Wheat Stem Sawfly Damage in Four Spring Wheat Varieties as Influenced by Date of Seeding

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A loss of 2,251,073 bushels of wheat was reported for Montana in 1952 as a result of the activity of the wheat stem sawfly, Cephus cinctus Nort. (1). Because wheats have not been found which give satisfactory sawfly resistance under all conditions, other methods of control have been suggested. Munro et al. (5) present limited data to show that delayed seeding is effective in preventing damage. Davis et al. (2) report that wheat planted after May 20 will escape sawfly damage. Early maturing varieties have been considered in the hope that injury would be avoided, but Eckroth and McNeal (3) found such varieties to be very susceptible to sawfly cutting.

Losses in yield due to sawfly activity are caused by (1) reduction in kernel weight due to larval tunneling in the stems, and (2) loss of wheat when the stem is cut and falls to the ground (4, 5, 6, 7). Seamans et al. (7) report losses of 10% in kernel weight due to sawfly tunneling, while Munro et al. (5) report losses of slightly over 9% from the same cause.

The present study reports the loss in kernel weight of 2 solid and 2 hollow-stemmed spring wheat varieties when seeded on 3 dates and subjected to heavy sawfly infestation.

MATERIALS AND METHODS

Two solid-stemmed varieties of spring wheat, Rescue and Merit-Pilot (B49-90), and 2 hollow-stemmed varieties, Thatcher and Merit-Pilot × Henry (C.I. 12733), were planted on 3 dates under conditions of heavy sawfly infestation on dryland at Chouteau, Mont., in 1953 and 1954. Dates of seeding in 1953 were May 6, May 15 and June 17, and in 1954 they were May 6, May 17, and May 31.

In both years the 12 treatments (4 varieties × 3 planting dates) were grown in a randomized complete block design with 4 replications of 3-row plots seeded in 10-foot rows 12 inches apart. All data were obtained from 5 feet of the center row of each plot in 1953 and from 2 feet of the center row of each plot in 1954, starting 1 foot from the edge of the plot.

Plants from the designated area in each plot were pulled at harvest time and stored. The first two dates of seeding were pulled on Sept. 11, 1953, and Sept. 1, 1954, while the third date was pulled on Sept. 16, 1953, and Sept. 22, 1954. Wheat from these plants was then used as a basis for determining sawfly losses.

Each stem from the 1953 planting was examined to determine if it had been tunneled by a sawfly larva or if it had escaped infestation. The stems which had been tunneled were separated into the categories, stems cut by sawfly and stems not cut. The uncut stems were further separated on the basis of whether they had been tunneled in 1, 2, 3, or 4 internodes. Some missing categories were obtained in the third date of planting because of little sawfly tunneling in the uncut stems.

Stems from the 1954 crop were separated on the basis of stems cut by sawfly, stems tunnelled but not cut, and stems not tunnelled. Some missing categories were obtained for the class, stems not tunnelled, due to extremely heavy sawfly tunneling and cutting. Kernel weight was obtained by weighing 200 kernels for each variety in each category on a 200-kernel weight basis.

The number of kernels per head was obtained by averaging the number of cut stems by the total number of stems.

RESULTS AND DISCUSSION

Kernel Weight

A comparison of kernel weights from stems tunnelled in 1, 2, 3, or 4 internodes (table 1). Data from the June 17, 1954, date were omitted from the analysis because of missing categories. The F test showed differences in kernel weight due to variety and date of planting, but no interaction was at a significant level. Losses in kernel weight were determined by dividing the number of cut stems by the total number of stems.

Combined data on kernel weights for varieties were analyzed on the basis of stems cut and stems not tunnelled (tables 2, 3, and 4). The June 17, 1954, date was omitted from the analysis because of missing categories (table 2).

There was generally a decrease in kernel weight as a result of sawfly tunneling. The only exceptions were C.I. 12733 and Thatcher seeded on May 17, 1953, and Thatcher seeded on the second date of seeding in 1954.

Significant differences in kernel weights were between the main effects: first two dates of planting, years, and varieties (tables 3 and 4). Significant interactions were at a significant level. The number of cut stems by the total number of stems. The number of cut stems by the total number of stems.

Table 1.—Average weight in grams of 200 kernels from stems cut and stems tunnelled by sawfly in a date of seeding experiment in 1953 and 1954

<table>
<thead>
<tr>
<th>Variety</th>
<th>Stems cut</th>
<th>Number tunnelled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>C.I. 12733</td>
<td>5.26</td>
<td>5.67</td>
</tr>
<tr>
<td>Thatcher</td>
<td>4.98</td>
<td>5.08</td>
</tr>
<tr>
<td>B49-90</td>
<td>5.12</td>
<td>5.18</td>
</tr>
<tr>
<td>Rescue</td>
<td>5.16</td>
<td>5.08</td>
</tr>
<tr>
<td>Average</td>
<td>5.13</td>
<td>5.25</td>
</tr>
</tbody>
</table>

Planted in 1953

Planted in 1954