1. **Linkage relationships for two mutants detected in Italian populations.**

Further investigations have been accomplished on linkage relationships of two mutants, described in 1967 MNL, with known genetic markers.

For the *ii*-type mutant, F₂ segregations (repulsion phase) presented the following data (inclusive of 1966 results):

\[
\begin{array}{cccc}
G_1 & \text{ii} & g_1 & \text{ii} & G_1 & \text{ii} & G_1 & \text{ii} \\
3882 & & 2037 & & 1889 & & 8 \\
\end{array}
\]

(c.o. 6.5% ± 1.5 st. error).

The data previously reported about close linkage between a shrunken type (bt) mutant and *su₁* have been confirmed by the scoring of ears obtained from backcrossing, to the triple recessive, plants of the constitution *Su₁ bt G₁₂ / su₁ Bt g₁₂*, as follows:

\[
\begin{array}{cccc}
Su₁ & Bt & Su₁ & Bt & Su₁ & bt & Su₁ & bt \\
113 & & 4124 & & 4157 & & 20 \\
\end{array}
\]

All the seedlings from the *su₁ bt* kernels had the *G₁* phenotype, while only 26 plants from *Su₁ Bt* seeds turned out to be *g₁*, indicating that part of them derived from contamination. Consequently, considering the *bt* phenotypes only, the *su-bt* recombination is 0.5% ± 0.1.

The *bt* mutant, then, has to be placed on chromosome 4 (probably allelic to *bt₂*), between *su₁* and *G₁₂* and very close to *su₁*.

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2. **Abnormal segregations (significantly different from a 1:3 ratio) of genetic markers in the F₂ of lines derived from Italian populations.**

In the analysis of a number of F₂ progenies derived from crossing lines from Italian populations to some genetic testers bearing recessive mutants, the following abnormal segregations have been observed:
<table>
<thead>
<tr>
<th>Marker</th>
<th>Chromosome</th>
<th>Number of examined F₂ progenies</th>
<th>Number of Italian populations</th>
<th>Segregations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;3:1 &lt;3:1</td>
</tr>
<tr>
<td>1g₂⁻</td>
<td>2</td>
<td>80</td>
<td>74</td>
<td>4</td>
</tr>
<tr>
<td>sh₂</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>su₁</td>
<td>4</td>
<td>91</td>
<td>85</td>
<td>4</td>
</tr>
<tr>
<td>bi⁻</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>γ</td>
<td>6</td>
<td>75</td>
<td>71</td>
<td>4</td>
</tr>
<tr>
<td>su₂</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>g₂⁻</td>
<td>7</td>
<td>67</td>
<td>63</td>
<td>2</td>
</tr>
<tr>
<td>wx</td>
<td>9</td>
<td>88</td>
<td>82</td>
<td>2</td>
</tr>
</tbody>
</table>

The mean number of ears examined per F₂ is about 7 for kernel markers and 4 for seedling characters.

Abnormal segregations can be, at least partially, interpreted as a consequence of the presence of gametophyte factors. The deviations for the markers of chromosomes 4, 5 and 9 could be attributed to the ga factors known for such chromosomes.

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3. **Somatic segregation in plants from X-ray and Ethyl-methane-sulphonate (EMS) seed treatments.**

In plants derived from seed of a multi-ear popcorn variety treated with X-rays and EMS, the number and relative position of ears segregating mutants have been reported: