

Hard Winter Wheat Regional Nurseries

The Hard Winter Wheat Regional Nursery Program is coordinated by USDA-ARS employees stationed at Lincoln, NE. The hard winter wheat region consists of those states, mostly in the Great Plains, where hard (both red and white) wheat is grown. It extends from Texas and New Mexico in the south, to Montana in the north, and is roughly bordered on the west by the Continental Divide, and on the east by the Mississippi River. The Hard Winter Wheat Regional Nursery Program was established in 1931. It is a cooperative organization, involving federal, state and private members. Federal members primarily are employees of the USDA-ARS; state members generally work at land grant universities in the region. Regional nurseries were established to foster testing of advanced breeding lines in diverse environments, to characterize disease response and quality characteristics of wheat cultivars before they are released for production, to facilitate exchange of germplasm, and to allow the evaluation of potential new cultivars by states lacking wheat breeding programs. The nursery program operates under an "Evaluation Only" Material Transfer Agreement (see below), signed by all participants. Seed of all entries remains legal property of the originating institutions. The USDA-ARS does not distribute seed to third parties, without written permission of the legal owners. Current coordinators of the Hard Winter Wheat Performance Nurseries R. Graybosch (oversight), S. Masterson (data analysis and reporting) and L. Divis (seed distribution) USDA-ARS, University of Nebraska, Lincoln, Nebraska, <https://www.ars.usda.gov/plains-area/lincoln-ne/>.

The nursery program includes the Southern Regional Performance Nursery (SRPN), the Northern Regional Performance Nursery (NRPN) and the Regional Germplasm Observation Nursery (RGON). The SRPN and NRPN are replicated yield trials. Each is limited to 50 entries per year. The SRPN is grown at 30+ locations, with sites in Texas, Oklahoma, Kansas, Colorado, Nebraska, and South Dakota,. The NRPN is grown at 15+ locations, situated in Nebraska, Minnesota, South Dakota, North Dakota, and Alberta, Canada. Entries are submitted as nominees to the Regional Coordinator. Entries generally are advanced breeding lines being considered for possible release as cultivars. Entries are derived from cooperating public and private breeding programs. Entries typically are not released cultivars, and may only be entered in a trial for two years. Each trial contains long-term check cultivars. Check cultivars are used to assess long-term improvements in grain yield, quality, etc. Seed of entries is sent from each cooperating breeding program to the Regional Coordinator. Typically, four to six entries are submitted per program. The Regional Coordinator then distributes seed of all entries to all cooperating locations for planting of replicated yield trials. Subsequent to harvest, cooperators return data on grain yield, test (volume) weight, plant height, lodging, and, at times, field response to disease infections, to the Regional Coordinator. Additional, location-specific data is accumulated, either due to local expertise, or as a result of opportunistic events. Seed of entries also is distributed to additional USDA-ARS locations for further evaluations. These include response to leaf and stem rusts (Cereal Disease Laboratory, St. Paul, MN), reactions to Hessian Fly (Plant Science and Entomology Group, Manhattan, KS). Programs at state universities provide data on acid soil tolerance, leaf rust and virus resistance (Oklahoma State University), field leaf rust reactions (Texas A&M University). After harvest, the USDA-ARS Grain Marketing and Production laboratory in Manhattan, KS, receives grain samples from all replicated yield sites. Complete end-use quality analyses, including milling and baking surveys, are conducted.

The Regional Germplasm Observation Nursery (RGON) is composed of entries at earlier stages of development, generally those just beginning to be entered in multilocation trials within their states of origin. Each cooperating breeding program may submit up to 30 entries. Entries are evaluated for

winter-hardiness and reactions to various biotic (fungal and insect pathogens and pests) and abiotic (drought, winter hardiness) stresses.

Each year, the Regional Coordinator summarizes the results of the various nursery trials in report form. Region-wide and statewide means are provided, and environmental stability is analyzed. The USDA-ARS Grain Marketing and Production Lab produce a separate report, summarizing quality traits. Reports are posted at the regional web page: <https://www.ars.usda.gov/plains-area/lincolne/wheat-sorghum-and-forage-research/docs/hard-winter-wheat-regional-nursery-program/research/>. As of 2010, only Excel® versions are posted. These reports are intended to provide information and results associated with the Hard Winter Wheat Performance Nursery Program, conducted in cooperation with State Agricultural Experiment Stations, USDA-Agricultural Research Service, and private companies involved in wheat improvement. Reports contain preliminary data on experimental wheat lines and primarily are intended for use by cooperators and those with special interest in wheat improvement efforts. **Data included herein are not intended for publication and should not be used in literature citations, nor publicity or advertising. Use of the data may be granted for certain purposes upon written request to the appropriate agency.**

For information on the Regional Material Transfer Agreement, contact:
Technology Transfer
USDA-ARS-Plains Area
<https://www.ars.usda.gov/plains-area/docs/technology-transfer/>

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