TABLE 5. Yields of Pima cotton from fast and slow emerging plants for weathered and late set seeds. Each value is an average of 10 replications each of which is an average of 3 individual plants.

<table>
<thead>
<tr>
<th>Seed Source</th>
<th>Yields (grams/plant)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fast emerg.</td>
</tr>
<tr>
<td>October</td>
<td>82.3</td>
</tr>
<tr>
<td>Weathered</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>79.0</td>
</tr>
<tr>
<td>December</td>
<td>69.8</td>
</tr>
<tr>
<td>January</td>
<td>102.2</td>
</tr>
<tr>
<td>Late Set</td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>71.8</td>
</tr>
<tr>
<td>December</td>
<td>71.6</td>
</tr>
<tr>
<td>January</td>
<td>61.4</td>
</tr>
<tr>
<td>mean</td>
<td>76.8a</td>
</tr>
</tbody>
</table>

*Means followed by the same letter on bottom row are not significantly different at the .01 level according to the Student-Newman-Keul's Test.

Quality of Commercial Seed Produced in 1979 for Planting in 1980 in Arizona

<table>
<thead>
<tr>
<th>Phoenix</th>
<th>Marana</th>
<th>Safford</th>
<th>Ave. Stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Std. Ger.</td>
<td>% Cool Ger.</td>
<td>% ET-50 Stand</td>
<td>% ET-50 Stand</td>
</tr>
<tr>
<td>DPL-55</td>
<td>99</td>
<td>67</td>
<td>9</td>
</tr>
<tr>
<td>ST-825</td>
<td>93</td>
<td>62</td>
<td>9</td>
</tr>
<tr>
<td>DPL-70</td>
<td>100</td>
<td>72</td>
<td>8</td>
</tr>
<tr>
<td>ST-213</td>
<td>91</td>
<td>32</td>
<td>9</td>
</tr>
<tr>
<td>DPL-41</td>
<td>96</td>
<td>33</td>
<td>8</td>
</tr>
<tr>
<td>ST-256</td>
<td>83</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>DPL-7120</td>
<td>91</td>
<td>49</td>
<td>10</td>
</tr>
<tr>
<td>ST-506</td>
<td>75</td>
<td>43</td>
<td>9</td>
</tr>
<tr>
<td>DPL-61</td>
<td>87</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Ave</td>
<td>91</td>
<td>43</td>
<td>9</td>
</tr>
</tbody>
</table>

Prejudging Cottonseed Quality

Robert G. McDaniel

There is general agreement among seedsmen, scientists and cotton growers that the standard germination test as applied to cottonseed, may leave much to be desired with regard to an accurate estimation of seedling emergence under actual field conditions. We have been evaluating a number of alternative measures of cottonseed viability and vigor which may find useful application as additions to or replacements for the standard germination test.

Data gathered across several seasons with extra long staple cottons indicate that, unless field conditions at planting time are nearly ideal, and soil borne pathogens are not abundant, or their effects largely negated through fungicide seed treatments, field performance of seed bears little re-
Relationship to the standard germination values. Laboratory "cool germ" tests, in which seed is germen-
tated at temperatures marginal for adequate seedling development (58-62°F) often provide a more accurate
prediction of field stand density. Interestingly, across an array of different cultivars and various
seed lots which were produced in different years, we find that the cool germ test results are highly
correlated with the standard germination tests. The actual predicted germination percentage is some 15
to 20% less for the cool germ test, however.

Almost without exception, lots which performed well in the standard germination test, but were
variations to the rule and performed relatively poorly in the cool germ test were found to exhibit signif-
cant cracked seed damage. The point at which obvious differences in cool test performance became
apparent was approximately 15 to 18% cracked seed, as judged by actual visual inspection of duplicate
lots of dry seed. These microscopic seed evaluations revealed a broad range in the degree of seed
damage. Large cracks (3/16") at a tangent to the narrow axis of the seed were rather obvious fractures
attributable to damage incurred during mechanical processing steps; picking, ginning or delinting pro-
cedures. These large breaks in the seed coat were found to severely compromise the seeds' viability
and germination potential under field conditions. When from 15% to 50% of the seed lot showed evidence
of cracked seed coats, field emergence was highly negatively correlated (r = 0.61*) with numbers of
cracked seed. Nearly 40% of the variability in field emergence was explainable by the percentage of
cracked seed in the lot alone. In these instances, the standard germination test results bore no re-
lation to the field performance results whatsoever. Small, microscopic cracks had little effect on
seed performance.

A further laboratory test was evaluated in an effort to provide some measure of the possible
detrimental effects of fungal pathogens on cottonseed performance. This is the accelerated aging test,
in which representative seed lots are held at high relative humidity (98%) and high temperature (100°F)
for several days, after which the seed performance is tested by standard laboratory germination com-
pared with unaged seed lots. Our previous tests had indicated that the accelerated aging test was
largely separating out seed lots which had fungal contamination. Carry-over seed without fungicide
treatments, or seed which had only a "light" fungicide coating were especially liable to loss of germ-
inality following the accelerated aging test. When all seed was uniformly fungicide treated, signi-
ficant differences in germination and vigor of seed lots which had the same standard germination
were seen. Cracked seed were especially prone to invasion by fungi during storage; and these seed performed
poorly after accelerated aging. The accelerated aging test appears to have the most promise as a
method, in conjunction with conventional germination tests, to enable seedsmen to identify lots which
will best "carry over" for planting the following season.

We have developed a method to evaluate cottonseed coat strength. After we identified cracked and
damaged seed as major determinants in poor seed performance under environmental stress, we realized
it would be difficult to modify or improve upon accepted practices in cotton picking and seed handling
in order to minimize such damage. We designed an instrument to evaluate the resistance of cottonseed
to cracking damage during handling. This instrument utilized a Dillon force gauge to measure pressure
applied to individual cottonseed by means of a lever action pin. A wide variation in cottonseed coat
strength has been found depending upon variety, year of production and location of production. We
believe this instrument will enable us to detect seed lots which may have weak seed coats before har-
vest; these can be "flagged" for special handling to try to minimize damage during processing. Seed
lots already harvested can be quickly evaluated for the degree of probable seed coat damage they may
have sustained, in order that profitable planting and storage decisions may be made.

In summary, we are confident that coordinated application of selected seed germination and vigor
tests under development will provide considerable assistance as inputs into the identification and use
of high quality plant seed by seedsmen and growers in the future.

THE EFFECT OF CULBAC SEED COATING ON
EMERGENCE OF COTTON SEED

R.G. McDaniel and B. B. Taylor

The data illustrates that Culbac seed treatments, either liquid or powder, at low concentrations
tended to improve the germination percentage of short staple cotton at both field locations, in Table 1.
The best seed treatment combination - Culbac powder at the low concentration, resulted in nearly 22%
more seedlings emerging at Marana, AZ. High concentrations of Culbac showed no effect or were detri-
mental to seedling emergence.