## IDENTIFYING PRACTICAL KNOWLEDGE AND SOLUTIONS FOR MANAGING THE SUCKING BUG COMPLEX IN COTTON: RESEARCH IN THE SOUTHEAST REGION: A PROGRESS REPORT

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## **Introduction**

Following the elimination of the boll weevil in the southeast and coupled with the present low spray environment resulting from the introduction of *Bt* cottons, the sucking bug complex [primarily the green stink bug, *Acrosternum hilare* (Say), the southern green stink bug, *Nezara veridula* (L.), the brown stink bug, Euschistus servus (Say), and the tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois)] have become major late season economic pests. The recent introduction of new *Bt* cottons, such as Bollgard II and Widestrike, are expected to further decrease the need for caterpillar treatments, thus increasing the potential for bug damage. To address this growing problem in a comprehensive, coordinated manner, in 2005 Cotton Incorporated, through the Southeast Region State Support Committees, funded a regional project entitled '*Identifying Practical Knowledge and Solutions for Managing The Sucking-Bug Complex in Cotton: Research in the Southeast Region*'. Entomologists in North Carolina and Georgia assumed the lead role in this research, with help from colleagues in Virginia, South Carolina, and Alabama. The stated objectives of this project are to: 1) investigate the temporal and spatial dynamics of sucking bugs within farmscapes to determine whether there are predictable patterns of crop and non-crop utilization, 2) develop efficient detection methods for sucking bugs or their damage in cotton, and 3) develop practical treatment thresholds for sucking bugs in cotton.

## **Studies Undertaken and Conference Presentations**

Under the direction of Drs. John Van Duyn and J. R. Bradley of NCSU, Ph.D. student Eric Blinka has begun work on the farmscape aspect of this grant. He has utilized pheromone trapping (brown stink bugs), light trapping (green stink bugs), plant sweeping in different crop and non-crop habitats (both stink bugs and plant bugs), and whole-plant examinations in determining between and within-field stink bug and plant bug distribution and movement. In the light trap research, Eric has identified crop and non-host mixes in an area of approximately 100 acres surrounding each of 35 light traps placed throughout North Carolina's major cotton-growing region. Eric will present a poster based on this latter work '*Stink bug distribution based on black light trap captures across North Carolina associated in relation to surrounding agricultural host plants*' in Salon H, viewed from Wed. to Friday.

This group is also evaluating the distribution of boll damage on the cotton plant by node zones in treated and in plots or subdivided fields to quantify times and amounts of economic injury.

Dr. Ames Herbert of Virginia Tech and Dr. John Van Duyn are directing research aimed at elucidating the relationship between all aspects of external and internal boll damage symptoms and its impact on hard lock, cotton yield and quality. This

in turn should help clarify cotton fruit and bug monitoring procedures and contribute to the development of dependable treatment thresholds. One major aspect of their research in 2005was the identification three cotton fields in Virginia and one in North Carolina at or close a 20% boll damage threshold, assessing the fate of three groups of 100 quarter-sized bolls per field. The first group of 100 bolls per field were selected and brought back to the lab for the examination and recording of all external and internal indications of bug damage. The second group of 100 identical bolls was tagged and brought back for evaluation at the black seed stage and each boll rated on a 1 to 5 scale for severity of bug damage. The third group of 100 tagged bolls was later picked as either damaged or open bolls and assessed in the lab on the rating scale described above. Seed cotton was picked from each lock of each boll and combined by damage category for yield. Fiber samples will be sent to the Cotton Incorporated facility in Cary, NC for fiber quality assessments to establish relationships between bug damage, hard lock, yield, and quality. A poster on this initial year's work, '*Association of bug-induced boll damage symptoms with hard lock, lint yield and quality*' will be presented at this conference during the days indicated above.

Drs. Jack Bacheler of NCSU and Phillip Roberts of UGA coordinated a series of eight graduated spray protection tests in 2005 in cooperation with Eric Blinka, Dr. John Ruberson, two county agents in North Carolina, David Morrison and Tom Pegram, and Dr. John Van Duyn. In all but one of these tests, protection from bug damage ranged from one to seven applications, with the most protected plot receiving seven weekly applications beginning at first bloom, the next most protected plot receiving six weekly applications beginning one week after anthesis, and so on. Data were taken weekly on square retention, shake cloth samples of all bug species, dirty bloom counts, weekly boll diameter measurements of the first 25 bolls encountered from a pre-measured spot in each replication of the most protected plot. The distance needed to find these first 25 consecutive bolls was measured weekly to calculate the number of bolls per acre throughout the season (this distance changed weekly). At 1, 3 and 5 weeks after bloom initiation, white flowers were tagged and boll diameters measured at 3.5 weeks (approximating the 'stink bug safe' point). Two to three days following the spraying of a 'new' plot, 100 to 200 row feet per plot (400 to 800 row feet per week) were checked for stink bug species and instar via crawling (the dreaded 'cadaver crawl'). Yields were machine picked from the center two to four rows of each plot in seven of eight tests. weighed and transported to the Microgin in Tifton, Georgia for gin turnouts. Fiber samples will be sent to the Cotton Incorporated facility for quality assessments to help further determine the relationship between bug damage and quality. Jack Bacheler will present a paper, 'Relationship between cotton phenology and bug pressure vs. yield and quality in a progressive spray environment' on Thurs. in at 3:00 p.m. The variability between boll damage and yield from one test to the next was significant in 2005. Phillip Roberts will address this issue in a paper 'Variability in the relationship between boll damage and yield' at 4:00 p.m. on Thursday.

Dr. Roberts, with help from Mr. Tommy Walker of Clemson, Dr. Ron Smith of Auburn, and John Ruberson of UGA coordinated a series of six threshold verification trials which compare no treatment with complete protection and treating at the 20% internal boll damage threshold under different agronomic and bug pressure conditions. This (and most of the above) research will continue in 2005.

## **Acknowledgements**

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