RELATIONSHIP BETWEEN GROWING DEGREE DAYS AND NODES ABOVE WHITE FLOWER TO PREDICT INSECTICIDE TERMINATION

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Abstract

This study was conducted in 2021 in 7 different locations, in the State of Mississippi. Field research was established to determine nodes above white flower (NAWF) coordinating with insecticide terminations. There were 18 varieties studied, ranging from early, mid, and late maturing timings. They were planted at 45,000 seeds per acre. In season data was taken starting with stand counts and a height, total node count, and first fruiting branch. NAWF data was taken starting at first bloom and every week following until cutout. This research will be used to determine when insecticide sprays can be cut off according to a NAWF count. Correlating NAWF to the DD60 equation was evaluated to help growers and consultants decide with insecticide terminations.

Introduction

On-farm research was conducted to evaluate a more efficient way for growers to determine when to terminate late season insect sprays. Research was taken to determine a standard for growers to retain to in late season. Growing Degree Days are called DD6s while calculating in a cotton crop. NAWF can be counted to evaluate many things. IN the study, NAWF was used to correlate with the DD60 for each day. This research has been studied in the past but with new seed germplasm technologies and new technologies in general, research was evaluated to provide a more up to date recommendation.

Materials and Methods

A two-year field experiment was conducted to evaluate the correlation between DD60 and NAWF. Experiments were established in eight locations representing many cotton producing environments in Mississippi. Field research will take place in Starkville, Brooksville, Stoneville, Sidon, Tunica, Clarksdale, Verona, and Yazoo City, Mississippi. Individual experiments were designed as a randomized complete block with four replications. The study was composed of 18 different varieties, occurring in both dryland and irrigated environments, Nexgen 3990 B3XF, Nexgen 4936 B3FX, Nexgen 5711 B3FX, DeltaPine 2127 B3FX, DeltaPine 2012 B3FX, DeltaPine 2020 B3FX, DeltaPine 2115 B3FX, Stoneville 4990 B3FX, Stoneville 5091 B3FX, Stoneville 4993 B3FX, Phytogen 332 W3FE, Phytogen 400 W3FE, Phytogen 443 W3FE, Dynagrow 3427, Dynagrow 3456 B3FX, Dynagrow 3535 B3FX, Armor 9371 B3FE, and Armor 9608 B3FX. Varieties were selected based on performance and relative maturity. Cotton was seeded into conventionally tilled beds at 50438 seeds ha^{-1} utilizing a small plot cone planter (Almaco cone planter, 99 M Avenue Nevada, Iowa 50201-1558). Each plot consisted of four rows of cotton spaced 97 cm apart separated by a perpendicular 3 m alley. Individual plots, measuring 12.2 m long were flagged to establish plot boundaries. All plots were maintained weed-free with preemergence and post emergence applied herbicides. A burndown was applied two weeks prior to planting with Fluridone (Brake; SePRO Corporation, 11550 North Meridian Street Suite 600 Carmel, IN 46032) at 473.176 ml ha^{-1}. During growing season, a tank mix of Glyphosate (Roundup PowerMax I; Bayer Crop Science, Bayer AG Crop Science Division Alfred-Nobel-Str. 50. 40789 Monheim am Rhein, Germany) at 1892.71 ml ha^{-1}, and S-metolachlor (Dual Mangnum; Syngenta United States, Syngenta Crop Protection AG P.O. Box CH-4002 Basel, Switzerland) at 629.3247 ml ha^{-1} was applied every three weeks for weed control. Liquid urea ammonium nitrate (UAN 32%), was applied sub-surface at emergence at 22 kg ha^{-1}, then at pinhead square at 32 kg ha^{-1}. Mepiquat chloride (PGR 4.2%, 15401 Weston Parkway, Suite 150, US-NC, Cary,27513), was applied in season, to regulate internodal growth. PGR were applied at 443 ml ha^{-1} for an early and late season application. Beginning at bloom, plant height, total node count, first fruiting branch (FFB) and NAWF data was taken. The data will consist of 5 plants

per plot, replicated four times, once a week, until the plant reaches first cracked boll. Data for nodes above the first cracked boll (NACB), a total node count (TN), and the upper most harvestable boll (UMHB) was collected. Data was taken with a 110 cm ruler and plants were selected randomly throughout the plot. DD60 calculations require a high and low temperature for day to determine the amount of growing degree days produced that day. High and low temperature data for each day from planting date to harvest date, were gathered with a HOBO MX2304 External Temperature Sensor Data Logger (Onset, Onset Computer Corporation 470 MacArthur Blvd. Bourne, MA 0253). The sensors were placed in the field for precision temperature and moister data. The experiment was defoliated, boll sampled, and harvested. Consequently, the data will correlate to the NAWF to determine a recommendation for insecticide terminations.

Results and Discussion

All locations hit NAWF 5 (cutout) at the same time within a 7-day period. Figure 1. shows NAWF counts starting July 6, 2021 through August 4, 2021. Varieties are color coded showing averages throughout the growing season. Varieties with different maturing groups also hit NAWF 5 at the same time within a 7-day period. (Figure1.)
Accumulated DD60s from July 6, 2021 through August 4, 2021 are shown in Figure 2. These data were collected to establish how many heat units were calculated for each day.

Summary

This research concluded that variety maturity didn't matter when reaching cutout. All varieties reached cutout at the same time within a 7-day period. All locations reached cutout at the same time within a 7-day period. Location did not matter while reaching cutout. Locations in the delta and hills region of Mississippi were researched. Figures 1 and 2 are represented to acknowledge data taken while conducting this research. All data is preliminary in this study.

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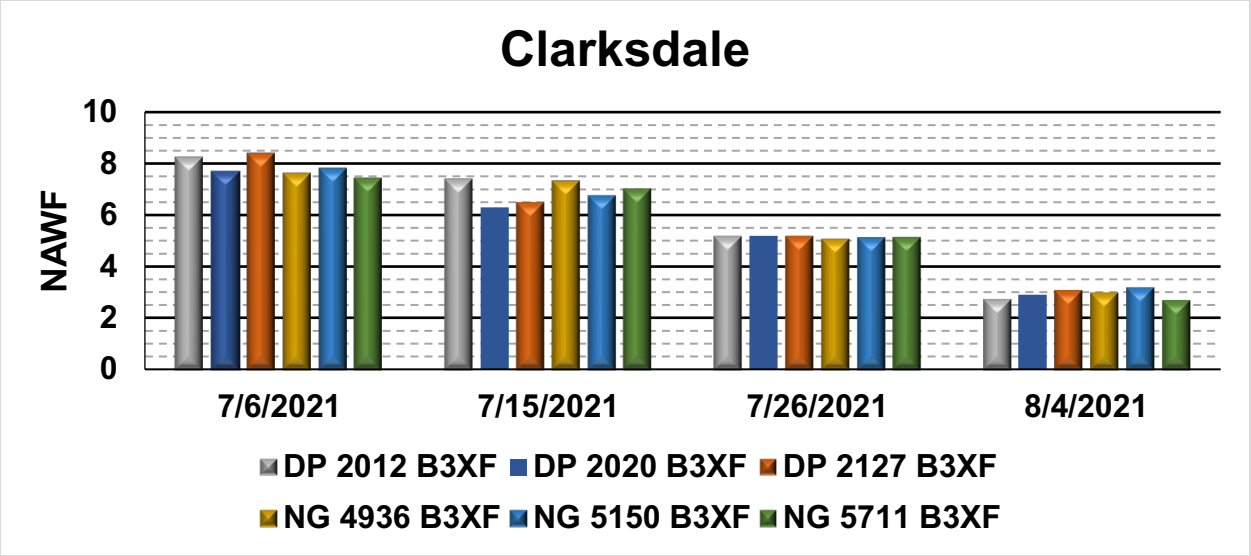

Figure 1. NAWF counts

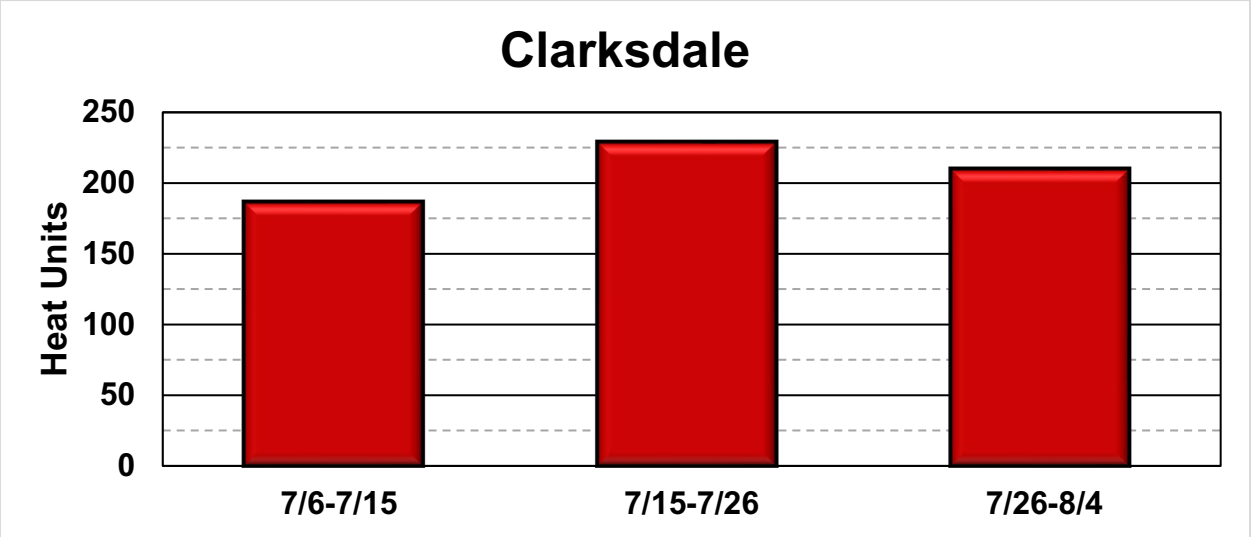

Figure 2. Accumulated DD60s