NOTICE OF RELEASE OF SEVEN RESTORER (SDR24 TO SDR30) OILSEED SUNFLOWER GERMPLASMS

The South Dakota Agricultural Experiment Station announces the release of seven oilseed sunflower (*Helianthus annuus* L.) restorer germplasms, SDR24 to SDR30. These germplasms have been selected for high oil yield in hybrid combinations and provide diversity for agronomic characteristics. They are available for use by industry and public researchers to create sunflower hybrids, parental lines, or germplasms.

SDR24 and SDR26 are $S_3$ and $S_6$-derived, respectively, fertility-restorer germplasm lines advanced by pedigree selection from SDHAR9-C1. SDHAR9 was initiated in 1986 by intermating several USDA public restorer and male-sterile lines, several Argentine varieties, the Donsky dwarf variety, various accessions from the USDA North Central Plant Introduction Station, SDHAR1-HO85 (a restorer population mass-selected for high oil content), and plants from open-pollinated seed harvested from a Sigco dwarf sunflower variety. After random-mating and one cycle of half-sib recurrent selection, $S_0$ plants from SDHAR9-C1 were self-pollinated in 1994. For SDR24, individual plants were selected in two more generations and selfed. Subsequent generations were handled in bulk. For SDR26, individual plants from SDHAR9-C1 were selected and selfed for six generations and then handled in bulk.

SDR25 and SDR28 are $S_6$-derived fertility-restorer lines advanced by pedigree selection from SDHAR1-HO85. SDHAR1-HO85 is a sunflower restorer population mass-selected for high oil content for three cycles. $S_0$ plants from SDHAR1-HO85 were self-pollinated in 1986. Individual plants were selected in five more generations and selfed. Subsequent generations were handled in bulk.

SDR27 is an $S_3$-derived restorer line advanced by pedigree selection from SD-Morgan, a sunflower restorer population developed by random-mating of plants grown from a bulk of open-pollinated seed from commercial sunflower hybrids entered into the SDSU performance trials in 1983, hybrids from the Morgan Co. of Argentina, and miscellaneous restorer populations. Individual plants from the base population were selfed in 1995. Individual plants were selected and selfed for two more generations. Subsequent generations were handled in bulk.

SDR29 is an $S_3$-derived fertility-restorer line advanced by pedigree selection from SDHAR11, a sunflower restorer population. SDHAR11 was formed in 1995 by intermating a large number of USDA public fertility-restorer, maintainer, and male-sterile lines that possess genes for resistance to several sunflower disease pathogens. The population was allowed to random-mate in isolation in 1996. $S_0$ plants from SDHAR11 were self-pollinated in 1997. Individual plants were selected in two more generations and selfed. Subsequent generations were handled in bulk.

SDR30 is an $S_6$-derived restorer line advanced by pedigree selection from SDHAR4-C0. SDHAR4 is a sunflower restorer population that originated from an unreleased restorer composite obtained from Murray Kinman when he closed his sunflower breeding program in Texas. The composite was allowed to random-mate in isolation in 1983 to form the base population, SDHAR4-C0. $S_0$ plants from SDHAR4-C0 were selfed in 1997. Individual plants were selected in five more generations and selfed. Subsequent generations were handled in bulk.
Plants of SDR24 to SDR30 were grown in the breeding nursery at Brookings, SD from 2003 to 2006. Averaged over 4 years, days to flower for SDR24, SDR25, SDR26, SDR27, SDR28, SDR29, and SDR30 was 73, 78, 69, 68, 73, 74, and 78 d, respectively, compared to 71 d for RHA 373. Plant heights averaged 146, 121, 142, 129, 126, 161, and 148 cm for SDR24 to SDR30, respectively, compared to 138 cm for RHA 373. SDR24 to SDR30 averaged 391, 498, 521, 487, 522, 470, and 496 g kg\(^{-1}\) oil, respectively, over 3 years, compared to 431 g kg\(^{-1}\) for RHA 373. SDR25, SDR26, SDR27, SDR28, SDR29, and SDR30 are homozygous for the recessive gene causing branching. SDR24 is single-headed. All seven of the germplasm lines are homozygous for the dominant fertility-restoration gene for PET1 cytoplasmic male sterility. All have traditional linoleic oil composition.

Hybrids with SDR24, SDR25, SDR26, SDR27, SDR28, SDR29, and SDR30 were produced by crossing with three cytoplasmic male sterile lines, cms HA404, cms HA406, and cms HA412. These hybrids were compared to the corresponding hybrids produced by crossing RHA 373, RHA 377, and RHA 409 with the same three male sterile lines. The hybrid testcrosses were evaluated at several environments in 2005 and 2006. A summary of the performance of the hybrids is presented in Table 1.

Averaged over the three male sterile testers in 10 trials, seed yield of hybrids with SDR24, SDR25, SDR26, SDR27, SDR28, SDR29, and SDR30 were 2150, 2279, 2218, 2150, 2111, 2101, and 2238 lbs/A, respectively, compared to a 1795 lbs/A average yield of the check hybrids. Oil content of hybrids with SDR24 to SDR30 averaged 427, 449, 445, 441, 450, 426, and 433 g kg\(^{-1}\), compared to a 435 g kg\(^{-1}\) average of the three checks. Days to flower of SDR24 to SDR30 hybrids averaged 67, 67, 66, 67, 65, 67, and 70 d, respectively, compared to 66 d for the average of the three check hybrids. Hybrids with SDR24, SDR25, SDR26, SDR27, SDR28, SDR29, and SDR30 averaged 162, 144, 155, 150, 145, 165, and 164 cm, respectively, plant height, compared to a 155 cm average height for the three checks.

Limited quantities of seed of SDR24 to SDR30 germplasms are available from the South Dakota Agricultural Experiment Station, Foundation Seed Stock Division, Box 2207A, South Dakota State University, Brookings, SD 57007, USA. There will be a charge for each seed lot to cover costs of seed production and distribution.

It is requested that appropriate recognition be given if these germplasms contribute to the development of a new breeding line or cultivar.

Dr. John D. Kirby, Director
South Dakota Agricultural Experiment Station

Date