Registration of ‘Resolute’ Great Northern Bean

‘Resolute’ (Reg. no. CV-248, PI 639057), an early-maturing upright great northern common bean (Phaseolus vulgaris L.), was developed at the Agriculture and Agri-Food Canada (AAFC) Research Centre, Lethbridge, AB, in collaboration with the AAFC Research Station, Morden, MB, and released in 2004. Resolute was tested in the narrow-row dry bean registration trials in Alberta, Saskatchewan and Manitoba for 4 yr and registered in 2004 (Registration no. 5793, Variety Registration Office, Plant Production Division, Plant Products Directorate, Canadian Food Inspection Agency [CFIA]). It is resistant to both yellow and orange strains of the bacterial wilt pathogen [Curtobacterium flaccumfasciens pv. flaccumfasciens (Hedges) Collins & Jones]. Resolute is particularly well adapted to narrow row production.

Resolute, tested as L98E212, was derived from a complex cross, made in 1994, 94133E = ‘83B352’/5/‘GN Star’/2/‘Redkloud’/‘Kentwood’/2/‘Swan Valley’/4/‘GN Star’/2/Redkloud/Kentwood/2/‘Swan Valley’/6/Sask 92070. Line 83B352 is a great northern (GN) elite line from the University of Guelph. GN Star was released by the University of Nebraska in 1975 with multiple disease resistances (including bacterial wilt) (USDA-ARS, National Genetic Resources Program, 2004). Redkloud is a photoperiod-insensitive, light-red kidney bean from New York State, derived from the cross ‘Redkote’/‘Charlottetown’ (Yellow Eye) and registered in 1974 (Wallace and Enriquez, 1980). Kentwood is an early-maturing, high-yielding navy bean from AAFC-Harrow, Ontario (Anonymous, 1973). Swan Valley is a tall and erect navy bean with a narrow profile and few basal branches, released by Michigan State University (Adams et al., 1986). Sask92070 is a GN line, registered as ‘CDC Nordic’ in 1997 by the Crop Development Centre, Saskatoon.

F₁ plants of the cross 94133E were advanced in the greenhouse at Lethbridge and the F₂ was grown in Chile during the northern winter, 1995 to 1996. F₃ space-planted progeny rows were grown at Lethbridge in 1996 and a single-plant selection was made based on agronomic (growth habit, maturity) and great northern seed traits, with a bulk F₄ row, similarly selected, harvested in 1997. Progeny-row yield was added to the selection criteria in F₅, conducted as a Modified Augmented Design. A series of replicated yield tests were grown in Lethbridge and Vauxhall, Alberta in 1998 and 1999: two wide-row (60 cm) and three narrow-row (23 cm) tests.

Line L98E212 was tested in the official Canadian prairie Bean Cooperative Registration Trials-Narrow Rows from 2000 to 2003, at 23 station–years. Plants from pods collected in Vauxhall, Alberta in 2003, were grown in progeny-rows in Chile in 2003 to 2004. After examining the seed of progeny rows grown in Chile, 100 lines were bulked in F₁₁, to produce the first Breeder Seed lot in 2004, in Parma, ID.

When averaged over twelve trials in 2000 and 2001, Resolute yielded 2060 kg ha⁻¹ and matured in 99 d, compared to 1980 kg ha⁻¹ for CDC Crocus, which matured in 100 d, and 1980 kg ha⁻¹ for the three checks, US1140, AC Polaris, and CDC Crocus. The 100 seed weight of Resolute averaged 32.5 g across 28 trials, was 1.7 for Resolute and more than 3.0 for the three checks, US1140, AC Polaris, and CDC Crocus. Resolute has the indeterminate growth habit, Type IIb, and can have long vines. Lodging (scored on a 1–5 scale, where 1 = upright and 5 = prostrate) averaged through seven trials, was 1.7 for Resolute, 3.0 for the three checks, US1140, AC Polaris, and CDC Crocus. The 100 seed weight of Resolute averaged 2661 kg ha⁻¹ at maturities which is smaller than that of CDC Crocus, larger than that of AC Polaris (31.7 g for Resolute, 29.2 g for AC Polaris across 12 sites) and matured compared to 30.5 g for US1140 and the medium long pods, as do US1140 and CDC Crocus. AC Polaris has long pods. The pod cross-section is elliptic in both Resolute and AC Polaris, medium for AC Polaris, and smooth for US1140. The pod distribution of Resolute, partly scattered for AC Polaris, and low for US1140. Resolute, having do all four cultivars, has medium veins, as does US1140. AC Polaris has weak veins and CDC Crocus has pronounced veins.

Resolute is resistant to white mold [caused by Sclerotinia sclerotiorum (Lib.) de Bary] while US1140 and CDC Crocus are susceptible, the navy bean check Envoy is resistant to all these races, and the great northern AC Polaris is susceptible to race 73 and susceptible to races delta, α-Brazil, and 1096 of anthracnose [caused by Colletotrichum lindemuthianum (Sacc. & Magnus) Lams.-Scrib.], while US1140 and CDC Crocus are susceptible, the navy bean check Envoy is resistant to all these races, and the great northern AC Polaris is susceptible to all.

Resolute has been released on an exclusive basis through a licensing arrangement with the Agricore–United, Bean Business Unit, Alberta Pulse Growers, and of Agriculture and Agri-Food Canada Matching Investment Initiative is gratefully acknowledged.

Application for U.S. Plant Variety Protection is not expected.

Acknowledgments

The technical support of J. Braun, C. Chell, R.L. Conner, R.S. Erickson, and M. David at Lethbridge, Alberta, and L. Yager at Morden, is gratefully acknowledged as the relevant personnel at all cooperating sites in Canada who conducted the official Canadian prairie Bean Cooperative Registration trials. The financial support of the Agriculture and Agri-Food Canada Matching Investment Initiative is gratefully acknowledged.