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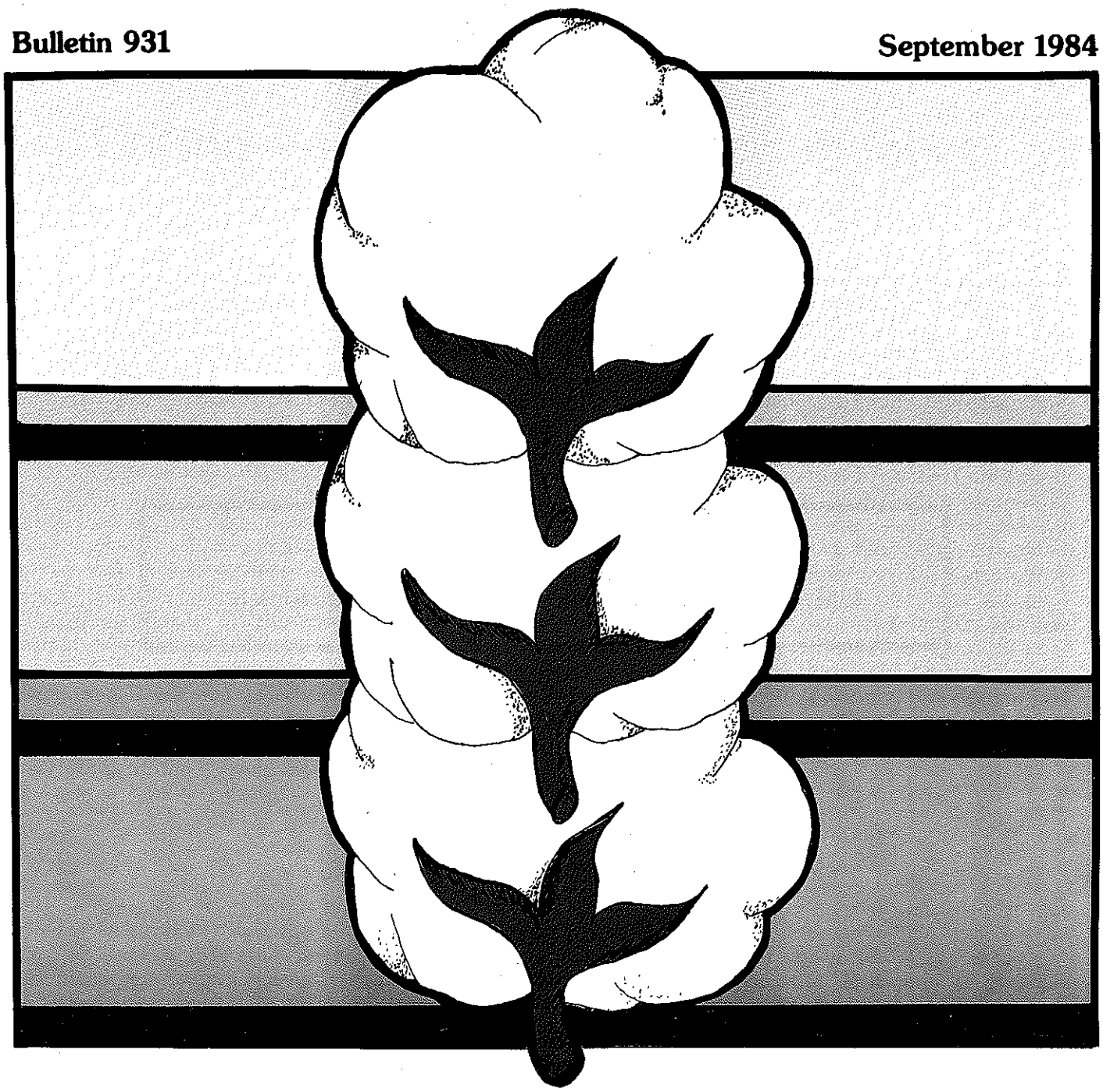

The Influence of Binary Seed Mixtures of 'Stoneville 825' and 'Deltapine 41' Cotton Varieties on Their Performance

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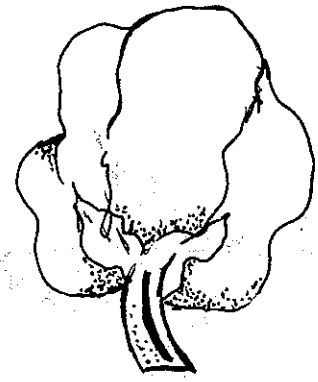

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The production of genetically pure seed by farmers has been encouraged by many agricultural organizations. Some of the most important agencies that promote pure seed through certification are the crop improvement associations. The purpose of seed certification is to maintain and make available to the public high-quality seed of superior plant varieties that are grown and distributed to maintain high-quality genetic identity and purity. Classes of seed that meet certain standards of the crop improvement association are generally designated as Breeder, Foundation, Registered or Certified. Inspection and standards for specific crops are based on the description of the variety as set forth by the breeder, and variants and "off-types" cannot exceed specific crop standards. An "off-type" usually refers to plants that deviate in one or more characteristics from the variety described. All associations must meet minimum AOSCA standards; however, quality standards may vary greatly from state to state.

It has been noted that some cottonseed arriving in Mississippi from other states, particularily the West, occasionally produce high percentages of "off-type" plants. These "off-type" plants are generally plants of other cotton varieties that resulted from mixtures that probably occurred during ginning. Some states allow more than one variety to be grown on a farm and more than one variety to be ginned at the same gin. These factors along with possible failure to adequately inspect harvesting equipment and gins lead to occasional mixtures of varieties. To minimize seed mixtures in Mississippi-grown cottonseed, the Mississippi Seed Improvement Association does a good job of assuring that fields are in compliance with isolation standards and that fields, gins, harvesting equipment and storage facilities are properly inspected. Certification is a guarantee that varietal purity has been maintained and the varieties' characteristics can be depended upon.

The objective of this study was to determine the influence of seed mixtures of cotton varieties on performance.

Materials and Methods

Seed of 'Deltapine 41' and 'Stoneville 825' used in this study had about the same germination percentage, 92 and 91%, respectively. Deltapine 41 had about 800 more seed per pound than did Stoneville 825 (5,316 and 4,503 seed per pound, respectively), and the seed were counted to ensure the same seeding rate. The plots consisted of two rows 59 feet long with 40 inches between rows. The seeding rate was 350 acid-delinted seed on each row (700 seed per plot). This study was conducted over a two-year period (1981-82), and a randomized complete block design with four replications was used each year. Planting dates were April 21 in 1981 and April 27 in 1982 on a Bosket sandy loam at Stoneville, Mississippi.

Eleven treatments (seed samples) were included in this study. The eleven treatments consisted of two pure seed lots (100% Deltapine 41 and 100% Stoneville 825) and nine seed mixtures of the two varieties. The mixed seed lots consisted of 90, 80, 70, 60, 50, 40, 30, 20 and 10% Stoneville 825, and the remaining percentage of each mixture was Deltapine 41. These two varieties were chosen because they represent nectaried (Deltapine 41) and nectariless (Stoneville 825) varieties that had shown about the same yield potential. Deltapine 41 possesses smaller seed, higher lint percentage, stronger fiber and a lower micronaire value than does Stoneville 825.

Yield determinations were based on the weight of cotton harvested from two-row plots. Determinations of lint percentage, boll size and fiber properties were made from hand-picked samples from two replications each year. Fiber property evaluations were made in the Cotton Fiber Lab at Stoneville.

Results

The percentage of seedlings that emerged ranged from 71.7 to 75.4%. There were no significant differences in seedling emergence among the eleven treatments, thus plant populations were about the same (Table 1).

The two-year average (1981-82) lint yields of the eleven treatments ranged from 876 to 963 pounds per acre, but these differences were not statistically significant. Average lint yield of the two pure-seed lots was 935 pounds. Average yield of the 50%:50% mixtures (912 pounds of lint) was less than that of the pure-seed lot, and this implies that the varieties may be antagonistic to each other (Figure 1). These two varieties have about the same yield potential, and the data indicate that mixing seed of two high-yielding varieties that are recommended for planting would not significantly influence lint yield. A treatment-by-year interaction was not detected in this study.

Lint percentage ranged from 38.75 to 41.60, with Deltapine 41 having a 2.8% higher lint percentage than did Stoneville 825. Significant differences in lint percentage were obtained and tended to increase as the

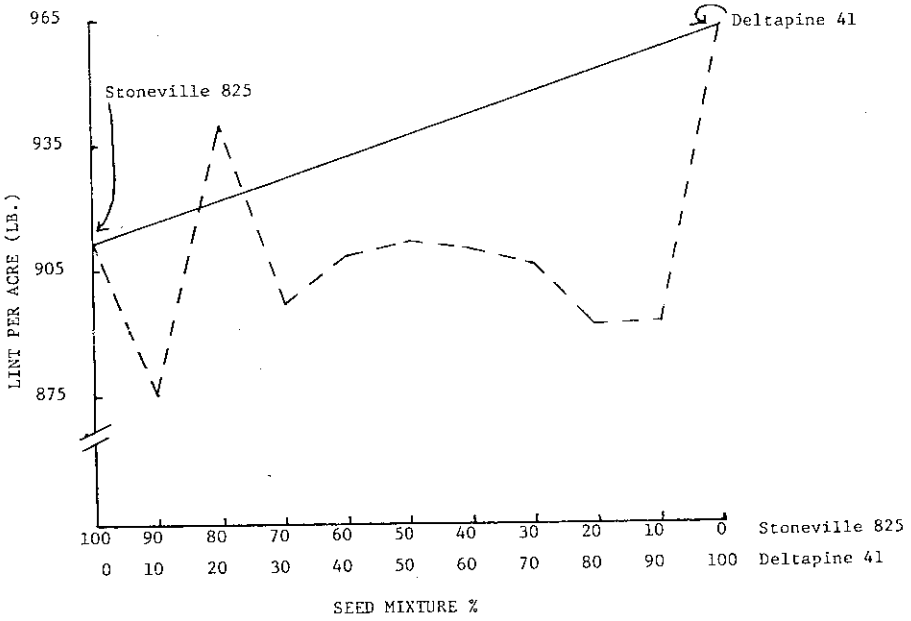

Figure 1. Influence of seed mixtures on lint yield.

Table 1. The influence of seed mixtures of cotton on performance, 1981-82 average.

Seed Mixture %	LINT PER ACRE Total	Lint percent	Boll size grams	FIBER PROPERTIES Length 2.5%	Length 50%	Strength g/tex	Elongation	Micronaire	% Seedling emergence
100% Stoneville 825	907	38.80	5.05	1.09	.51	18.62	6.8	4.8	73.4
*90% Stoneville 825	876	38.75	4.98	1.09	.50	18.87	7.3	4.8	72.9
80% Stoneville 825	939	38.80	5.00	1.09	.52	18.74	8.2	4.5	71.7
70% Stoneville 825	897	39.25	5.01	1.09	.50	18.79	7.7	4.7	73.1
60% Stoneville 825	908	39.55	5.02	1.10	.51	19.09	7.8	4.7	72.5
50% Stoneville 825	912	39.32	5.00	1.09	.50	20.34	8.6	4.6	73.2
40% Stoneville 825	910	39.45	5.03	1.11	.52	19.43	7.3	4.8	73.0
30% Stoneville 825	906	40.35	4.82	1.09	.51	19.51	8.2	4.6	75.4
20% Stoneville 825	892	40.60	4.89	1.10	.51	19.55	8.0	4.6	73.6
10% Stoneville 825	893	41.05	4.79	1.09	.51	20.02	8.4	4.5	74.5
100% Deltapine 41	963	41.60	4.81	1.10	.51	20.24	8.4	4.5	74.7
LSD .05	NS	.71	.20	NS	NS	0.65	0.8	0.1	NS
C.V. in %	12.2	1.1	2.5	1.8	--	3.0	4.2	2.0	4.6

Planted: April 21, 1981 and April 27, 1982
Harvested: September 21, 1981 and September 30, 1982
Irrigated: July 16, 1981 and July 13, 1982

*90% Stoneville 825 and 10% Deltapine 41

proportion of Deltapine 41 seed in the mixture was increased. Again, the varieties were antagonistic in their action rather than synergistic (Figure 2).

Bolls of Deltapine 41 were significantly smaller than those of Stoneville 825, and there was a slight tendency for bolls to decrease in size as the proportion of Deltapine 41 seed in the mixture was increased. The 50:50 mixtures produced a larger boll size than did one of the pure lots (Deltapine 41), suggesting that synergistic effects were becoming evident for this characteristic (Figure 3).

No significant trends were noted for fiber length, which was expected because the two varieties possess about the same fiber length. Deltapine 41 produced significantly stronger fiber than did Stoneville 825 (20.24 vs. 18.62 g/tex), with the two pure lots of each variety having the strongest and weakest fiber, respectively. The general trend was for fiber strength to increase as the proportion of Deltapine 41 was increased.

Fiber elongation values ranged from 6.8 to 8.6, and Deltapine 41 possessed a significantly higher elongation value than did Stoneville 825. Elongation values of fiber from the seed mixtures were generally between the values of the two pure lines, with no specific trend evident.

The 50:50 mixture produced higher responses than did either of the varieties for fiber strength and elongation, suggesting that synergistic effects were coming into play for these characters (Figures 4 and 5).

Micronaire values ranged from 4.5 to 4.8, and significant differences were detected. As the percentage of Stoneville 825 in the mixtures increased, the micronaire values tended to increase. The 50:50 mixture produced a larger micronaire than did one of the pure seed lots (Deltapine 41) and a micronaire value equal to that of Stoneville 825,

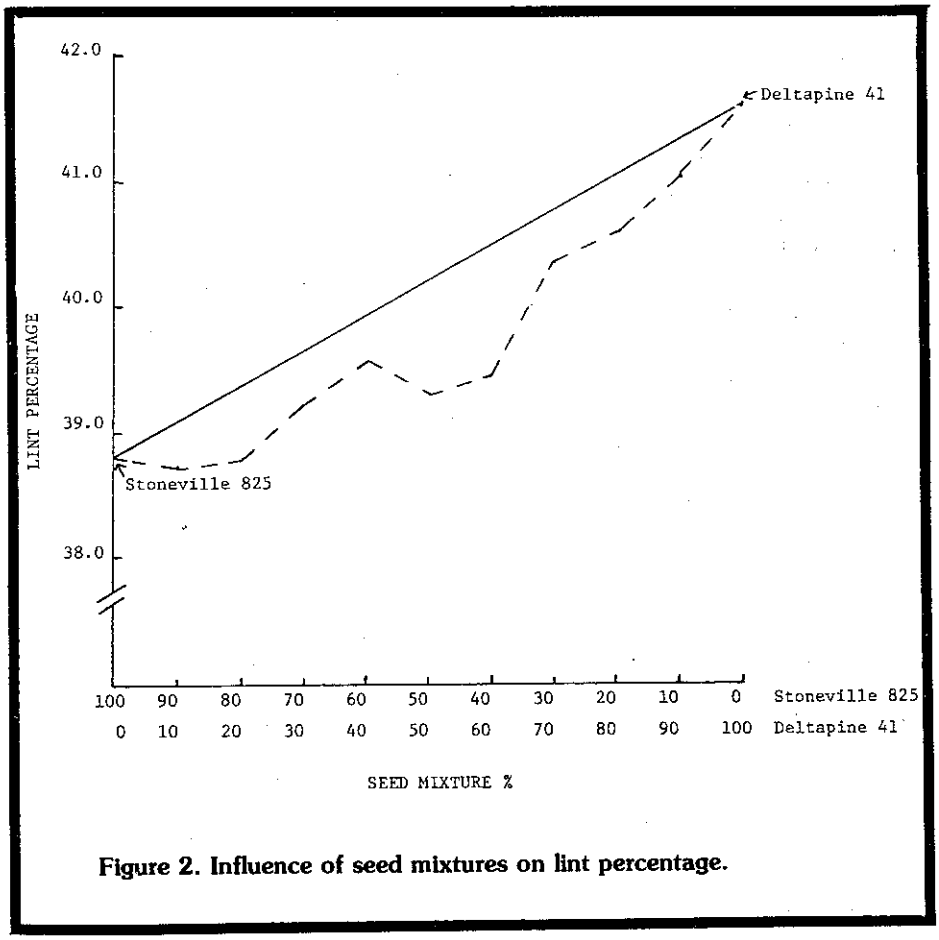

Figure 2. Influence of seed mixtures on lint percentage.

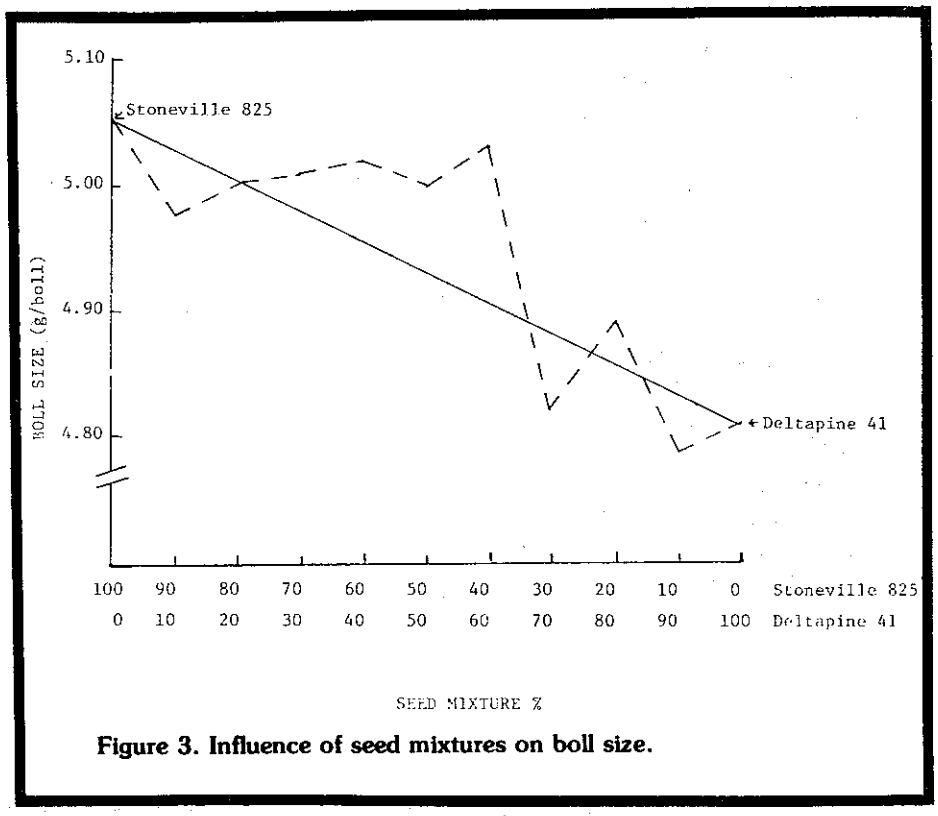

Figure 3. Influence of seed mixtures on boll size.

suggesting that synergistic effects were becoming evident for micronaire (Figure 6).

These two varieties were selected for this study because of their popularity and varietal characteristics. Stoneville 825 is a nectariless variety with larger bolls, larger seed, weaker fiber, higher micronaire value and a lower lint percentage as compared to Deltapine 41. This study indicates that mixing seed of two adapted high-yielding varieties had no significant influence on yield. The data do suggest, however, that lint percentage, boll size and fiber properties are influenced by seed mixtures. The data also suggest that the varieties may be antagonistic to each other for lint yield and lint percentage, and synergistic to each other for boll size and fiber properties.

If certification procedures are neglected and basically pure seed lots are not obtained, varietal identification will become virtually impossible. Our results indicate that seed mixtures may cause changes in fiber quality and it is conjectured that seed mixtures could influence yield if varieties with different yielding capacities are mixed.

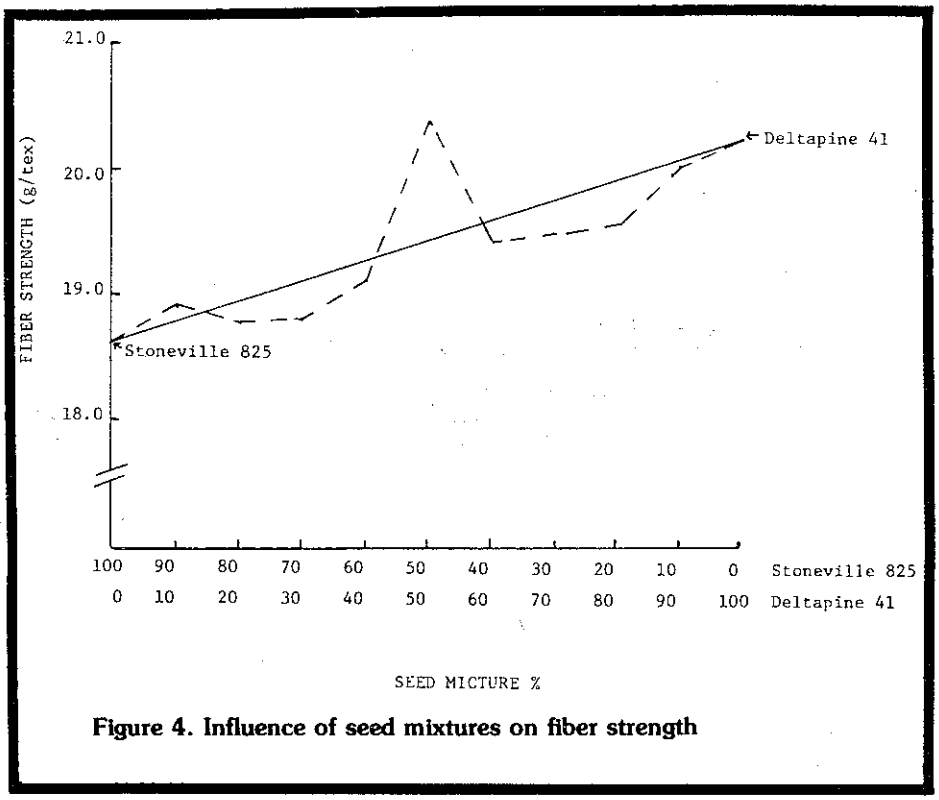

Figure 4. Influence of seed mixtures on fiber strength

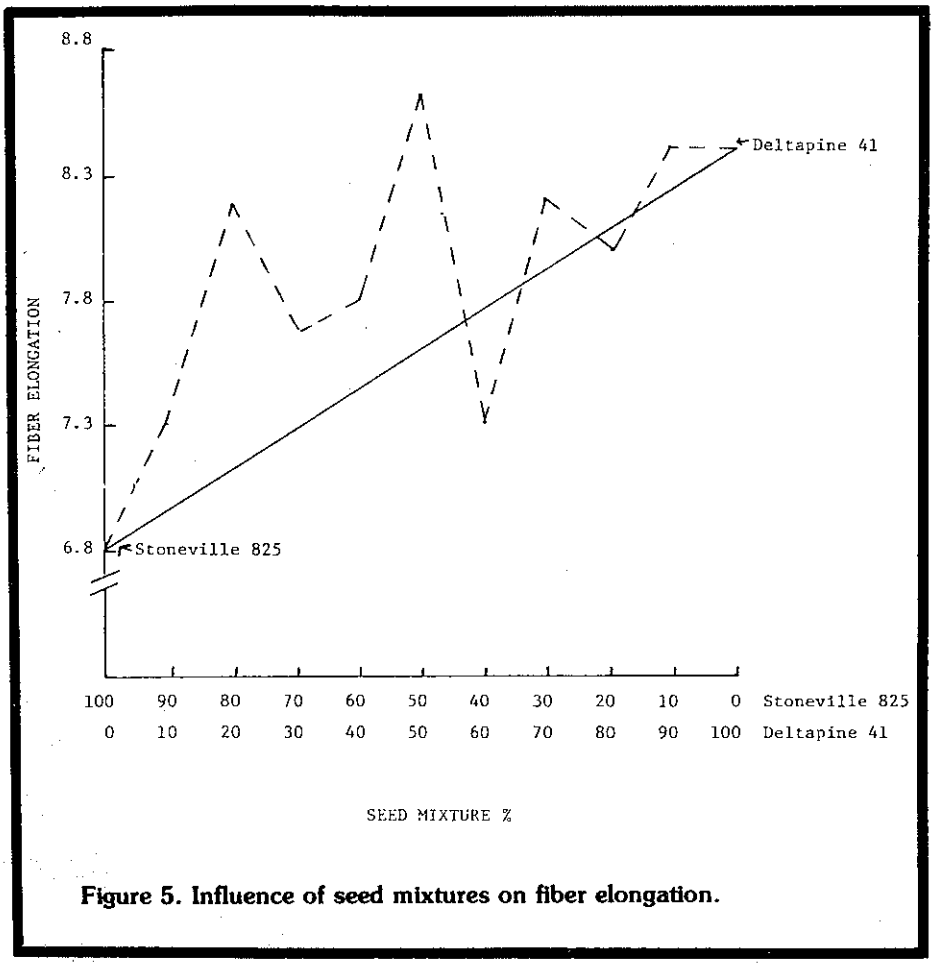

Figure 5. Influence of seed mixtures on fiber elongation.

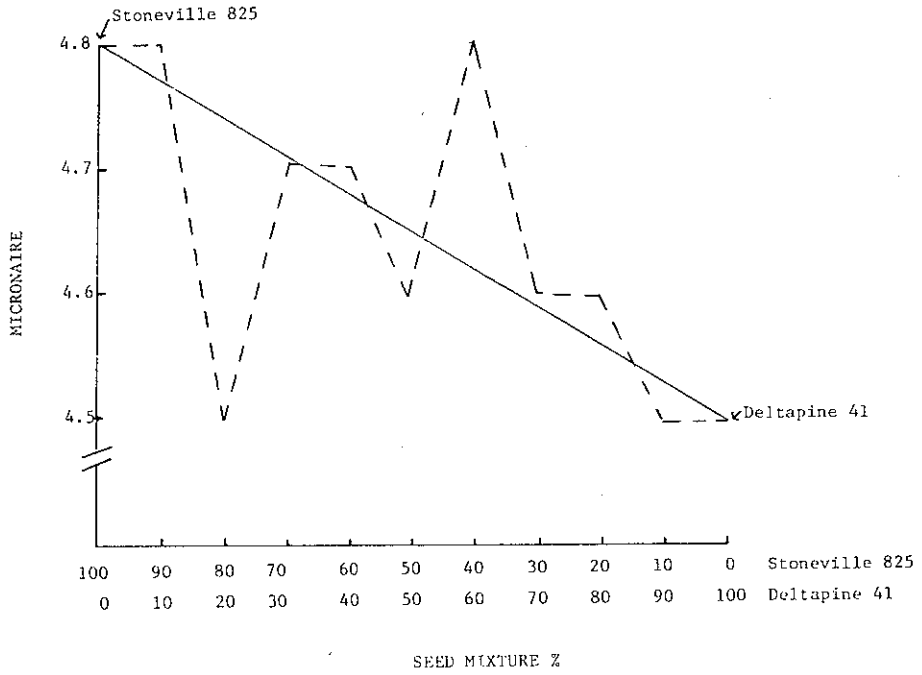

Figure 6. Influence of seed mixtures on micronaire.

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