REGISTRATION OF THREE SUNFLOWER HIGH-OIL NONRESTORER GERMPLASM POPULATIONS

The Departments of Breeding and Agriculture and Soil and Irrigation of the Agricultural Research Center, Cordoba, Spain, in cooperation have developed three sunflower (Helianthus annuus L.) random-mating B-line populations, PEM-S-R-88 (Reg. no. GP-120; PI 536623), B-Sin-82 (Reg. no GP-121; PI 536624), B-FSS-88 (Reg. no. GP-122; PI 536625) which were released in 1988. The populations were improved for seed yield through several cycles of recurrent selection, using dryland yield/irrigated yield and irrigated yield as main selection criteria. The populations are unbranched, without genes for restoration of the normal source of cytoplasmic male sterility, and have high oil content and high yield potential. The populations may be useful in breeding programs for either inbred line development or continued recurrent selection.

Population PEM-S-R-88 was derived from the open pollinated variety 'Pemir', which was developed by introducing resistance to downy mildew caused by Plasmopara halstedii (Farl.) Berl. & de Toni into the cultivar Peredovik and into one high-oil-content population derived from Peredovik. The initial population was formed after evaluation of 300 S_2 families under dryland conditions. One hundred families were selected for high oil content and wide variability in morphology and long cycle. Remnant S_2 seed of selected S_2 families was planted and used for recombination. Recombining was carried out by emasculating 10 plants of each S_2 family and pollinating with a mixture of pollen of all other selected families. An additional cycle of recombination was conducted under isolation cages with bees (Apis mellifera). Three cycles of recurrent selection involving progeny testing of S_2 lines for drought resistance were carried out, beginning in 1984. Three hundred S_2 families, obtained by selfing plants of the initial population, were tested in normal spring planting at one location under dryland and irrigated conditions. Remnant S_2 seed of the 40 best families, using dryland yield/irrigated yield and irrigated yield as main selection criteria, were intercrossed the same year in a summer nursery, following the procedure described above. Recombined populations were used to start a new cycle. The PEM-S-R-88 shows ample variability for plant characters such as height, maturity, and plant type, and has high oil content and downy mildew resistance.

The B-Sin-82 is a synthetic germplasm population with broad genetic base, formed in 1983 by intercrossing 29 high-oil lines (eight from USA, five from Canada, six from Spain, and 10 S_2 lines derived from USA and Spanish populations: Table 1). Five plants of each line were hand emasculated and pollinated with a mixture of pollen from all lines. Seed of emasculated plants was harvested, and equal amounts were bulked to form the initial population. About 1000 plants from the bulked seed were allowed to recombine in an isolation cage with bees. The B-Sin-82 is an unbranched, high-oil B-line population with high variability in maturity and in plant morphological characters.

The B-Sin-82 after three cycles of reciprocal full-sib selection for drought tolerance with the restorer population R-FSS-88, using breeding procedures described previously (1). An additional recombination cycle in B-FSS-88 using isolation cages with bees was carried out after the third selection cycle. The B-FSS-88 is an unbranched population with high oil content and without restorer genes. It is strongly heterogeneous for maturity, height, and plant type, and combines very well with the restorer population R-FSS-88 (1) developed simultaneously in the reciprocal full-sib selection program.

Limited seed quantities of each population are available for research and breeding purposes. Requests should be directed to Dr. J. Fernández-M., Institute of Agronomy and Protection, CSIC, Apartado 240, 14071 Córdoba, Spain.

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References and Notes

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REGISTRATION OF FIVE SUNFLOWER HIGH-OIL RESTORER GERMPLASM POPULATIONS

Five sunflower (Helianthus annuus L.) restorer populations R-Sin-82 (Reg. no. GP-123; PI 536626), R-FSS-88 (Reg. no. GP-124; PI 536627), R-CH-82 (Reg. no. GP-125; PI 536628), F-Yu-82 (Reg. no. GP-126; PI 536629), and R-CS-SE-82 (Reg. no. GP-127; PI 536630) were developed cooperatively by the Departments of Breeding and Agronomy and Soil and Irrigation of the Center of Agricultural Research of Córdoba, Spain, and released in 1988. The populations were selected for seed yield in the semiarid Mediterranean climate of Southern Spain, using dryland yield/irrigated yield and irrigated yield as main selection criteria. All populations are branched (recessive br gene), and have a high frequency of PI genes for resistance to downy mildew, causing Plasmopara halstedii (Farl.) Berl. & de Toni. Each has genes for restoration of cytoplasmic male sterility and male-sterile cytoplasm derived from H. petiolaris Nutt. The populations show wide variability for maturity, agronomic characters, and high oil content. They provide useful germplasm for development of restorer inbred lines or continued recurrent selection in breeding programs.

The R-Sin-82 was formed by combining 38 different entries, including 12 inbred lines from the USA, six from Canada, and 20 F_1 lines derived from different commercial hybrids from Spain, Yugoslavia, and Argentina (Table 1).