Deficiencies of Cotton Classing

and

Possible Methods of Correction

SUMMARY

As cotton harvesting approaches complete mechanization, cleaning of the fiber by gin plants has been intensified. These practices are based on the assumption that lower nonlint content means improved quality at all stages, including fiber grade and spinning potential.

The deficient factors in cotton classing are those elements of cotton quality which are not included in grade and staple length.

The dominant factor in spinning potential is bright color when associated with a satisfactory maturity index. Color frequently is misinterpreted by the classer because it is associated with what appears to be excessive nonlint in the fiber. The findings of this project indicate that as nonlint content is diminished by gin plant cleaning, yarn quality is not necessarily improved.

A system of quality evaluation geared to actual nonlint content, color by the Colorimeter, associated with an acceptable maturity index and fiber uniformity ratio would assist in the determination of quality differences that reflect effectively the fiber spinning potentials.

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TABLE 1. FIBER PROPERTIES AND SPINNING PERFORMANCE OF UPPER GULF COAST COTTONS, 1957 CROP, CLEANED WITH TWO TYPES OF LINT CLEANERS[1]

Type of lint cleaning	Date ginned	Tests, number	Maturity index[2]	Fineness, micrograms per inch[3]	Fiber tensile strength, 000's pounds per square inch, zero gauge[4]	Length U.H.M., inches[5]	Uniformity ratio[6]	Grade index[7]	Colorimeter			Nonlint content, per cent[9]	Waste picker & card, per-cent[10]	Average yarn break factor, 22's & 50's[11]	Average yarn appearance index[12]
									Rd.	+b	Grade equivalent[8]				
Single-saw	8-21	1	81	4.8	86	1.04	82	100	75.1	9.4	100	2.36	8.13	2539	110
Mean		1	81	4.8	86	1.04	82	100	75.1	9.4	100	2.36	8.13	2539	110
Air-jet-saw	8-29	1	83	5.2	85	1.13	81	85	71.5	8.7	94	4.58	10.40	2454	100
Air-jet-saw	8-29	1	79	4.6	84	1.00	81	94	72.0	9.3	97	3.36	8.78	2401	100
Air-jet-saw	8-29	1	75	4.0	90	.94	81	100	73.2	9.7	100	2.89	9.27	2279	100
Single-saw	9-19	1	77	3.9	84	.98	80	85	70.5	8.6	94	3.84	8.80	2282	100
Air-jet-saw	9-20	1	79	4.5	87	1.04	81	94	72.0	8.5	94	3.80	8.90	2450	100
Air-jet-saw	9-20	1	80	4.6	83	1.01	80	97	72.5	8.6	97	2.35	7.46	2327	100
Mean		6	79	4.4	85	1.02	81	92	72.0	8.9	96	3.39	8.89	2365	100
Single-saw	8-21	1	79	4.0	87	1.04	81	94	72.5	9.2	97	4.06	9.63	2573	100
Single-saw	9-6	1	82	4.7	87	1.10	82	89	67.5	9.1	89	5.09	10.51	2533	100
Mean		2	80	4.3	87	1.07	81	91	69.9	9.1	93	4.55	10.00	2553	100
Single-saw	8-21	1	76	3.8	87	1.03	81	85	67.1	8.6	85	4.09	10.50	2473	90
Single-saw	8-29	1	74	3.6	87	1.01	79	89	71.0	9.2	94	4.93	12.24	2533	90
Mean		2	75	3.7	87	1.02	80	87	69.0	8.9	89	4.49	11.34	2503	90

[1]Project field samples processed at a card production rate of 9½ pounds per hour by AMS, USDA.

[2]Maturity index is the ratio of the untreated to the treated Causticaire readings multiplied by 100: above 81 is mature, 76 to 81 average and 70 to 75 is immature.

[3]Fiber fineness is linear density expressed in terms of micrograms per inch: 3.0 to 3.9 is fine, 4.0 to 4.9 average, 5.0 to 5.9 coarse and 6.0 and above very coarse.

[4]Fiber strength is the force in 1,000 pounds required to break the equivalent of a surface area of 1 square inch calculated from the Pressley index: 86 to 95 is strong, 76 to 85 average, 66 to 75 fair and 65 or less is weak.

[5]Expressed in terms of the upper-half-mean which is the average length of the longest half of the fiber array by weight. This corresponds closely to staple length as determined by classers: .92-.96 equals 15/16 inch, .95-.99 equals 31/32 inch, .98-1.02 equals 1 inch, 1.01-1.05 equals 1-1/32 inches, 1.04-1.08 equals 1-2/32 inches and 1.07-1.11 equals 1-3/32 inches.

[6]Uniformity is a measure of fiber length distribution and is obtained by dividing the mean by the upper-half-mean and expressing the result in percent. Above 80 is considered uniform in fiber length, 75 to 80 average and below 75 irregular in fiber length.

[7]Grade index: 104 is Strict Middling, 100 Middling, 94 Strict Low Middling, 85 Low Middling, 76 Strict Good Ordinary and 70 Good Ordinary.

[8]Color by the Colorimeter. The color values are percentages reflectance in terms of Rd and yellowness in terms of +b. Increasing Rd values indicate increasing brightness and increasing +b values indicate increasing degrees of yellowness.

[9]Nonlint content for the various lots was determined by the use of the Shirley analyzer which separates the lint from the foreign matter. The results are distinguished from total picker and card waste in that practically no fiber is included, whereas textile mill wastes include appreciable amounts of fiber. Based on tests made of bales of cotton used in the official standards for grade of Upland cotton, the following scale has been developed to represent average percentages of nonlint for the various white grades as determined by the Shirley analyzer: Good Middling 2.4, Strict Middling 2.9, Middling 3.7, Strict Low Middling 5.1, Low Middling 7.6, Strict Good Ordinary 11.0 and Good Ordinary 17.0.

[10]Experience has shown the average relationship between grade and manufacturing waste, as based on medium staple Upland cotton when carded at 9½ pounds per hour, is approximately as follows: Good Middling, 6.3%, Strict Middling 7.2%, Middling 8.1%, Strict Low Middling 9.3%, Low Middling 12.5%, Strict Good Ordinary 15.6% and Good Ordinary 18.3%.

[11]The break factor is obtained by multiplying the yarn strength by the yarn number and averaging these values for the two standard numbers spun.

[12]Yarn appearance refers to the relative evenness, smoothness and freedom from foreign material of the yarn as evaluated by a visual comparison with the standards adopted by the American Society for Testing Materials. An index of 100 is average, 110 good and 120 very good.

Deficiencies of Cotton Classing and Possible Methods of Correction

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Cotton classing is the art of estimating grade and staple. Grade of cotton is composed of three factors in combination – color, leaf and preparation.

Color evaluation deals with the major differences or degree of yellowness among classes of white, spotted, tinged, yellow, stained and gray.

Leaf and trash vary in quantity through each of the grades, increasing from the high grades, in which there is little, to the lower grades, in which the proportion becomes comparatively large. Grades which contain the least proportion of leaf and foreign matter, other conditions being equal, are those with the highest spinning value.

Preparation is a term used to describe the degree of smoothness or roughness with which the lint is ginned. As a general rule, smoothly ginned cotton results in less waste, and produces a slightly smoother and more uniform yarn than roughly ginned cotton. Longer cottons normally will have a rougher appearance after ginning than shorter cottons, but that does not necessarily mean that yarns made from such cottons will be relatively poorer.

The length of staple of any cotton is the normal length by measurement, without regard to quality or value, of a typical portion of its fibers under a relative humidity of an atmosphere of 65 percent and a temperature of 70° F. (1) [1]

Grade is a leading factor in the determination of price quality differences. Leaf and other trash have been of prime importance in grade determination; perhaps it has been over-emphasized.

FIBER CLEANING FACILITIES

The use of lint cleaning equipment in gin plants has increased in recent years. This has emphasized cleaning of the fiber after the gin stand has separated the seed from the lint. This in turn seems to indicate that one or more segments of the cotton industry put a high value on elaborately cleaned cotton. (4) The cotton grading system now in use was developed before the advent of lint cleaning in gin plants. The current grading system has not been adjusted to changes in gin plant processing.

Although leaf and other trash in raw cotton is a factor which determines spinning performance, it is only one of several. It is not the most important nor most vital as is implied by the increased use of fiber-cleaning equipment in gin plants.

EFFECTS OF DRYING AND CLEANING

Spinners believe that the inherent spinning quality of cotton is being diminished rather than improved by over-drying and over-machining. Over-drying diminishes the natural oils and waxes in the fibers and makes them subject to excessive breaking. The excellent spinability of the cotton fiber is highly dependent on its delicate surface properties. (3)

The ginner must please his customer, the cotton grower. If he overcleans cotton so that it will make a good grade for the loan, the mills using the fiber have processing difficulties. If he does not clean the fiber to make a good grade for the classing board, the grower is displeased. The fiber should be processed by gin plants to preserve the quality produced. Cotton ginned in this way is acceptable to the mills. That portion of the crop not purchased by spinners can find an outlet in the loan. (4)

DRYING AND CLEANING NOT ALWAYS PROFITABLE

An investigation by the National Cotton Council disproved the theory that higher grades (attained by drying, excessive machining and cleaning alone) return greater profits to the farmer through government loans or supports. Instead, in many instances the producer receives less dollar return on much of the higher grades produced. The loss in weight due to drying and cleaning, staple shrinkage and removal of foreign matter nullifies any gain due to higher grades. The support price discounts for the lower grades will be smaller in 1960 than in 1958 or 1959. This will further diminish the potential gains from lint cleaning. Spinners have learned that synthetic higher grades attained by drying and elaborate cleaning will not produce the quality fabrics that once were obtained from hand-picked cotton ginned on old conventional gins. During the past 3 seasons, their preference for the lower grades has been limited only by the supply available. Many of the lower grades are not overheated or excessively cleaned and produce fabrics of satisfactory quality at lower manufacturing costs. Some ginners are beginning to question the wisdom of buying, installing and using much elaborate equipment. (2) Many questioned this move at the beginning of the past decade; but the installation of lint-cleaning equipment continued.

[1] Numbers in parentheses refer to literature cited.

The solution is to show growers and ginners that the apparent benefits of drying and cleaning are not what they seem to be. Spinners have avoided high grades when supplies permitted and the long-term market for cotton has not been enhanced by current drying and cleaning practices in gin plants. Eventually, each bale must be converted into yarn and fabrics. The system of cotton classification and evaluation should be revised to reflect true spinning value.

A study was made by the Texas Agricultural Experiment Station during the crop years of 1957-59 on the processing performance of cottons produced in two areas. The areas chosen for the tests were Wharton and Fort Bend counties in the Upper Gulf Coast and Burleson, Brazos and Robertson counties in the Brazos River Valley of Central East Texas.

Deltapine is the predominant type of cotton grown in each area.

Marked changes in ginning techniques have occurred in these areas in the past decade. These changes have been more pronounced since 1956. Many gins with no lint cleaning installed single phase cleaning in 1957. Some gins with one-stage lint cleaning installed a second stage. This is known as tandem lint cleaning.

Machine-picked and hand-harvested cottons of similar harvest periods were sampled at the gin during the 3 seasons, and spinning performance tests were run on each bale. These tests were analyzed on the basis of fiber properties, color, nonlint content, percentage of picker and card waste, and average break factor and yarn appearance index of 22's and 50's yarn.

UPPER GULF COAST

Cottons produced in the Upper Gulf Coast in 1957-59 are arrayed in Tables 1, 2 and 3 in descending order of the yarn appearance grades of the yarns processed from each test spun in each year, thus separating the tests into groups having the same yarn appearance grade. The yarn appearance grade is correlated with the nonlint content as determined by the Shirley analyzer.

Recent ginning emphasis has shifted to lint cleaning or removal of leaf and other trash from the lint after ginning. Nonlint content is one of the three factors considered when assigning grade to a sample. The rapid increase in the use of lint cleaners by ginners since 1956 indicates that nonlint content is the most important factor considered by an influential segment of the cotton industry when evaluating cotton for grade.

The data shown in Table 1 are from 11 tests from the crop of 1957. The lint cleaners used were six by one-stage saw-type and five by air-jet followed by a saw-type cleaner. The increase in nonlint content from the highest to the next two lower yarn appearance groups was significant. The difference between the lowest yarn appearance grade to the group just above was not significant.

The data on the four groups indicate that yarn appearance grade is correlated with nonlint content, color, maturity index and uniformity ratio. The latter is of less influence when it is within the acceptable range of good quality. The dominant factor is bright color, when associated with a satisfactory maturity index.

TABLE 2. FIBER PROPERTIES AND SPINNING PERFORMANCE OF UPPER GULF COAST COTTONS, 1958 CROP CLEANED WITH THREE TYPES OF LINT CLEANERS

Type of lint cleaning	Date ginned	Tests, number	Maturity index	Fineness, micrograms per inch	Fiber tensile strength, 000's pounds per square inch, zero gauge	Length U.H.M., inches	Uniformity ratio	Grade index	Colorimeter			Nonlint content, percent	Waste picker & card, percent	Average yarn break factor, 22's & 50's	Average yarn appearance, 22's & 50's index
									Rd.	+b	Grade equivalent				
Tandem-saw	8-8	1	80	4.5	87	1.11	79	100	74.7	10.7	100	2.28	6.50	2607	110
Air-jet-saw	8-8	1	81	4.8	86	1.07	79	100	68.5	9.4	94	2.16	7.24	2368	110
Single-saw	8-19	1	80	4.4	87	1.04	80	100	74.5	9.5	100	1.88	7.25	2537	110
Mean		3	80	4.5	87	1.07	79	100	72.5	9.8	98	2.10	6.99	2504	110
Air-jet-saw	8-12	1	78	4.2	83	1.03	80	94	71.0	9.9	88	2.92	8.50	2478	105
Air-jet-saw	8-18	1	84	5.0	88	1.00	82	104	76.5	9.3	102	1.56	5.86	2355	105
Tandem-saw	8-19	1	78	4.2	83	1.02	78	100	69.5	9.5	94	1.30	6.46	2243	105
Tandem-saw	9-3	1	78	4.4	80	1.02	76	85	63.0	8.2	85	4.36	8.86	2184	105
Mean		4	79	4.4	83	1.02	79	96	69.7	9.2	92	2.26	7.31	2315	105
Tandem-saw	8-28	1	80	4.4	86	1.01	79	94	68.3	8.6	89	3.22	8.84	2300	95
Single-saw	8-28	1	75	3.8	86	1.02	79	94	72.0	9.2	97	2.53	8.10	2487	95
Single-saw	9-3	1	75	3.8	87	1.01	78	100	73.5	8.9	100	3.21	7.00	2465	95
Mean		3	77	4.0	86	1.01	79	96	71.2	8.9	95	2.97	7.94	2417	95

TABLE 3. FIBER PROPERTIES AND SPINNING PERFORMANCE OF UPPER GULF COAST COTTONS, 1959 CROP, CLEANED WITH TANDEM-SAW LINT CLEANERS

Type of lint cleaning	Date ginned	Tests, number	Maturity index	Fineness, micrograms per inch	Fiber tensile strength, 000's pounds per square inch, zero gauge	Length U.H.M., inches	Uniformity ratio	Grade index	Colorimeter			Nonlint content, percent	Waste picker & card, percent	Average yarn break factor, 22's & 50's	Average yarn appearance, 22's & 50's index
									Rd.	+b	Grade equivalent				
Tandem-saw	9-15	1	82	4.8	79	1.05	78	94	69.5	8.7	94	3.67	8.63	2096	110
Mean			82	4.8	79	1.05	78	94	69.5	8.7	94	3.67	8.63	2096	110
Tandem-saw	9-29	1	80	4.4	78	1.06	77	76	66.5	7.9	85	4.10	9.47	2200	105
Tandem-saw	10-6	1	76	4.4	79	1.09	78	85	68.0	8.4	85	3.05	7.99	2214	105
Tandem-saw	7-21	1	79	4.2	83	1.06	79	94	74.3	8.0	97	3.77	7.39	2375	105
Mean		3	78	4.3	80	1.07	78	85	69.5	8.1	89	3.61	8.24	2263	105
Tandem-saw	9-1	1	77	4.4	80	1.06	79	94	71.0	8.8	94	2.15	7.06	2276	100
Tandem-saw	9-7	1	79	4.2	80	1.07	80	94	72.5	9.1	97	1.90	6.55	2236	100
Mean		2	78	4.3	80	1.06	79	94	71.7	8.9	95	2.02	6.80	2256	100

Table 2 contains data on 10 bales of cotton from the 1958 crop. Processing of the fiber by gin plants had been intensified as compared with 1957 ginnings. Three bales were cleaned by single-saw units, three by air-jet saw combinations and four by the tandem-saw process. When the tests were grouped by yarn appearance grades, the nonlint content became less reliable as an index of potential yarn appearance grade. The difference in the nonlint content between the two top yarn appearance grade groups was not significant. Differences in picker and card also were not significant. The difference in nonlint content between the two lowest yarn appearance groups was significant. The difference in picker and card waste was not significant.

Factors which influenced the rankings by yarn appearance were the brightness of color in combination with a desirable maturity index. The third ranked group had a mean color index slightly above the second ranked group, but the maturity index was significantly lower. Uniformity ratio does not differ among the three groups.

The data in Table 3 include six tandem-saw lint-cleaned bales from the crop of 1959. Use of nonlint content as a guide to yarn appearance grade of the processed cotton was less reliable than in the 1957-58 tests. The groups with the greatest nonlint content had the highest yarn appearance grades. The lowest nonlint content fiber processed into yarn with the lowest yarn appearance grades. Similar results were noted with respect to picker and card waste. The difference in nonlint content and picker and card waste between the first two groups was not significant. Low processing waste traditionally has been associated with superior yarn appearance. Possibly the intensive cleaning of lint impairs some of the delicate surface qualities of the fiber which contribute to high spinning performance.

The first ranked group was superior in the desirable fiber properties of maturity and color. The second ranked group had a lower color index than the third; the maturity index was similar. The ranking of the third group cannot be explained by relative color, maturity or uniformity of fiber length.

BRAZOS RIVER VALLEY

Table 4 contains fiber properties and spinning data on 14 bales produced in the Brazos River Valley in 1957. Seven bales were processed through single-saw type lint cleaners, three were cleaned by tandem-saw combinations, two by air-jet-saw and two were not lint-cleaned.

There was no significant difference in nonlint content between the two lowest yarn appearance groups (100 and 95). The difference in nonlint content between the 105 yarn appearance group and the 100 group was not significant. However, the highest nonlint content of a single test group ranked was 4.17 percent in the 105 group.

In the first of the four yarn appearance groupings, nonlint content was indicative of superior yarn grade. As more intensive lint cleaning was used in the third and fourth ranked groups, nonlint content was less reliable as a measure of desirable yarn appearance.

The factors which contributed to the highest ranking samples in yarn appearance were brightness of color (measured by the Colorimeter) combined with one of the three top maturity indexes. One bale in the second ranked group (105) had brighter color, but the maturity index was the lowest of the group.

The data in Table 5 include 12 bales of the 1958 crop from two farms. All of the cottons in this lot were ginned by the same plant, with moderate

before-ginning cleaning and one-stage saw-type comber lint cleaning. The yarn from six bales graded 105; the remainder 100. There was a significant difference in the nonlint content between the two yarn appearance groups; the group graded 105 had the lowest percentage. There was a slight but non-

TABLE 4. FIBER PROPERTIES AND SPINNING PERFORMANCE, BRAZOS RIVER VALLEY COTTONS, 1957 CROP CLEANED WITH THREE TYPES OF LINT CLEANERS AND NO LINT CLEANERS

Type of lint cleaning	Date ginned	Tests, number	Maturity index	Fineness, micrograms per inch	Fiber tensile strength, 000's pounds per square inch, zero gauge	Length U.H.M., inches	Uniformity ratio	Grade index	Colorimeter			Nonlint content, percent	Waste picker & card, percent	Average yarn break factor, 22's & 50's	Average yarn appearance, 22's & 50's index
									Rd.	+b	Grade equivalent				
Air-jet-saw	10-9	1	81	4.5	87	1.05	78	94	74.8	8.4	97	1.83	6.59	2347	110
Mean		1	81	4.5	87	1.05	78	94	74.8	8.4	97	1.83	6.59	2347	110
No lint cleaner	10-2	1	79	4.2	84	1.05	79	76	66.5	7.9	85	6.92	12.49	2409	105
No lint cleaner	10-2	1	81	4.4	83	1.08	81	76	62.5	7.5	76	6.25	12.02	2400	105
Single-saw	10-4	1	78	4.2	81	1.14	80	94	75.5	8.7	100	2.13	6.78	2629	105
Tandem-saw	11-1	1	81	4.4	77	1.05	78	94	71.1	8.0	89	3.27	8.63	2295	105
Mean		4	80	4.3	81	1.08	79	85	68.6	8.0	85	4.17	9.68	2433	105
Tandem-saw	10-4	1	77	4.2	84	1.12	79	85	70.5	8.1	94	2.99	8.24	2536	100
Single-saw	10-7	1	79	4.4	79	1.10	79	85	71.1	8.1	94	3.29	8.39	2408	100
Single-saw	11-1	1	77	4.0	77	1.07	80	85	66.5	7.4	85	4.40	10.16	2250	100
Tandem-saw	12-4	1	79	4.4	79	1.08	80	85	65.5	8.0	85	3.73	8.54	2199	100
Single-saw	12-15	1	76	4.0	79	1.06	78	85	70.5	7.1	85	4.64	8.73	2253	100
Mean		5	77	4.2	80	1.08	79	85	68.7	7.7	85	3.76	8.79	2329	100
Air-jet-saw	10-10	1	73	3.5	84	1.01	79	85	66.5	7.9	85	3.36	7.25	2383	95
Single-saw	12-4	1	76	4.0	78	1.02	78	85	66.3	8.6	85	4.49	10.14	2075	95
Single-saw	12-5	1	79	4.3	75	1.07	79	85	68.5	7.3	85	3.82	9.81	2107	95
Single-saw	12-5	1	78	4.2	82	1.05	80	85	63.1	7.6	80	4.04	9.77	2194	95
Mean		4	76	3.7	80	1.04	79	85	66.1	7.8	85	3.91	8.92	2189	95

TABLE 5. FIBER PROPERTIES AND SPINNING PERFORMANCE, BRAZOS RIVER VALLEY COTTONS, 1958 CROP CLEANED WITH SINGLE-SAW TYPE LINT CLEANERS BY ONE GIN PLANT

Type of lint cleaning	Date ginned	Tests, number	Maturity index	Fineness, micrograms per inch	Fiber tensile strength, 000's pounds per square inch, zero gauge	Length U.H.M., inches	Uniformity ratio	Grade index	Colorimeter			Nonlint content, percent	Waste picker & card, percent	Average yarn break factor, 22's & 50's	Average yarn appearance, 22's & 50's index
									Rd.	+b	Grade equivalent				
Single-saw	9-9	1	82	4.8	78	1.12	82	94	73.5	8.8	97	2.79	6.89	2340	105
Single-saw	9-9	1	80	4.8	85	1.02	80	100	75.5	8.8	100	2.55	6.62	2310	105
Single-saw	10-3	1	79	4.5	80	1.05	79	85	67.0	7.7	85	4.00	8.10	2262	105
Single-saw	9-30	1	80	4.6	80	1.09	80	94	71.7	7.8	94	3.20	6.89	2347	105
Single-saw	9-30	1	80	4.6	81	1.12	80	85	69.4	8.0	85	5.85	9.17	2330	105
Single-saw	10-10	1	81	4.8	77	1.12	79	85	67.0	7.7	85	4.95	8.81	2199	105
Mean		6	80	4.7	80	1.08	80	90	70.6	8.1	94	3.72	7.68	2298	105
Single-saw	9-15	1	81	4.4	82	1.12	79	94	72.4	8.3	94	3.94	7.51	2616	100
Single-saw	9-15	1	79	4.1	81	1.12	79	89	73.0	8.2	94	5.30	8.00	2613	100
Single-saw	10-6	1	81	4.8	83	1.08	81	85	68.7	7.9	85	4.47	8.31	2304	100
Single-saw	10-16	1	78	4.4	82	1.06	77	85	69.4	7.8	85	5.25	9.09	2009	100
Single-saw	10-20	1	79	4.6	79	1.10	82	89	70.5	7.5	85	3.26	7.04	2367	100
Single-saw	10-20	1	79	4.6	81	1.11	82	85	73.0	7.3	94	4.40	8.07	2337	100
Mean		6	79	4.5	81	1.10	80	88	71.2	7.8	94	4.38	7.98	2374	100

TABLE 6. FIBER PROPERTIES AND SPINNING PERFORMANCE, BRAZOS RIVER VALLEY COTTONS, 1959 CROP MACHINE-PICKED FROM ONE FARM, CLEANED WITH SINGLE-SAW TYPE LINT CLEANERS, BY ONE GIN PLANT

Type of lint cleaning	Date ginned	Tests, number	Maturity index	Fineness, micrograms per inch	Fiber tensile strength, 000's pounds per square inch, zero gauge	Length U.H.M., inches	Uniformity ratio	Grade index	Colorimeter			Non-lint content, percent	Waste picker & card, percent	Average yarn break factor, 22's & 50's	Average yarn appearance, 22's & 50's index
									Rd.	+b	Grade equivalent				
Single-saw	9-28	1	79	4.4	77	1.08	81	85	74.3	8.0	97	3.85	7.90	2373	115
Single-saw	9-16	1	83	4.9	80	1.08	80	89	73.5	8.8	97	4.20	7.83	2374	110
Mean		2	81	4.6	78	1.08	80+	87	73.9	8.4	97	4.02	7.86	2373	112
Single-saw	10-7	1	81	4.8	77	1.07	79	89	68.7	8.5	89	3.46	7.58	2218	105
Single-saw	10-19	1	79	4.6	74	1.06	79	89	70.4	8.3	94	3.22	8.55	2055	105
Single-saw	10-21	1	79	4.6	74	1.06	79	89	70.5	8.3	94	3.10	8.13	2147	105
Mean		3	80	4.7	75	1.06	79	89	69.8	8.4	92	3.25	8.07	2140	105
Single-saw	10-21	1	79	4.6	77	1.05	78	94	73.5	8.1	94	2.70	6.36	2143	100
Single-saw	10-18	1	79	4.4	76	1.06	80	89	70.2	8.6	94	3.40	8.18	2124	100
Single-saw	10-16	1	79	4.4	77	1.06	78	85	69.4	8.5	94	4.35	8.53	2105	100
Single-saw	10-12	1	79	4.4	74	1.03	77	85	68.5	8.2	85	4.18	9.25	2102	100
Mean		4	79	4.4	76	1.05	78	88	70.3	8.3	92	3.59	8.08	2118	100
Single-saw	10-28	1	81	4.7	74	1.07	79	85	65.7	7.8	85	3.80	9.85	2016	95
Single-saw	10-26	1	80	4.6	79	1.06	77	85	71.3	8.1	94	3.27	8.84	2182	95
Single-saw	10-23	1	77	4.0	78	1.06	78	85	71.0	8.1	94	3.60	9.06	2259	95
Single-saw	10-8	1	81	4.5	76	1.07	77	88	70.5	8.5	94	3.22	7.64	2202	95
Mean		4	80	4.4	77	1.06	78	86	69.5	8.1	92	3.46	8.81	2164	95

significant difference in picker and card waste. Nonlint content gave a reliable indication of yarn quality; picker and card waste did not. The mean Colorimeter readings indicated no significant difference between the two lots. The higher appearance groups had a significantly higher fiber maturity index. There was no difference in uniformity ratio between the two groups.

Table 6 contains data on 13 machine-picked bales of the 1959 crop from the same farm. All were processed on the same gin that was used in 1958. Nonlint content was not an accurate criterion of potential yarn appearance index. The group having the greatest nonlint content had the highest yarn appearance index. This nonlint content was significantly above that of the second ranked yarn appearance group. The second, third and fourth-ranked groups did not differ significantly in nonlint content. The first-ranked yarn-apperance group differed significantly in picker and card waste only when compared with the fourth-ranked group. The spread in this instance was less than 1 percent. Nonlint content, as well as picker and card waste, were not reliable criterion of yarn appearance index even though nonlint content is influential in cotton grade determination.

The combination of bright color and high maturity index was the most significant indication of superior yarn appearance grade.

The cottons in this project were in the white category. There were no spotted, tinged or off-color bales.

ACKNOWLEDGMENTS

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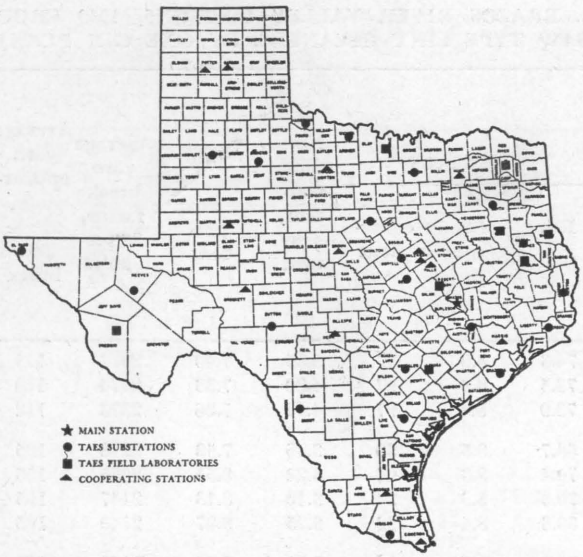

Location of field research units of the Texas Agricultural Experiment Station and cooperating agencies

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