"Indeed if in England anyone should wish to plant clover in this manner, there is a large white kind which is of equal value with the red, and will answer better because taking root at the joints and growing vastly branched, it will produce a great deal more from the separate plants, than the common red kind possibly could, however favored both by art and nature (1)."

The second reference is from a description of the meadows of Lombardy Italy. A. Zappa (5) considered white clover the queen of forage plants. In the continued discussion he wrote, "Trifolium Repens: this excellent plant for cattle is sown together with Trifolium Pratense; vegetates early, flowers the middle of May, ripens in a month, and is cut at the usual time—Trifolium Pratense—Some people are of opinion, that in every state, this species is inferior to the Trifolium Repens; others think that its hay (not the grass)3 is more nutritious, in particular to cows and horses.

The third reference is from the well known forage crop writer, C. L. Flint of Massachusetts. He wrote of white clover in 1884: "Sometimes it is seen fully two feet high, though this is very rare, its usual growth not being over ten inches . . . (2)."—Paul Tabor, U. S. Soil Conservation Service, Athens, Georgia.

LITERATURE CITED


3Green forage.

DWARFINING IN Triticum vulgare (vill.)

During a genetic study of the inheritance of differences in plant height, numerous dwarf wheat plants (3 to 6 inches) appeared in the F2 progeny of a cross between the semidwarf selection Norin 10 × Brevor —14, C.I. 13253 and Burt, C.I. 12696. A study was initiated to determine whether this dwarfing could be: (1) transgressive segregation for plant height with the dwarfishness being a part of a continuous range of height variation, or (2) a discontinuous character resulting from a growth inhibitor early in the development of the plant such as characters described by Florell and Martin, and McMillan.

The average plant heights of the Norin 10 × Brevor —14 parent, the F1 hybrid, and the Burt parent were 19, 29, and 32 inches, respectively. The observed and expected numbers of plants with normal and dwarf plant heights in the segregating generations are given in table 1 for a two-gene hypothesis.

The data confirm the hypothesis that the parents differ by two genes, a factor for normal height, (I), which inhibits a dwarfing factor (D).

A sister selection of Norin 10 × Brevor —14, Norin 10 × Brevor —1978, produced all dwarf F1 plants when crossed with Burt.

Thompson hypothesized the presence of the factor for normal, the inhibitor for dwarf (I) or (N), plus the dwarfing factor (D) and an extra inhibitor (E). E inhibits or neutralizes the action of the inhibitor (I). Florell and Martin reported that Federation, one of the progenitors of Burt, had the genotype DDllEe, and that Turkey—Florence, one of the progenitors of Brevor had the genotype ddiIEE. It is assumed that the genotype of Burt is DDllEe, that of Norin 10 × Brevor —14 is ddiIEe, and that of Norin 10 × Brevor —1978 is ddiIEE. Crosses between normal parents that produce all dwarf F1 progeny have the F2 genotype, liDdEe. Since Burt X (Norin 10 × Brevor —1978) produced all dwarf F1 plants, Burt had the genotype DDllEe. All of the F2 plants of the cross Burt X (Norin 10 × Brevor —14) were normal since both parents carried the ee gene pair.

This information should be of interest because Burt and several selections of Norin 10 × Brevor are being used in crosses by many cereal breeders.—E. H. Everson, formerly Agronomist, Crops Research Division, A.R.S., U.S.D.A., Pullman, Wash., now Associate Professor Farm Crops, Michigan State University; C. E. Muir, formerly assistant in Field Crops Research, Washington State College; and O. A. Vogel, Agronomist, Crops Research Division, A.R.S., U.S.D.A., Pullman, Wash.


Table 1.—Observed and expected numbers of normal and dwarf plants in F2 and backcross populations of wheat.

<table>
<thead>
<tr>
<th>Generation</th>
<th>Total</th>
<th>Observed</th>
<th>Expected</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal</td>
<td>Dwarf</td>
<td></td>
</tr>
<tr>
<td>F1 × (Norin 10 × Brevor —14)</td>
<td>804</td>
<td>614</td>
<td>190</td>
<td>603</td>
</tr>
<tr>
<td>F1 (Norin 10 × Brevor —14) × Burt</td>
<td>1153</td>
<td>925</td>
<td>228</td>
<td>937</td>
</tr>
<tr>
<td>F1 × Burt</td>
<td>832</td>
<td>632</td>
<td>0</td>
<td>522</td>
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