HIGH PLAINS HARVEST-AID APPLICATION TIMING STUDIES

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Abstract

Since the advent of harvest aids, producers In the Texas High Plains have benefitted from early crop termination and timely harvesting. This is important in maximizing production and optimizing lint quality. Leaving a crop in the field until freeze can, and often does, reduce yields and lint quality due to inclement weather. The losses incurred from leaving a crop in the field can often be reduced when harvest aids are utilized. These studies were conducted to determine how early a crop can be terminated without adversely effecting lint yield and quality. With the recent expansion in harvest aid usage, from less than 30% of the acres treated in 1992 to over 80% in recent years, harvest aid chemicals are now a very important management tool for cotton growers in the High Plains. The objective of this research was to evaluate the effects of harvest-aid treatments applied at various stages of boll opening on cotton lint yields, defoliation parameters, and fiber properties.

Two studies were established in 1998. Site one was furrow irrigated and was located at the Texas Agricultural Experiment Station, Lubbock, and 'Paymaster 2326RR' (a stormproof-boll type) cotton was used. The chemically terminated plots were stripper harvested on October 9. The untreated control (left to frost) was harvested on November 23. The second location was center-pivot irrigated and was near Seminole (Gaines County). 'Deltapine 5409' (an open-boll type) was used. Chemically terminated plots were harvested on October 16, and the untreated control was harvested on November 23. A storm which generated 60+ mph winds was encountered at both sites on November 9 which resulted in considerable preharvest losses in control plots at the Seminole site. Harvest-aid material formulations included the following: Harvade 5F (dimethipin), Prep 6 EC (ethephon), Folex 6 EC (tribufos), and Cyclone 2 EC (paraquat). The harvest-aid treatment structure included the following treatments: untreated control (taken to frost); Cyclone termination (16 oz/acre) 7 to 10 days after 30-40% open boll applications; Harvade 8 oz/acre + crop oil concentrate 16 oz/acre at 5-10% open bolls followed by Cyclone termination; Harvade 8 oz/acre + crop oil concentrate 16 oz/acre at 30-40% open bolls followed by Cyclone termination; Harvade 12 oz/acre + crop oil concentrate 16 oz/acre at 5-10% open bolls followed by Cyclone termination; Harvade 12 oz/acre + crop oil concentrate 16 oz/acre at 30-40% open bolls followed by Cyclone termination; Prep 1 pt/acre + Folex 1 pt/acre at 5-10% open bolls followed by Cyclone termination; and Prep 1 pt/acre + Folex 1 pt/acre at 30-40% open bolls followed by Cyclone termination. The experimental design was a randomized complete block with 4 replications. The treated plot area was four 40-inch rows wide by 40 ft long. A Lee Company "Spider" self-propelled plot sprayer was used. XR Teejet XR11002VS (50 mesh) flat fan spray tips were calibrated to deliver 15 gpa at 20 psi. Ground speed was 3 mph, and a 20-inch nozzle spacing was configured. Visual ratings of defoliation /desiccation/green leaves were made at 13 days after initial treatment (DAIT) at Lubbock, and 17 DAIT at Seminole. Two center rows, 30 ft in length were harvested for yield with a modified John Deere 482 plot stripper. Stripper-harvested material weights were recorded and composite samples of stripper-harvested material from each plot was ginned on a laboratory gin. HVI fiber properties on composite samples were determined at the Texas Tech International Textile Center.

Results from the Lubbock site indicated that due to the stormproof cultivar used, untreated control plots did not experience any excessive preharvest losses from the wind storm. Highest lint yields were obtained from the Cyclone termination only treatment. The only significant lint yield reduction (compared to the untreated control) was observed with the early application at 5-10% of Prep+Folex. However, all other harvest aid treatments resulted in numerically lower lint yields when compared to the untreated control. When compared to the untreated control, micronaire was significantly reduced by all harvest aid treatments, with the exception of Cyclone termination only, and the Harvade at 12 oz/acre applied at 5-10%, and 30-40% open bolls followed by Cyclone termination. At 13 days after the 5-10% open boll applications were made, visual defoliation and boll opening ratings were significantly lower with Harvade than the Prep+Folex treatments (at both application dates). Compared to the untreated control, defoliation was not significantly enhanced by Harvade treatment from either application date or rate, although it tended to be numerically greater. Desiccation tended to be higher for Prep+Folex treatment compared to Harvade. Correspondingly, green leaf was higher in the Harvade treatments compared to Prep+Folex. Harvade treatments were not significantly different from the untreated control, but were numerically lower for green

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leaf. Green leaf was significantly higher for Harvade treatments and the untreated control compared to the Prep+Folex treatments. No statistically significant differences for HVI leaf were observed in stripper harvested lint.

At the Seminole site, the untreated control (taken to frost) experienced considerable preharvest losses from a wind storm because of the open boll cultivar produced. Harvade applications followed by Cyclone termination resulted in the highest numerical lint yields. The untreated control produced significantly lower yield than all Harvade treatments and Cyclone termination only. Harvade applications resulted in the highest numerical yields; however, Cyclone termination only was not significantly different from these treatments. Both Prep+Folex treatments resulted in significantly lower lint yield than Harvade at 12 oz/acre applied at 30-40% open bolls. When compared to the Cyclone termination only treatment, micronaire was significantly reduced by all harvest aid treatments, except for Harvade at 8 oz/acre applied at 30-40% open bolls followed by Cyclone termination. The lowest micronaire values were observed in the Prep+Folex treatments at both application dates. The untreated control was lower in micronaire than expected, attributed to the preharvest loss of higher micronaire lint from lower strata bolls. Significant differences in visual estimates of defoliation, desiccation, and green leaf at 17 DAIT were observed. Prep+Folex treatment at 30-40% open bolls resulted in the highest defoliation, followed by Prep+Folex applied at 5-10% open bolls. It is unclear why later Prep+Folex application resulted in higher defoliation. Harvade treatments produced intermediate levels of defoliation, but were significantly lower than Prep+Folex. Leaf desiccation was significantly enhanced by applications of Harvade and Prep+Folex when compared to the untreated control. All Harvade treatments resulted in significantly lower green leaf ratings than the untreated control, but were significantly higher than Prep+Folex treatments. No significant differences were noted for HVI leaf content from stripper-harvested material.

Results from this study indicate that the application of harvest aids at the various stages of boll opening had significant effects on lint yield, micronaire and defoliation parameters evaluated. Prep+Folex applications at 5-10%, and 30-40% open bolls followed by Cyclone termination tended to reduce yields and micronaire compared to the untreated control, Cyclone termination only, or Harvade treatments followed by Cyclone termination. However, defoliation and boll opening arising from Prep+Folex treatments tended to be considerably greater than with Harvade treatment. Harvest-aid treatments had no significant effects on lint yield at one site where a determinate stormproof cultivar was produced. At another site where an indeterminate open boll cultivar encountered preharvest losses due to a wind storm, Harvade applied at 12 oz/acre at 30-40% open bolls followed by Cyclone termination resulted in significantly higher yield than Prep + Folex applications followed by Cyclone termination.