USDA
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 CMS TUB1-HA 89 AND RF TUB1-ANG, OIL SUNFLOWER

The genetic base of the commercial sunflower crop is very narrow, based on a single male-sterile Helianthus petiolaris cytoplasm, PET1, and few fertility restoration genes 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 genetic base of sunflower. The sunflower crop wild relatives are native to North America and distributed over a large geographic area, therefore exposing them to a wide range of environmental conditions and disease organisms that coevolved with the crop. New cytoplasms and complementary restoration genes from crop wild relatives will provide unique sources of genetic variation for breeders to incorporate additional genetic diversity into elite populations and parental lines allowing sunflower to better withstand biotic and abiotic stresses.

The CMS 514A H. tuberosus line was obtained through a scientific exchange with China in 2003. The line has a cultivated background and is maintained by crossing with inbred line HA 89. Fertility restoration of CMS 514A was first observed in F1 progeny after crossing with an interspecific amphiploid, AMP H. angustifolius/P21. All F1s had 2n=51 chromosome numbers and were backcrossed with HA 89 twice followed by self-pollination. Male-fertile progeny with fertility restoration from the BC1F4 with 2n=34 chromosomes were designated as RF TUB1-ANG and named Rf6, specific for CMS 514A.

CMS TUB1-HA 89 is a cytoplasmic male-sterile BC2 bulk of CMS 514A crossed with HA 89 three times, with a pedigree of CMS 514A/3*HA 89, BC2F1. The line is single headed, plant height of 155 cm, flowers 77 days after planting, head diameter of 17.6 cm, 1000-seed weight of 66.7 grams, open-pollinated seed set of 86 percent, and the majority of seed white with black stripes, and some black with white stripes. In comparison, CMS HA 89 is single headed, plant height of 124 cm, 74 days to flowering, 20 cm head diameter, 63 grams 1000-seed weight, 86 percent open-pollinated seed set, and seed black with white stripes.

Office of the Administrator
Jamie L. Whitten Federal Building, Room 302-A
1400 Independence Avenue, SW.
Washington, D.C. 20250

Rf TUB1-ANG is an F4 bulk homozygous for the Rf6 fertility restoration gene for CMS TUB1-HA 89, with the pedigree of CMS 514A/AMP H. angustifolius/P21//HA 821/3/HA 89, F4. This line is predominantly branched, plant height of 83 cm, flowers 69 days after planting, diameter of 8.8 cm, 1000-seed weight of 39 grams, open-pollinated seed set of 56 percent, and black seed with white stripes. In comparison, HA 89 is single headed, plant height of 124 cm, 74 days to flowering, 18.8 cm head diameter, 71 grams 1000-seed weight, 89 percent open-pollinated seed set, and black seed with white stripes.

CMS TUB1-HA 89 and Rf TUB1-ANG genetic stocks 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 CMS TUB1-HA 89 and Rf TUB1-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

12/2/16
Date

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

12/15/16
Date