

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 THREE MAINTAINER (HA 444 TO HA 446) AND ONE RESTORER (RHA 447)
HIGH-OLEIC OILSEED SUNFLOWER GERMPLASMS

The United States Department of Agriculture, Agricultural Research Service, and the North Dakota Agricultural Experiment Station, North Dakota State University, announce the release of three maintainer (HA 444, HA 445, and HA 446) and one restorer (RHA 447) oilseed sunflower germplasms. These germplasms possess a high-oleic fatty acid composition and are available for use by industry and public researchers to create hybrids, parental lines, or improved germplasms with a mid-oleic (NuSun) or a high-oleic fatty acid composition.

HA 444 is an F₆-derived F₇ maintainer line selected from the cross HA 434/HA 406. HA 434 and HA 406 are maintainer lines released by USDA and the North Dakota Agricultural Experiment Station in 2001 and 1993, respectively. HA 445 is an F₅-derived F₆ maintainer line selected from the cross HA 434/87CAEB//HA 335/HA 434. 87CAEB is a short-statured line with excellent lodging resistance obtained through a germplasm exchange with W. Vermeulen, Oil and Protein Seed Centre, Potchefstroom, South Africa. HA 335 was released by USDA and the North Dakota Agricultural Experiment Station in 1987 and is resistant to downy mildew [caused by *Plasmopara halstedii* (Farl.) Berl. & De Toni in Sacc.] race Pla 730. HA 446 is an F₅-derived F₆ maintainer line selected from the cross HA 335/87CAEB//HA 434/HA 412. HA 412 was released by USDA and the North Dakota Agricultural Experiment Station in 1995. The pedigree breeding method was used to develop HA 444, HA 445, and HA 446. Analyses for oleic acid concentration were conducted on seed harvested from F₃ to F₆ plants by gas chromatography. The oleic acid concentration of HA 444, HA 445, and HA 446 was 83.6, 85.9, and 81.7%, respectively, compared with the oleic acid concentration of 86.1% for HA 434. Height of HA 444, HA 445, and HA 446 was 125, 113, and 108 cm, respectively, compared with 125 cm for HA 434. Days to flower of HA 444, HA 445, and HA 446 was 63, 65, and 66 d, respectively, compared with 63 d for HA 434. HA 445 and HA 446 are resistant to the downy mildew race 730, conferred by the *Pl⁶* gene derived from the line HA 335. These lines also provide protection against metalaxyl-insensitive strains of downy mildew collected from sunflower production fields in North Dakota in 1998.

RHA 447 is an F₇-derived F₈ restorer line selected from the cross RHA 377/RHA 348. RHA 377 and RHA 348 are restorer lines released by USDA and the North Dakota Agricultural Experiment Station in 1990 and 1986, respectively. The pedigree breeding method was used to develop RHA 447. Analyses for oleic acid concentration were conducted on seed harvested from F₃ to F₇ plants by gas chromatography. The oleic acid concentration of RHA 447 was 84.4%, compared with 82.1% for RHA 348. Height of RHA 447 was 115 cm, compared with 155 for RHA 348. Days to flower of RHA 447 was 65 d, compared with 63 d for RHA 348.

Hybrids with the cytoplasmic male-sterile equivalents of HA 444, HA 445, and HA 446 were produced by crossing with two restorer lines, RHA 373 and RHA 377. Hybrids with the restorer line RHA 447 were produced by crossing to two cytoplasmic male-sterile lines, CMS HA 412 and CMS HA 434. These hybrids were compared with the commercial hybrids Pioneer 63M80, Interstate Hysun 530, and Mycogen 8377 in 2000, 2001, and 2002 trials planted at Casselton, ND, for agronomic characteristics. In addition, tolerance to Sclerotinia head rot of RHA 447 testcross hybrids was evaluated by artificial inoculation under mist irrigation at the Carrington Research and Extension Center, Carrington, ND. Yield of hybrids with HA 444, HA 445, HA 446, and RHA 447 was 2212, 2075, 2223, and 2070 kg ha⁻¹, respectively, compared with a 2238 kg ha⁻¹ average of the three check hybrids. Oleic acid concentration of hybrids with HA 444, HA 445, HA 446, and RHA 447 was 55.8, 56.8, 55.3, and 59.4%, respectively, compared with a 59.0%

average of the three check hybrids. Oil content of hybrids with HA 444, HA 445, HA 446, and RHA 447 was 43.5, 45.0, 47.2, and 46.1%, respectively, compared with a 46.4% average of the three check hybrids. Height of hybrids with HA 444, HA 445, HA 446, and RHA 447 was 153, 165, 163, and 165 cm, respectively, compared with a 173 cm average of the three check hybrids. Days to flower of hybrids with HA 444, HA 445, HA 446, and RHA 447 was 67, 68, 71, and 67 d, respectively, compared with a 68 d average of the three check hybrids. Root lodging % of hybrids with HA 444, HA 445, HA 446, and RHA 447 in year 2002 was 22, 13, 12, and 27%, respectively, compared with a 34% average of the three check hybrids. Sclerotinia incidence averaged over 2000 to 2002 trials for hybrids with RHA 447 was 38%, compared with 88, 44, 71, and 30%, respectively, for the check hybrids Mycogen SF 270, Mycogen 8377, Pioneer 63M80, and Syngenta 278.

Limited quantities of seed of each germplasm are available from the Seedstocks Project, Department 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 444, HA 445, HA 446, or RHA 447.

The release date for these germplasms will be on the date of final signature. Appropriate recognition should be made if this material contributes to the development of a new breeding line or cultivar.

Director
North Dakota Agricultural Experiment Station
Fargo, ND

Date

Administrator
Agricultural Research Service
United States Department of Agriculture

Date