Registration of Three Maintainer
(HA 456, HA 457, and HA 412 HO) High-Oleic
Oilseed Sunflower Germplasms

Three maintainer oilseed sunflower (Helianthus annuus L.)
germplasms were developed and released by the USDA-ARS,
Fargo, ND, and the North Dakota Agricultural Experiment
Station, Fargo, ND, in 2005: HA 456 (Reg. no. GP-322, PI
642775), HA 457 (Reg. no. GP-323, PI 642776), and HA 412
HO (Reg. no. GP-324, PI 642777). These high-oleic germ-
plasms are available for use by industry and public researchers
to create hybrids, parental lines, or germplasms with a mid-
oleic (NuSun) (>550 and <700 g kg\(^{-1}\) oleic acid) or high-oleic
(>800 g kg\(^{-1}\) fatty acid concentration in the oil.

HA 456 is an F\(_3\)-derived F\(_4\) maintainer line advanced by
pedigree selection from the cross HA 434/S-16 YU. HA 434
(PI 633744) is a high-oleic maintainer germplasm line released by
USDA and the North Dakota Agricultural Experiment Station in 2001 (Miller et al., 2004). The S-16 YU breeding line was
obtained through a germplasm exchange with Dr. Dragan
Skoric, Institute of Field and Vegetable Crops, Novi Sad, Ser-
bia, in 1992, and had high yield and high oil content potential.

HA 457 is an F\(_3\)-derived F\(_4\) maintainer line advanced by
pedigree selection from the cross HA 434//HA 821/Dussol.
HA 821 (PI 599984) is a maintainer germplasm line released by
the USDA and the North Dakota Agricultural Experiment Station in 1983 (Roath et al., 1986). Dussol (Ames 22499) is a
short-statured maintainer line released by INRA, Clermont-
Ferrand, France, in 1995.

HA 412 HO is a BC\(_{1}\)F\(_3\) germplasm derived from the
pedigree HA 412*S/HA 434. The objective of this backcross
was to convert the traditional oil line (high-linoleic acid) HA
412 to a high-oleic acid line to be used to produce NuSun or
high-oleic hybrids with Sclerotinia [caused by Sclerotinia
sclerotiorum (Lib.) de Bary] head and stalk rot tolerance.
The recurrent parent, HA 412 (PI 603993), is a Sclerotinia
head and stalk rot tolerant line released by USDA and the
North Dakota Agricultural Experiment Station in 1995 (Miller
and Gulya, 1999).

Height of HA 456, HA 457, and HA 412 HO averaged 103,
78, and 122 cm, respectively, compared with 118 cm for HA
434 and 122 cm for HA 412 in the 2003 and 2004 breeding
nurseries at Fargo, ND. Days to flower for HA 456, HA 457,
and HA 412 HO averaged 67, 64, and 63 d, respectively,
compared with 65 d for HA 434 and 63 d for HA 412. Plants of HA
456, HA 457, and HA 412 HO averaged 838, 835, and 834 g
kg\(^{-1}\) oleic acid, respectively, compared with 847 g kg\(^{-1}\) for HA
434. HA 456, HA 457, and HA 412 HO are single-headed.

Hybrids with the cytoplasmic male-sterile equivalents of the
three maintainer lines, HA 456, HA 457, and HA 412 HO,
were produced by crossing with RHA 373 (PI 560191) and
RHA 377 (PI 560145). These hybrids were compared with three
NuSun 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 456, HA 457, and HA 412 HO was 2338, 2425, and
2473 kg ha\(^{-1}\), respectively, compared with a 2409 kg ha\(^{-1}\)
average of the three check hybrids. Oil content of hybrids with
HA 456, HA 457, and HA 412 HO was 433, 438, and 444 g
kg\(^{-1}\), respectively, compared with a 448 g kg\(^{-1}\) average of the
three check hybrids. Height of hybrids with HA 456, HA 457,
and HA 412 HO was 149, 151, and 173 cm, respectively,
compared with a 166 cm average of the three check hybrids.

Days to flower of hybrids with HA 456, HA 457, and HA
412 HO was 76, 75, and 73 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, Dep. of Plant Sciences, Loftsgard
Hall, North Dakota State University, Fargo, ND 58105. We
ask that appropriate recognition be made if these germplasm
lines contribute to the development of a new breeding line,
germplasm, or hybrid. U.S. Plant Variety Protection will not be
requested for HA 456, HA 457, and HA 412 HO.

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References

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