Registration of Lesaf 414, an Early-Maturing Safflower Germplasm Line

An early-maturing safflower (Carthamus tinctorius L.) germplasm line, Lesaf 414 (Reg. no. GP-35, PI 603206) was developed at the Agriculture and Agri-Food Canada, Lethbridge, Alberta, Research Centre. Lesaf 414 is hereby being released to provide an opportunity for breeding and related research to combine into future cultivars the attributes of early maturity, good yield potential, good field resistance to head rot [caused by Sclerotinia sclerotiorum (Lib.) de Bary] and to damping-off [caused by Pythium sp. "group G", a form of P. ultimum Trow (1)], which was morphologically identified as such at the Biosystematics Centre in Ottawa by D.J.S. Barr and was identified using DNA mitochrondria at the University of Manitoba by G.R. Klassen and J. Buchko]. Lesaf 414 is also suitable as birdseed, due to its white achenes. Lesaf 414 was developed using the pedigree method from the cross Saffire/Oker, made in 1985, with the last single-plant selection made in the F4 generation. Bulked plants from the selected row were advanced to field tests in 1990. Multilocation field trials in the western Canadian prairies (Alberta, Saskatchewan, Manitoba) followed from 1991 to 1996. Lesaf 414 was compared with check cultivars, which included three Lethbridge-bred cultivars (Saffire, AC Stirling, and AC Sunset) (5,6) and S-208, a cultivar commercially grown in the USA, developed by SeedTec International, Woodland, CA. Comparisons were made among cultivars at sites which permitted expression of the relevant characters. Yield of Lesaf 414, at 2.67 t ha-1 averaged over three years at four Alberta and Saskatchewan sites, averaged 0.80 t ha-1 higher than S-208, 0.17 t ha-1 higher than Saffire, 0.16 t ha-1 higher than AC Sunset, and 0.12 t ha-1 higher than AC Stirling. Oil content, averaged over 13 trials, was 356 g kg-1 for Lesaf 414, compared with 322 g kg-1 for Saffire, 349 g kg-1 for both AC Stirling and AC Sunset, and 393 g kg-1 for S-208. Days to maturity averaged 127 for Lesaf 414 over 12 trials, compared with 125 for Saffire and AC Sunset, 128 for AC Stirling, and 133 for S-208. Results over three years of field evaluation showed that the incidence of sclerotinia head rot was 15% for Lesaf 414, compared with 8% for Saffire and AC Sunset and 32% for S-208. Lesaf 414 expresses the white achenes, early maturity, and sclerotinia head-rot resistance of Saffire (2,3) but with 34 g kg-1 higher oil and 0.17 t ha-1 higher yield than Saffire, traits derived from Oker, a Montana-bred high-oil and high-yielding striped-hull cultivar (4).

In 1997, a field trial was also conducted in a field naturally infested with P. ultimum Trow var. ultimum (7). Stand counts were carried out one (9 June) and three months (9 August) after seeding and adjusted for germination rate (all were >85 plants germinated per 100 seeded). Lesaf 414 stand counts were 100 and 91 plants, respectively, which is significantly (P < 0.05) higher than for S-208 (73 and 61 plants, respectively). Stands for the Lethbridge cultivars (Saffire, AC Stirling, and AC Sunset) did not differ significantly from those observed for Lesaf 414. The flower color of Lesaf 414 is yellow in early bloom and orange on the maturing head. The safflower breeding program at Lethbridge was terminated in 1997; however, seed of Lesaf 414 will be made available upon written request to R.C. Johnson (rcjohnson@wsu.edu), USDA-ARS Western Regional Plant Introduction Station, Box 646402, Washington State University, Pullman, WA 99164-6434. Appropriate recognition of the source of the development of this germplasm line (AAFC-LRC) shall be given in any contributions to research, germplasm enhancement, or variety development.

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