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Results of Insect Control Evaluations on Corn, Sorghum, Cotton, Sunflower, Pasture, and Stored Grain in Texas Coastal Bend Counties
LEAF-FOOTED BUG DAMAGE AND YIELD EFFECTS ON LATE SEASON COTTON

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Darwin Anderson, Michael Brewer, and Charlene Farias
Texas A&M AgriLife Research, Corpus Christi, Texas

SUMMARY: The presence of leaf-footed bugs in South Texas cotton is sporadic. For example, in 2010 leaf-footed bugs were present in only 4 of 25 surveyed fields. Three of these fields were followed in 2011 and 2012 with leaf-footed bugs not present in 2011 but present in 2012. In 2012, one of these fields was chosen to evaluate boll damage of late planted cotton from the leaf-footed bug and whether the boll damage substantially affected yield. The field test involved 2 varieties of cotton (Phytogen 367 WRF and Stoneville 5458 B2RF), 2 planting dates (late, April 12 and very late, April 30), and 3 water regimes (dryland, 75% ET irrigation, and 100% ET irrigation). Boll damage was significantly higher in the top crop bolls of the very late (April 30) planting when compared to the late (April 12) planting. No differences in lint and seed yield could be attributed to the leaf-footed bug damage occurring in the top crop. Lint and seed yield differences were only associated with planting date (lint and seed yields were significantly higher in the April 12 planted cotton compared to the April 30 planted cotton), and irrigation treatment (lint and seed yields were significantly higher as water was increased across the three water regimes). These results support current Texas A&M AgriLife Extension recommendations for the management of sucking bugs in maturing cotton at cut-out (5 NAWF), timely planted cotton with a good fruit set, receiving adequate moisture during the growing season. Under this management, little to no economic damage to leaf-footed bug was experienced after cut-out (5 NAWF). Plus the required accumulated heat units.

OBJECTIVE: To evaluate middle and top crop boll damage and yield effects in the presence of leaf-footed bugs across 2 cotton varieties, 2 planting dates and 3 water regimes.

MATERIALS/METHODS: In 2012, we observed a migration of leaf-footed bugs into a cotton field experiment when the cotton was at cut-out (5 NAWF) in the dryland plots planted on April 12 (late). No insecticide was applied and the population increased. Previously, in 2010 leaf-footed bugs were present in only 4 of 25 surveyed fields in South Texas. Three of these fields were followed in 2011 and 2012 with leaf-footed bugs not present in 2011 but present in 2012. The 2012 cotton field experiment had three replicated treatments: 2 cotton varieties, 2 late planting dates, and 3 water regimes. The presence of leaf-footed bug late in the test and our decision not to control this insect provided the opportunity to evaluate if the apparent damage to the top crop contributed to yield differences not attributable to the planting date, variety, and water regime treatments. The test was a split plot design with the main plot water regimes and the split a 2 variety and 2 planting date combination of treatments. The plot size was 4 rows (38 inch) by 50 feet with 5 replications. The cotton varieties were Phytogen 367 WRF and Stoneville 5458 B2RF. The two planting dates were late (April 12) and very late (April 30) as designed to increase insect presence. The water regimes were dryland, 75% ET irrigation, and 100% ET irrigation). Field observations indicated greater occurrence of leaf-footed bug on 1) the
late planted plots compared to the very late planted plots, 2) the irrigated plots compared to the dryland plots, and 3) the top crop bolls compared to the middle crop bolls. On August 16, 2012 (126 days after planting for the April 12 planting and 108 days post plant for the April 30 planting) a random sample of 15 open bolls per plot was taken from the middle of the sampled plants and rated for plant bug damage using a 0 to 4 scale (Fig. 1). The same 0 to 4 rating system was used on a random sample of top bolls 1 day prior to harvest on August 23 for the late planting and August 30 for the very late planting. Harvest was by a 2-row John Deere Picker and ginning was on a 10 saw Eagle laboratory gin. The means were calculated across the 5 replications and analyzed using ANOVA per the split plot design of the experiment. Tukey’s means separation tests at a probability level of 0.05 were done comparing the four variety:planting date treatments (averaged across the water regimes) and the three water regimes (averaged across the variety:planting date treatments).

![Image of damage scale](image.png)

**Fig. 1.** Example of the 0 to 4 damage scale used when scoring open bolls for insect damage.

**RESULTS/DISCUSSION:**

**Boll Damage:** The statistical separation of the top crop bolls of the late planting compared to the very late planting indicate that the leaf-footed bug damaged the top crop bolls and this matched our observations of leaf-footed bug activity on the top of the plant in the very late planted cotton. In comparison, we saw little middle boll damage attributable to leaf-footed bug activity (Fig. 2). In the comparison across water regimes there was no difference in insect damage for the middle crop bolls across all three water regimes. Insect damage did increase for the top crop bolls as water was increased and was significantly higher in the 100% ET irrigation compared to both the dryland and 75% ET irrigation treatments (Fig. 3).

**Yield:** No differences in lint and seed yield could be attributed to the leaf-footed bug damage occurring in the top crop. Lint and seed yield differences were only associated with planting date (lint and seed yields were significantly higher in the April 12 planted cotton compared to the April 30 planted cotton, Figs. 4 and 5), and irrigation treatment (lint and seed yields were significantly higher as water was increased across the three water regimes, Figs. 6 and 7). Seed and lint yield results agreed with normal accepted practices where earlier planting dates and increased water affect yields in a positive manner.

The insect damage ratings concurred with our observations that the leaf-footed bug occurred predominantly and damaged 1) the top crop bolls as compared to the middle crop bolls, 2) the very late (April 30) planted cotton as compared to the late (April 12) planted cotton, and 3) the 100% ET irrigated cotton as compared to the 75% irrigated and dryland cotton. Planting date and water had more effect on lint and seed yields than the leaf-footed bug when it occurred after cotton cut-out (5 NAWF).
Timely planted cotton with a normal boll load and adequate water during the growing season will likely be able to tolerate late season leaf-footed bug activity without negative yield effects when cut-out is set at 5 NAWF + 475 accumulated heat units.

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**Fig. 2.** Open boll insect damage rating (0 to 4 scale, 0 = no damage and 4 = damage of all locules) of middle and top crop bolls for cultivar Phytogen 367 WRF (PHY) and Stoneville 5458 B2RF (STV) planted on April 12, 2012 (late) and April 30, 2012 (very late). Means are averaged across the three water regimes. Data are averages of 15 randomly selected middle and top bolls across 5 replications. Differences in boll damage ratings are indicated by different letters (capital and lower case letters are compared separately). The statistical separation of the top crop bolls of the late planting compared to the very late planting indicated that the leaf-footed bug damaged the top crop bolls, and this matched our observations of leaf-footed bug activity on the top of the plant in the very late planted cotton. In comparison, we saw no middle boll damage attributable to leaf-footed bug activity. (Nueces County, TX 2012)
Fig. 3. Open boll insect damage rating (0 to 4 scale, 0= no damage and 4= damage of all locules) of middle and top crop bolls under 3 water treatments of dryland, 75% ET irrigation, and 100% ET irrigation. Means are averaged across the varieties and planting dates. Data are averages of 15 randomly selected middle and top bolls across 5 replications. Differences in boll damage ratings are indicated by different letters (capital and lower case letters are compared separately). Damage to middle crop bolls did not increase across water regimes but did significantly increase across water regimes for the top crop bolls indicating the leaf-footed bugs favored the top crop of the 100% ET irrigated cotton over the 75% irrigation and dryland treatments. (Nueces County, TX 2012)

Fig. 4. Lint yield (lbs/A) for cultivar Phytogen 367 WRF (PHY) and Stoneville 5458 B2RF (STV) planted on April 12, 2012 (late) and April 30, 2012 (very late). Means are averaged across the three water regimes. Data is an average of 15 randomly selected middle and top bolls across 5 replications. Differences in lint yield are indicated by different letters. Significant differences in lint yield follow results from accepted cropping results for the region where earlier plantings consistently out-yield later plantings of cotton. (Nueces County, TX 2012)
Fig. 5. Seed yield (lbs/A) for cultivar Phytogen 367 WRF (PHY) and Stoneville 5458 B2RF (STV) planted on April 12, 2012 (late) and April 30, 2012 (very late). Means are averaged across the three water regimes. Data is an average of 15 randomly selected middle and top bolls across 5 replications. Differences in seed yield are indicated by different letters. Significant differences in seed yield follow results from accepted cropping results for the region where earlier plantings consistently out-yield later plantings of cotton. (Nueces County, TX 2012)

Fig 6. Lint yield (lbs/A) for three water regimes: dryland, 75% ET irrigation, and 100% ET irrigation. Means are averaged across the two planting dates and two varieties. Data are averages of 15 randomly selected middle and top bolls across 5 replications. Differences in lint yield are indicated by different letters. Significant differences in lint yield follow results from accepted cropping results for the region where increasing water consistently increases yield. (Nueces County, TX 2012)
Fig. 7. Seed yield (lbs/A) for three water regimes: dryland, 75% ET irrigation, and 100% ET irrigation. Means are averaged across the two planting dates and two varieties. Data are averages of 15 randomly selected middle and top bolls across 5 replications. Differences in seed yield are indicated by different letters. Significant differences in seed yield follow results from accepted cropping results for the region where increasing water consistently increases yield. (Nueces County, TX 2012)