REGISTRATION OF SIX NEAR-ISOGENIC WHEAT GENETIC STOCKS DIFFERING IN GLAUCOUSNESS

THREE PAIRS of near-isogenic durum wheat genetic stocks (Triticum turgidum L. var. durum Desf.), were developed at the Agriculture Canada Research Station, Swift Current, SK, and released in 1991. Each pair consists of a glaucous and a nonglaucous isolate. Glaucousness refers to the waxy bloom evident on upper leaves (especially the flag leaf), sheaths, spike structures, and stems. The pairs are designated as follows: 8261-AC2-G, glaucous (Reg. no. GS-1, PI 556981) and 8261-AC2-NG, nonglaucous (Reg. no. GS-2, PI 556982); 8261-BN3-G, glaucous (Reg. no. GS-3, PI 556983) and 8261-BN3-NG, nonglaucous (Reg. no. GS-4, PI 556984); and 8262-AR3-G, glaucous (Reg. no. GS-5, PI 556985) and 8262-AR3-NG, nonglaucous (Reg. no. GS-6, PI 556986).

The 8262 pair was developed from a G3059/2*DT367 cross, while the two 8261 pairs were developed from different F2 plants from a G3028/2*DT367 cross. G3059 and G3028 are nonglaucous Triticum dicoccum introductions from the University of California, Riverside (1). DT367 (Reg. no. GP-328, PI 546060) is a glaucous, high-yielding adapted genotype with parentage S-017/Wascana/7168 (2). Each near-isogenic pair was developed by retaining the heterozygote for glaucousness from the F2 through the F6 generations, followed by selection of F6-derived F10 lines homozygous for the glaucous or nonglaucous character.

The nonglaucous character displayed dominance over glaucousness; this contrasts with results from hexaploid wheat, in which heterozygous plants were distinguishable due to intermediate levels of glaucousness (3). Heterozygotes were identified through progeny tests. The segregation of 1754 F11 plants from 140 nonglaucous F10 plants was consistent with the glaucousness being controlled by a single gene or tightly linked genes (P ≤ 0.01). The 8262-AR3-G line is atypical and differs from the remaining two glaucous lines in that the spike structures are nonglaucous. This indicates that spike glaucousness may be controlled by a gene (or tightly linked genes) independent of, although also tightly linked with, the gene or genes for glaucousness of leaves, sheaths, and stems.

The three pairs of isolines were grown in replicated rainfed plots in 1989 near Swift Current. The three glaucous isolines, as a group, had significantly (P ≤ 0.01) more wax on flag leaves and sheaths than the nonglaucous isolines (data not shown). Furthermore, within each pair, the glaucous line had higher levels of leaf (P ≤ 0.01) and sheath (P ≤ 0.05) wax than the nonglaucous lines (Table 1). This lower than levels on spikes of the 8261-BN3-G lines, and did not differ from the 8262-AR3-NG line.

In agreement with an earlier report (3), preliminary grain-yield testing in 1989 suggested that glaucousness may be associated with higher yields. In a test involving the three near-isogenic pairs, and 14 other sibling near-isogenic pairs, grown at three locations in Saskatchewan, the glaucous lines differed significantly at the 0.05 and 0.01 probability levels, outyielding the nonglaucous lines.

Although these isolines have not been tested for pasta making quality, testing was carried out at the F2 and later F5 stages on the three lines from which these pairs were derived. These lines were medium high strong to strong in gluten strength.

These lines should provide a useful source for studies attempting to understand the effects of glaucousness and epicuticular wax on physiological processes and grain yield. Seed of these lines (5 g) is available upon written request to the senior author.

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References and Notes

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