 inches at Lamesa, 0.91 inch at Levelland, only 0.25 inch at Littlefield, 0.87 inch at Lubbock, 0.67 inch at Morton, about 0.90 near Muleshoe, about 0.5 inch at Plainview, 1.74 inches at Post, 1.18 inches at Seminole, 1.57 inches at Snyder, an additional 1.06 at Tahoka, and only 0.29 inch at Tulia.

Lynn County continues to capture good rainfall, and perhaps will be on the road for a good crop this year. These folks deserve it after the 2001 crop year. As of this writing I'm unaware if any hail was encountered with this weather system. Hopefully, the cloudy conditions will not affect fruit retention. As of last week, our COTMAN monitoring at the PCIP systems trial locations (**Tokio**, **Cone**, **Muleshoe**) indicated that fruit retention decreased somewhat compared to the previous week. See previous week's complete data.

Plant monitoring. Monitoring fruiting is an important management consideration. First position fruit is very quickly counted, and is generally adequate for "getting a handle on the crop" (Figure 3). At early bloom, up to 80% of the harvestable crop will be on the plant in the form of squares and blooms. We like to see 85% square retention going into the first week of bloom. Many times, High Plains fields will enter blooming with square retention greater than that. Plant mapping can be used to help monitor the progress of the crop and determine some important crop factors. (See also COTMAN section.)

Figure 3. Early bloom plant mapping considerations using first position fruiting sites.



Important plant mapping data at early bloom are:

1. Total 1st position squares present and missing (retained squares / total square sites = % square retention). Square retention goal is 75 - 85% 14 days after early bloom.

2. Total 1st position bolls present and missing (retained bolls / total boll sites = % boll retention). Percent boll retention goal is at least 50%, with 75% excellent for 3 - 4 plants / ft on 40 inch rows.

3. Nodes above white flower (NAWF) gives an indication of crop vigor and yield potential. For the High Plains region, greater than 7-8 NAWF could be considered excellent, 6-7 - good, 5 moisture stress evident, 4 or less - cutout imminent on determinate varieties.

Roundup Ready variety Crop Destruct Programs (Monsanto and Syngenta). Questions about seed tech fee refunds on Roundup Ready cotton have recently been asked. If a grower planted a dryland field and has cotton that has very poor growth and chooses to abandon the crop, the Crop Destruct Program can kick in. The producer must get this done within 60 days of planting or by July 15th (whichever is the earlier date). Contact your dealer, or Paymaster/Monsanto or Syngenta representative if you have questions concerning seed and technology fee refunds. ALL CROP DESTRUCT ACRES MUST BE APPROVED BY A COMPANY REPRESENTATIVE PRIOR TO DESTRUCTION.

Monsanto's Replant Relief Program includes a Crop Loss/Destruct Refund, which is implemented when a producer loses the crop within 60 days after planting or by July 15. Eligible Roundup Ready varieties with will

receive 100% of technology fees plus $9.00/bag. Those with Bollgard will receive 100% of technology fees plus $13/bag. Bollgard/Roundup Ready stacked varieties will receive 100% of technology fees plus $15/bag. Most cotton varieties with Monsanto transgenic traits planted in the High Plains region are eligible for this program. Contact your Monsanto representative or seed provider for a complete list.

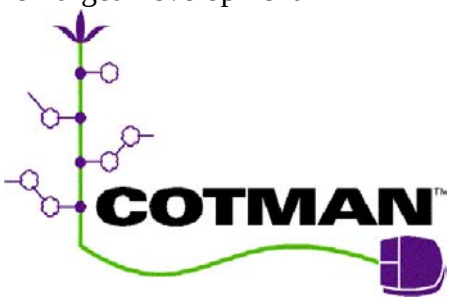
The Syngenta Crop Loss Protection Refund Program covers eligible Roundup Ready varieties and Bollgard/Roundup Ready stacked varieties. Touchdown herbicide must have been used on the crop for burndown or in-crop applications. The refund includes 100% of technology fees for Roundup Ready and Bollgard/Roundup Ready stacked varieties. Eligible varieties with Roundup Ready will receive 100% of technology fees plus $9.00/bag. Bollgard/Roundup Ready stacked varieties will receive 100% of technology fees plus $15/bag. The loss must occur within 60 days of planting. Most cotton varieties with Monsanto Roundup Ready or Bollgard/Roundup Ready traits planted in the High Plains region are eligible for this program.

Fertilizer costs. Some questions have been asked about the benefits of foliar fertilization versus soil applications. It is imperative that the crop be properly fertilized through traditional soil applications or fertigation. When one calculates the amount of fertilizer (lbs of actual nutrients on a per acre basis) applied via foliar applications, and then compares that to the crop needs (about 50-60 lb actual N/bale of cotton produced), then there is no way that foliar applications can meet crop uptake requirements. If one assumes that a foliar fertilizer weighs 12 lb/gallon and has about 16% N, and one gallon/acre is applied, then the crop is only going to receive (12 lb x 16% N = 1.9 lb) under 2 lb of N/acre. This is not enough to satisfy crop requirements.

Another factor to consider is price per pound of actual N. First determine the cost per ton of the source material. Then calculate the pounds of actual N per ton of material. For the example below, 32-0-0 fluid fertilizer material is used. Multiply 32% x 2000 = 640 lbs actual N per ton of fertilizer. Next divide the cost per ton of material by pounds of actual N per ton: $135 per ton (MSRP) / 640 lbs actual N per ton = $0.211 / lb of actual N from 32-0-0. The per unit cost of nutrients can vary considerably, especially for foliar-feed type materials. **RB**

COTMAN PLANT MONITORING TOOL

Continuing our discussion of this plant monitoring tool from last week, I will delve into SQUAREMAN, mainly the collection of data. Next week I will discuss data interpretation and the Target Development Curve. Once per season each field will need to have plant stand density determined. This will be obtained by counting plants in 3 row feet from 24 consecutive rows. This will be used to calculate fruit per acre.



During the first plant mapping visit, first fruiting node will need to be determined. This is a once per season chore and is obtained by counting up from the cotyledons (seed leaves = “0”) up to the first sympodial or fruiting branch (FFN). This is done at 4 locations per field. At each location, check 5 consecutive plants in one row, turn around and then check 5 consecutive plants in this row, for a total of 40 plants per field. FFN will typically be found between nodes 5 and 7 but sometimes as low as 3 or as high as 8 or 9.

Square mapping for retention is done at least three times before bloom once or twice per week. This is done in 4 locations in the field, 5

consecutive plants per row, and two adjacent rows per location for a total of 40 plants. You will stop collecting square map data when 10 plants at each of the 4 locations can be found with a first position flower. At this time you will switch to BOLLMAN and start counting nodes above white flower (NAWF). More on this next week. For square mapping purposes, start with the upper-most expanded leaf (edges not touching) and check for the presence or absence of a square. Record a "1" if present, a "0" if missing or a "2" if a flower is present. Continue down the plant recording a "1", "0", or a "2" until you run out of fruiting branches. Don't mistakenly count second positions. See Randy Boman's Figure 3.

When square mapping, also take plant height from the ground to the terminal on the first plant of each set of 5 consecutive plants for a total of 8 per field. This information is needed for the calculation of height-to-node ratios. **JFL**

IRRIGATION SCHEDULING

Scattered storms continue to produce variable precipitation on the South Plains. During the period from July 2 to July 8, South Plains Evapotranspiration Network (SPET) weather stations recorded precipitation in the amounts of 1.01 inches at Lubbock, 0.01 inches at Halfway, and 1.55 inches at Lamesa. Crop water use estimates for the same time period are indicated in the table below.

Crop water use estimates based on SPET Network Data, July 2-8, 2002.
(Inches per Day)

Location	Cotton emerge	Cotton 1st square	Peanut pegging	Peanut pod	Sorghum 4-leaf	Sorghum flag
Halfway	0.10	0.20	0.21	0.23	0.11	0.18
Lubbock	0.09	0.18	0.19	0.21	0.11	0.18
Lamesa	0.09	0.19	0.19	0.21	0.11	0.18

Crop water use for other crops (corn, soybeans, and lawn grasses) and growth stages are available. For more specific crop evapotranspiration information, consult the South Plains ET Network daily summaries at http://lubbock.tamu.edu/irrigate/et/etMain.html.

Evapotranspiration daily summary for Lubbock:
http://lubbock.tamu.edu/irrigate/et/weather/lubbock.fx

Evapotranspiration daily summary for Halfway:
http://lubbock.tamu.edu/irrigate/et/weather/halfway.fx

Evapotranspiration daily summary for Lamesa:
http://lubbock.tamu.edu/irrigate/et/weather/lamesa.fx
DP

WEST NILE VIRUS UPDATE

Most people have heard that two birds in the Houston area tested positive for West Nile Virus. Mike Merchant, our excellent urban entomologist in Dallas, has sent some information on West Nile Virus, and I am including it below.

"West Nile Virus (WNV) is a new form of encephalitis caused by a virus transmitted by mosquitos. Encephalitid diseases are not new to Texas. From 1991 through 2000, an average of 62 cases of human encephalitis were reported yearly. Horse owners regularly vaccinate their animals for encephalitis diseases. As encephalitis diseases go, WNV is not one of the more pathogenic. In New York City, where the disease was first detected, an estimated 130 people contracted the virus for every one person who was hospitalized. Hospitalization rates are higher for people over the age of 65. Nevertheless WNV has been incriminated in 10 human deaths and deaths of scores of horses in the eastern US since 1999."

"As far as we know, horses are the only domestic livestock likely to be harmed by WNV. As a result, horse owners east of the I-35 corridor in Texas are being urged by some veterinarians to get their horses vaccinated for WNV. Although the risk [in the Dallas area] is probably low, it is not safe to assume that it will be a long time until WNV reaches north Texas or other parts of the state. This virus has a history of jumping from one location to another fairly quickly. Although WNV is transmitted by mosquitos, it can be carried long distances by songbirds, including crows and grackles. Horse owners should check with their veterinarians to decide whether the vaccine is recommended in their county."

"You should be alert to any unusual local die-offs of hawks, crows, grackles, or bluejays. These bird species are apparently very susceptible to WNV and are the ones TDH is most interested in surveying. Instructions for sending in bird samples for analysis, as well as general information on WNV impact on domestic livestock and humans, can be found at the website maintained by the Texas Department of Health. http://www.tdh.state.tx.us/zoonosis/DISEASES/arboviral/westnile/westnile.asp."

I have a limited number of one-page color fact sheets on West Nile Virus. To receive a copy, please call Michelle Coffman at (806) 746-4042 or e-mail her at m-coffman@tamu.edu. The fact sheet is also on the web at: http://ncpmc.org/NewsAlerts/westnilevirus.html.
RPP

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