The Effects Of Seed Cotton Tramping On Lint Grades and Values

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Recommendations concerning the production of high grade cotton usually advise against tramping or even walking on the harvested cotton as it is deposited in the wagon. This recommendation seems logical, as tramping might be expected to grind some of the fine trash and leaves further into the lint, thereby making them more difficult to remove at the gin.

However, information obtained from an unrelated ginning study at the Oklahoma Cotton Research Station during the 1956 ginning season created some doubt as to the validity of the above recommendation for Oklahoma cottons. That year, several loads of seed cotton were tramped very tightly in wagons and trucks and hauled to the Oklahoma Cotton Research Station at Chickasha for a ginning experiment. This was cotton which had been machine stripped in a once-over operation after frost. When it was ginned and classed, it was assigned grades of Middling Spot and Strict Middling Spot. No cotton ginned at the Cotton Research Station gin has ever received a leaf grade higher than Strict Middling, regardless of how carefully it was handled in the field or wagon.

The fact that cotton could be assigned a leaf grade of Strict Middling after receiving a severe tramping prompted an investigation of the validity of the no-tramping recommendation.

A search for literature concerning this subject revealed frequent use of the recommendation, but no data or reference to any data on which it may have been based (1, 2, 3, 4, 5, 6, 7, 8, 9).** Therefore, not-

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* Stationed at Oklahoma Cotton Research Station, Chickasha, operated jointly by the Oklahoma Agricultural Experiment Station and the U. S. Department of Agriculture, in cooperation with the Oklahoma Cotton Research Foundation.

** Numbers in parenthesis refer to references listed in "Literature Cited," page 14.

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withstanding the seemingly logical basis of the recommendation, studies of the effects of seed cotton tramping were initiated at the Oklahoma Cotton Research Station in 1957 and concluded in 1959.

PROCEDURES

Only hand-snapped cotton was used in this study in 1957. In 1958 and 1959, both hand-snapped and machine-stripped cottons were used. Hand snapped varieties were Stoneville 62 in 1957, Parrott in 1958, and Acala 44 in 1959. Parrott was used for the machine-stripped cottons. All cottons were harvested without prior defoliation. The hand-snapped Parrott of 1958 and the Acala 44 of 1959 were harvested before frost. All others were harvested after frost.

Except for the irrigated Acala 44, which had a staple length of 1-1/32 inches, the cottons used in this study were of the 29/32 - 15/16 inch staple typical of dryland production in Oklahoma.

The procedure used for securing comparable lots of tramped and untramped cotton was as follows:

For the hand-snapped cottons, alternate pick-sacks were dumped into two different wagons. In one wagon, the cotton was thoroughly and almost continuously tramped. In the other, walking on the cotton was limited to the amount absolutely essential to the emptying of sacks. For the machine-stripped cottons, the procedure was similar except that the unit of dumping was the stripper basket, which held about 500 pounds of seed cotton. The "untramped" one-half of the machine-stripped cottons was not walked on at all.

The specific weight of the tramped cottons averaged 10.0 pounds per cubic foot as compared to 6.2 for the untramped cottons. This means that slightly more than three bales of tramped cotton could be loaded on the same wagon space as two bales of untramped cotton.

All of the cottons were harvested within one-half mile of the gin; it is unlikely that the effects of tramping were altered by the effects of hauling long distances.

All cottons were walked upon to the usual extent by the suction telescope operator while they were being unloaded. While this may possibly have obscured some of the effects of prior tramping, no attempt was made to eliminate this source of confounding since it is a customary practice at almost all gins.

All of the cottons remained on the wagon from three to nine days before ginning. It is not believed that this delay in ginning altered the effects of tramping, since in most instances seed cotton moisture contents were less than the maximum recommended for extended storage.

Each treatment was ginned with 11 cylinders of overhead screen cleaning and a master burr extractor preceding the unit extractor-cleaner-feeders and 80-saw gin stands. One half of each of the tramped and untramped cottons was routed through saw-type lint cleaners following ginning; and the other one-half by-passed the lint cleaners. Thus the effects of tramping were studied both with and without lint cleaning. In the first two years of this study, unit lint cleaners behind each gin stand were used. In the third year, tandem battery or bulk type cleaners were used.

Of a total of five cottons used in these studies, only two received drying in the gin.

Overhead cleaning and drying were performed at nominal rates of four bales per hour. Ginning and lint cleaning were performed at the rate of one bale per hour per 80-saw gin stand.

The tramped and untramped portions of each cotton were divided into 14 replications at the gin. All data collected for each cotton used in this study were analyzed by accepted statistical procedures for significance of treatment differences.

RESULTS

Table I lists mean values for many of the measurements made from each cotton used in this study, as well as the average values for all cottons used during the three years.

Grades

Most of the lint grades in this study were in the Strict Low Middling to Middling category, and most of them carried a Spot or Light Spot designation. Grades and staples were obtained at a cotton classing office of the Agricultural Marketing Service, U. S. Department of Agriculture.

For only one of the five cottons was a recognizable effect on lint grades associated with the tramping treatments. This was with the machine-stripped Parrott of 1958 (figure 1). With this cotton, that which had been tramped was classed approximately two-thirds of a

Table I.—Three-year Comparison of Tramping vs. Not Tramping Seed Cotton in Wagon; 1957, 1958 and 1959.[1]

	Stoneville 62 Hand Snapped 1957		Parrott Hand Snapped 1958		Parrott Machine Strippeed 1958		Acala 44 Hand Snapped 1959		Parrott Machine Stripped 1959		3-Year Average	
	Tramped	Untr.	Tramped	Untr.	Tramped	Untr.	Tramped	Untr.	Tramped	Untr.	Tramped	Untr.
Moisture content of harvested material (pct.)	13.68	13.99	12.89	11.61	**6.84**	**7.61**	9.15	9.05	10.07	9.55	10.53	10.36
Moisture content of seed cotton at feeder apron (pct.)	10.55	10.49	9.40	8.86	**5.99**	**6.65**	7.71	7.94	8.84	8.66	8.50	8.52
Moisture content of lint (pct.)	6.32	6.23	**6.25**	**5.88**	**5.11**	**6.45**	6.42	6.45	6.15	6.02	6.05	6.21
Foreign matter content of harvested material (pct.)	22.13	22.61	21.01	21.59	**19.42**	**21.94**	25.13	25.27	19.24	19.16	21.39	22.11
Foreign matter content of seed cotton at feeder apron (pct.)	1.17	1.16	0.77	0.69	**1.19**	**1.53**	3.28	3.20	1.87	1.89	1.66	1.69
Waste content of lint (pct.)[2]	**5.38**	**4.43**	**3.32**	**3.79**	4.83	4.83	4.78	4.75	4.04	3.95	4.47	4.35
Lint grade index[3]	83.6	83.7	90.5	91.3	**88.0**	**83.8**	90.1	90.2	89.4	89.6	88.3	87.7
Lint staple length (32nds inch)	30.1	30.2	30.1	**30.3**	**28.5**	**29.1**	33.0	33.0	29.6	29.7	30.3	30.5
Unit lint value (cents per lb.)[4]	22.8	22.8	25.1	25.6	23.4	23.0	29.8	29.7	26.6	26.7	25.5	25.6
Gin turnout (lbs. lint per bale unit)[5]	546	541	551	549	676	673	553	555	672	674	600	598
Gross lint value (dollars per bale unit)	124	123	138	140	158	155	165	164	178	180	153	152

[1] Values in boldface type were found different from their counterpart at no less than the 95 percent level of statistical probability. Values for the 3-year average were not statistically analyzed. Except for 3-year average, each value is average of 14 replica ions.
[2] Lint waste contents determined by Shirley Analyzer.
[3] From USDA Agri. Marketing Service grade code in which Middling has index of 100.
[4] From Commodity Credit Corporation loan schedules for upland cotton.
[5] Bale unit is defined as the nominal amount of harvested material necessary to produce 500 pounds of ginned lint. 2000 pounds of hand-snapped or 2400 pounds of machine-stripped material is considered a bale unit.

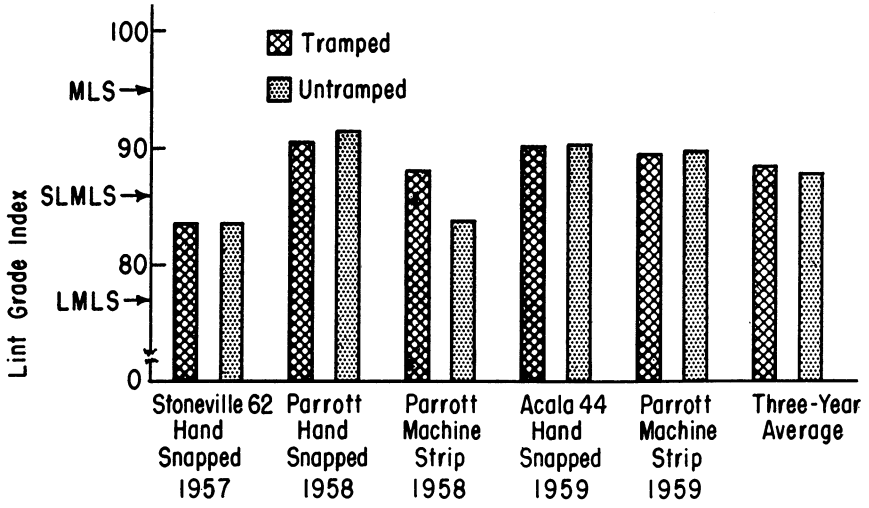

Figure 1.—Effects of seed cotton tramping on lint grade index.

grade higher than that which had not been tramped. This difference in grade is believed to be a result of the lower moisture and foreign matter contents of the tramped cotton at the time of ginning, rather than a result of tramping itself.

Differences in grade between tramped and untramped treatments for the other four cottons were less than one grade index point, the three-year average difference being 0.6 index point.*

The relatively few white grades displayed no more response to tramping than did the colored grades.

Lint Waste Contents

With the Stoneville 62 cotton in 1957, tramping resulted in an increased lint waste content amounting to approximately 5 pounds of additional waste per 500-pound bale. But with the hand-snapped Parrott cotton in 1958, tramping resulted in a slightly decreased lint waste content, 3½ pounds less waste per bale (figure 2). As indicated previously, neither of these differences in lint waste content associated with tramping was sufficient to be reflected in differences in grade.

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* USDA Agricultural Marketing Service grade code in which Middling has an index of 100, Strict Low Middling = 94, and Low Middling = 85. Light Spotted and Spotted classifications are approximately 7 and 9 index points lower than their white counterparts.

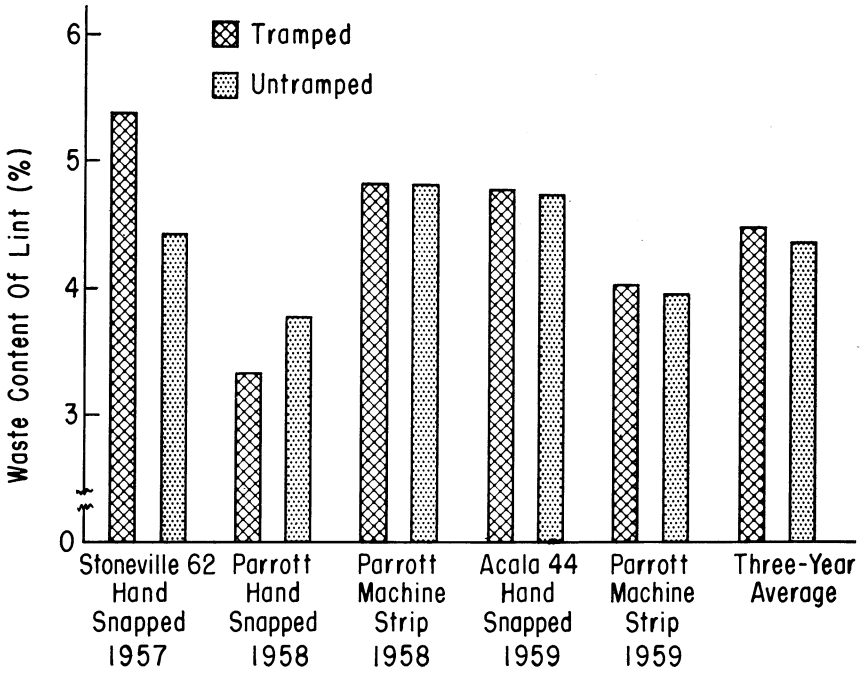

Figure 2.—Effects of seed cotton tramping on waste content of ginned lint.

For the other three cottons, tramping produced no discernible effects on lint waste contents. The three-year average lint waste content for the tramped cottons was 4.47 percent as compared to 4.35 percent for the untramped cottons.

Staple Length

Only the machine-stripped Parrott cotton of 1958 showed an association between staple length and tramping. The staple length of the untramped cotton was 29.1 thirty-seconds of an inch compared to 28.5 for the tramped cotton. But again, as with grade differences in this cotton, staple differences are believed due to differences in the moisture contents of both seed cotton and lint, rather than to the effects of tramping. In this instance, the lower grade of the untramped cotton was offset by its longer staple length to the extent that no differences in lint value were associated with tramping.

Gin Turnouts

No association between tramping and gin turnout could be detected. The three-year average difference in gin turnout between the tramped and untramped cottons was two pounds of lint per bale unit of harvested material delivered to the gin, with the maximum difference for any of the five cottons being five pounds per bale unit. Two thousand pounds of hand-snapped and 2400 pounds of machine-stripped material are considered bale units.

Unit Lint Values

Unit lint values (price per pound) were computed from the Commodity Credit Corporation price support schedule using the grade and staple assigned to each lint sample by a cotton classing office of the Agricultural Marketing Service, U. S. Department of Agriculture.

No significant difference in unit lint value associated with tramping was found for any of the five cottons (figure 3). The three-year average for the tramped cottons was 25.5 cents per pound as compared to 25.6 for the untramped cottons.

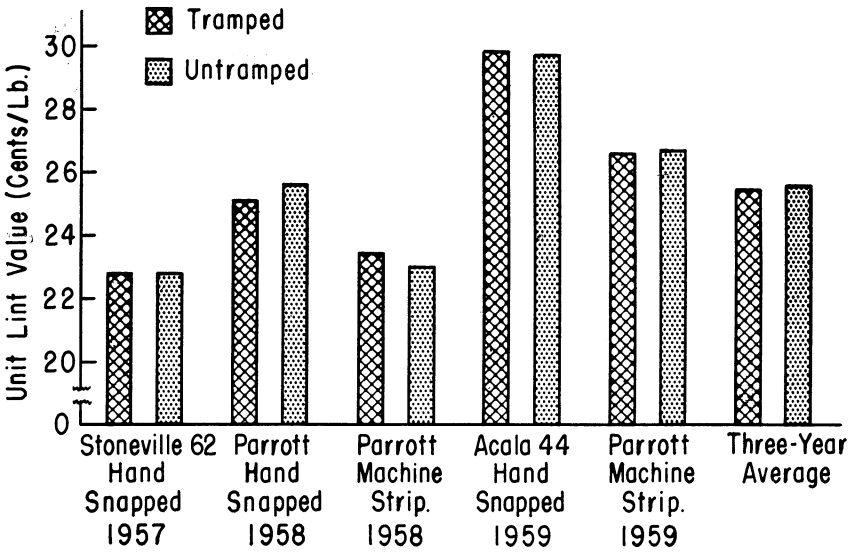

Figure 3.—Effects of seed cotton tramping on unit lint value (based on CCC support prices).

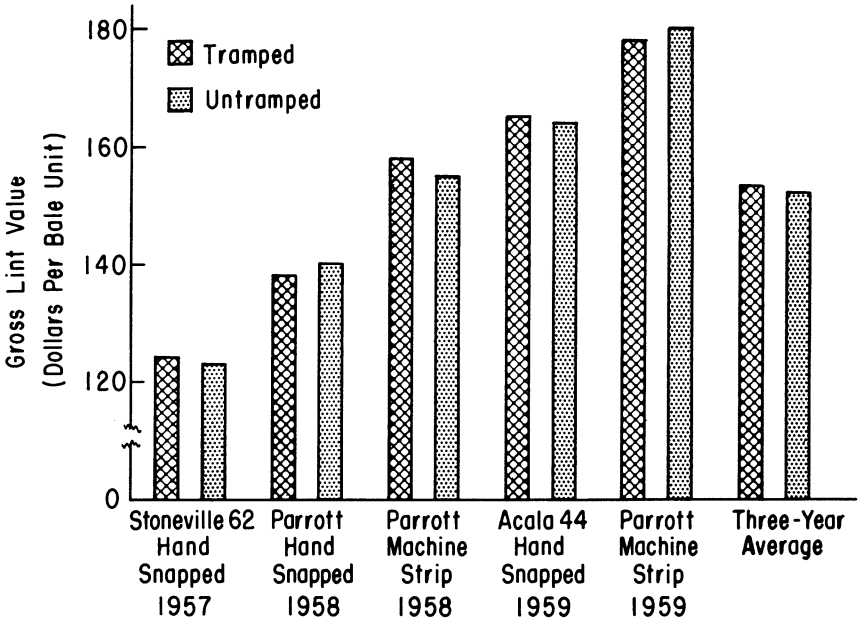

Figure 4.—Effects of seed cotton tramping on gross lint value.

Gross Lint Values

Gross lint value is the term applied in this study to the value of the lint ginned from a bale unit of harvested material as delivered to the gin. This value was computed by multiplying gin turnouts and unit lint values. This term represents the producer's gross returns per bale unit of material delivered to the gin before any ginning and packaging fees are deducted.

Tramping produced no significant, substantial, or consistent effect on gross lint values (figure 4). The maximum difference in gross lint value associated with the tramping treatments was three dollars per bale unit with the machine stripped Parrott of 1958. The three-year average difference in gross lint value was a negligible one dollar per bale unit in favor of tramping.

Lint Cleaning — Tramping Interaction

The usual effects of lint cleaning were noted in this study with respect to gin turnouts, lint waste contents, grade, unit lint values, and gross lint values. In only one instance was evidence found that lint

cleaners were less effective with tramped cotton than with untramped cotton. This was with Stoneville 62 cotton in 1957, when approximately five more pounds of lint waste was removed from each bale unit of untramped cotton than from the tramped cotton.

DISCUSSION

The foregoing results indicate no grade or monetary penalties associated with tramping, but this in no way implies that the deliberate practice of tramping is desirable. From the viewpoint of the cotton producer, thorough tramping could reduce wagon requirements and trips to the gin by one-third. But the additional time, expense or inconvenience which might sometimes be necessary to perform this tramping may not outweigh these advantages.

From the ginner's viewpoint, tramping could result in one-third less wagons in gin-yard traffic and storage. Also, for those ginners who furnish cotton wagons to their customers, wagon requirements could be reduced by tramping. But cotton which has been tightly packed in the wagon is considerably more difficult to unload with the suction telescope than is cotton which has not been packed. And since the suction telescope is sometimes one of the restrictions to increased ginning capacity, this might be in some instances a serious consequence of tramping. Also, tramping could increase the possibility of dropping matches in the load and creating a fire hazard when the cotton is ginned.

Thus it can be seen that several factors should be considered in deciding whether or not cotton should be tramped in the wagon; but the results of this study do not indicate that grade and lint value need be among those factors.

This study did not include hand-picked or machine-picked cottons, therefore the results are not necessarily applicable to those methods of harvest. Furthermore, while similar indications have been found at some other cotton research laboratories in the Cotton Belt, the results of this study cannot necessarily be projected to other areas having different climatic conditions for growth and harvest, generally higher lint grades, and in which different methods of harvest are used.

SUMMARY

From three years of study using three varieties of cotton and two methods of harvest, there is little indication that the Oklahoma cotton

producer would suffer a loss of grade or returns as a result of tramping hand-snapped or machine-stripped cotton in the wagon as it is harvested, in order to reduce the amount of wagon space required.

The results of this study cannot necessarily be projected to other areas having different climatic conditions and methods of harvest.

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