NAWF AND HEAT UNIT ACCUMULATION FOR DETERMINING COTTON DEFOLIATION

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Abstract

Cotton (*Gossypium hirsutum* L.) defoliation is a continuing challenge for growers throughout the Cotton Belt. Currently there are many guidelines, programs, and procedures for determining timing of harvest aid applications. However, no method is markedly better than another. One method bases harvest aid application on accumulated heat units (HU or DD60s) after physiological maturity (i.e., cutout). Cutout has been defined as the growth stage when there are five nodes above the uppermost first position white flower (Bourland et al., 1986). This measurement assumes that the last effective boll that contributes toward yield is set at this uppermost sympodial branch. From cutout, heat units are accumulated to determine timing of harvest aids. Currently, 850 HU after cutout is the guideline set for defoliant application without observing a reduction in yield (Stringer et al., 1989). However, this guideline potentially could lead to early application of harvest aids in some areas. Consequently, early harvest aid application can lead to delayed harvest, need for multiple harvest aid applications, decreased yield, reduced lint quality, and ultimately reduced cotton profitability. A one-year study was conducted in 2000 to address the effects of early and late applications of harvest aids based upon varying accumulated heat units after cutout. The study was conducted at the Texas Agricultural Experiment Station in Burleson County. Two cotton varieties, DP 20B and DP 422 B/RR, were planted on 11 May and arranged as a split-plot design, with whole plot being variety and sub-plot being treatment. These treatments included application of defoliants at 650, 750, 850, 950, and 1050 HU accumulated after cutout. All treatments were defoliated with a tank-mix of Dropp® (0.1 lb/A), Folex® (1.0 pt/A), and Prep™ (1.33 pt/A) and machine-picked 14 days after application. Both cotton varieties reached cutout on 16 July, 66 DAP. No differences were observed between the two cotton varieties. Furthermore, there was no variety by treatment interaction, meaning that both varieties exhibited the same response to all treatments. DP20B yielded significantly more lint per acre than DP 422 B/RR with 655 compared to 524 lbs./A, respectively. Cotton defoliated at 650, 750, and 850 HU after cutout did not exhibit acceptable defoliation ratings for harvestability. Treatments having less than 950 HU exhibited 25% or less open bolls at the time of treament. Ultimately, this translated into a significant reduction in harvestable lint. These results show that 850 HU after cotton cutout is not indicative of proper timing for application of harvest aids in the Brazos Bottoms of Texas. Yields ranged from 354 to 871 lbs. lint /A with 650 HU yielding the least and 1050 HU being the most. These data also lead to suggest two possible conclusions: 1) the definition for cotton 'cutout' of 5 NAWF cannot be applied uniformly to all cotton growing areas, and/or 2) the use of 850 HU after 'cutout' is inadequate for timing harvest aid application without reducing lint yield. Therefore, a more extensive study needs to be conducted to determine the proper accumulation of heat units needed to ensure proper timing of harvest aids in Texas before this method can effectively be used.

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