AgriLIFE EXTENSION
Texas A&M System

Impact of Cotton Aphids Infesting Pre-Bloom Dry-Land Cotton, 2010

Cooperators: Rob Warren, Grower

David Kerns
Extension Entomologist-Cotton

Gaines County

Summary:

A test on pre-bloom dryland cotton investigating the impact of aphids on yield was conducted. Intruder at 1 oz/ac was effective in mediating an aphid population that was averaging 238 aphids per leaf. However, Intruder was found to reduce the population of Scymnus lady beetle larvae by 84%. Treating pre-bloom cotton did not result in significantly more cotton lint yield. The reason for there not being any difference in yield may have been due to: 1) pre-bloom cotton can tolerate very high aphid populations, 2) since the aphid population was already severe that all the damage that could occur had already happened, or 3) the lady beetles reduced the aphid population in the untreated fast enough that natural control equaled chemical control. Although we can't be certain which of these is the reason, most research suggests that pre-bloom cotton infested with very high aphid numbers may be stunted and somewhat delayed, but will usually not suffer yield reduction under normal circumstances.

Objective:

The objective of this study was to determine if treating a severe infestation of aphids infesting pre-bloom dryland cotton resulted in increased yield. Additionally, the efficacy of Intruder was evaluated and its impact on Scymnus lady beetle larvae was evaluated.

Materials and Methods:

This test was conducted in a commercial cotton field in eastern Gaines County. The field was dry-land production, but at the time of the tested had good moisture. The test was a RCB design with four replications. Plots were 4-rows wide × 60 ft in length. The only treatment evaluated was Intruder at 1 oz/ac. Dyne-Amic non-ionic surfactant was included at 0.25% v/v. Intruder was applied in a broadcast pattern

with a CO_2 pressurized hand-boom sprayer calibrated to deliver 10 gpa through Teejet TX-6 hollow cone nozzles (2 per row) at 40 psi. The application was applied on 15 July. At this time the cotton was pre-bloom.

On 15, 19 and 23 July, the number of cotton aphids, *Aphis gossypii* (Glover), were counted on 10, 3 to 4th node leaves. Scymnus lady beetle larvae, *Scymnus loewii* Mulsant were by far the most prevalent lady beetles present in the field (Figure 1). Their population was estimated by counting the number present on 5 consecutive plants using whole plant visual samples.

Data were analyzed using ANOVA and means were separated based on an F-protected LSD ($P \leq 0.05$).

Results and Discussion:

On 15 July the aphid population was extremely high, averaging 238 aphids per leaf (Figure 2). Although aphids have been shown to cause significant yield loss to cotton during boll filling, their ability to damage seedling and pre-bloom cotton is questionable. When cotton is filling bolls it is reasonable to assume that aphids rob the plant of resources that should be directed to filling those bolls; thus causing yield loss. When there are no bolls, the diversion of resources may stunt a plant or delay maturity, but in dry-land cotton with ample moisture at the time of infestation, delayed maturity should have little or no impact.

At 4 day after treatment (DAT), the aphid population was in decline throughout the test. At this time the untreated was averaging 104.58 aphids per leaf, while the Intruder treated plots were averaging 23.8 per leaf. Based on Henderson-Tilton's equation, this equated to 81.44% control.

By 8 DAT, the aphid population had crashed, and the untreated was averaging only 9.73 per leaf. The number of aphids in the Intruder plots were averaging 3.73 per leaf and was not statically different from the untreated.

The reason for the rapid reduction of the aphid population across the test was undoubtedly due in part to the large number of lady beetles present. Scymnus lady beetles were plentiful at the onset of this test, averaging 4.69 larvae per plant (Figure 3). Intruder and other neonicotinoid insecticides are known to be harsh on convergent lady beetle larvae, but their impact on Scymnus lady beetles was not known. At 4 DAT, the lady beetles in the untreated plots had increased to 8.9 larvae per plant, while those in the Intruder plots had declined to 1.95 per plant, an 80.57% reduction.

There was no detectable difference in yield between the untreated and the Intruder plots (Figure 4). HVI analyses indicated no differences in specific lint quality parameters; however there was a slight ($P < 0.10$) difference in loan value. The untreated plots had about a 2-cent higher loan value (Figure 5). The mike in the Intruder treated plots, although not statistically different from the untreated, was consistently higher and hit the more severe loan discount, thus accounting for the higher loan value in the untreated. Therefore, I do not think the difference in loan value is truly significant. Regardless, it was evident that treating this aphid population was not justified. The reason for there not being any difference in yield

may have been due to: 1) pre-bloom cotton can tolerate very high aphid populations, 2) since the aphid population was already severe that all the damage that could occur had already happened, or 3) the lady beetles reduced the aphid population in the untreated fast enough that natural control equaled chemical control. Although we can't be certain which of these is the reason, most research suggests that pre-bloom cotton infested with very high aphid numbers may be stunted and somewhat delayed, but will usually not suffer yield reduction under normal circumstances.

Acknowledgments:

Appreciation is expressed to the Plains Cotton Improvement Program for financial support of this project.

Disclaimer Clause:

Trade names of commercial products used in this report are included only for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.

Figure 1. Scymnus lady beetle larva (top) and adult (bottom).

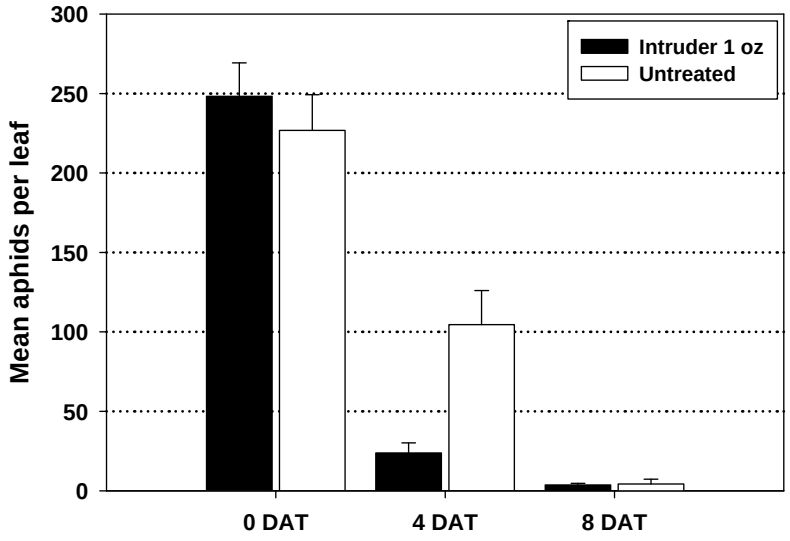

Figure 2. Impact of Intruder insecticide on cotton aphids at 4 and 8 DAT.

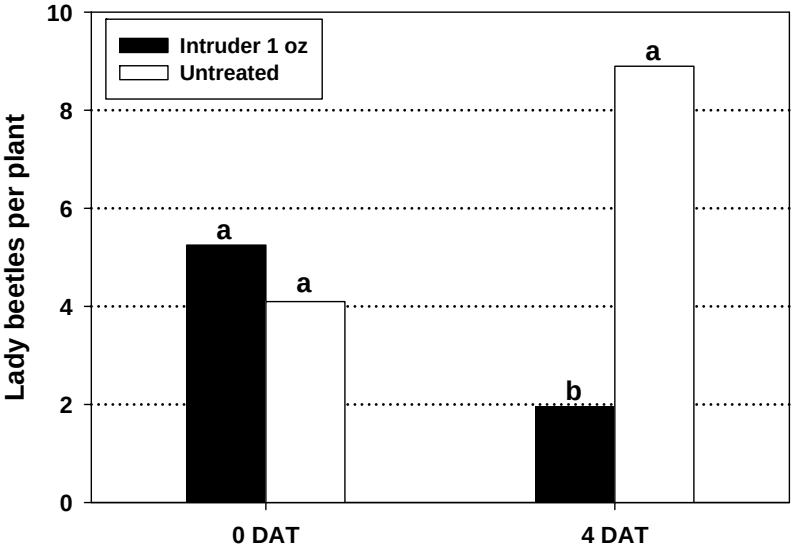

Figure 3. Impact of Intruder on Scymnus lady beetle larvae.

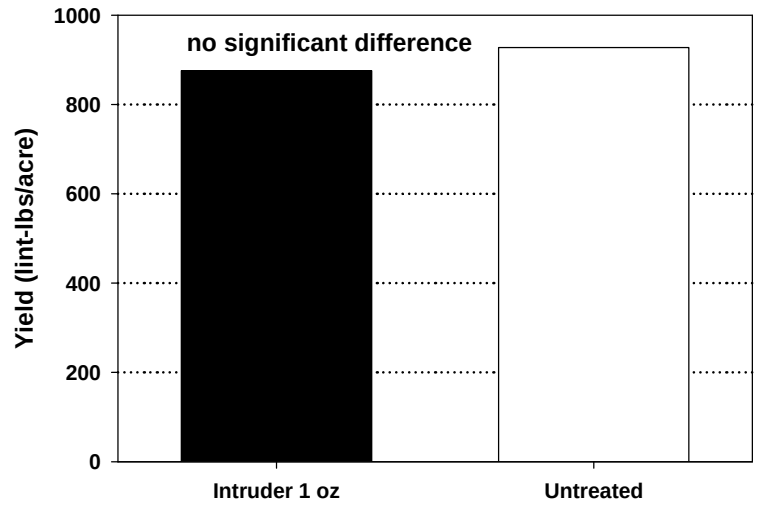

Figure 4. Yield response to controlling aphids in pre-bloom dryland cotton.

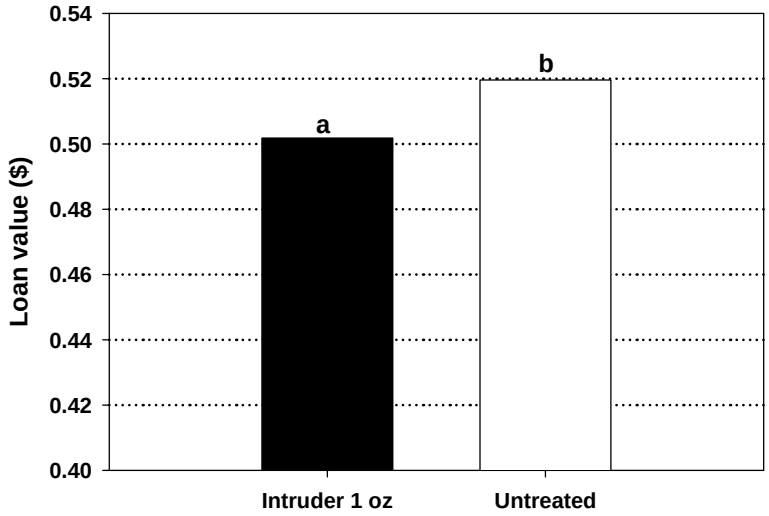

Figure 5. Loan values from cotton where aphids were controlled and left non-treated on pre-bloom dryland cotton.