DEFOLIATION SCREENING STUDIES IN PIMA (S-7) COTTON

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Abstract

Several defoliants were evaluated for their effect on defoliation, desiccation, open boll, and lint yield for S-7 Pima cotton during a three year period. The following combinations exhibited the greatest defoliation: Ginstar + Prep followed by Sodium Chlorate + Starfire; Ginstar followed by Ginstar; Dropp + Agridex followed by Ginstar; Prep + Dropp followed by Ginstar, or Sodium Chlorate + Harvade, or Sodium Chlorate + Folex, or Sodium Chlorate + Cotton Aide, or Starfire; and Cotton Quik + Ginstar. The following combinations exhibited the greatest desiccation: Ginstar followed by Ginstar; Prep + Dropp followed by Ginstar; Prep + Ginstar followed by Sodium Chlorate + Starfire; and Cotton Quik + Ginstar. There were minor differences among treatments in percent open boll. In all three years nearly all treatments had 90 percent or greater open boll. Lint yields were similar in most treatments. There were only minor differences in percent gin turnouts. However, there was a trend showing that treatments with poorer defoliation resulted in a slightly lower gin turnout.

Introduction

Cotton producers have different standards for what kind of defoliation job they expect. Costs vary considerably with different defoliation programs, sometimes with similar results. As urban complaints continue because of defoliants, it is imperative that growers have access to defoliants that are effective, low odor, safe, and affordable.

Materials and Methods

Studies were conducted at the West Side Research and Extension Center on a Panoche clay loam soil. Plot design was a randomized complete block with three replications. Plots were four 40-inch rows by 70 feet. Defoliants were applied when cotton plants were at three nodes above cracked boll on October 10, 1994; October 5, 1995; and September 26, 1996. Treatments were broadcast applied with a Hagie high cycle sprayer using TX-VS10 conejet nozzles at 20-inch spacing. A total volume of 20 gpa was applied at 2 mph using 55 psi. Wind speed and air temperatures ranged from 0-5 mph and 80-85°F. All evaluation were based on a scale of 0 to 100 (zero meaning no defoliation, desiccation or open boll). Percent open boll was determined by counting total and open bolls in one linear meter of row per plot. In 1994 the two center rows of each plot were harvested with a commercial two-row picker. A six pound sample was taken for ginning to determine gin turnouts.

Results and Discussion

Defoliation

In 1994, defoliation ranged from 45 to 83 percent. Dropp (.3 lb) + Agridex (1p) followed by Sodium Chlorate 6lb (.83G) + Starfire (21oz); Dropp (.3 lb) + Agridex (1p) followed by Ginstar (13oz); and Radiant Energy Water (20 G) (treatments 14,15,17) exhibited 60% or lower defoliation. All other treatments defoliation in the ranged of 65 to 83 percent defoliation.

Prep (2p) + Ginstar (10oz) followed by Sodium Chlorate 6lb (.83G) + Starfire (21oz); Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate 6lb (.83G) + Starfire (21oz); Dropp (.3lb) + Agridex (1p) followed by Ginstar (13oz) and Ginstar (6oz) followed by Ginstar (13oz) (treatments 7,14,15 and 16) showed moderate increases in defoliation between 14 and 21 DAT; 9, 7, 17, and 8 percent respectively.

In 1995, defoliation ranged from 22 to 64 percent. Prep (2p) + Dropp(.3 lb) + Agridex (1p) followed by Ginstar (10oz); Prep (2p) + Dropp(.3 lb) + Agridex (1p) followed by Ginstar (6 oz); Prep (2p)+ Ginstar (10oz) followed by Sodium Chlorate (1G) + Starfire (21 oz); Ginstar (13oz) + Prep (1.5p); and Ginstar (6oz) followed by Ginstar (10oz) (treatments 1,2,7,10, and 16) exhibited the greatest defoliation between 51 and 64 percent. All other treatments exhibited between 22 and 45 percent defoliation.

In 1996, defoliation ranged from 13 to 51 percent. Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Ginstar (10oz); Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate (1G) + Cotton Aide (1.3p); and Cotton Quik (3.5q) + Ginstar (13oz) (treatments 1,5 and 11) exhibited 43, 46, and 51 percent defoliation respectively. All other treatments were in the range of 13 to 39 percent defoliation.

Desiccation

In 1994, desiccation ranged from 8 to 77 percent. Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Ginstar (10oz); Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate 6lb (.83G) + Starfire (21oz); Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate 6lb (.83G) + Cotton Aide (1.3p); Prep (2p) + Ginstar (10oz) followed by Sodium Chlorate 6lb(.83G) + Starfire (21oz); Ginstar (13oz); Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate 6lb (.83G) + Starfire (21oz); Ginstar (6oz) followed by Ginstar (13oz); (treatments 1,3,6,7,11,14 and 16) exhibited desiccation levels in the range of 50 to 77 percent. By 21 DAT Prep (2p) + Dropp (.3lb) + Agridex

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(1p) followed by Ginstar (10oz); Prep (2p) + Ginstar (10oz) followed by Sodium Chlorate (.83G) + Starfire (21oz); Dropp (.3lb) + Agridex (1p) followed by Ginstar (13oz) and Ginstar (6oz) followed by Ginstar (13oz) (treatments 1,7,15 and 16) maintained a rating of 50% or better.

In 1995, desiccation ranged from 9 to 53 percent. Prep (2p)+ Ginstar (10oz) followed by Sodium Chlorate (1G) + Starfire (21 oz); Ginstar (6oz) followed by Ginstar (10oz) (treatments 7, and 16) exhibited the greatest level of desiccation, 53 and 52 percent respectively. All other treatments exhibited desiccation levels between 9 and 38.

In 1996, desiccation ranged from 40 to 85 percent. Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Ginstar (10oz); Cotton Quik (3.5q) + Ginstar (13oz); and Ginstar (6oz) followed by Ginstar (10oz) (treatments 1, 11, and 17) exhibited 82, 85, and 83 percent desiccation respectively. Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate (1G) + Folex (2p); Prep (2p) + Dropp (.3lb) + Agridex (1p) followed by Sodium Chlorate (1G) + Cotton Aide (1.3p); Prep (2p) + Ginstar(10oz) followed by Sodium Chlorate (1G) + Starfire (21oz) + Agridex (1p); Prep (2p) + Folex (2p) followed by Sodium Chlorate (1G) + Starfire (21oz) + Agridex (1p); Cotton Quik (3.5q) + Dropp (.3lb); Ginstar (6oz) followed by Cutloose (2q) + Ginstar (10oz); and Dropp (.3lb) + Agridex (1p) followed by Ginstar (13oz) (treatments 3,5,6,7,12,13, and 16) exhibited between 60 and 75 percent desiccation. All other treatments were in the range of 40 to 58 percent desiccation.

Open Boll

In 1994, all treatments exhibited 90% or greater open bolls at 7 DAT. In 1995, percent open boll ranged from 66 to 85 percent. Within this range, there were minor differences with no clear trends. In 1996, the majority of the treatments (treatments 1-6, 8-18, and 20) exhibited between 80 and 91 percent open boll. Those treatments that had the least open boll were as follows: Prep (2p) + Folex (2p) followed by Sodium Chlorate (1G) + Starfire (21oz) + Agridex (1p); Dropp (.3lb) + Accelerate (1p) + Folex (1p) + Agridex (1p); and the untreated control (treatment 7,19, and 21) exhibiting 76, 76, and 61 percent open boll respectively.

Yield and Gin Turnouts

In 1994, lint yields were similar in most treatments. Over the entire three year period, there were only minor differences in percent gin turnouts, however, there was a slight trend showing that treatments with poorer defoliation resulted in a slightly lower gin turnout.