EVALUATION OF ECOSHEILD AG-100 INSECTICIDE APPLICATION TECHNOLOGY IN NORTHEAST TEXAS

David R. Drake
Texas A&M AgriLife Extension Service
Commerce, TX

Introduction and Abstract

Ground based ultra low volume (ULV) insecticide application technology by the patented and proprietary EcoShield AG-100 machine (Fig. 1), http://agspraytech.com; was evaluated during the 2017 and 2018 growing seasons in Northeast Texas. In 2017, a forage sorghum field was treated for sugarcane aphids and a cotton field for bollworms. During the 2018 growing season three cotton fields were treated for bollworms and evaluated for pest control. All treated fields exhibited signs of control determined by before and after ratings or as comparisons with adjacent or protected untreated areas. Two fields, the 2017 forage sorghum field in Lake Creek, TX and a 2018 cotton field in Fairlie, TX; were extensively evaluated for control confirming both the efficacy and distribution distance of the treatment. Control was measured in 7-8 ft tall forage sorghum at 1013 ft and in 30 inch tall cotton at 925 ft distance downstream from the path of the applicator.

Figure 1. Proprietary AG-100 machine producing an application demonstration with water.

Materials and Methods

Cotton Bollworm Treatments

A cotton field with bollworm eggs and fruit damage meeting the economic control threshold was treated with 14 fl oz of Prevathon per acre, by the AG-100 on the evening of July 16th 2018. To test for efficacy 15 locations distributed throughout the field, were covered with 33 gallon plastic bags during treatment and removed the next morning to act as untreated test areas. The locations ranged from 100 ft to 1000 ft away from the path of the applicator in a grid pattern (Figure 2.). These areas were then monitored for insects and compared to adjacent treated rows to measure treatment differences. The locations were monitored weekly until late August when pest numbers, crop maturity, and growing conditions did not warrant further monitoring. In late September the untreated areas and an adjacent treated area were plant mapped to estimate cotton boll production and harvested to determine cotton yield. The following measurements were taken to determine the effectiveness of the insecticide treatment: Number of open bolls and green bolls on September 11tth, seed cotton, lint, and cotton seed from open and green bolls, lint

and seed turnout from treated and untreated area, and lint yield. These measurements were taken at the test locations in the field and tested for statistical analysis for differences between treated and untreated plots.

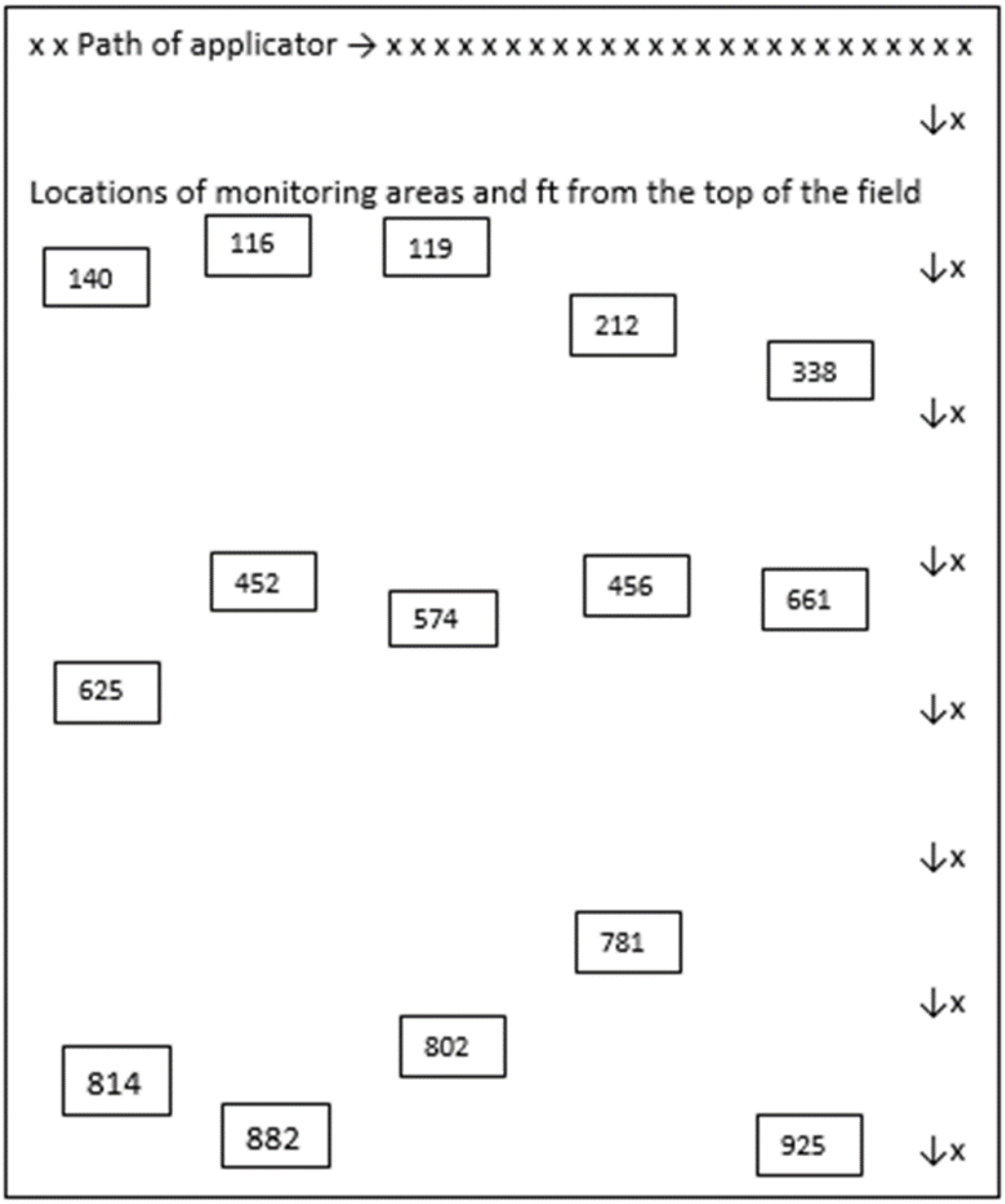

Figure 2. Map of Prevathon insecticide application and monitoring locations in a northeast Texas cotton field in July of 2018.

Sugar Cane Aphid Control in Forage Sorghum

Very high populations of sugarcane aphids (hundreds per leaf) were observed in a forage sorghum field near Cooper, Texas in June of 2017. The field was treated with the AG-100 applicator on the evening of June 28, 2017 applying 7 fl oz per acre of Sivanto. The applicator traveled along the upwind edge of the field with the treatment traveling into the forage sorghum. One week after treatment the field was surveyed for SCA by starting at the point of application and traveling into the forage sorghum until SCA were observed. The field was transected every 100

feet in a sprayer track and the distance measured by a measuring wheel. A diagram of the field and transects are given in Figure 3.

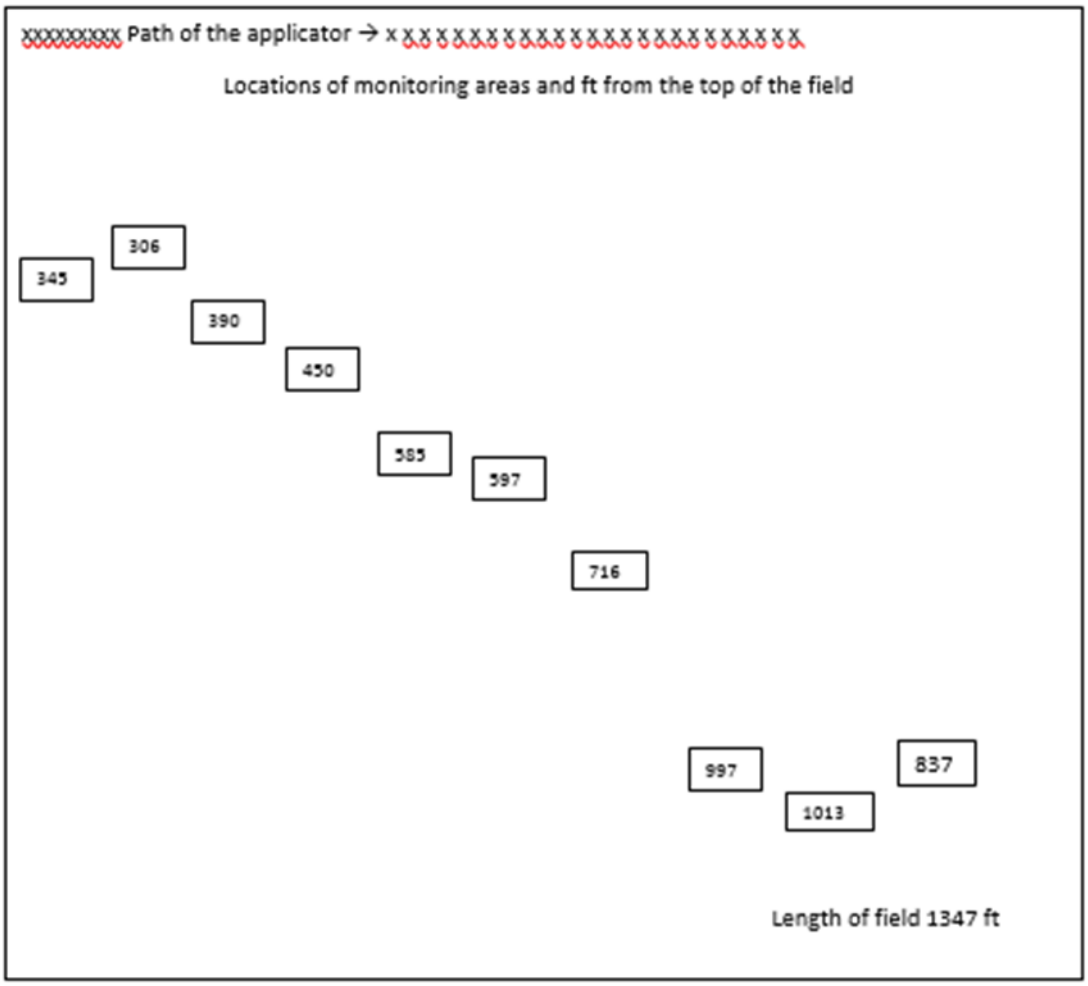

Figure 3. Map of Sivanto insecticide application to a Forage Sorghum field in June 2017 in northeast Texas for control of sugarcane aphid.

Results and Discussion

Comparing treated and untreated areas or pre and post treatment insect levels differences were observed following treatments in all cases. Measured control of bollworms in cotton were observed up to 925 feet from the path of the applicator. Table 1 shows means for treated and untreated cotton areas from 15 comparisons of 2018 cotton treated with 14 fluid ounces of Prevathon. Although not statistically different there are numerical differences. The higher amount of open bolls on September 11th in treated areas suggests that the treatment protected the earlier fruit although untreated plants compensated for the loss later in the season The total lint yield was not statistically different between treated and untreated plots because the season was also cut short by the lack of late season rain.

Measurements of control of sugar cane aphid in 7 to 8 ft tall and dense forage sorghum started at 300 feet and at the one location in the field reached 1013 ft from the path of the AG-100 applicator. This control type of application compares to an aerial application as a boom sprayer would not be able to pass through the field. It is also impressive because of the low volume of total application is a maximum of 64 fl oz per acre including water. The AG-100 has an onboard weather station and is used at night with low wind and inversion conditions to penetrate the canopy. This application is also rapid requiring only a few minutes to treat the entire field.

Table 1. Mean measured differences between Prevathon treated and untreated cotton in Fairlie, TX 2018. Means followed by the same letter are not statistically different.

Parameter	**Untreated**	**Treated**
Seed cotton (lbs/ac) from open bolls on Sept 11, 2018	1358 a	1496 a
Seed cotton (lbs/ac) from proportion of green bolls on Sept. 11, 2018	496 a	322 a
Lint turnout	0.41 a	0.40 a
Total lint yield (lbs/ac)	904 a	883 a

Conclusions

- The proprietary and patented EcoShield AG-100 ultra low volume applicator treated cotton fields in 2017 and 2018 and a forage sorghum field in 2017 in Northeast Texas for insects.
- All treatments appeared to control the target insect pests covering large areas in a short amount of time.
- Yields were not measured for forage sorghum or were not statistically different for treated or untreated portions of the cotton field.
- The applicator is designed to operate at night time with low wind and during inversions to provide better crop canopy penetration.
- More information is available on the company website at http://agspraytech.com

Acknowledgements

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- EcoShield applied the insecticides free of charge and provided funds for crop scouts, students of Texas A&M University – Commerce; to monitor fields and collect harvest data.