REGISTRATION OF GENETIC STOCKS


Five near-isogenic genetic stocks of pea (Pisum sativum L. cv. Juneau), A317I (Reg. no. GS-1, PI 598366), nod3I (Reg. no. GS-2, PI 598367), A317nod3I (Reg. no. GS-3, PI 598368), E135I (Reg. no. GS-4, PI 598369), and R25I (Reg. no. GS-5, PI 598370) were developed and released in 1997 by the University of Guelph. These genetic stocks differ in one of the following characteristics: the production of effective nodules with Rhizobium leguminosarum bv. viceae, the tolerance of nodulation to nitrate, and the assimilation of nitrate. These genetic stocks can be used in agronomic and physiological studies of N2 fixation and nitrate metabolism, and as sources of genetic material in cultivar development programs.

These near-isogenic genetic stocks were developed from six backcrosses of existing mutants in various genetic backgrounds (A317, nod3, E135, and R25) and a new double mutant (derived from A317 and nod3) with the recurrent parent cultivar Juneau (PI 595572). Juneau is an indeterminate, dark-skinned, smooth-seeded, early-maturing cultivar developed for general purpose processing by Western Valley Seed Co. of Moscow, ID. (That company has since merged with Crites-Moscow Growers, Inc., of Moscow, ID.)

A317 is a mutant of Juneau with less than 6% of its NADH-nitrate reductase (nar1) activity; it exhibits incomplete dominance (1). Nod3 (nod3) is a monogenic recessive mutant of ‘Rondo’ with higher than normal nodule numbers, even in the presence of 15 mM nitrate (2). The E135 mutant of ‘Sparkle’ forms a normal number of white nodules lacking nitrogenase activity, and is conditioned by a monogenic recessive allele at the sym13 locus (3,4). The R25 mutant of Sparkle is a nonnodulating mutant conditioned by a monogenic recessive allele at the sym8 locus (5,6).

For selection of nitrate reductase deficiency, seedlings were grown in vermiculite in a greenhouse and supplied twice weekly with one-quarter-strength Hoagland’s solution (pH 6.5) containing 5 mM nitrate. After 2 wk, the nitrate reductase activity in the third pair of recently unfolded leaflets was determined as nitrate-dependent nitrite formation in the dark (7). Nitrate reductase-deficient progeny were rescued by inoculation with R. leguminosarum bv. viceae (Liphatech, Milwaukee, WI), and were fertilized for 10 d with nutrient solution containing 0.5 mM NH4+ and then with N-free solution until maturity. Flowers that appeared during the first week after screening were removed, to ensure sufficient vegetative growth for successful fruit development. For selection of nodulation mutants, seeds were germinated on moist vermiculite and inoculated with R. leguminosarum bv. viceae. The mutagenic treatments were applied to the seedlings by spraying with a suspension of nitrate-free solution containing 0.5 mM nitrate. After 2 wk, the nitrate reductase activity in the third pair of recently unfolded leaflets was determined as nitrate-dependent nitrite formation in the dark (7).

The 13 clonal lines (Table 1) were selected from 174 somatic embryogenesis lines derived from 'Kenwell' tall fescue (Festuca arundinacea Schreb.) (2). The clones were originally selected for high pollen fertility. Subsequently, these clones were shown to have low self-fertility, and thus few selfed seed, are available as clonal material only, as long as the clones persist.

These clonal lines were developed cooperatively by the USDA-ARS Tobacco and Forage Unit, Lexington, KY, and the Kentucky Agricultural Experiment Station and were jointly released by CSSA. Accepted 31 Oct. 1997. *Corresponding author. Appropriate recognition of contribution in programs and publications is provided.

Published in Crop Sci. 38:554 (1998).

References and Notes