

## Emergence and Yield from Six Seed Densities of DPL 90 Cotton

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### Summary

Six seed densities of DPL 90 cotton obtained from the gravity table in commercial seed preparation were planted in four tests in Arizona. The lowest density seed (seed that is discarded in seed processing) consistently had reduced seedling emergence as compared to the remaining seed densities. In two tests, that had adequate stands and were saved for harvest, the low density seed produced significantly reduced yield as compared to the other densities. Analysis of covariance indicated that 58 and 76% of the reduced yield could be explained by reduced stand in the two tests. The remaining 42% and 24% yield reduction is related to some other factor or factors.

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These tests are from the second year of a three-year study. Six samples of a lot of DPL 90 upland cotton seed were obtained from different areas of a gravity table from a commercial seed processing operation. The lots were: 1) uncut, a sample taken just before the seed entered the gravity table; 2) low, seed that was discarded; 3,4, and 5) seed from increasingly high density along the gravity table; and 6) commercial, a combination of the three highest density samples.

It was estimated that about 15% of the seed was removed from the original seed lot by the cleaner prior to entering the gravity table. Of the remaining seed, treatments 2 and 3 each constituted 10% or less of the seed, while treatments 4 and 5 each represented about 40% of the total cleaned seed.

The six seed densities were planted at three planting rates in four tests. The tests were planted on 28 March in Maricopa, 2 April and 26 April at Marana, and 4 April at Safford. Tests at Maricopa and Marana were planted at rates of 100, 200, and 300 seeds/row in two row plots. At Safford the planting rates were 150, 300, and 450 seeds/row. Row (plot) lengths were: Maricopa 40 feet, Marana 35 feet, and Safford 36 feet. There were five replications at Safford and six for the remaining tests. Emergence counts were made periodically in all tests on one row of the low planting rate for each plot. Total emergence, days to 50% emergence (ET 50), and a weighted days to 50% emergence (WET 50) were determined for each treatment.

Standard germination and cold test germination of each seed density are given in Table 1.

**Table 1. Standard germination and cold test germination of DPL 90 upland cotton of six seed densities separated on a gravity table and used in tests in Arizona in 1984.**

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<u>Treatment</u>	<u>Germination %</u>	
	<u>Standard</u>	<u>Cold Test</u>
1. Uncut	90	80
2. Low	58	53
3. 2nd Low	88	70
4. 2nd High	88	72
5. High	84	75
6. Commercial	86	73

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The low density seed (treatment 2) had significantly lower emergence than other treatments in all tests (Table 2). This was seed that went to discard from the gravity table in a commercial seed processing operation. Stand of the remaining treatments varied among tests. The high density seed had the highest average stand. There was a tendency for high density seed to emerge faster than low density seed. However, this tendency was not consistent across tests. The weighted days to 50% emergence was highest for the low density seed lot. The high density seed lots tended to have the lowest WET 50, but again the response was not consistent across tests.

The original plan was to harvest these tests for lint yield. The early planted test at Marana and the Safford tests were abandoned because of inadequate stand. Lint yield of the remaining two tests is given in Table 3. The low density seed (seed that is discarded in commercial operations) produced significantly reduced lint yield. Other seed densities differed only slightly in lint yield in both tests. The 100 seed/row treatment had significantly lower lint yield than the 200 seed and 300 seed treatments in both tests.

In the Maricopa test, the high density seed had 455 pounds more lint/acre than the low density seed. When covariance was used to correct for different in stand, there was still 193 pounds of lint/acre different and the difference was significant. Thus, 58% of the lint yield different between high and low seed density can be explained by reduced stand and 42% is attributable to some other factor(s). At Marana, stand accounted for 76% of the yield difference between high and low seed density and other factor(s) amounted to 24%.

**Table 2. Percentage stand, days to 50% emergence, and weighted days to 50% emergence of DPL 90 upland cotton seed of six seed densities in four tests in Arizona in 1984.**

Seed Density Treatment	Maricopa 3/28/84	Marana 4/2/84	Marana 4/26/84	Safford 4/4/84	Mean
----- % stand -----					
1. Uncut	33.5 a*	13.6 ab	29.8 a	17.0 a	25.0 a
2. Low	13.4 b	4.8 b	9.8 b	2.2 b	8.0 b
3. 2nd Low	33.8 a	14.6 ab	27.0 a	15.6 a	23.7 a
4. 2nd High	30.5 a	14.6 ab	28.2 a	13.0 a	22.7 a
5. High	37.2 a	17.4 a	32.8 a	15.2 a	28.4 a
6. Commercial	39.0 a	15.3 ab	35.3 a	12.2 a	27.5 a
Mean	34.1	13.4	27.2	12.5	22.6
C.V.	59%	73%	28%	62%	62%
ET 50 (days)					
1.	16.8 bc	16.7 a	10.9 a	22.4 a	16.4 a
2.	16.1 c	18.7 a	12.2 a	20.6 a	16.8 a
3.	19.3 a	17.3 a	11.3 a	20.0 a	16.8 a
4.	18.0 ab	17.3 a	11.4 a	19.7 a	16.5 a
5.	17.3 bc	17.8 a	12.0 a	19.1 a	16.4 a
6.	16.9 bc	17.4 a	10.1 a	14.9 a	14.8 a
Mean	17.4	17.5	11.3	19.4	16.3
C.V.	35%	10%	16%	33%	31%
WET 50					
1.	0.97 b	2.47 b	0.82 b	2.67 b	1.69 b
2.	2.42 a	11.99 a	3.08 a	19.64 a	7.80 a
3.	1.52 ab	2.37 b	0.92 b	4.07 b	2.14 b
4.	1.68 ab	2.77 b	0.89 b	3.85 b	2.23 b
5.	0.86 b	1.82 b	0.82 b	4.48 b	1.89 b
6.	1.00 b	2.42 b	0.65 b	5.47 b	2.25 b
Mean	1.41	3.98	1.19	5.77	2.93
C.V.	57%	78%	72%	87%	123%

\*Means within a column with an evaluation, followed by the same letter are not significantly different at the 0.05 confidence level according to Duncan's Multiple Range Test.

**Table 3. Lint yield of DPL 90 having six seed density cuts from the gravity table and three planting rates at two locations in Arizona in 1984.**

<u>Seed Lot</u>	<u>Planting <sup>1/</sup> Rate</u>	<u>Lint Yield</u>	
		<u>Maricopa</u>	<u>Marana</u>
1. Before gravity table	1X	1463 de <sup>2/</sup>	915 ef
	2X	1720 abc	1143 abcd
	3X	1686 abc	1221 ab
2. Lowest density	1X	1064 f	541 h
	2X	1331 e	714 g
	3X	1357 e	903 ef
3. Second lowest density	1X	1472 de	962 def
	2X	1606 bcd	1168 abc
	3X	1836 a	1253 a
4. Second highest density	1X	1441 de	1026 bcde
	2X	1693 abc	1236 a
	3X	1724 abc	1224 a
5. Highest density	1X	1621 bcd	970 cdef
	2X	1713 abc	1197 ab
	3X	1784 ab	1245 a
6. Commercial seed lot	1X	1531 cde	984 cdef
	2X	1735 abc	1161 abc
	3X	1700 abc	1279 a
<u>Mean</u>			
1. Before		1623 a	1093 a
2. Lowest		1251 b	719 b
3. Second lowest		1638 a	1128 a
4. Second highest		1619 a	1162 a
5. Highest		1706 a	1137 a
6. Commercial		1655 a	1141 a
	1X	1432 b	900 b
	2X	1633 a	1103 a
	3X	1681 a	1188 a
Test mean		1582	1064
CV		10%	14%

<sup>1/</sup> 1X = 100 seed/row, 2X = 200 seed/row, 3X = 300 seed/row. One 1X = about 33,000 seed/acre at Maricopa and 37,000 seed/acre at Marana.

<sup>2/</sup> Means within a subcolumn followed by the same letter are not significantly different at the 0.05 confidence level according to Duncan's Multiple Range Test.