REGISTRATION OF GERMPLASM

Registration of Four Maintainer (HA 382 to HA 385) and Four Restorer (RHA 386 to RHA 389) Sunflower Germplasm Lines

Four oilseed sunflower (Helianthus annuus L.) maintainer germplasm lines, HA 382 (Reg. no. GP-189, PI 578871), HA 383 (Reg. no. GP-190, PI 578872), HA 384 (Reg. no. GP-191, PI 578873), and HA 385 (Reg. no. GP-192, PI 578874), and four oilseed sunflower restorer germplasm lines, RHA 386 (Reg. no. GP-193, PI 578008), RHA 387 (Reg. no. GP-194, PI 578009), RHA 388 (Reg. no. GP-195, PI 578010), and RHA 389 (Reg. no. GP-196, PI 578010), were developed and released by the USDA-ARS and the North Dakota Agricultural Experiment Station at Fargo, ND, in May 1992. These germplasm lines provide increased genetic diversity in agronomic, morphologic, and oil content characteristics for use in sunflower breeding and hybrid development programs.

HA 382 is an F5-derived F1 maintainer line selected from the cross HA 89/82 Rom. B-line Composite. HA 89 was released by the USDA and the Texas Agricultural Experiment Station in 1971. The 82 Rom. B-line Composite was obtained in 1982 through an Office of International Cooperation and Development (OICD) germplasm exchange with Romania. HA 383 is an F5-derived F1 maintainer line selected from the cross HA 300/CM 400. HA 300 (PI 552938) was released by the USDA-ARS and the North Dakota Agricultural Experiment Station in 1976. CM 400 (PI 552952) was released by Agriculture Canada, Research Station, Morden, MB, in 1978. HA 384 is an F5-derived F1 maintainer line selected from the cross HA 300/07657. 07657 is an inbred line developed in Romania for orobanchec (Orobanche cumana Wallr.) resistance and thin receptacle. 07657 was obtained in 1983 through an OICD germplasm exchange with Romania. HA 385 is an S5 fertility restorer line selected from Cycle 2 of a reciprocal full-sib selection program utilizing the Verticillium Wilt Resistant B-line Synthetic (VWRBS) (1). Lines HA 382 to HA 385 were converted to cytoplasmic male sterility (PET1 cytoplasm) (2) by the backcross method.

RHA 386 is an S6 fertility restorer line selected from the population 82 Rom. R-line Bulk, obtained through an OICD germplasm exchange program with Romania in 1982. RHA 387 is an F5-derived F1 fertility restorer line selected from the cross HA 274/83 Rom. R-line Bulk. HA 274 is a restorer line released by the USDA and the Texas and North Dakota Agricultural Experiment Stations in 1973. The 83 Rom. R-line Bulk was obtained through an OICD germplasm exchange program with Romania in 1983. RHA 388 is an F5-derived F1 fertility restorer line selected from the cross RHA 274/FELIX. FELIX is a hybrid from the Food and Agricultural Organization (FAO) Sunflower Subnetwork Hybrid Trial in 1984. RHA 389 is an S6 fertility restorer line selected from Cycle 3 of a reciprocal full-sib selection program utilizing the Downy Mildew Resistant R-line Synthetic (DMRRS) (1). RHA 386 to RHA 388 and HA 382 to HA 384 germplasm lines were developed utilizing the pedigree breeding method.

HA 382, HA 383, HA 384, and HA 385 are homozygous for resistance to verticillium wilt (caused by Verticillium dahliae Kleb.); and RHA 386, RHA 387, RHA 388, and RHA 389 are homozygous for resistance to Race 2 downy mildew (caused by Plasmopara halstedii (Farl.) Berl. & De Toni in Sacc.). RHA 386 to RHA 389 have upper stem branching conditioned by a recessive gene. RHA 386 to RHA 389 have genes for fertility restoration of the PET1 (2) cytoplasmic male sterility. Hybrids with the cytoplasmic male sterile lines of the four maintainer lines, HA 382 to HA 385, were produced by crossing with two restorer lines, RHA 274 and RHA 801. Hybrids with the four restorer lines were produced by crossing with three cytoplasmic male sterile (CMS) lines, cmsHA 89, cmsgHA 821, and cmsgHA 372. These hybrids were compared with the checks, hybrid 95 and cmsgHA 821/RHA 274, in 1990 and 1991 tests planted at Casselton, ND. Hybrids with the eight germplasm lines were equal or higher yielding than the hybrid checks averaged over the 2 yr of testing. Plant height of hybrids with HA 382 to HA 385 and RHA 386 to RHA 389 were 148, 163, 158, 160, 168, 165, and 170 cm, respectively, compared with 154 cm for hybrid 894 and 168 cm for hybrid cmsgHA 821/RHA 274. Days from planting to flowering R5.1 (3) of hybrids with the eight germplasm lines were 64, 64, 63, 63, 66, 65, and 66 d, respectively, compared with 65 d for hybrid 894. Days from planting to maturity R9.0 of hybrids with the eight germplasm lines were 101, 103, 102, 104, 103, 101, and 104 d, respectively, compared with 103 d for hybrid 894. Oil content of hybrid seed (dry weight basis) was 456, 464, 466, 467, 476, 478, and 484 g kg-1, respectively, compared with 456 g kg-1 for seed of hybrid 894 and 482 g kg-1 for seed of hybrid cmsgHA 821/RHA 274. HA 382 produced hybrids with earlier maturity and fast dry-down characteristics compared with the two check hybrids. HA 384 and RHA 389 had significantly higher oil content in hybrids than the check hybrids. Limited quantities of seed of each germplasm source are available from the Seedstocks Project, Crop and Weed Sciences Department, North Dakota State University, Fargo, ND 58105.

References and Notes


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Registration of H401-4-4-2 Birdsfoot Trefoil Germplasm Resistant to Sulfonyleurea

Birdsfoot trefoil (Lotus corniculatus L. cv. Leo) germplasm H401-4-4-2 (Reg. no. GP-136, PI 578075) was developed at McGill University, Macdonald Campus, as a source of resistance to the sulfonylurea (SU) herbicide thifensulfuron methyl [3-[[[4-methoxy-6-methyl-1,3,5-triazine-2-yl]amino]carbonyl]amino]sulfonyl]-2-thiophencarboxylate.

H401-4-4-2 is a field selection originating from in vitro herbicide exposure through a number of steps given in detail in Pofelis et al. (1). Briefly, 10 pieces of callus of Leo, weighing a total of 0.5 g per petri plate, were grown on Gamborg's B5 medium (B5M) and progressively tested on six selection media (10-3, 2.5 x 10-3, 5 x 10-3, 7.5 x 10-3, 2.5 x 10-2, 5 x 10-2).