A FORM OF PORTULACA GRANDIFLORA BEARING CREAMISH FLOWERS WITH YELLOW AND ORANGE STRIPES

by

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Portulaca grandiflora, Hook. includes at least three forms of variegated flowers, namely, creamish with yellow stripes, white with magenta stripes, and pink with magenta stripes. IKENO (1929), in his extensive studies, dealt with the variegated forms, and, with the results obtained as basis, formulated his "Mosaikgamen" hypothesis. The present investigation, from the standpoint of gene lability, was carried out with a form having creamish flowers with yellow and orange stripes.

In 1931, a striped creamish plant was selfed, the results obtained the following season being shown in table I.

<table>
<thead>
<tr>
<th>Observed</th>
<th>Orange</th>
<th>Striped yellow</th>
<th>Striped creamish</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>43</td>
<td>271</td>
<td>319</td>
<td></td>
</tr>
<tr>
<td>1.57</td>
<td>13.48</td>
<td>84.95</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

It will be seen that three types appeared in different proportions, namely, 1.57 per cent orange, 13.48 per cent striped yellow, and 84.95 per cent striped creamish. The orange flowers have no stripes, but the yellow flowers have orange stripes, the stem colour being
dark red in both cases. The striped creamish has greenish stems with
dark red stripes and blooms creamish flowers with marked yellow
and orange variegation, the latter stripes occurring secondarily on
the yellow areas. The data obtained in 1933 showed conclusively
that orange is homozygous for gene self-coloured, while striped yellow
is heterozygous for same. On account of the mutable nature of the
gene that is carried by the stock, the striped creamish flowers repeated
the production of self-coloured mutants, as shown in table 2.

Table 2

<table>
<thead>
<tr>
<th>Mother plant</th>
<th>Num. of plants</th>
<th>Orange</th>
<th>Striped yellow</th>
<th>Striped creamish</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange . . . .</td>
<td>4</td>
<td>86</td>
<td>—</td>
<td>—</td>
<td>86</td>
</tr>
<tr>
<td>Striped yellow .</td>
<td>10</td>
<td>80</td>
<td>157</td>
<td>65</td>
<td>302</td>
</tr>
<tr>
<td>Striped creamish</td>
<td>12</td>
<td>22</td>
<td>224</td>
<td>1411</td>
<td>1657</td>
</tr>
</tbody>
</table>

Table 2 shows that orange becomes homozygous for gene self-
coloured, while striped yellow is heterozygous, segregating into 26.49
per cent orange, 51.99 per cent striped yellow, and 21.52 per cent
striped creamish, or nearly a 1 : 2 : 1 ratio of homozygous dominant,
heterozygous, and homozygous recessive. The striped creamish
pedigrees included 1.33 per cent orange, 13.52 per cent striped yellow
and 85.15 per cent striped creamish. The striped creamish form is
therefore exhibited by a labile gene that frequently changes into its
dominant allelomorph self-coloured. The self-coloured plants that
appeared in the striped creamish pedigrees are due to mutation, the
majority of them being seminal mutants derived from the union of
mutant gametes. The orange mutants developed from self-coloured
micro- and megaspores, and the striped yellow from self-coloured
and striped gametes, giving homozygotes in the former and hetero-
yzygotes in the latter. In totaling the data obtained for two gener-
ations, the striped creamish pedigrees gave:

<table>
<thead>
<tr>
<th>Orange</th>
<th>Striped yellow</th>
<th>Striped creamish</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed . . . . .</td>
<td>27</td>
<td>267</td>
<td>1682</td>
</tr>
<tr>
<td>Percentage . . . .</td>
<td>1.37</td>
<td>13.51</td>
<td>85.12</td>
</tr>
</tbody>
</table>