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

and

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION
North Dakota State University
Fargo, ND 58108

# NOTICE OF RELEASE OF OILSEED SUNFLOWER GENETIC STOCKS HOLS1, HOLS2, HOLS3, AND HOLS4

The United States Department of Agriculture, Agricultural Research Service, and the North Dakota Agricultural Experiment Station, Fargo, ND, announce the release of four oilseed sunflower germplasms in April 2015. These genetic stocks have been developed to provide diversity for fatty acid composition in the seed oil, specifically elevated oleic acid levels above current high oleic inbred lines while also reducing the saturated fatty acid composition of the seed oil. The recurrent parent of the genetic stocks has resistance to Sclerotinia head rot [caused by Sclerotinia sclerotiorum (Lib.) de Bary], one of the most devastating diseases in sunflower production, and resistance to imidazolinone herbicides. The genetic stocks are available for use by industry and public researchers to create parental lines or germplasms.

Germplasm Pedigree Descriptions:
HOLS1 is a BC3F3-derived BC3F4 maintainer genetic stock selected from the cross HA 466/4/HA 466/3/RS1/HA 466//HA 466. HOLS1 contains genes for high oleic acid and low saturated fatty acids in the seed oil (35 ± 1g kg-1 palmitic acid, 30 ± 1 g kg-1stearic acid, 18 ± 1 g kg-1 C20 to C24 saturated fats, and 897 ± 2 g kg-1 percent oleic acid in 2013 nursery trials). RS1 (PI 616494) is a genetic stock with low saturated fatty acids and high linoleic acid in the seed oil. HA 466 (PI 667183) is a Sclerotinia head rot resistant, imidazolinone herbicide tolerant germplasm released by the USDA and the North Dakota Agricultural Experiment Station in 2006.

HOLS2 is a BC3F3-derived BC3F4 maintainer genetic stock selected from the cross HA 466/4/HA 466/3/RS3/HA 466//HA 466. HOLS2 contains genes for high oleic acid and low saturated fatty acids in the seed oil (27 ± 1 g kg-1 palmitic acid, 28 ± 3 g kg-1 stearic acid, 16 ± 1 g kg-1 C20 to C24 saturated fats, and 895 ± 9 g kg-1 oleic acid in 2013 nursery trials). RS3 (PI 642702) is a genetic stock with low saturated fatty acids and high linoleic acid in the seed oil.

HOLS3 is a BC3F3-derived BC3F4 maintainer genetic stock selected from the cross HA 466/4/HA 466/3/RS5/HA 466//HA 466. HOLS3 contains genes for high oleic acid and low saturated fatty acids in the seed oil (36 ± 1 g kg-1 palmitic acid, 25 ± 1 g kg-1 stearic acid, 14 ± 1 g kg-1 C20 to C24 saturated fats, and 897 ± 4 g kg-1 oleic acid in 2013 nursery trials). RS5 (PI 660979) is a genetic stock with low saturated fatty acids and high linoleic acid in the seed oil.

HOLS4 is a F7-derived F8 maintainer genetic stock selected from the cross HA 466/PI 170414 + PI372259 bulk. PI 170414 is a landrace germplasm collected in Gelibolu, Canakkale, Turkey, and PI 372259 is a derivative of VNIIMK 6540, developed in the former Soviet Union. Both plant introductions were selected for their resistance to lepidopteran insect pests of sunflower, although resistance has never been confirmed in HOLS4. This genetic stock contains genes for high oleic and low saturated fats: 29 ± 1 g kg-1 palmitic acid, 15 ± 1 g kg-1 stearic acid, 10 ± 1g kg-1 C20 to C24 saturated fats, and 896 ± 4 g kg-1 oleic acid in 2013 nursery trials.

The recurrent parent HA 466 had fatty acid concentrations of 39 ± 2 g kg-1 palmitic acid, 36 ± 2 g kg-1 stearic acid, 19 ± 1 g kg-1 C20 to C24 saturated fats, and 859 ± 10 g kg-1 oleic acid, by way of comparison.

Fatty acid evaluations: Our evaluation methods take into consideration the fact that the pollen parent contributes to the genetics of seed fatty acids. We implemented the backcross and pedigree methods with single seed selection for fatty acid content. Partial seed sampling, in which 1/3 of the cotyledonary portion of the seed was harvested and subjected to fatty acid analysis on a gas chromatograph, was conducted on BC1F2 and BC3F2 seeds in order to make efficient progress in determining plants with low saturated and high oleic fatty acids. In all other generations, a 20 seed sample from each plant head was subjected to gas chromatography in order to monitor progress and make selections.

Availability: Small quantities of seed of each germplasm will be available from the North Dakota Foundation Seed Stocks Project, NDSU Dept. 7670, P.O. Box 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 HOLS1, HOLS2, HOLS3, or HOLS4.

It is requested that appropriate recognition be made if these genetic stocks contribute to the development of a new germplasm, breeding line, or cultivar. These genetic stocks were developed with support from the National Sclerotinia Initiative, USDA-ARS.

Signature:

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North Dakota State University

6/18/15
Date

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Deputy Administrator, Crop Production and Protection
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6/25/15
Date