FOUR -YEAR SUMMARY OF COTTON YIELD RESPONSE TO STARTER FERTILIZER. AMISORB, AND DXL-500

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Abstract

Starter fertilizer (ammonium poly-phosphate) was evaluated in combinations with Amisorb® (polyaspartate) Nutrient Absorption Enhancer™ (1997-1998) and Donlar DXL-500 beta protein biopolymer (1999-2000) for their effects on crop nutrient management and cotton production. In a 2-year study to evaluate Amisorb combinations with starter ammonium poly-phosphate (10-34-0), neither broadcast nor band applications had any significant effect on total lint yields. Total lint yields over the 1997 and 1998 growing seasons averaged 1152, 1165, and 1174 lb/acre for the 0, 1, and 2 qt/acre Amisorb applications, respectively. In a second study (1999-2000), six treatments combinations involving 1 to 3 qt/acre of DXL500 with and without 10 gal/acre of ammonium polyphosphate (10-34-0, 12.4 lb N/acre, 18.4 lb P/acre) starter fertilizer were studied at two locations in the Mississippi Delta. This research was located on the Delta Research and Extension Center (DREC, Irrigated) at Stoneville, MS on a Bosket very fine sandy loam (Mollic Hapludalfs) and on the Tribbett Satellite Farm (TSF, Non-irrigated) at Tribbett, MS on a Forestdale/Dundee silty clay loam (Typic Ochraqualfs/Aeric Ochraqualfs). For each study, nitrogen (N) was applied at a total rate of 120 lb N/acre as urea-ammonium nitrate solution (32% N, 3.54 lb N/gal) with one-half of the total N applied prior to planting and the remainder as a sidedress application at beginning bloom. Cultural practices such as weed and insect control, cultivation, and defoliation were maintained uniformly across all treatments but were specific for each location. At TSF, total lint yields ranged from 1046 to 1070 lb/acre when averaged across years. There was no significant difference between any of the treatments and no response to either starter fertilizer or the DXL500. With respect to the DREC study, total lint yields ranged from 1332 to 1356 lb/acre when averaged across years. The irrigated cotton on the sandy loam at DREC had yields which were about 27 % higher than the non-irrigated yields at TSF on the silty clay loam. There was no significant difference between the DXL500 treatments. Under the conditions evaluated, which were quite diverse, the was no benefit from either starter fertilizer or Donlar DXL500. In summary, neither the applications of starter fertilizer (ammonium poly-phosphate) nor the applications of Amisorb or DXL-500 amendments had any significant effect on cotton production.

Introduction

Every year new products come on the scene and into the market place with promises of increased yields, better fertilizer efficiency, lower production cost, improved productivity, and/or better quality. Some of these products end up being evaluated in replicated field trials across the country and under controlled conditions while others are never evaluated. Producers do not have the time or expertise to evaluate many products and thus rely on the public sector scientist to evaluate products. These scientists can provide an unbiased report on the products and product performance. However, the scientific community often has limited time and resources to evaluate many products.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:621-626 (2001)
National Cotton Council, Memphis TN

In the last few years, products such as Amisorb® Nutrient Absorption Enhancer™ from Amilar International, received a great deal of press and producers had questions. This product was advertized to increase cotton lint yields from 70 to 200 lb/A where the product was used. Amisorb was not listed as a fertilizer nor as a growth regulator so fertilizer regulations did not apply. After two years of research in the Mississippi Delta (Ebelhar et al., 1999), authors reported no significant response to Amisorb when applied with starter fertilizer (ammonium poly-phosphate) either in a band over the row or as a broadcast application. Similar results were reported in Arkansas (Robertson, 1998) in 1998.

Donlar Corporation introduced another new product, DXL-500, which has been listed as beta protein biopolymer designed to increase the effective utilization of fertilizer nutrients by the plant resulting in improved crop productivity and quality. This product was to be included with an ammonium-polyphosphate starter fertilizer (10-34-0 or 11-37-0). Starter fertilizers have been evaluated across the cotton states for several years. Most of the studies have evaluated nitrogen (N) and phosphorus (P) containing fertilizers. The N-P starters have been applied in many fashions including, in-furrow, banded over the row, banded to the side of the row in various configurations, and broadcast. Both conventional and no-tillage systems have been evaluated in Alabama (Bryce et al., 1996; Burmester et al., 1995), Georgia (Bednarz et al., 1998), North Carolina (Edmisten and Stewart, 1997), Tennessee (Howard and Hutchinson, 1994; Howard, 1996; Howard and Gwathmey, 1997; Howard and Gwathmey, 1998), Louisiana (Howard and Hutchinson, 1994; Kovar et al., 1994; Kovar et al., 1995) and Texas (Matocha et al., 1998). The emphasis has been placed on yield since that is the component that must pay for additional production inputs. Several other factors have been measured including seedling vigor, root growth and development, stand establishment, and earliness. In general, results have been inconsistent from year to year but when cool damp planting conditions are prevalent, starter materials have shown promise, especially if soil P levels are low.

Little research has been reported where non-traditional soil amendments or fertilizer additives have been used with starter fertilizers such as ammonium poly-phosphate (Ebelhar et al., 1999 and 2000; Robertson, 1998). Additional studies are needed to keep the producers abreast of new potential technologies. The objectives of the first study (SI, 1997-1998) were to 1)determine seedcotton and lint yield response to starter fertilizer in combinations with Amisorb as well as to 2) determine the effects of band verses broadcast application. The second study (SII, 1999-2000) had as its main objective to determine seedcotton and lint response to starter fertilizer with and without DXL-500 at two locations in the Mississippi Delta.

Materials and Methods

Study I (SI) - Amisorb

A 2-year study was initiated in 1997 on a Bosket very fine sandy loam (Mollic Hapludalfs) to determine cotton lint response to soil applications of starter fertilizer (ammonium poly-phosphate, 10-34-0) and a soil amendment called Amisorb® (polyaspartate) Nutrient Absorption Enhancer™ from AmiLar International. Both products were applied in a 4-in band directly over the row at the time of planting or as a broadcast application immediately following planting. The ammonium poly-phosphate was applied at 0 and 10 gal/acre (12.4 lb/gal) but diluted 1:1 to simplify application. Amisorb was applied at rates of 0, 1, and 2 qt/acre either alone or in combination with the ammonium poly-phosphate starter. The 2x3x2 factorial arrangement of treatments was included in a randomized complete block design with four (1997) or six (1998) replications. Urea-ammonium nitrate solution (32% N) at 120 lb N/A was "knifed-in" prior to planting. The spray solutions were pre-mixed in stainless steel containers and delivered through an air-pressurized spray system that was flushed with water between treatments. Cultural practices

such as weed and insect control, cultivation, irrigation, and defoliation were maintained uniformly across all treatments during the growing season. Four-row plots (55 or 60 feet long) were used in the study. Plots were relocated each year. After defoliation, harvests were made utilizing a 2-row spindle picker adapted for plot harvest. The two center rows of each plot were harvested for yield determination. A subsample was taken from each plot at harvest and ginned with a 10-saw sample gin to determine lint turn-out. All results were analyzed statistically (Analysis of Variance, SAS Institute, Inc.) with means across replications presented. Where appropriate means over years are presented in the tables with the appropriate statistics.

Study II (SII) - DXL-500

Two locations were initiated in 1999 to assess the effects of DXL-500 and ammonium poly-phosphate (10-34-0, 12.4 lb/gal, 12.4 lb N/acre, 18.4 lb P/acre) starter fertilizer. The first location was at the Delta Research and Extension Center (DREC), Stoneville, MS on a Bosket very fine sandy loam (Mollic Hapludalfs) field that was being rotated with corn under furrow irrigation. The second location was at the Tribbett Satellite Farm (TSF) at Tribbett, MS on the mixed Forestdale/ Dundee silty clay loam (Typic Ochraqualfs/Aeric Ochraqualfs). No irrigation was available at the second location.

Treatments at each location included combinations of 10-34-0 applied a 10 gal/acre applied as a 4-in band over the planted row and DXL-500. Treatments included:

No Starter and No DXL-500 (Untreated Control)
10 gal/acre 10-34-0 and No DXL-500
10 gal/acre 10-34-0 plus 1qt/acre (2 qt/acre in 2000) DXL-500 at planting
10 gal/acre 10-34-0 plus 1qt/acre DXL-500 at planting plus 2qt/acre DXL-500 at sidedress
No Starter plus 2 qt/acre DXL-500 at sidedress
No Starter plus 3 qt/acre DXL-500 at sidedress

Ammonium poly-phosphate was applied at 10 gal product/acre and diluted 1:1 with water to simplify application. DXL-500 was applied with the starter solution when possible. For sidedress applications, DXL-500 was mixed directly with a urea-ammonium nitrate solution (UAN, 32% N) and "knifed-in" to both sides of the planted row (10 inches to either side). A total of 120 lb N/acre as UAN was applied with 50% applied prior to planting and 50% at first bloom. The spray solutions of were per-mixed in stainless steel containers and delivered through an air-pressurized spray system that could be flushed between treatments. Cultural practices such as weed and insect control, cultivation, and defoliation were maintained uniformly across all treatments within a location. The study at DREC was furrow irrigated during both growing seasons utilizing roll-out pipe as needed. The plots themselves consisted of four 40-in rows either 100 ft long (TSF) with ten replications or 60 ft long (DREC) with 8 replications in 1999 and 12 replications in 2000.

After defoliation, one or two harvests were made utilizing a 2-row spindle picker adapted for plot harvest. The two center rows of each plot were harvested for yield determination. A subsample was taken from each plot at harvest and ginned with a 10-saw sample gin to determine lint turn-out. All results were analyzed statistically (Analysis of Variance, SAS Institute, Inc.) With means across replications presented.

Results and Discussion

Amisorb Study (SI)

Total lint yields have summarized in Table SI-1 for each year (1997 and 1998) and across years. Since all plots were sampled at harvest and lint percent determined for each plot, only lint yields are reported in the tables. In 1997, total lint yield ranged from 1215 to 1357 lb/acre with no significant difference between any of the treatments. Most of the cotton (>93%) was harvested at the first harvest with no apparent difference in maturity. Even though the total lint range difference was 142 lb/acre, the difference was not significant. The untreated check (UTC) produced 1292 lb lint/acre (mean of band and broadcast where no starter fertilizer or Amisorb was applied) which falls midway in the yield range. In 1998, total lint yield ranged from 1014 to 1138 lb/acre. The lint yield of the UTC in 1998 was 1046 lb/acre. The highest numerical yields in both years (1357 lb/acre in 1997 and 1138 lb/acre in 1998) were obtained with 10 gal/acre of 10-34-0 and 2.0 qt/acre Amisorb applied as a band application. However, these yields were not statistically different from the UTC (1292 lb/acre in 1997 and 1046 lb/acre in 1998). When averaged across the two years, total lint yields ranged from a low of 1120 lb/acre to a high of 1226 lb/acre, but as with the individual year results, there was no statistically significant difference between the values. None of the treatments or treatment combinations had a significant effect on maturity as measured by percent first harvest (data not shown).

There were no significant interaction effect between treatments as determined by the analysis of variance in either of the individual years or in the combined analysis. Therefore, main effect means were determined for both the individual years and across years (Table SI-2). With respect to starter fertilizers, there was no significant increase in lint yield where the starter was applied in either 1997, 1998, or across years. There was a very slight trend toward an increased lint yield with the starter fertilizer (Fig. SL-1). However, the difference was not significant and certainly not economical.

The main effect means for Amisorb treatments (averaged over starter fertilizer and application methods) are given in Table SI-2 and Fig. SI-2. There were no significant differences between Amisorb rates and no difference in maturity as measured with percent first harvest (PFH) (data not shown). When averaged over years, total lint yields were 1152, 1165, and 1174 lb/acre for the 0, 1, and 2 qt/acre Amisorb rates, respectively. The 22 lb lint/acre range represented only 1.9% difference between the high rate (2 qt Amisorb/acre) and no Amisorb (when averaged over the other factors) (Fig. SI-2). The main effect means for method of application (band vs broadcast) are also given in Table SI-2 Fig. SI-3. When averaged over starter fertilizer rates, Amisorb rates, and years, there was only a 3 lb lint/acre difference (Fig. SI-3).

DXL-500 Study (SII)

Total lint yields have been summarized in Table SII-1 for 1999, 2000, and across years for the irrigated DREC location and Table SII-2 for the TSF non-irrigated location. Total lint yields were not significantly increased with any combination of starter fertilizer and/or DXL-500 in either 1999, 2000, or when averaged across the two years (Table SII-1) at the DREC location. This particular area is in a corn/cotton rotation and has responded positively with respect to rotation and especially with irrigation. Lint yields ranged from a low of 1541 to a high of 1602 lb/acre in 1999. This 61-lb range corresponds to 4.0% change between low and high. In 2000, total lint yields ranged from a low of 1178 to a high of 1194 lb lint/acre. This 16 lb/acre difference translates to a mere 1.4% range. Across the two years of the study, total lint yields ranged from 1332 to 1356 lb lint/acre with no significant difference between any treatment combination.

Dryland yields (Table SII-2) at the Tribbett Satellite Farm (TSF) ranged from 1092 to 1112 lb/acre with the 20-lb difference accounting for a 1.8% range in 1999. Like the DREC study, there was no significant difference between any of the treatments. Overall, the non-irrigated test at TSF had lint yields which averaged almost a bale less than the irrigated test at DREC. The 462 lb/acre yield decrease represented a 29.6% lower lint yield. In 2000, total lint yields were about 7% lower than 1999 with a range of 1000 to 1045 lb lint/acre. No significant differences were detected between any of the treatment combinations with respect to lint yield. When

averaged across years, total lint yield ranged from 1046 to 1070 lb lint/acre with the highest yield measured on the untreated control. However, it should still be emphasized that there were no significant differences (Table SII-2)

An overall summary across locations and years has been presented in Table SII-3. Total lint yields ranged from 1208 to 1228 lb lint/acre with no significant difference between any treatments. The 20-lb/acre difference a range of only 1.7% which under normal conditions is quite low.

Graphic comparisons of starter fertilizer and Dxl-500 treatments are given in Fig. SII-1 through Fig. SII-6. In both field situations, DREC and TSF, neither applications of starter fertilizer as 10-34-0 nor DXL-500 had any significant effect on yield. Fig. SII-1 through Fig. SII-3 illustrates the effects of starter fertilizer treatments on lint yields without taking into consideration any interaction between the starter and DXL-500. At the DREC location in 1999, total lint yield was 1560 lb/acre with starter and 1562 lb/acre without the starter. At the TSF location, the difference was also 2 lb/acre. In 2000, the difference between lint yields with and without starter was only 10 lb/acre at the DREC location and 6 lb/acre at the TSF location. As with previous studies on starter fertilizer (Ebelhar et al., 1999), there is no significant response to starter fertilizer. When the cost of the product and the application costs are incorporated in the equation, the practice loses money. When averaged across years, lint yields were 1335 lb/acre with starter and 1342 lb/acre without the ammonium poly-phosphate starter fertilizer at the DREC location. At the TSF location, average yields were 1061 with starter and 1059 without (Fig. SII-3).

Figures SII-4 through SII-6 show the and lint yield differences for the two locations for each year and across years. These means are for the DXL-500 treatments only and do not take into account the starter fertilizer component. Lint yields in 1999 (Fig. SII-4) ranged from 1541 to 1602 lb/acre at DREC and 1092 to 1112 lb/acre at TSF. Again, there is no significant difference between any of the treatments. In 2000, yields at the DREC location were much lower than those obtained in 1999 and ranged from 1178 to 1199 lb lint/acre. At the non-irrigated TSF location, total lint yields ranged from 1000 to 1029 lb/acre (Fig. SII-5). When averaged across the 1999 and 2000 growing seasons, lint yields ranged from 1132 to 1356 lb /acre at the irrigated DREC locations and 1046 to 1061 lb/acre at the non-irrigated TSF location.

After the two years of evaluation of DXL-500 under quite diverse conditions, there was no significant response to either starter ammonium poly-phosphate (10-34-0) or DXL-500. When the cost of the materials are taken into account, the use of these products is not warranted.

Summary and Conclusions

After examining the data over two years in Study I (1997-1998) and an additional two years in Study II (1999-2000), it appears that ammonium poly-phosphate (10-34-0 or 11-37-0) starter fertilizer applied as a band (SI and SII) over the row at planting or broadcast at planting (SI) would supply the producer with sufficient income to cover the cost of the material or application costs. With starter fertilizers, such as 10-34-0 or other N-P starter fertilizer materials, there may be more response under cool damp conditions early in the growing season. However, under the conditions of these studies, phosphorus availability is not a problem. Planting on time, under optimum soil conditions, with a sound fertility program, based on soil testing provides the best alternative compared to expensive “solutions”. Products such as Amisorb and DXL-500 have not proven effective in producing the needed increase in productivity which could offset the costs of both the product and its application.

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Table SI-1. Summary of total lint yields from the evaluation of starter fertilizer (ammonium poly-phosphate, 10-34-0), Amisorb®, and method of application. Delta Research and Extension Center, Stoneville, MS – 1997-1998

Treatment [1]			Lint yield [2]		Mean [4]
Starter	Amisorb	Method	1997	1998	Lint Yield
(gal/A)	(qt/A)		---------- lb/A ----------		
0	0.0	Band	1278.1 [3]	1014.2 [3]	1119.8 [4]
0	0.0	Broad	1297.0	1077.6	1165.4
0	1.0	Band	1311.0	1069.5	1166.1
0	1.0	Broad	1299.1	1075.1	1164.7
0	2.0	Band	1296.7	1079.3	1166.3
0	2.0	Broad	1214.7	1088.6	1139.0
10	0.0	Band	1254.4	1064.0	1140.2
10	0.0	Broad	1290.3	1112.8	1183.7
10	1.0	Band	1271.4	1065.9	1148.0
10	1.0	Broad	1346.4	1068.0	1179.4
10	2.0	Band	1357.1	1138.3	1225.8
10	2.0	Broad	1272.9	1092.3	1164.5
	LSD (0.05) [3], [4]		ns	ns	ns
	Prob. > F		0.9306	0.2692	0.3220
	C. V. (%)		9.00	6.01	6.29

[1] Treatments: Ammonium poly-phosphate (10-34-0) applied at 10 gal/A (12.4 lb/gal) Amisorb® Nutrient Absorption Enhancer™ applied according to recommendations

Application Method: Band application applied at planting with spray tip directly above the row; Broadcast application made with John Deere Hi-cycle sprayer.

[2] Lint yield calculated using hand-grab samples taken at harvest and ginned through a 10-saw microgin.

[3] LSD's provided for mean comparisons at the 5% level of significance. Significance determined by using Fisher's Protected Least Significant Difference. No letters are used where differences are not significant (n=48 in 1997 and n=60 in 1998)

[4] LSD's provided for mean comparisons at the 5% level of significance across years. Significance determined by using Fisher's Protected Least Significant Difference. No letters are used where differences are not significant (n=108)

Table SI-2. Summary of main effects for lint yields from the evaluation of starter fertilizer (ammonium poly-phosphate, 10-34-0), Amisorb®, and method of application. Delta Research and Extension Center, Stoneville, sMS 1997-1998.

Treatment [1]			Lint yield [2]		
Starter	Amisorb	Method	1997	1998	2-year Mean
(gal/A)	(qt/A)		---------- lb/A ----------		
0	-----	-----	1282.8	1067.4	1153.6
10	-----	-----	1298.7	1090.2	1173.6
	LSD (0.05) [3]		ns	ns	ns
	Prob. > F		0.6381	0.1413	0.1601
-----	0.0	-----	1279.9	1067.2	1152.3
-----	1.0	-----	1307.0	1069.6	1164.6
-----	2.0	-----	1285.3	1099.6	1173.9
	LSD (0.05) [4]		ns	ns	ns
	Prob. > F		0.7851	0.1648	0.4578
-----	-----	Band	1294.8	1071.9	1162.1
-----	-----	Broad	1286.7	1085.7	1165.1
	LSD (0.05) [5]		ns	ns	0.5
	Prob. > F		0.8103	0.3683	0.8305

[1] Treatments: Ammonium poly-phosphate (10-34-0) applied at 10 gal/A (12.4 lb/gal) Amisorb® Nutrient Absorption Enhancer™ applied according to recommendations

Application Method: Band application applied at planting with spray tip directly above the row; Broadcast application made with John Deere Hi-cycle sprayer.

[2] Lint yield calculated using hand-grab samples taken at harvest and ginned through a 10-saw micro-gin.

[3] LSD's provided for mean comparisons at the 5% level of significance. Means over Amisorb rates (3), application method (2), and replications (4 or 6). With years (2); [N=60] .

[4] LSD's provided for mean comparisons at the 5% level of significance. (Means over starter fertilizer rates (2), application method (2), and replications (4 or 6). With years (2); [N=40]

[5] LSD's provided for mean comparisons at the 5% level of significance. (Means over starter fertilizer rates (2), Amisorb rates (3), and replications (4 or 6). With years (2); [N=60]

Table SII-1. Summary of total lint yields from the evaluation of starter fertilizer (ammonium poly-phosphate, 10-34-0) and DXL-500 (Donlar Corporation). Delta Research and Extension Center, Stoneville, MS – 1999-2000.

Treatment [1]			Total lint yield [2]		
	DXL-500				2-year
Starter	PP	SD	1999	2000	Mean
(gal/A)	(qt/A)	(qt/A)	---------- lb/A ----------		
0	0.0	0.0	1543.1 [3]	1193.5 [3]	1333.4 [4]
10	0.0	0.0	1570.3	1187.6	1340.8
10	2.0	0.0	1563.9	1177.5	1332.1
10	1.0	2.0	1546.8	1189.0	1352.1
0	0.0	2.0	1541.2	1192.2	1336.0
0	0.0	3.0	1602.0	1191.8	1355.9
	Overall Mean [5]		1561.2	1189.8	1338.4
	LSD (0.05) [3, 4]		ns	ns	ns
	Prob. > F		0.5766	0.9530	0.7992
	C. V. (%)		4.78	4.50	-----

[1] Treatments: Ammonium poly-phosphate (10-34-0) applied at 10 gal/A (12.4 lb/gal) which is 12.4 lb N/acre and 18.4 lb P/acre. Donlar Corporation DXL-500 applied according to recommendations. PP = Preplant Applications; SD = Sidedress at first bloom

[2] Lint yield calculated using hand-grab samples taken at harvest and ginned through a 10-saw micro-in for each harvest.

[3] LSD's provided for mean comparisons at the 5% level of significance for individual years. Significance determine by using Fisher's Protected Least Significant Difference (LSD). No letters are used where differences are not significant. [1999: 8 replications; 2000: 12 replications]

[4] LSD's provided for mean comparisons at the 5% level of significance across years. Significance determine by using Fisher's Protected Least Significant Difference (LSD). No letters are used where differences are not significant.

[5] Overall mean for study: 1999– (N = 48); 2000– (N = 96); 2-year– (N = 144)

Table SII-2. Summary of total lint yields from the evaluation of starter fertilizer (ammonium poly-phosphate, 10-34-0) and DXL-500 (Donlar Corporation). Tribbett Satellite Farm, Tribbett, MS – 1999-2000.

Treatment [1]			Total lint yield [2]		
	DXL-500				2-year
Starter	PP	SD	1999	2000	Mean
(gal/A)	(qt/A)	(qt/A)	---------- lb/A ----------		
0	0.0	0.0	1095.0 [3]	1045.0 [3]	1070.0 [4]
10	0.0	0.0	1106.9	1026.7	1066.8
10	2.0	0.0	1095.2	1013.8	1054.5
10	1.0	2.0	1092.8	1029.1	1061.0
0	0.0	2.0	1092.3	1000.2	1046.3
0	0.0	3.0	1112.2	1006.1	1059.2
	Overall Mean [5]		1099.1	1020.1	1059.6
	LSD (0.05) [3, 4]		ns	ns	ns
	Prob. > F		0.9614	0.7074	0.9053
	C. V. (%)		5.41	6.69	6.26

[1] Treatments: Ammonium poly-phosphate (10-34-0) applied at 10 gal/A (12.4 lb/gal) which is 12.4 lb N/acre and 18.4 lb P/acre. Donlar Corporation DXL-500 applied according to recommendations. PP = Preplant Applications; SD = Sidedress at first bloom

[2] Lint yield calculated using hand-grab samples taken at harvest and ginned through a 10-saw micro-in for each harvest.

[3] LSD's provided for mean comparisons at the 5% level of significance for individual years. Significance determine by using Fisher's Protected Least Significant Difference (LSD). No letters are used where differences are not significant. [10 replications per year]

[4] LSD's provided for mean comparisons at the 5% level of significance across years. Significance determine by using Fisher's Protected Least Significant Difference (LSD). No letters are used where differences are not significant.

[5] Overall mean for study (6 treatments and 10 replications) [N = 60 observations per year]

Table SII-3. Two-year summary of lint yields from the evaluation of starter fertilizer (ammonium poly-phosphate, 10-34-0) and DXL-500 (Donlar Corporation) across locations (TSF and DREC) and years. 1999 2000.

Treatment [1]			Total Lint Yield [2]				
	DXL-500		1999	2000	1999	2000	GRAND
Starter	PP	SD	TSF	TSF	DREC	DREC	MEAN
(gal/A)	(qt/A)	(qt/A)	---------- lb/A ----------				
0	0.0	0.0	1095.0 [3]	1045.0 [3]	1543.1 [3]	1193.5 [3]	1219.2 [3]
10	0.0	0.0	1106.9	1026.7	1570.3	1187.6	1222.9
10	2.0	0.0	1095.2	1013.8	1563.9	1177.5	1212.6
10	1.0	2.0	1092.8	1029.1	1546.8	1189.0	1214.4
0	0.0	2.0	1092.3	1000.2	1541.2	1199.2	1208.2
0	0.0	3.0	1112.2	1006.1	1602.0	1191.8	1228.0
[4]	Overall Mean		1099.1	1020.2	1561.2	1189.8	1217.6
[3]	LSD (0.05)		ns	ns	ns	ns	-----
	Prob. > F		0.9614	0.7074	0.5766	0.9530	-----
	C. V. (%)		5.41	6.69	4.78	4.50	-----

[1] Treatments: Ammonium poly-phosphate (10-34-0) applied at 10 gal/A (12.4 lb/gal) which is 12.4 lb N/acre and 18.4 lb P/acre. Donlar Corporation DXL-500 applied according to recommendations. PP = Preplant Applications; SD = Sidedress at first bloom

[2] Lint yield calculated using hand-grab samples taken at harvest and ginned through a 10-saw micro-in for each harvest.

[3] LSD's provided for mean comparisons at the 5% level of significance for individual years and across years. Significance determine by using Fisher's Protected Least Significant Difference (LSD). No letters are used where differences are not significant.

[4] Overall mean for study (6 treatments and 10 replications) [N = 60 observations per year]