

INCREASING PICKER EFFICIENCY BY USING A BOLL SAVER

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Abstract

Replicated tests were conducted for three years (1994 to 1996) during harvest seasons at the Edisto Research & Education Center at Blackville, SC. to determine the efficiency of a new harvest aid device, the "Boll Saver", as affected by cotton variety and adverse harvesting conditions. In all three years, cotton was picked later than an ideal time for harvest.

Use of a Boll Saver significantly reduced ground losses and total losses during 1994 and 95 harvest. In both years about 35 lb/acre more cotton lint was harvested with this attachment. There were no significant differences in trash content between samples picked with and without the Boll Saver in 1996, except for the Stoneville 474 cotton variety (3.2% vs. 1.9% , with & without attachment). The Boll Saver had no effect on lint turn out within a given cotton variety. Use of a Boll Saver significantly reduced ground losses for all varieties. Except for Suregrow 125 and Delta Pine 51, plant losses were significantly less with the Boll Saver. Savings in lint cotton ranged from 23.2 lb/acre for Stoneville LA887 to 52.1 lb/acre for Delta Pine 51.

Introduction

Ideally, cotton harvest should be completed within 30 days after a defoliant is applied. Many times this cannot be accomplished due to adverse weather conditions. Cotton that is rained upon and wind blown following defoliation often is "strung out" and is harder to pick. Even without adverse weather, cotton begins to string out over time. This will result in some of the cotton falling on the ground during harvest. A new piece of equipment developed by the Jones Tractor Co., Thomasville, GA, can help cotton growers reduce stalk losses during harvest. This device, called the "Boll Saver", mounts under the front drums of the picker, and replaces the bottom ribs of the drum in a configuration that leaves the ribs and Boll Saver in the same line vertically. There are models available for all John Deere and Case-International pickers. The Boll Saver contains an air manifold and air supply boots which are connected to the flexible air hoses at the sides of the cotton picker. The air manifold contains holes -- 0.125 in. diameter, 0.5 in. apart-- facing different directions on the top of the manifold. This upward air flow prevents the seed

cotton from falling on the ground and helps to detach that cotton left behind by the picker.

The Boll-Saver has been reported to increase the amount of seed cotton picked in Georgia under normal picking conditions (Kim Jones, 1995) by redirecting the air flow at the picker head. It would be reasonable to expect even greater differences for that cotton suffering from adverse weather conditions.

Objective

The objective of this study was to determine the efficiency of a new harvest aid device, the "Boll Saver", as affected by cotton variety and adverse harvesting conditions in South Carolina.

Methods and Materials

Two units of Boll Saver were installed on a JD9900 spindle picker, under the front drums of the picker. The picker was modified by replacing the storage basket with a platform and adding a sacking attachment to the discharge end of the pneumatic conveying system. This will allow collecting yield samples in burlap sacks from small plots (100 ft or less).

Tests were conducted for three years (1994 to 1996) at the Edisto Research & Education Center at Blackville, SC. In all three years, cotton was picked later than an ideal time for harvest and was strung out. In 1995 and 96, plot size was 4 rows (38 inch spacing) X 50 ft. length, with 4 replications. The two middle rows of each plot were machine harvested, with and without Boll Saver attachment, for yield determinations.

In 1996, six varieties of cotton (Suregrow 125, Stoneville 474, Suregrow 501, Delta Pine 51, Stoneville LA887, and Georgia King) were planted and carried to yield using recommended practices for seedbed preparations, seeding, fertilization, insect and weed control. Plot size was 4 rows (38 in spacing) X 35 length. Each test was replicated four times.

In order to collect plant and ground losses, each plot was hand raked and any cotton falling to the ground was picked up by hand so that prior to initial picking all plots were absolutely clean. After machine harvesting the two middle rows, a ten ft. section of each plot was established and any cotton falling to the ground was hand picked and weighed to determine ground losses. In addition, any cotton remaining on the stalk above ground was also hand picked and weighed to determine plant losses. Subsamples were taken from individual plots, ginned for % lint turnout, and in turn these gin samples were analyzed for trash content.

Discussion

Table 1 shows effects of the Boll Saver attachment on cotton yield, plant and ground losses for 1994. No significant difference was seen in cotton yield nor in plant loss. There was a significant difference in ground loss, 70 lb lint/acre without the Boll-Saver and only 43 lb lint/acre with the Boll-Saver. Total loss was 136 lb/acre without the Boll-Saver and 101 lb/acre with the Boll-Saver, 12.1 and 8.4 % respectively. Lint turn out was 41% with both samples. The 35 lbs. lint/acre compares very closely to data reported from Georgia.

Table 2 shows the results for the 1995 test. Again, there was a significant difference in ground loss (103 lb lint/acre vs. 74 lb lint/acre) and total loss (174 lb lint/acre vs. 139 lb lint/acre) between the plots picked without and with the Boll Saver attachment.

Table 3 shows the effects of the Boll Saver on trash content, yield, and stalk losses for different cotton varieties for 1996 test. There were no significant differences in trash content between samples picked with and without Boll Saver, except for the Stoneville 474 cotton variety (3.2% vs. 1.9% , with & without attachment). The Boll Saver had no effect on lint turn out with in a given cotton variety. Use of a Boll Saver significantly reduced ground losses for all varieties. Except for Suregrow 125 and Delta Pine 51, plant losses were significantly less with the Boll Saver. Savings in lint cotton ranged from 23.2 lb/acre for Stoneville LA887 to 52.1 lb/acre for Delta Pine 51.

Summary

Use of a Boll Saver significantly reduced ground losses and total losses during 1994 and 95 harvest. In both years about 35 lb/acre more cotton lint was harvest with this attachment.

There were no significant differences in trash content between samples picked with and without Boll Saver in 1996, except for the Stoneville 474 cotton variety (3.2% vs. 1.9% , with & without attachment).

The Boll Saver had no effect on lint turn out within a given cotton variety. Use of a Boll Saver significantly reduced ground losses for all varieties. Except for Suregrow 125 and Delta Pine 51, plant losses were significantly less with the Boll Saver.

Savings in lint cotton ranged from 23.2 lb/acre for Stoneville LA887 to 52.1 lb/acre for Delta Pine 51.

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References

Jones Kim. 1995. Boll saver (cotton picker attachment). Proceedings Beltwide Cotton Conferences, January 4-7, San Antonio, TX, pp. 49-50.

Table 1. Effects of Boll Saver on cotton yield, plant and ground losses (lbs lint/acre), 1994. Edisto Research and Education Center, Blackville, SC.

Treatment	Yield	Plant losses	Ground losses	Total losses	(%) losses
With Boll Saver	1205 a	57 a	44 b	101 b	8.4 b
Without Boll Saver	1132 a	66 a	70 a	136 a	12.1 a

Values in a column followed with the same letter are not significantly different at the 95% confidence level (values averaged over 4 replications).

Table 2. Effects of Boll Saver on cotton yield, plant and ground losses (lbs lint/acre), 1995. Edisto Research and Education Center, Blackville, SC.

Treatment	Yield	Plant losses	Ground losses	Total losses	(%) losses
With Boll Saver	1220 a	65 a	74 b	139 b	11.4 b
Without Boll Saver	1191 a	71 a	103 a	174 a	14.6 a

Values in a column followed with the same letter are not significantly different at the 95% confidence level (values averaged over 4 replications).

Table 3. Effects of Boll Saver on trash content, cotton yield, plant and ground losses (lbs. lint/acre), for different cotton varieties, 1996. Edisto Research and Education Center, Blackville, SC.

	Suregrow 125		Stoneville 474		Suregrow 501	
	W*	WO	W	WO	W	WO
% Trash	2.9 a**	3.2 a	3.2 a	1.9 b	3.2 a	3.2 a
% lint	39.4 a	37.5 a	41.2 a	41.8 a	40.5 a	40.5 a
Yield	885 a	796 a	957 a	894 a	941 a	842 a
Ground losses	22.6 a	44.5 b	24.0 b	46.9 a	25.1 b	46.5 a
Plant losses	34.6 a	54.5 a	29.9 b	52.0 a	28.2 b	57.9 a
Total losses	57.2 b a	99.0	53.9 b	98.9 a	53.3 b	104.4 a
% losses	6.5 b a	12.4	5.6 b	11.1 a	5.7 b	12.4 a
	Delta Pine 51		Stoneville LA887		Georgia King	
	W*	WO	W	WO	W	WO
% Trash	1.3 a**	1.3 a	2.3 a	2.3 a	2.6 a	2.8 a
% lint	38.1 a	38.3 a	41.1 a	41.3 a	38.3 a	38.6 a
Yield	876 a	771 a	840 a	816 a	865 a	827 a
Ground losses	20.4 b	51.6 a	25.4 b	39.7 a	17.5 b	36.3 a
Plant losses	45.5 a	66.8 a	42.3 b	51.2 a	42.9 b	60.3 a
Total losses	65.9 b	118 a	67.7 b	90.9 a	60.4 b	96.6 a
% losses	7.2 b a	15.3	8.1 b	11.1 a	7.0 b	11.7 a

* W and WO = With and Without the Boll Saver attachment.

** Values in a row, within a variety, followed with the same letter are not significantly different at the 95% confidence level (values averaged over 4 replications).