EFFECT OF MORPHOLOGICAL FACTORS ON THE SUCCESS OF COTTON BOLL OPENING

Cayden B. Catlin
Bradley R. Wilson
Seth A. Byrd
Oklahoma State University
Stillwater, OK

Abstract

Harvest aids are products utilized in cotton to inhibit growth, remove leaves, and open bolls. With the use of harvest aids, bolls can be opened more uniformly resulting in a timelier harvest. The typical recommendation to optimize boll opening and maturity is to apply harvest aids when the plants reach 4 nodes between the uppermost first position cracked boll to the uppermost first position harvestable boll (4 NACB) To evaluate boll opening success at a range of maturity levels, a standard harvest aid mix was applied at 4-5 day intervals over the course of a 20-day period, beginning in late September. Since application timing is crucial to facilitate a timely harvest, this project evaluated boll opening success resulting from applications at a range of NACB values. It was concluded that the early applications resulted in a higher percentage of undersized bolls opening in the short term (5 days after application), although by the end of the season earlier applications resulted in the greatest percent of open harvestable sized bolls while later applications had a higher level of undersized bolls open. The greater daily and total heat unit accumulation likely played a significant factor in the success of harvestable boll opening in the earlier application timings.

Introduction

Harvest aids are products utilized in cotton to inhibit growth, remove leaves, and open bolls (Brecke et al. 1991). The indeterminate growth habit of cotton results in longer periods of exposure for lower, open bolls, relative to upper, less mature bolls that remain unopened at optimum physiological maturity (Valco and Snipes,2001). To evaluate boll opening success at a range of maturity levels, a standard harvest aid mix at 4-5 day intervals was applied over the course of a 20-day period, beginning in late September. The NACB value is acquired by recording the uppermost 1st position cracked boll on the plant, and then counting the mainstem nodes above it to the uppermost harvestable 1st position boll (Brecke, B.J., Banks, J.C., and J.T., Cothren, 2001). Since application timing is crucial to facilitate a timely harvest, this project evaluated boll opening success resulting from applications at a range of NACB values. While it is difficult to achieve boll maturity within a timely period, long-term exposure to environmental conditions can reduce lint yield and lead to reduced fiber quality (Ray and Minton, 1973).

Materials and Methods

On the day of each application, the diameter of all closed bolls on 7 plants per plot was determined using digital calipers. Bolls greater than 24 mm in diameter (or the diameter of an American quarter) at their widest point were deemed “harvestable bolls” while all smaller bolls were termed “undersized bolls”. Percentage of open harvestable bolls, and NACB were also recorded on the day of application. Boll opening success for harvestable and undersized bolls was recorded 5 days after application (DAA) and at end of the season.

Results and Discussion

The short term (5 DAA) differences in success of opening harvestable bolls were not present regardless of crop maturity status at application. By the end of the season applications prior to reaching 60% open bolls generally resulted in greater success in opening harvestable size bolls. Early applications resulted in a higher percentage of undersized bolls opening in the short term (5 DAA), although by the end of the season the greatest percentage of opened undersized bolls were contained in the latest application timing and non-treated control.

References

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