Issues in Agriculture

The Newsletter about Integrated Pest Management for the El Paso Valley

Volume: 36
Issue: 9
Date: November 15, 2011

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Announcements

- **Pima cotton variety trial field day** on Wednesday Nov 16 (10:00-11:00 AM) at Mr. Ramon Tirres Farm on North Loop Dr., ½ mile west of intersection with Webb Road. This is a great opportunity to evaluate the performance of pima cotton varieties in local conditions. This meeting is free of charge. Participation certificates with one Continuing Education Unit will be provided.

- Dr. Jaime Iglesias invites you to the **Soil-Water Salinity Management and Low Flow Irrigation Techniques Workshop** at the Texas AgriLife Research Center 1380 A&M Circle, El Paso, TX 79927 on Nov 30, 2011 (1:30 - 5:30 PM). The workshop consists of the following five presentations: Soil water salinity chemistry and correction, Soil water salinity tests and recommendations, Irrigation techniques with low flow and salty water, Soil drainage, and Salinity management preparedness. The cost to attend is $20. Three general CEUs will be given to pesticide applicators and CCAs. RSVP by Nov 28th or call 915-860-2515 for more information.

- The **2011 Texas Plant Protection Association Conference** will be held on December 5th and 6th at the Brazos Center in Bryan, Texas. The conference will include a half day session on precision agriculture; which will include classroom discussions and equipment displays. Information: **http://tppa.tamu.edu/** or call Bob Sasser, phone: (936) 537-7083, e-mail: tppa@consolidated.net.

- The **2012 Beltwide Cotton Conferences** will be held on January 3-6 at the Orlando World Center Marriott in Orlando, Florida. Information: **http://www.cotton.org/beltwide/**

- The **2012 El Paso Pesticide Applicator Training** will be held on Tuesday January 24 at the Ysleta Cultural Arts Center, 9600 Simms (Exit I-10 @ McRae), El Paso, Texas 79925 from 7:30 A.M. to 3:00 P.M. This event is sponsored by the Texas AgriLife Extension Service, the Texas Department of Agriculture, El Paso Pest Management Association, and the Ysleta Independent School District. The cost will be $50. Five CEUs may be obtained for TDA, SPCS, NMDA, commercial, non-commercial, and private pesticide applicators. For general information, please call Texas AgriLife Extension Service at (915) 860-2515. For licensing information, contact Mario Saavedra (TDA) at (915) 859-3942.

I recently attended the **2011 Entomology Science Conference** at College Station (Nov 1-3) and would like to use this issue of the IPM newsletter to summarize some of the cotton presentations given at that meeting.

Entomopathogens as endophytes for cotton pest management. Greg Sword.

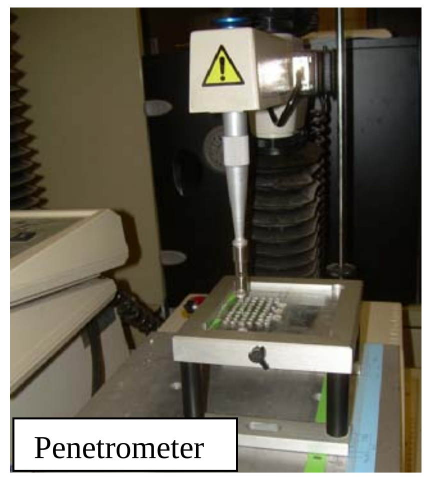
There are four to ten fungal endophytes *(plant organisms that are usually of a parasitic nature and live on or within plants)* that are common in Texas cotton. Some fungi species live asymptomatically *(without causing disease symptoms)* in plant tissues for at least part of their life cycle. Some may be latent pathogens *(disease-causing microorganisms)* and some are beneficial or antagonistic to other organisms. Microorganisms that cause insect diseases *(entomopathogens)* can grow on plants also. Entomopathogens growing on cotton can be used to control or reduce insect pests. This is a new approach to biocontrol. For instance, *Beauveria bassiana* is a well-know entomopahtogen frequently used as biocontrol agent. Inoculation of *B. bassiana* in cotton, wheat, bean, tomato, corn, and pumkin has resulted in a 50% reduction of aphid and grasshopper populations, but the specific anti-herbivore mechanisms are not understood yet. It is possible that fungal metabolites act as feeding deterrents, cause direct infection, activate/enhance plant defenses, or change plant nutrients. This approach may also work as a seed treatment in cotton. Inoculation may be used on seed, soil, or leaves.

Leaf orientation and biomechanical properties do not explain thrips preference for feeding on the underside of leaves. Lauren Kalns, Justin Fiene, Tom Jondiko, Julio Bernal, Pete Krauter, Gregory Sword, and Christian Nansen.


Adult


Immature

Western flower thrips, *Frankliniella occidentalis*, is the dominant thrips species in Texas High Plains cotton. Temik was the gold standard as the insecticide of choice against this pest, but EPA and Bayer agreed in August 2010 that Temik will be phased out by the year 2018, and there are not great alternatives to Temik at the moment. Thrips usually feed on the edge and bottom leaf surface, and rarely on the upper side of leaves. To evaluate the possibility of negative phototaxis (negative response to light by an organism) in thrips, leaves were placed upside down under a light in lab conditions. However, the proportion of thrips that feed on the natural underside, edge and upper side of the leaves does not change with leaf orientation. Another possible explanation is that thrips feeding preference obeys to biomechanical properties of the leaf surface because the top of the leaves is a bit thicker and harder to pierce. Data from the penetrometer (device that measures the force necessary to pierce the leaf surface) showed that in the genotype Atlas less force was needed to pierce lower side of the leaf, but in the genotype VO7 both sides of the leaf surface required the same force. While feeding on Atlas was correlated with leaf biomechanics, there was no correlation with V07; therefore, the leaf biomechanical hypothesis was rejected. A third hypothesis called "leaf quality" states that fitness gain per unit of feeding will be greater on the bottom surface. Contrary to what was expected, fitness per unit feeding can be better on top surface. Apparently, some factor limits thrips feeding on top of the leaf surface, but it has not been identified yet. New hypothesis: epidermal thickness, as a physical barrier, limits thrips feeding on top of the leaf surface.

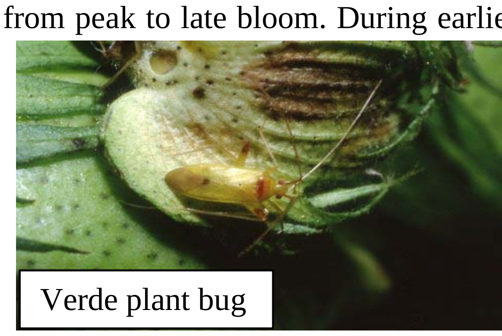

Penetrometer

Transgenic cotton cultivars show differential responses to drought stress and herbivory by western flower thrips. Justin Fiene, L. Kalns, C. Nansen, C. Rock, and G.A. Sword.

The Ogallala aquifer has reduced its reserves in approximately 9% since the 1950s. For 55.8% of land in Texas, the 2011drought has been the worst, based on 100 years of data. The year 1925 was the previous standard for a one year drought in Texas, but it can now only be considered the worst ever in 14.6% of the state. During drought, the production of abscisic acid (ABA) increases which results in stomata closing (leaf pores) and lower transpiration which causes the leaf surface temperature to rise. Some of the new transgenic cotton varieties over-express ABA which magnifies this process. Periods of drought and recovery favor growth and reproduction of herbivorous insects such as Western flower thrips. Under high ambient temperature and well water conditions lint yield increases. Cultivars recover from drought at different rates. The wild type cotton had fewer thrips eggs laid than transgenic varieties. Conclusion: different transgenic events in the same genomic background can result in substantial variation in the plants' response to drought as well as susceptibility to Western flower thrips. In other words: the behavior of cotton cultivars varies in response to drought and thrips. Future research will attempt to correlate leaf surface temperature and stomatal behavior with yield under well water and drought stress conditions. The economic viability of functional responses related to ABA-related genes will be evaluated too.

Verde plant bug association with cotton boll rot and potential in-season indicators of harvest boll damage. Michael Brewer, S. Armstrong, G. Medrano, and D. Anderson.

Bolls were visually inspected for external wounds in the field and for internal wounds and cotton boll rot in the lab. At harvest, bolls were rated for damage and presence or absence of boll rot. Verde plant bug was the predominant boll-feeding insect species in coastal fields from peak to late bloom. During earlier growth (square-feeding), the cotton fleahopper was the dominant insect pest. Boll rot resulted in damage of up to 25% of open bolls. Most boll rot damage occurred in coastal fields where verde plant bug was detected. The causal agent of boll rot is likely a bacterium. Beat bucket sampling appeared to be more sensitive to a range of pest densities. Internal feeding damage correlates well with boll rot, but not with external damage. There is very little tolerance to risk: an insecticide application is recommended if pest density exceeds 0.2-0.5 bugs per plant when using the beat bucket as a sampling method. If a grower is more willing to seek confirmation and pest density exceeds 0.2-0.5 bugs per plant


Verde plant bug

using beat bucket, then he should crack the bolls to verify boll penetration. This procedure represents more effort but it allows verification of relevant feeding.

Timing of fleahopper herbivory and cotton's compensatory response. Loriann Garcia and Micky Eubanks.

Resistance and tolerance are some of the plant mechanisms to defend against herbivores. Resistance is when the plants reduce the performance or preference of herbivores. Tolerance is when plants produce compensatory growth following herbivory. Overcompensation occurs when herbivory induces improved plant performance. For instance, the mirid *Nesidiocoris tenuis* induces increased fruit size in tomato following a 30% of flower abortion. The cotton fleahopper, *Pseudatomescelis seriatus* is a piercing-sucking herbivore. Research by Parajulee et al. (2011), Sansone et al. (2009), and Chen et al. (2007) concluded that cotton may compensate for up to 30% of square loss due to fleahoppers. There are reports of yield increase (overcompensation) as result of fleahopper infestations. This study used the variety DP 174 RR. Conclusions: fleahopper injury accelerated plant maturity, altered branching patterns (regardless of the timing of fleahopper damage), increased the number of harvestable bolls, and marginally increased lint yield. Potential mechanisms of compensation to fleahopper damage may be producing taller plants with more nodes and increased fruiting in lateral positions.

Cotton fleahopper control tests in cotton. Roy Parker.

During the period from the year 1993 to 2010, 23 tests on cotton fleahopper control were conducted near Corpus Christi. A summary of these field studies indicate that there is an average net return of $39.95 per acre by controlling fleahoppers. In 2011, the following insecticides were evaluated for fleahopper control: Belay / Poncho (clothianidin), Carbine (flonicamid), Centric (thiamethoxam), CMT4586 (imidacloprid + spirotetramat), Couraze (imidacloprid), Dimethoate, Fastac (alpha-cypermethrin), Intruder (acetamiprid), and Transform (sulfoxaflor). Centric was used as the standard insecticide. All treatments significantly reduced fleahopper levels; especially Belay, which resulted in the lowest numbers of fleahoppers after treatment. Very good fleahopper control was achieved by using Centric or Transform.

Potential for Transform insecticide in Texas cotton. David Kerns.

Sulfoxaflor is a new insecticide from Dow AgroSciences that is marketed under the trade names of Transform (in cotton) and Closer (in vegetables). The pests controlled include: aphids, whiteflies, Lygus, planthoppers, scales, and other sap-feeding insects. It has an excellent mammalian and environmental profile as a systemic insecticide that moves through the xylem and it is also a translaminar (through the leaves). So far it is effective at low rates even on insect populations that are resistant to a variety of other insecticides. It degrades quickly in the soil and is labeled as fast acting with extended residual control. It stops insect feeding in 2 hours. Pest targets in TX cotton include Lygus, cotton fleahopper, and aphids. Transform was compared to Orthene 97 at 1 lb/a, Belay 4.5 fl oz/a, and Carbine (the standard for Lygus control) at 2.3 oz/a. Transform was tested at 0.35, 0.7, 1.43, and 2.14, oz/a. Centric and Belay resulted in greater mite damage ratings. Conclusions: Transform provides highly effective Lygus control with low potential for flaring of secondary pests. It is a great alternative to Carbine. It provides good activity and residual control against the cotton fleahopper. Transform performed well with longer residuals for aphid control.

The effects of pulsed water stress on cotton pest abundance and diversity. Warren Sconiers and Micky Eubanks.

The plant stress hypothesis states that at more water stress levels, more nitrogen is produced in the plant and that excess nutrients may benefit herbivores. Continuous stress occurs when the water deficit is constant. Pulsed stress happens in periods of stress followed by periods of recovery. Herbivores will perform better on pulsed stress plants due to excess nutrients and higher turgor pressure. The pattern of thrips and stikbugs abundance matches the pulsed stress hypothesis. Conclusions: Pulse-stressed plants harbor more damaging pests than continuously stressed or non-stressed plants. Non-stressed and pulse-stressed plants support similar abundance of herbivores. Stress severity influences herbivore and predator abundance

The effect of thiamethoxam applications on spider mites and their natural enemies in cotton fields. Adrianna Szczepaniec and Micky Eubanks.

Neonicotinoids are a very widely used class of insecticides. It is worth asking: Do neonicotinoids increase populations of spider mites in agricultural fields? Neonicotinoids may lower the expression of genes involved in pest defense in cotton, corn, and tomatoes. This study compared Cruiser seed treatment, Centric 40 WG foliar, Cruiser 5 FS seed + Centric 40 EG foliar, Cruiser 40 WG, and Orthene 97. Abundance of spider mite predators was not different among treatments.

Cotton aphid control and damage, and insecticide impact on lady beetle larvae. Brant Baugh, David Kerns and Dustin Patman.

Insecticides evaluated for aphid control included: Cyazapyr at 13.5, 16.9, and 20.5 oz/a, spirotetramat +

imidacloprid at 8 oz/a, zeta cypermethrin + bifenthrin + imidacloprid at 4 and 4.8 oz/a, azadirect at 6 and 8 oz/a, Intruder at 8 oz/a, and Centric at 1.5 oz/a. Test results indicated that spirotetramat + imidacloprid at 8 oz/a, zeta cypermethrin + bifenthrin + imidacloprid at 4.8 oz/a, Intruder at 8 oz/a, and all rates of Cyazapyr provided effective aphid control. In general, neonicotinoids produce significantly high lady beetle larvae mortality (Belay, Centric, Trimax). The currently accepted aphid threshold is 50 aphids/leaf, but field tests suggest that the aphid threshold should instead be based on plant stress as follows: when there is no plant stress (normal conditions pre-bloom) treatment is rarely justified. In mild stress (normal conditions, early bloom) the current threshold of 50 aphids per leaf is appropriate. During high stress (water stress or heavy boll filling) a level of 20 aphids per leaf should be used.

Kurtomathrips morrilli: a new cotton pest. Kerry Siders, Manda Anderson, David Kerns, Brant Baugh and Dustin Patman

Originally described in AZ. Collected in AZ CA, NM, NV, TX, FL, HI, Jamaica, and India. Reported on cotton, eggplants, beans, and chrysanthemums. Reports on cotton date back to 1920-1950s, but there is little information on these infestations. It is very difficult to see with the naked eye. It quickly spreads after a stress event such as insufficient water, boll fill, or irrigation termination. There are winged and wingless adult forms. The immatures are pearly white and later turn creamy yellow. This thrips species prefers to feed along the leaf veins on both upper and lower leaf surfaces. Symptoms initially show silvery leaf color at the edge of the field along with reddening of leaf veins. Plant defoliation started 10 days after initial diagnosis. Trimax Pro at 1.8 fl oz/a, Orthene 97 at 8 oz/a, Intruder at 1 oz/a, Radiant 6 fl oz/a, and Tracer 2.5 oz/a were tested for Kurtomathrips control. All chemicals were effective. Vydate at 17 fl oz/a reduced thrips levels at 6 and 13 DAT.


Adult and larva

Controlling bollworms and fall armyworms in non-bt cotton. Dustin Patman, Scott Russell, Manda Anderson, Brant Baugh and David Kerns.

Prior to August, worm populations usually consist of bollworms. By mid-August, worm population are often mixed (bollworms and fall armyworms). Pyrethroids are effective against bollworms, but weak on fall armyworms. Insecticides that provide effective armyworm control tend to be weak on bollworms. Results from this study indicate that Belt is weak for both bollworms and fall armyworms control. Mixing a low rate of Belt with a pyrethroid is a good tactic for mixed populations. Prevathon at a high rate appears effective toward both bollworms and fall armyworms. Besiege (Prevathon + Lambda-cyhalothrin) may be a cheaper control option than using Prevathon alone. Cyazapyr looks promising as a bollworm material and probably has good fall armyworm activity. Blackhawk does not appear effective for bollworm control.


Bollworm


Fall armyworm

2010-2011 West Texas/New Mexico pink bollworm trapping/ modeling. Warren Multer, Jane Pierce, Manda Anderson, Scott Russell, Tommy Doederlein, Richard Zink, Michelle Walters, Bob Staten and Charles Allen.

The El Paso/Trans Pecos zone is composed of the 15 westernmost Texas counties. The southeastern part of Midland County was the hot spot in the fall season of 2010 with a total 1,434 pink bollworm (PBW) moths captured. The extensive use of Bt cotton varieties and the harsh weather resulted in few PBW left. PBW moths were captured in only six fields. Three of these were non Bt-fields. It is likely that less than 100 acres were infested. This may be a good opportunity to eradicate PBW in S. E. Midland County.

The Texas AgriLife El Paso IPM Program is partially supported by the following organizations:
El Paso Pest Management Association
Texas Pest Management Association
Valley Gin Company, Tornillo
West Texas Pecan Association

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The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.