Registration of Common Bean Blight-Resistant Germplasm, HR45

The common bean (*Phaseolus vulgaris* L.) germplasm line HR45 (Reg. no. GP-114, PI 570661) was developed by the Agriculture Canada Research Station, Harrow, ON, and released in 1993. It was selected for small white navy bean type with improved resistance to common bacterial blight incited by *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye and for upright plant type.

HR45 was derived from the cross of HR13-621*2/XAN159/HR13-621, of which the original single cross between XAN159 and HR13-621 was made in 1986. The backcross breeding method was used to develop HR45 because partial dominance and pronounced additive gene effects for common blight resistance had been detected in the XAN lines (2). XAN159, a common blight-resistant line, was selected by the International Institute for Tropical Agriculture (CIAT) in Colombia (seed provided by M. Pastor-Corrales) from multiple interspecific crosses with tepary bean (*P. acutifolius* A. Gray) P1 319443 made at the University of California, Riverside (4). XAN159 has determinate growth habit with dark purplish variegation on grey solid seed coat of small kidney shaped seed. Seed color and reaction to local strains of *X. campestris* pv. *phaseoli* (*Xcp*) in Ontario are variable. Before hybridization, plants of XAN159 were screened against *Xcp* to confirm common blight resistance.

HR13-621 was selected from a cross between Ex Rico 23 and NEP-2 for upright plant type, small white navy bean seed, and slow rate of common blight infection on leaves. In 1987, 48 backcross *F*1 plants were grown in the field. In summer 1988, 16 selected *F*2 bulk populations were screened in the field for reaction to *Xcp* by artificial inoculation (10⁶ colony-forming units mL⁻¹) at ≈ 1333 kPa using a spray boom (3). From one of the bulked rows, 15 plants resistant to common blight infection on leaves were saved individually. The rest were harvested as single-seed-descent *F*3 bulks. Twelve *F*3 plants of navy bean type were selected for resistance to common blight infection on leaves by multiple-needle inoculation under controlled environment conditions during winter 1988. The resistant *F*4 plants were screened in the field in 1989, and plant row No. 45491 was selected for its uniform resistance to common blight, medium season maturity, and erect plant type and bulked at maturity. The line W1445d-45491 was evaluated for agronomic performance in replicated trials in 1990 and 1991, and entered as HR45 in the Ontario Cooperative Dry Bean Cultivar trials in 1992.

HR45 is highly resistant to common blight in the field and greenhouse. Under controlled conditions it shows a higher level of resistance to common blight on leaves than does the resistant parental line XAN159. It does not react with lesions in response to multiple-needle inoculation, while XAN159 develops small to intermediate size lesions. HR45 was tolerant to white mold caused by *Sclerotinia sclerotiorum* (Lib.) de Bary (1). Mold tolerance may be attributable to the upright plant type with a narrow canopy, the mold-resistant cultivar Ex Rico 23 (5) in its lineage, and HR45 has light green leaves and is slightly susceptible to ozone injury at Harrow, ON.

HR45 has a green hypocotyl, white flower color, light green leaves at maturity, and white seeds with dull seed coats similar to HR13-621. It has a semideterminate growth habit, a medium-maturing navy bean and its mean seed yield (1952 kg ha⁻¹) was 17% less than that of six recommended white bean cultivars in the Ontario Cooperative Dry Bean Cultivar trials in 1992. HR45 has a 100-seed weight of 19.1 g and the seeds have acceptable cooking and canning quality.

Small amounts of seed of HR45 may be obtained from the Agriculture Canada Research Station, Harrow, ON, Canada.

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References and Notes


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