Natural Crossing in Cotton in Western Punjab

III. Methods of Checking Natural Crossing

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I. INTRODUCTION

In the breeding plots at the cotton research stations where single plant progenies are grown in contiguous rows some natural crossing is inevitable. The extent of natural crossing at Lyallpur under these conditions is about 2% (Afzal and Khan, 1944). The only means of checking natural crossing in this case is the artificial selfing of flowers. The cotton breeders have the necessary finance and technical skill at their disposal to do this work and it is common knowledge that the cotton breeders employ one or the other method of selfing the flowers in their breeding plots.

Under the ordinary field conditions, however, the problem is rather complicated. The farmer who grows two or more varieties cannot be expected to use the routine methods of selfing the flowers, nor indeed is such a procedure desirable from practical considerations. Besides being expensive, such methods are wasteful, as yield is reduced. The only practical way of dealing with this problem is the American system of developing one-variety-cotton-communities. Such a system cannot be followed in the West Punjab, because the farmers of this country are not yet sufficiently educated to grasp the significance of such an organisation. A way out of the difficulty may, therefore, be found in growing different types of barriers, and work so far carried out on this aspect of the problem is dealt with in this paper.

Literature Review

Brown (3) and Pope, Simpson, and Duncan (4) used barriers of corn to prevent natural crossing. Although 10 rows of corn decreased the percentage of natural crossing, it was not considered an absolutely effective shield. Trought (5) came to the same conclusion and recommended a belt of 20 metres of cotton around the seed-propagation plots. Several other workers have found that empty space of varying breadth between two fields of cotton checked natural crossing. Literature on this aspect has already been reviewed (Afzal and Khan, 1944) and will not be dealt with here. It may, however, be mentioned that this aspect of the problem has not been adequately dealt with by the previous workers and it appears necessary to investigate the problem in detail.

Material and Methods

The following barriers were employed:

1. Local variety for local cotton and American variety for local cotton or American variety for American cotton and local variety for American cotton.
2. Open space.

Local varieties.—(1) 39 Mollisoni, (2) 119 Sanguineum, (3) Jubilee.

American varieties.—(1) 4 F, (2) L.S.S., (3) 289F/43, (4) hirsutum.

The arrangement of the sowing design permitted and on all the three aspects mentioned above.

Experimental Results

Local Cotton Barrier for Local Cotton

A plot of 30 rows of 39 Mollisoni was grown adjacent to 119 Sanguineum (red arboreum). They were picked and the produce ginned showing the occurrence of natural hybrids in the 30 rows in Table 1.

It will be seen from Table 1 that the number of hybrids after the fifteenth row was small. The total number of natural hybrids in the first fifteen rows (i.e., up to a distance of 37.5 feet from plants) was 164, while it was only 38 in the last rows. It would, thus, appear that a belt of 30 rows (75 feet) is essential when one variety of local cotton is used as a barrier for another variety of local cotton.

American Cotton Barrier for Local Cotton

This experiment was carried out with an American barrier in 1944-45 and 289F/43 in 1945-46.

Table 1.—Natural crossing in consecutive rows of local cotton barrier.

<table>
<thead>
<tr>
<th>Row No.</th>
<th>1944-45</th>
<th>1945-46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No. of plants</td>
<td>Hybrids</td>
<td>Percentage</td>
</tr>
<tr>
<td>1</td>
<td>16,343</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>30,150</td>
<td>70</td>
</tr>
<tr>
<td>3</td>
<td>46,116</td>
<td>87</td>
</tr>
<tr>
<td>4</td>
<td>57,075</td>
<td>103</td>
</tr>
<tr>
<td>5</td>
<td>70,474</td>
<td>106</td>
</tr>
<tr>
<td>6</td>
<td>83,647</td>
<td>119</td>
</tr>
</tbody>
</table>

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