United States Department of Agriculture
Research, Education, and Economics
Agricultural Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Washington, D.C.

and

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION
North Dakota State University
Fargo, ND

NOTICE OF RELEASE OF 10 ALLOPLASMIC SUNFLOWER CYTOPLASM LINES FROM WILD HELIANTHUS SPECIES

The genetic base of the commercial sunflower crop is very narrow, based on a single female cytoplasm, PET1 used globally making it extremely vulnerable to attacks by abiotic and biotic stresses. Helianthus species, the crop wild relatives of sunflower, provide a readily available resource for broadening the genetic base of sunflower. The sunflower crop wild relatives are native to North America and are distributed over a large geographic area, therefore exposing them to a wide range of environmental conditions and disease organisms that coevolved with the crop. Annual and perennial crop wild relatives of sunflower can be used to develop unique genetic materials allowing breeders to incorporate additional genetic diversity into their breeding programs. In general, most cytoplasms of wild annual species can accommodate cultivated nuclear genes without drastic adverse interactions, and are potential sources of cytoplasmic diversity for sunflower breeding. In addition, these new alloplasmic cytoplasmic sources will provide a tool for studying cytoplasmic effect, as well as cytoplasmic nuclear interactions.

Ten diverse alloplasmic genetic stocks, AP NIV, AP PRA, AP PRA-380, AP NEG, and AP ANO originated from four wild annual Helianthus species, while AP MOL, AP MAX, AP GRO, AP DIV, and AP ANG originated from five perennial species. The pedigrees are: AP NIV (H. niveus/8*HA 89, F_2); AP PRA (H. praecox/8*HA 89, F_2); AP PRA-380 (H. praecox 380/8*HA 89, F_2); AP NEG (H. neglectus/8*HA 89, F_2); AP ANO (H. anomalus/8*HA 89, F_2); AP MOL (H. mollis/8*HA 89, F_4); AP MAX (H. maximiliani/8*HA89, F_4); AP GRO (H. grosseserratus/8*HA 89, F_4); AP DIV (H. divaricatus/8*HA 89, F_4); and AP ANG (H. angustifolius/8*HA 89, F_4).

Pedigrees of alloplasmic genetic stocks originating from four wild annual Helianthus species are: AP NIV (H. niveus/8*HA 89, F_2); AP PRA (H. praecox/8*HA 89, F_2); AP PRA-380 (H. praecox 380/8*HA 89, F_2); AP NEG (H. neglectus/8*HA 89, F_2); and AP ANO (H. anomalus/8*HA 89, F_2). AP NIV is single headed (SH), with plant height (PH) of 129 cm, flowers (DF) in 67 days after planting, matures (DM) in 110 days, head diameter (HD) 19 cm, 1000-seed weight (SW) 64 grams, oil percentage (OL) 46%, and seed black with gray stripes (BGS); AP PRA is SH, PH 127 cm, DF 68 days, DM 111 days, HD 19 cm, SW 57 grams, OL 46 %, and seed BGS; AP PRA-380 is SH, PH

128 cm, DF 68 days, DM 110 days, HD 21 cm, SW 58 grams, OL 46%, and seed BGS; AP NEG is SH, PH 123 cm, DF 66 days, DM 108 days, HD 20 cm, SW 57 grams, OL 47%, and seed BGS; and AP ANO is SH, PH 125 cm, DF 68 days, DM 109 days, HD 20 cm, SW 58 grams, OL 46 %, and seed BGS, respectively. The CMS HA 89 and HA 89 checks were SH, PH 129 and 126 cm, DF 66 and 67 days, DM 109 days, HD 19 and 20 cm, SW 54 and 57 grams, OL 49 and 47%, and seed BGS, respectively.

The pedigrees of alloplasmic genetic stocks originating from five perennial Helianthus species are: AP MOL (H. mollis/8*HA 89, F_4); AP MAX (H. maximiliani/8*HA89, F_4); AP GRO (H. grosseserratus/8*HA 89, F_4); AP DIV (H. divaricatus/8*HA 89, F_4); and AP ANG (H. angustifolius/8*HA 89, F_4). AP MOL is single headed (SH), with plant height (PH) of 128 cm, flowers (DF) 68 days after planting, matures (DM) in 110 days, head diameter (HD) of 17 cm, 1000-seed weight (SW) of 54 grams, oil percentage (OL) of 47%, and seed black with gray stripes (BGS); AP MAX is SH, PH 133 cm, DF 67 days, DM 108 days, HD 20 cm, SW 55 grams, OL 47%, and seed BGS; AP GRO is SH, PH 123 cm, DF 68 days, DM 109 days, HD 18 cm, SW 54 grams, OL 46%, and seed BGS; AP DIV is SH, PH 123 cm, DF 69 days, DM 107 days, HD 17 cm, SW 53 grams, OL 47%, and seed BGS; and AP ANG is SH, PH 122 cm, DF 69, DM 109 days, HD 17 cm, SW 52 grams, OL 45%, and seed BGS. Checks CMS HA 89 and HA 89 were SH, PH 129 and 126 cm, DF 66 and 67 days, DM 109 days, HD 19 and 20 cm, SW 54 and 57 grams, OL 49 and 47%, and seed BGS, respectively. The CMS HA 89 and HA 89 checks were SH, PH 129 and 126 cm, DF 66 and 67 days, DM 109 days, HD 19 and 20 cm, SW 54 and 57 grams, OL 49 and 47%, and seed BGS, respectively.

Alloplasmic genetic stocks AP NIV, AP PRA, AP PRA-380, AP NEG, AP ANO, AP MOL, AP MAX, AP GRO, AP DIV, and AP ANG will be maintained by the USDA-ARS, Fargo, North Dakota with small quantities of seed of each genetic stock available from the North Dakota Foundation Seed Stocks Project, NDSU Dept. 7670, P.O. 6050, Fargo, ND 58108-6050. Seed of these releases will be deposited in the National Plant Germplasm System, where it will be available for research purposes. U.S. Plant Variety Protection will not be requested for AP NIV, AP PRA, AP PRA-380, AP NEG, AP ANO, AP MOL, AP MAX, AP GRO, AP DIV, and AP ANG.

ARS GIVES NO WARRANTIES OR GUARANTEES, EXPRESSED OR IMPLIED, FOR THE MATERIAL, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signatures:

Vice President for Agricultural Affairs
North Dakota State University

7/5/16
Date

Deputy Administrator, Crop Production and Protection
Agricultural Research Service, U.S. Department of Agriculture

8/9/16
Date