CROP REGISTRATIONS

Registration of Eight Root Rot Resistant and Susceptible Near-Isogenic Lines of 'Neepawa' and 'Chester' Wheat: NR 1, NR 2, NS 1, NS 2, CR 1, CR 2, CS 1, and CS 2

Eight near-isogenic lines derived from the hard red spring wheat (*Triticum aestivum* L.) cultivars Neepawa and Chester were developed and released from the Lethbridge Research Station, Lethbridge, AB: two lines from each cultivar are resistant and two are susceptible to common root rot [caused primarily by *Bipolaris sorokiniana* (Sacc.) Shoemaker]. In 1992 and 1993, the two susceptible Chester lines, CS 1 (Reg. no. GP-400, PI 574496) and CS 2 (Reg. no. GP-401, PI 574497), and the two susceptible Neepawa lines, NS 1 (Reg. no. GP-402, PI 574498) and NS 2 (Reg. no. GP-403, PI 574499), had root rot severity ratings similar to those of the susceptible wheat line S-615 (Table 1). The other two near-isogenic lines of Neepawa, NR 1 (Reg. no. GP-404, PI 574500) and NR 2 (Reg. no. GP-405, PI 574501), and of Chester, CR 1 (Reg. no. GP-406, PI 574502) and CR 2 (Reg.

Table 1. Root rot reaction of resistant and susceptible near-isogenic lines of Neepawa and Chester in greenhouse and field tests.

<table>
<thead>
<tr>
<th>Cultivar or line†</th>
<th>Greenhouse</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1</td>
<td>3.90C</td>
<td>3.58C</td>
</tr>
<tr>
<td>CS 2</td>
<td>3.90C</td>
<td>3.57C</td>
</tr>
<tr>
<td>NS 1</td>
<td>3.70C</td>
<td>3.40C</td>
</tr>
<tr>
<td>NS 2</td>
<td>3.66C</td>
<td>3.28C</td>
</tr>
</tbody>
</table>

The lines derived from the moderately resistant Neepawa and Chester (4) with the susceptible line S-615. Resistance is a recessive trait, susceptible *F*<sub>1</sub> lines from both crosses were backcrossed to their respective parent, using it as the maternal parent in each of eight backcrosses. The lines and their root rot reaction in the greenhouse. Only *B.C.F.*<sub>3</sub> lines required for screening and to ensure that a sufficient number of both resistant and susceptible near-isogenic lines of Neepawa and Chester could be identified for root rot evaluation.

The *F*<sub>4</sub> progeny of the most resistant and the near-isogenic *B.C.F.*<sub>3</sub> lines of Neepawa and Chester were evaluated with the parents Neepawa, Chester, and S-615 for their root rot reaction in three separate greenhouse experiments. In each experiment, 15 seeds of a specific line were sown in single-row plots arranged in a randomized complete block design with three or six replications. The lines were screened for their reaction to common root rot under greenhouse conditions according to an established procedure (3). After every second backcross, the *B.C.F.*<sub>3</sub> lines were grown to maturity, and 70 *B.C.F.*<sub>3</sub> lines from each cross, along with their resistant and susceptible parents were evaluated for their root rot reaction in the greenhouse. Only *B.C.F.*<sub>3</sub> lines with high frequencies of susceptible plants were selected for subsequent backcrosses, to minimize the number of lines required for screening and to ensure that a sufficient number of both resistant and susceptible near-isogenic lines of Neepawa and Chester could be identified for root rot evaluation.

These lines were further evaluated under field conditions near Vauxhall, AB, in 1992, and at Lethbridge in sites where common root rot was severe. Two lines from each experiment were sown in hill plots spaced 90 cm apart and arranged in a randomized complete block design with four replications in 1992 and five replications in 1993. The root rot reaction (3) of each line was determined at anthesis. The root rot ratings of each line were consistent across experiments.

These lines will be useful for determining the effect of common root rot on yield at different locations and could also be used in genetic and biochemical studies of resistance. Seed of these lines (5 g) is available upon written request to the corresponding author.

References and Notes


Published in Crop Sci. 34:1428–1429 (1994).