**UNITED STATES DEPARTMENT OF AGRICULTURE**

**AGRICULTURAL RESEARCH SERVICE**

**In cooperation with**

**STATE AGRICULTURAL EXPERIMENT STATIONS**

**Report on Hard Red Spring Wheat Varieties Grown in Cooperative Plot and**

**Nursery Experiments in the Spring Wheat Region in 2022**

Nursery Coordinator:

Sarah Blecha

USDA-ARS

Report prepared by: S. Blecha and J. Neyhart

This is a joint progress report of cooperative investigations underway in the State Agricultural Experiment Stations and the Agricultural Research Service of the U.S. Department of Agriculture. It contains preliminary data which have not been sufficiently confirmed to justify general release, and interpretations may be modified after additional experimentation. Confirmed results will be published through established channels. This report is primarily a tool for use by cooperators and their official staffs, and for those persons having direct and special interest in the development of agricultural research programs.

This report includes data furnished by the State Agricultural Experiment Stations as well as by the Agricultural Research Service of the U.S. Department of Agriculture. This report is not intended for publication and should not be referred to in literature citations, nor quoted in publicity or advertising. Accuracy of information within this report is not guaranteed by the U.S. Government.

Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

USDA is an equal opportunity provider and employer.

Agricultural Research Service

U.S. Department of Agriculture

Midwest Area

St. Paul, Minnesota

January 30, 2023

**2022 HARD RED SPRING WHEAT UNIFORM REGIONAL NURSERY REPORT**

**CONTENTS PAGE**

Cooperating Agencies, Stations and Personnel 2

Policy for Protected or Patented Genes 3

2022 Spring Wheat Production Statistics 4

Description and Summary of 2022 HRSWURN 5

Figure 1. Geographic Locations of 2022 HRSWURN 6

Table 1. List of Entries in the 2022 HRSWURN 7

Table 2. Nursery Locations and Comparative Plot Management Data 8

Tables 3-16. Nursery Data by Individual Location 9-22

Table 17. Summary of Trait Means Across Locations 23

Table 18. Yield Rankings by Location 24

Table 19. Seedling Leaf Rust Reactions, St. Paul, MN 25

Table 20. Seedling and Field Stem Rust Reactions, St. Paul, MN 26-27

Table 21. Fusarium Head Blight (Scab) Reactions, St. Paul, MN 28

Table 22. Fusarium Head Blight (Scab) Reactions, Crookston, MN 29

Table 23. Bacterial Leaf Streak Nursery, Prosper, ND 30

Table 24. Molecular Marker Data for Agronomic Trait/Disease Resistance Genes 31-33

**COOPERATING AGENCIES, STATIONS, AND PERSONNEL FOR THE 2022 HRSWURN**

USDA-AGRICULTURAL RESEARCH SERVICE

National Program Leader J. Costa

Midwest Area Director A. Pantoja

Nursery Coordinator, Plant Science Research Unit, St. Paul, MN S. Blecha

Quality Investigations, Cereal Crops Research Unit, Fargo, ND L. Dykes

Molecular Marker Analysis, Cereal Crops Research Unit, Fargo, ND R. Nandety

J. Fiedler

Disease Evaluations

Cereal Disease Laboratory, St. Paul, MN J. Kolmer

Y. Jin

MINNESOTA AGRICULTURAL EXPERIMENT STATION

St. Paul, University of Minnesota J. Anderson

Morris, West Central Experiment Station C. Reese

Crookston, Northwestern Experiment Station M. Leiseth

NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Fargo, North Dakota State University A. Green

J. Underdahl

Hettinger Research Extension Center J. Rickertsen

Langdon Research Extension Center B. Hanson

Williston Research Extension Center G. Pradhan

Carrington Research Extension Center M. Ostlie

SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Brookings, South Dakota State University K. Glover

MONTANA AGRICULTURAL EXPERIMENT STATION

Bozeman, Montana State University J. Cook

H.-Y. Heo

**Entering Lines with Protected or Patented Genes into the Hard Red Spring Wheat Uniform Regional Nursery**

Transgenic wheat lines may be considered for the nursery program ONLY if they have been granted permanent non-regulated status. Non-regulated status is granted only after the originator files a formal petition to de-regulate a line with APHIS. However, ultimately the decision whether to include or exclude such germplasm will reside with individual location cooperators.

**U.S. SPRING WHEAT PRODUCTION, 2022**

***SPRING WHEAT (OTHER THAN DURUM)*: Growers produced an estimated 482 million bushels of spring wheat. This production estimate is 45.7 percent higher than year 2021 production. Yield averaged 46.2 bushels per acre, an increase of 13.6 bushels per acre from year 2021. Acres harvested totaled 10.4 million acres, which is approximately 2.8 percent higher than the acreage harvested in 2021.**

**Spring Wheat Production Statistics, 2020-2022\***

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Acres Harvested (x1000) | | |  | Production (x1000 Bushels) | | |  | Yield (Bushels/Acre) | | |
|  | 2020 | 2021 | 2022 |  | 2020 | 2021 | 2022 |  | 2020 | 2021 | 2022 |
| Minnesota | 1,360 | 1,160 | 1,210 |  | 72,080 | 55,680 | 73,810 |  | 53 | 48 | 61 |
| Montana | 3,310 | 2,180 | 2,440 |  | 125,780 | 37,060 | 61,000 |  | 38 | 17 | 25 |
| North Dakota | 5,630 | 5,210 | 5,260 |  | 275,870 | 174,535 | 263,000 |  | 49 | 33.5 | 50 |
| South Dakota | 755 | 580 | 700 |  | 35,485 | 16,820 | 33,600 |  | 47 | 29 | 48 |
| USA | 12,095 | 10,155 | 10,440 |  | 587,505 | 330,850 | 482,190 |  | 48.6 | 32.6 | 46.2 |

\* Source: National Agricultural Statistics Service: (https://quickstats.nass.usda.gov) as of 1-3-23.

**2022 NURSERY DESCRIPTION AND SUMMARY**

The Hard Red Spring Wheat Uniform Regional Nursery (HRSWURN) was planted for the 92nd year in 2022. The nursery contained 21 entries submitted by 5 different scientific or industry breeding programs, and 6 checks (Table 1). Trials were conducted as randomized complete blocks with three replicates except where noted. The HRSWURN was planted at 14 locations in 4 different states in the USA (MN, ND, SD, MT). All fourteen locations provided data included in this report (Figure 1, Table 2). Data summaries for each of the reporting locations are presented in individual tables. Overall means across locations for a set of core traits are summarized in Table 17, and yield rankings for individual locations are found in Table 18. Entries were also evaluated for various diseases at different locations; these can be found by looking at individual location data summaries. Leaf rust and stem rust resistance was evaluated in St. Paul, MN. These results are presented in Tables 19-20. Entries were evaluated for Fusarium head blight at St. Paul and Crookston, MN; these results are provided in Tables 21 and 22, respectively. For the first time, entries were inoculated and evaluated for bacterial leaf streak at Prosper, ND; these results are provided in Table 23. Molecular marker genotyping for select agronomic, quality and disease resistance traits was also performed; this information is presented in Table 24. The highest average yielding location was Crookston, MN, with 84.1 Bu/Ac, while the lowest yielding location was Williston, ND, with 30.2 Bu/Ac.

**Figure 1. Hard Red Spring Wheat Uniform Regional Performance Nursery Locations, 2022**

