Two additional 49-entry experiments were examined in which performance index values rather than actual yields had been used for the initial regression analysis. The performance index used is a measure of grain yields on sound plants only, eliminating from consideration all broken and root lodged plants or those with dropped ears. Similar results were obtained:

<table>
<thead>
<tr>
<th>Experiments</th>
<th>Regr. coeff.</th>
<th>F values</th>
</tr>
</thead>
<tbody>
<tr>
<td>62-7-161</td>
<td>1.25650</td>
<td>9.14</td>
</tr>
<tr>
<td>62-7-261</td>
<td>1.740948</td>
<td>5.97</td>
</tr>
</tbody>
</table>

From the data it appears that in each case a positive relation existed between yield or performance index and the number of days from planting to flowering for hybrids with equivalent moisture at harvest and that there was a gain in yield of over 56 pounds (1 bushel) of dry grain per acre for each increase of 1 day in the interval from planting to flowering.

The data are taken to indicate that the expectation of higher yields in early hybrids which flower later in the season and then lose moisture rapidly after physiological maturity of the grain is supported and that hybrids of this type are preferable from a yield standpoint to hybrids which flower early in the season and then dry slowly.

INHERITANCE OF ABNORMAL PALISADE MUTANT IN AMERICAN UPLAND COTTON, *Gossypium hirsutum* L. 1

R. J. Kohel

In 1959, a plant with numerous light-colored areas on most of the leaves (Figure 1) was noted in a population of 20 F₂ plants from the cross Texas 133 (G. *hirsutum* race *morrichi*) × DPL (a highly inbred line derived from G. *hirsutum* race *latifolium* 'Deltapine 14'). On close observation these areas appeared as small depressions in the leaf surface without any appearance of external damage. Freehand sections of leaves indicated that the palisade tissue in these areas was absent or disintegrated. The phenotype of this mutant plant was referred to as "abnormal palisade" (AP).

Flowers on the mutant plant were self-fertilized. In 1960, ten plants were grown and all expressed the AP phenotype. Cotyledons, as well as leaves, exhibited the AP phenotype (Figure 2). Flowers from AP and DPL plants were cross-fertilized to begin a study of the inheritance during the winter and flowers on F₁ plants were self-fertilized and backcrosses to the AP stock (BC₁) were made. F₂ plants had normal cotyledons and leaves; therefore, if the AP phenotype was under genetic control it must have resulted from a recessive genotype.

Seeds from greenhouse pollinations were planted in 1961 field plots to provide the following populations: F₂, F₃, F₄, and BC₁. Observed segregation (Table 1) approximated that expected from segregation of alleles at two independent loci with the mutant phenotype resulting from the homozygous recessive genotype. Chi-square tests (Table 1) indicated that the observed segregation did not deviate significantly from the proposed segregation of 15 normal:1 AP.

1 Contribution from the Crops Research Division, ARS, USDA, and the Soil and Crop Sciences Department, Texas A. and M. University. Received July 1, 1963.

2 Geneticist, Crops Research Division, ARS, USDA, College Station, Texas.

In 1962, F₂, BC₁, F₃, and SBG₁ (from self-fertilized BC₁ plants) populations were grown to test further the proposed genetic model. Chi-square tests for deviation from the model were not statistically significant (Table 1), however, seedlings heterozygous for red plant body were found in the F₂ population. The red seedlings resulted from improper pollination or errors in harvesting. These were excluded from the classification, but they left a shadow of doubt as to the possibility of green-plant contaminants. To remove any doubt about the genetic control of the plant phenotype, remnant seed from 1960-61 greenhouse F₁ plants and seed from 1962 F₁ plants were grown in the 1962-63 greenhouse. The resulting segregation was in agreement with the proposed genetic model (Table 1).

The 1962-63 greenhouse classification was based on seedling scoring. Mutant expression on cotyledons of the 1960 parent stock proved to be characteristic of the AP phenotype. In the 1961 and 1962 classification of segregating populations, mutant expression on the cotyledon always corresponded to mutant expression on mature leaves, and no plants were found with a mature leaf expression that did not have a corresponding expression on the cotyledons. This classification was made possible by planting seeds singly in six-ounce paper cups in the greenhouse and classifying the seedlings and then transplanting them to field plots.

A mutant controlled by homozygous recessive alleles at a single locus called mosaic leaf (ml ml) has been reported in cotton. 3 Mosaic-leaf phenotype differs from AP in that