

THE UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Washington, D.C.
And
THE NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION
NORTH DAKOTA STATE UNIVERSITY
Fargo, North Dakota

NOTICE OF RELEASE OF TWO MAINTAINER (HA 451, AND HA 452) AND THREE RESTORER (RHA 453 TO RHA 455) SCLEROTINIA-TOLERANT OILSEED SUNFLOWER GERMPASMS

The United States Department of Agriculture, Agricultural Research Service, and the North Dakota Agricultural Experiment Station, Fargo, ND announce the release of two maintainer (HA 451, and HA 452) and three restorer (RHA 453 to RHA 455) sunflower germplasms. These germplasms have been selected for their tolerance to *Sclerotinia* head rot [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary], a major sunflower disease, and provide diversity for agronomic characteristics, and oil quality. These germplasms are available for use by industry and public researchers to create hybrids, parental lines, or germplasms with increased tolerance to *Sclerotinia* head rot.

HA 451 is an F₆-derived F₇ maintainer line advanced by pedigree selection from the cross HA 411/Fuksinka 10. HA 411 (PI 603992) is a maintainer germplasm line released by USDA and the North Dakota Agricultural Experiment Station in 1995. Fuksinka 10 (Ames 3300) was obtained from Germany in 1985 and was tested for *Sclerotinia* head and stalk rot tolerance in 1992 to 1995 under natural infestation in selected fields in North Dakota and Minnesota. HA 452 is an F₆-derived F₇ maintainer line advanced by pedigree selection from the cross HA 335/HA412. HA 335 (PI 518773) is a maintainer germplasm line released by the USDA and the North Dakota Agricultural Experiment Station in 1987. HA 412 (PI 603993) is a maintainer germplasm line released by USDA and the North Dakota Agricultural Experiment Station in 1995. HA 452 has the *Pl₆* resistance gene for downy mildew [caused by *Plasmopara halstedii* (Farl.) Berl.& De Toni in Sacc.], imparting resistance to all known North American races. Height of HA 451 was 138 cm, compared with 123 for HA 411. Height of HA 452 was 140 cm, compared with 139 cm for HA 335. Days to flower for HA 451 was 68 d compared with 63 d for HA 411. Days to flower for HA 452 was 67 d compared with 63 d for HA 335. HA 451 and HA 452 are single-headed. *Sclerotinia* tolerance of these lines was evaluated through the use of testcross hybrids that were artificially inoculated under mist irrigation in 2003 and 2004 at the North Dakota Agricultural Experiment Station, Carrington Research and Extension Center, Carrington, ND. Percent infection of HA 451 and HA 452 in testcross hybrids was 12.5% and 23.0%, respectively, when compared with the check hybrids NK 278 (resistant) and SF270 (susceptible) which were 24.9% and 73.2% infected, respectively.

RHA 453 is an F₆-derived F₇ fertility restorer germplasm line advanced by pedigree selection from the cross RHA 344/Inedi. RHA 344 (PI 509054) is a high-oleic fertility restorer germplasm line released by the USDA and the North Dakota Agricultural Experiment Station in 1986. Inedi is a hybrid obtained through a germplasm exchange with Dr. Felicity Vear, Station d'Amelioration des Plantes, INRA, Clermont-Ferrand, France. RHA 454 is an F₆-derived F₇ fertility restorer germplasm line advanced by pedigree selection from the cross RHA 447//RHA440/PSC 8. RHA 447 is a high-oleic fertility restorer germplasm line released by the USDA and the North Dakota Agricultural Experiment Station in 2003. PSC 8 is a *Sclerotinia* head and stalk rot tolerant germplasm line obtained through a germplasm exchange with Dr. Felicity Vear, Station d'Amelioration des Plantes, INRA, Clermont-Ferrand, France. RHA 455 is an F₆-derived F₇ fertility restorer germplasm line advanced by pedigree selection from the cross RHA 440/HO IS R-line. HO IS R-line is a high-oleic fertility restorer line obtained through a germplasm exchange with Dr. Florin Stoenescu, Advanta

North America, West Fargo, North Dakota. Plants of RHA 453, RHA 454, and RHA 455 grown in the 2004 breeding nursery at Fargo, ND averaged 868, 824 and 864 g kg⁻¹ oleic acid, respectively, compared with 834 g kg⁻¹ for RHA 344. Height of RHA 453, RHA 454, and RHA 455 was 120, 145, and 128 cm, respectively, compared with 115 cm for RHA 440. Days to flower for RHA 453, RHA 454, and RHA 455 was 67, 67, and 66 d, respectively, compared with 70 d for RHA 440. RHA 439 and RHA 440 have fertility restoration factors for the PET1 cytoplasmic male sterility and have upper-stem branching conditioned by a recessive gene. Sclerotinia tolerance of these lines was evaluated through the use of testcross hybrids that were artificially inoculated under mist irrigation in 2003 and 2004. Percent infection of RHA 453, RHA 454, and RHA 455 in testcross hybrids was 22, 23, and 8%, respectively when compared with the check hybrids NK 278 (resistant) and SF 270 (susceptible) which were 24.9 and 73.2% infected, respectively.

Hybrids with the two maintainer lines, HA 451 and HA 452, were produced by crossing with RHA 373, and RHA 377. Hybrids with the restorer lines, RHA 453, RHA 454, and RHA 455, were produced by crossing two cytoplasmic male sterile lines, CMS HA 412 and CMS HA 434. These hybrids were compared with the commercial hybrids Pioneer 63M80, Interstate Hysun 525, and Mycogen 8377 in 2003 and 2004 trials planted at Casselton, ND, for agronomic evaluation. Yield of hybrids with HA 451, HA 452, RHA 453, RHA 454 and RHA 455 was 2371, 2577, 2402, 2577, and 2371 kg ha⁻¹, respectively, compared with a 2409 kg ha⁻¹ average of the three check hybrids. Oil content of hybrids with HA 451, HA 452, RHA 453, RHA 454, and RHA 455 was 431, 432, 441, 443, and 449 g kg⁻¹, respectively, compared with a 448 g kg⁻¹, average of the three check hybrids. Height of hybrids with HA 451, HA 452, RHA 453, RHA 454, and RHA 455 was 164, 166, 158, 162, and 172 cm, respectively, compared with a 166 cm average of the three check hybrids. Days to flower of hybrids with HA 451, HA 452, RHA 453, RHA 454, and RHA 455 was 77, 76, 76, 75, and 76 d, respectively, compared with a 74 d average of the three check hybrids.

Limited quantities of seed of each germplasm are available from the Seedstocks Project, Dept. of Plant Sciences, Loftsgard Hall, North Dakota State University, Fargo, ND 58105. Seed of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. U.S. Plant Variety Protection will not be requested for HA 451, HA 452, RHA 453, RHA 454, and RHA 455.

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