# INSECTS: NEW PRODUCTS, TECHNOLOGY AND CONCERNS

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## Abstract

Despite the advances in cotton insect management documented from the time when insects were first recognized as an economic threat to profitable production to the present, insects have continued to extract significant economic losses, both through their direct damage to cotton and via the indirect penalties resulting from control costs, most recently not only resulting from insecticide and spray costs but also in the form of significant up-front technology fees for seeds that produce caterpillar resistant and herbicide tolerant plants. Although the more recent advances in transformed plants have led to unprecedented control of most caterpillar and weed species, the selection of herbicide-resistant weeds and the increased pest status of formerly secondary pests in low spray environments have stymied our attempts at low cost effective insect control. However, only by continued advances in insect managemt have producers been able to produce cotton profitably in the face of new and changing insect threats.

In 2011, Beltwide Insect Losses data, which considered damage, control costs and technology fees, reflects a variety of insect pests and considerable regional differences. Whereas yield reductions from plant bugs, thrips, and stink bugs were similar across the Cotton Belt in 2011, thrips and stink bugs were far more an issue in the Southeast than elsewhere and plant bugs a strikingly serious pest in the Midsouth. The authors of presentations in the Insect Control Conference of our 2012 Beltwide Cotton Conferences generally reflect these regional differences. Other pest issues, such as the Boll Weevil Eradication Program and the adoption of Bt and herbicide-tolerant plants, account for essentially a Beltwide buy-in.

Even within regions, differences in the intensity of specific pests between cotton states may vary greatly. For example, averaged over several years, the damage and control costs for thrips is far higher in Virginia and North Carolina than elsewhere in the Southeast, probably a result of both this sub-region's high ratio of thrips overwintering hosts to relatively small field size and this area's extended window of seedling vulnerability to thrips damage in early seedling growth stages. In Virginia, in a series of 12 replicated small plot tests conducted from 2005 through 2011, plots which received a seed treatment plus a foliar spray out-yielded the untreated plots by more than 375 pounds of lint per acre. While the dwindling supplies of aldicarb (Temik 15G) and potential loss of this product for thrips and nematode control loom as a serious economic loss to our cotton producers, an as yet untested aldicarb replacement Meymik may be produced and sold in the US by 2013. Data collected through a 2011 Cotton Incorporated Southeast Regional Project has helped scientists in this area to show decisively that foliar pyrethroids are ineffective for thrips under moderate populations and that some new foliar insecticide sprays, such as Radiant and Benevia, show promise if they can be sold at cost-effective rates. Transformed plants resistant to thrips feeding may provide producers an additional tool in their annual battle against thrips.

Although WideStrike cotton varieties showed consistently lower bollworm damage to bolls than Bollgard II varieties in whole field under grower conditions, in a 6-year late season boll damage evaluation conducted in North Carolina in 512 cotton fields from 2006 to 2011, the difference between technologies was only 0.18% damaged bolls (0.33% for WideStrike and 0.15% for BGII). If one assumes a 10 pound lint yield loss for every 1% boll damage, at $0.95/lb., this difference is approximately $2.00 an acre. Comparisons such as this show that varietal performance, not Bt technology, should inform producer choices of variety selection.

Through a variety of projects funded by Cotton Incorporated from 2005 until 2011 and a project funded by the Southern Region IPM Center, extension entomologists were able to develop far more efficient scouting procedures and thresholds for management stink bugs. Out of this work came the development of the "Dynamic Threshold" concept which focused scouting efforts and provided lower thresholds for the period of maximum susceptibility to economic damage from stink bugs – weeks 3 through 5 of the bloom period. A rugged 3x6-inch plastic Pocket Scouting Decision Aid field card was developed which provided 1) a "threshold by week of bloom" table, 2) recommended scouting procedures, 3) measuring holes to select the correct boll sizes, and images of external and internal boll damage from stink bugs. These cards were produced and distributed to agents, producers and consultants throughout the Southeast in 2010. The use of the card was expanded into Midsouth, Oklahoma and Texas in 2011 to judge the utility of this card in areas of the respective states were stink bugs were the major pest

complex. A new stink bug pest may be on the horizon - the brown marmorated stink bug. This invasive Asian insect, recognized as a significant fruit and vegetable pest in Pennsylvania around 2000, has been gradually been spreading into areas of Virginia, North Carolina and Tennessee. Dr. Ames Herbert of Virginia Tech has been conducting preliminary cage studies with this pest. This stink bug species appears to be able to damage older cotton bolls than is the case with our common green stink bug and tends to develop much high populations. The big present unknown is the extent to which this insect may spread into the cotton belt of the United States and if cotton bolls are high on this species host preference “list”.

As is the case with weeds and diseases, our ability to manage insects effectively and economically appears to be an ever-changing struggle. The solving of one set of pest problems seems to herald the dawn of new challenges. Cotton pest management history tells us that we can expect no less. I hope we continue to be up to the challenge.