

Table 1. Lint yield and final plant population of DPL 61 cotton planted at two locations and DPL 62 planted at three locations in Arizona. There were three planting rates of two seed qualities in each test.

Qual.	Lbs planting seed/acre		Lbs lint/acre			Thousand plants/acre		
			Phoenix	Marana	Safford	Phoenix	Marana	Safford
	Phx & Mar	Safford						
-----DPL 61-----								
Lo	6	10	1343b <sup>1/</sup>	805d	-----	14e	14e	-----
"	13	20	1413ab	930bc	-----	27d	31c	-----
"	20	30	1352b	968ab	-----	46b	47a	-----
Hi	6	10	1465a	847cd	-----	17e	22d	-----
"	13	20	1452a	1051a	-----	40c	39b	-----
"	20	30	1380ab	1056a	-----	54a	53a	-----
C.V.			5%	9%		10%	15%	
-----DPL 62-----								
Lo	6	10	1393a	748b	947b	18c	16c	31d
"	13	20	1354a	929a	1028b	36b	35b	48c
"	20	30	1379a	933a	1167a	50a	48a	64b
Hi	6	10	1466a	855ab	998b	20c	18c	27d
"	13	20	1417a	888a	1125a	36b	37b	55bc
"	20	30	1286a	952a	1135a	51a	51a	77a
C.V.			7%	12%	5%	7%	8%	16%
<u>Summary</u>								
DPL 61			1401a	943a	-----	33b	35a	-----
DPL 62			1382a	883a	1067	35a	34a	50
Lo quality			1372a	885a	1047a	32b	32b	48a
Hi "			1411a	942a	1086a	36a	37a	53a
6 or 10 lb/acre			1417a	814b	972b	17c	18c	29c
13 or 20 " "			1409a	950a	1077a	35b	36b	52b
20 or 30 " "			1350a	978a	1151a	50a	50a	70a

<sup>1/</sup> Values within a group followed by the same letter are not significantly different at the .05 level by Duncan's new multiple range test.

#### Seedling Emergence Studies on Upland and Pima Cotton in Arizona in 1982.

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#### Summary

Seventeen varieties of upland cotton were tested for germination, percent emergence, and speed of emergence in 1982. Field plantings were made early in the planting season at Phoenix, Marana, and Safford. Eight 100 seed replication of each variety were planted in each test. Similar tests for 12 pima cotton strains were planted at Phoenix and Safford. Germain strains generally performed best and DPL 41, 61, and 90 were poorest. There was considerable variation in emergence and speed of emergence among pima strains with Pima S-5 and Pima S-6 being intermediate. Pima cotton on an average required fewer heat units to emerge than upland cotton.

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These tests are the continuation of studies on cotton seed quality that have been conducted in Arizona for several years. The two tests reported here were designed to evaluate upland and pima cotton cultivars for total emergence and speed of emergence but not yield. Other tests on seed quality have been established for lint yield determination.

The upland cotton tests had 17 entries and were planted on experiment stations at Phoenix, Marana, and Safford. The pima cotton tests had 12 entries and were planted at Phoenix and Safford. Treatments were replicated eight times at all locations. Plots consisted of 100 seeds planted in 27 feet of 40 inch spaced rows with unplanted alleys between plots. Planting dates were on 1 April at Phoenix, 5 April at Safford, and 7 April at Marana. Dead seedlings were counted as they occurred and were included in total emergence. Time to 50% emergence (ET-50) was computed using quadratic regression on individual plots. The weighted ET-50 is ET-50 times two and divided by total emergence. This gives an evaluation of total emergence and speed of emergence in one number. Low numbers represent higher seed quality in the weighted emergence.

Daily maximum and minimum soil temperatures were obtained at seed depth in the soil at Phoenix and Marana. Daily heat units were computed by adding maximum and minimum temperatures, dividing by two and subtracting 55.

Seedling emergence was better than expected in 1982, because temperatures were above normal during the emergence period (Table 1). This was unfortunate as cool soil temperatures slow seedling emergence and weak seed lots become more readily apparent. Seedling emergence was nearly four days slower in Safford than Phoenix and Marana and as a result a greater differentiation among seed lots occurred at Safford (Table 2).

The Germain strains in general were near the highest in total emergence and speed of emergence. Deltapine 41, 61, and 90 generally gave the poorest performance. Some of the differences obtained can be explained by Germain strains having large seed and Deltapine strains having small seed. The germination percentages suggest that differences in seed quality among individual seed lots were not factors in differential performance.

A fair differentiation among Pima entries in total emergence and speed of emergence was obtained at Safford. E-15 and P-61 had significantly faster emergence than other entries at Safford and had non-significantly faster emergence at Phoenix (Table 3). Time for 50% emergence increased among remaining entries with P-45 requiring over 3 days longer to reach 50% emergence at Safford than E-15. P-45 had significantly lower total emergence than all other entries at both locations.

Heat units required for 50% emergence (average of all entries) were 115 for pima cotton at Phoenix, and 143 and 166 for upland cotton at Phoenix and Marana, respectively (Table 4).

Stand counts were made on upland and pima tests at Safford following harvest (data not shown) because of severe symptoms of "sore shin" disease on upland cotton following completion of spring emergence counts. "Sore shin" disease apparently did not cause seedling mortality as the average stand at harvest was 64% for upland and 74% for pima, which were increases of 8% and 3% respectively, from the final spring emergence. This average increase in stand, which undoubtedly occurred after the first post-plant irrigation would have little value for lint yield because of the late emergence date.

Table 1. Percent germination and total emergence for upland cotton cultivars planted at Phoenix, Marana, and Safford, Arizona in 1982.

Cultivar	%	% Total emergence			
		Germ.	Phoenix	Marana	Safford
DPL 41	98ab	62b*	63abc	39f	54ef
DPL 55	99a	72ab	70abc	53cde	65abcd
DPL 61	96abc	72ab	58c	43ef	58def
DPL 62	99ab	76a	68abc	65abc	70abc
DPL 70	96abc	71ab	73ab	43ef	63bcde
DPL 90	96abc	71ab	48d	38f	52f
DPL 733	99a	78a	66abc	61abc	68abc
Germain 362	91c	75a	76a	67ab	73ab
Germain 363	96bc	68ab	75a	59abcd	67abcd
Germain 364	98ab	78a	74ab	66ab	73ab
Germain 510	97ab	76a	74ab	71a	74a
Germain 555	96abc	75a	74ab	69a	73ab
McNair 220	94abc	75a	76a	66ab	72ab
McNair 235	86d	73ab	60bc	48def	60cdef
Stoneville 506	95abc	70ab	73ab	55bcde	66abcd
Stoneville 825	97ab	68ab	63abc	52cde	61cdef
7209	95abc	66ab	63abc	55bcde	61cdef
Test Mean	95	72	68	56	65

\* Means within a column are not significantly different at the 0.05 level from other means if followed by the same letter according to the Student-Newman-Keul test.

Table 2. Days to 50% emergence and weighted speed of emergence for upland cotton cultivars planted at Phoenix, Marana, and Safford, Arizona in 1982.

Cultivar	Days to 50% emergence (ET-50)				Weighted ET-50			
	Phoenix	Marana	Safford	Mean	Phoenix	Marana	Safford	Mean
DPL 41	12.4e	11.8def	15.9de	13.4a	.40e	.37abc	.85	.54cd
DPL 55	11.6bcd	11.2abcd	15.6cde	12.8a	.31abcd	.32ab	.60abc	.41abc
DPL 61	12.5de	12.3f	16.1e	13.7a	.34bcde	.42c	.77de	.51bcd
DPL 62	11.4bcd	11.3abcd	15.0abc	12.4a	.29abc	.33ab	.47ab	.36a
DPL 70	11.1abc	10.9abc	15.1abc	12.2a	.30abcd	.30a	.77de	.44abcd
DPL 90	13.0e	11.8def	15.1abc	13.3a	.37de	.50d	.81de	.56d
DPL 733	11.9cd	11.4bcde	15.1abc	12.8a	.31abcd	.37abc	.50abc	.39ab
Germain 362	10.2a	10.7ab	14.5ab	11.8a	.26a	.28a	.44a	.32a
Germain 363	10.9abc	10.9abc	14.8ab	12.2a	.30abcd	.29a	.52abc	.39ab
Germain 364	10.6ab	10.8ab	14.7ab	12.1ab	.26a	.29a	.45a	.33a
Germain 510	10.6ab	10.8ab	14.5a	11.9a	.26a	.29a	.41a	.32a
Germain 555	10.7a	10.6a	14.5a	11.9a	.28ab	.29a	.43a	.33a
McNair 220	11.1abc	11.0abc	14.7ab	12.3a	.29abc	.29a	.45a	.35a
Stoneville 506	12.3de	11.3abcd	15.2abc	12.9a	.34bcde	.32ab	.56abc	.41abcd
Stoneville 825	12.0cde	11.6cde	15.3bcd	13.0a	.35cde	.37abc	.65bcd	.46abcd
7209	11.6cd	11.2abcd	15.0abc	12.6a	.33bcde	.37abc	.56abc	.43abcd
Test Mean	11.6	11.3	15.1	12.6	.31	.34	.58	.41

\* Means within a column are not significantly different at the 0.05 level from other means if followed by the same letter according to the Student-Newman-Keul test.

Table 3. Total emergence, days to 50% emergence, and weighted speed of emergence for pima cotton cultivars planted at Phoenix and Safford, Arizona in 1982.

Cultivar	% Germ	% Total emergence		Days to 50% emergence (ET-50)		Weighted ET-50				
		Phoenix	Safford	Phoenix	Safford	Phoenix	Safford			
E-15	97a	85a*	77a	82a	9.8a	13.7a	11.7a	.23a	.36a	.29a
P-61	93a	81a	72abc	77ab	9.9ab	13.8a	11.9a	.24a	.39a	.31a
P-57	94a	80a	74ab	78ab	10.1abc	14.7b	12.4a	.25a	.40a	.32a
P-60	98a	85a	78a	82a	10.5abcd	14.9bc	12.6a	.24a	.38a	.31a
S-5	97a	79a	71abc	76ab	10.5abcd	15.1bcd	12.8a	.26a	.43ab	.35a
P-59	98a	84a	75ab	80ab	10.6bcd	15.7de	13.2a	.25a	.43ab	.34a
P-53	96a	86a	74ab	80ab	10.9d	15.6cde	13.2a	.25a	.42ab	.34a
P-58	97a	84a	72abc	78ab	10.8cd	15.7de	13.3a	.26a	.44ab	.35a
S-6	99a	85a	73ab	79ab	10.8cd	15.9e	13.3a	.25a	.44ab	.35a
P-51	95a	83a	66bc	75ab	10.7cd	16.2e	13.5a	.26a	.49bc	.37a
P-52	96a	80a	63c	73b	11.0d	16.4e	13.7a	.27a	.53c	.40a
P-45	93a	68b	57d	62c	11.6e	17.0f	14.3a	.35b	.62d	.48b
Test Mean	96	82	71	77	10.6	15.4	13.0	.26	.44	.35

\* Means within a column are not significantly different at the 0.05 level from other means if followed by the same letter according to the Student-Newman-Keul test.

Table 4. Soil Temperatures and heat units in the 1982 cotton seedling emergence tests in Arizona.

Date	Phoenix				Marana			
	Max.	Min.	heat units*		Max.	Min.	heat units	
			daily	cumm.			daily	cumm.
1 April								
2	71.6	52.3	7	7				
3	73.4	52.3	8	15				
4	74.8	53.6	9	24				
5	74.8	56.3	9	33				
6	70.7	57.2	9	42				
7	73.4	58.1	11	53	68			
8	77.0	51.8	9	62	74	49	7	7
9	76.1	55.0	11	73	69	57	8	15
10	86.5	51.8	14	87	77	52	10	25
11	87.4	56.8	17	104	78	57	13	38
12	86.9	61.3	19	123	81	61	16	54
13	85.6	57.2	16	139	84	60	17	71
14	86.5	53.2	15	154	84	60	17	88
15	86.5	53.6	15	169	82	58	15	103
16	88.7	54.5	17	186	84	57	16	119
17	85.6	57.2	16	202	85	60	17	136
18	86.0	51.8	14	216	85	60	18	154
19	87.8	53.2	16	232	83	60	16	170
20	87.4	54.1	16	248	81	58	15	185
21	80.2	53.2	12	260	76	57	12	197
22		51.4			77	52	10	207
23					78	54	11	218
24					81	56	13	231
25					83	56	15	246
26					87	60	18	264

\* Heat units equal daily maximum plus daily minimum divided by two less fifty-five

## Salt and Temperature Interaction on the Germination of Cotton Seed

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### Summary

Untreated Delta Pine 62 seed was germinated in growth chambers at 8 levels of salinity at each of 8 temperatures. Significant interaction was measured with the affects of salinity being more severe at temperature extremes.

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Getting a jump on the growing season by planting early in the spring can be a profitable practice. It can also be a dangerous practice if soil conditions are too severe for vigorous seed germination and seedling development. Both temperature and salinity are important soil factors which affect seed germination. A study has been started to evaluate how these variables interact to affect seed germination.

Untreated Delta Pine 62 seed was germinated at 10, 15, 20, 25, 30, 35, 40, and 45 C (50, 59, 68, 77, 86, 95, 104, and 113 F) in growth chambers. At each temperature there were 8 salt (NaCl) levels: 0, -.3, -.6, -.9, -1.2, -1.5, -1.8, and -2.1 MPa (0 to -21 bars). There were 100 seed in each treatment with five replications.