

Research Proposal for the Oklahoma Wheat Research Foundation and Oklahoma Wheat Commission 04/07/17

TITLE: *Small Grains Variety Testing*

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COOPERATORS:

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- Brett Carver, Wheat Breeder, Department of Plant and Soil Sciences, OSU, Stillwater
- Tracy Beedy, Area Research and Extension Agronomist for the Panhandle region, OSU, Goodwell, OK
- Various farmer-cooperators throughout the state of Oklahoma

FUNDING HISTORY: The Oklahoma wheat variety trials have been supported by the Oklahoma Wheat Research Foundation and the Oklahoma Wheat Commission for many years. The variety trials were supported at \$45,000 in 2016-2017, and we are requesting a similar amount in 2017-2018. The requested amount is reflective of the continued reduction in state funding for technical support and increased labor costs associated with proposed changes to overtime rules.

ABSTRACT: An ever-changing list of wheat varieties available to Oklahoma wheat producers necessitates evaluation and comparison of hard red and hard white winter wheat varieties currently being sold. To address this need, *this project is designed to evaluate yield potential and quality characteristics of approximately 20 commercially released wheat cultivars and 2-4 candidate cultivars at approximately 16 locations throughout Oklahoma.* In addition, we will evaluate 40 – 50 cultivars and experimental lines at five regional test sites to ensure that our statewide tests are filled with the best-adapted cultivars. Data to be collected include grain yield under dual-purpose and grain-only production systems, forage yield, resistance to disease, response to fungicide application, adaptability to no-till production systems, high- temperature sensitivity to germination, plant height, first hollow stem date, and heading date. Data will be collected and distributed through Extension publications, oral presentations, and web-based communication outlets.

OBJECTIVES: The primary objective of this research is to provide farmers, Extension personnel, seedsmen, and consultants the necessary information to make well-informed decisions as to what variety will work best at a particular location. To achieve this primary objective, we propose the following sub-objectives:

1. Evaluate 40 – 50 cultivars and experimental lines at five regional test sites to select varieties for entry into county-level trials the following year.
2. Compare and contrast the grain yield and test weight of approximately 20 commercially released varieties and 2 to 4 candidate cultivars at approximately 16 locations throughout

Oklahoma.

3. Evaluate disease incidence and severity at any of the locations where disease pressure is high enough to differentiate among varieties.
4. Determine fall forage production at 2 or more locations.
5. Compare and contrast variety responses to foliar fungicide application at the Lahoma and Apache locations.
6. Evaluate varieties under intensive management practices at the Chickasha location
7. Evaluate other variety characteristics such as grain protein, high-temperature germination sensitivity, first hollow stem date, plant height, and heading date at select locations.
8. Provide approximately 30 demonstration strip seed sets (10-15 varieties each) for county Extension personnel.
9. Disseminate information through print and web-based media outlets.

PROCEDURES:

Hierarchy of trials

1. **Regional trials:** The OSU Regional Wheat Variety Performance Tests consist of the fall forage yield test and four regional grain yield test sites. The entry fee charged all companies (including OGI) is \$500 per eligible variety per year and covers all five regional test sites. Entries to individual sites will be accepted, but the entry fee will not be prorated. Experimental lines from the OSU Wheat Breeding Program, OSU-developed varieties without licensing agreements, and other varieties of historical or regional importance may be entered free of charge at the discretion of the OSU Small Grains Extension Program. Trial sites are subject to change, but general locations are as follows:
 - Forage trial – Stillwater, OK
 - Southcentral – Chickasha, OK
 - Southwest – Altus, OK
 - Northcentral – Lahoma, OK
 - Northwest – Goodwell, OK
2. **County trials:** The top ten yielding commercially released varieties at each regional grain yield trial will be included in OSU county-level replicated variety trials within the associated region for one production season following the regional trial. Additional years of testing, additional varieties, and experimental lines will be included at the discretion of the OSU Small Grains Extension Specialist. There is no entry fee for county-level trials, but seed (20 lbs per region or 60 lbs for all regions) must be supplied according to the same deadlines and guidelines as the regional trials.

- 3. Non-replicated demonstration sites:** Top-performing varieties statewide may be invited to be included in approximately 30 non-replicated demonstration sites. These tests are planted by County Extension Educators in conjunction with farmer cooperators and are not generally harvested for yield. If invited, 300 lbs. of seed are required for these tests, and special arrangements will be made for shipment of seed.

Eligibility

All hard winter wheat varieties with acceptable milling and baking characteristics that are offered for sale as a certified class of seed in the state of Oklahoma and promising experimental lines will be eligible, space providing. Acceptance into the variety testing program does not constitute endorsement or recommendation by Oklahoma State University.

Planting procedures and sites: Locations are selected to represent as wide of an array of environments as possible and to reflect the distribution of harvested wheat acres within the state. Approximately one third of the trials will be planted with the anticipation that they will be a graze plus grain production system (i.e., dual-purpose). These locations will be sown at a 120 lb/ac seeding rate as opposed to the 60 lb/ac rate used in grain-only trials. Locations where forage measurements are to be taken will have an “extra” set (4 replications) of variety plots that will be planted for the sole purpose of forage sampling, and plots from which grain is to be harvested will be grazed as normal. So, grain yield data from all dual-purpose locations accurately represent a true dual-purpose system.

TIMELINES: Management of the variety trials is a year-round enterprise. Plots will be planted in September and October, and data will be collected throughout the growing season. Forage measurements will be collected, published, and distributed by April 2018.

Near real-time posting of variety trial data to the OSU Small Grains Website has been extremely well received, and this practice will continue in 2018. We anticipate posting yield data for variety trial locations within four days of harvest. Printed materials will be available within a few weeks after completion of harvest.

Data for high-temperature sensitivity to germination is obtained from seed saved from the Stillwater demonstration strip; therefore these data are not completed in the first year but will be published soon thereafter. Annual renewal of this project is proposed.

Locations

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| 1. Afton | 10. Chickasha Intensive | 18. Lahoma Fungicide |
| 2. Altus | Management | 19. Lamont |
| 3. Alva | 11. Goodwell Irrigated | 20. Marshall |
| 4. Apache | 12. Homestead | 21. Marshall Grazed |
| 5. Apache Fungicide | 13. Hooker | 22. Stillwater |
| 6. Balko | 14. Kingfisher | 23. Thomas |
| 7. Buffalo | 15. Keys | 24. Union City |
| 8. Cherokee | 16. Kildare | 25. Walters |
| 9. Chickasha | 17. Lahoma | |

JUSTIFICATION: Data from the Oklahoma wheat variety trials are extremely important to producers and are the most requested data by producers. Through a cooperative agreement with High Plains Journal, these data are distributed to approximately 8,000 subscribers in the state of Oklahoma. The Oklahoma Wheat Commission and Oklahoma Wheat Research Foundation are recognized as the primary granting agencies on the cover of these publications.

Published survey data indicated that variety trials are the most influential decision-making tool used by producers in deciding which varieties to plant. These data represent an unbiased source of information to help growers make better-informed decisions and are generally the only source of variety data for the dual-purpose production system. In addition, two of the variety trial locations are used by the OSU wheat breeding program to evaluate elite germplasm that may be nearing release. The inclusion of fungicide trials and tillage comparisons provide data that are publishable in refereed scientific publications.

REPORT OF ACCOMPLISHMENTS: We collected data at 2010 wheat field days on the impact of the OSU small grains variety testing program. Field day attendees represented over 1.7 million acres and placed an average value of \$21.46 per acre on the information they received. This equated to a \$37 million in perceived value by producers from a \$30,000 investment in the small grains variety testing program by the OWC and OWRF. This and other impact statistics were published in two tri-fold leaflets: L-342 *Impact of the OSU Wheat Variety Testing Program* and L-343 *Impact of the OSU Small Grains Extension Program*.

Wheat variety trial results were posted on the small grains extension website (www.wheat.okstate.edu) within a few days of harvest, which allowed producers in each region to access data much more quickly than in previous years. The information on the small grains extension site was accessed over 20,000 times in 2016 or about one page view every 25 minutes.

The print version of the small grains variety performance tests was published in late July and distributed to over 8,000 High Plains Journal subscribers in Oklahoma. The Oklahoma Wheat Research Foundation and Oklahoma Wheat Commission were both recognized on the cover of this publication, which helped Oklahoma wheat farmers see the value of their checkoff investment.

BUDGET: Services and supplies reflect the purchase price of materials as well as repair and maintenance on equipment. Travel is a significant budget item and is reflective of the geographic dispersal of our 21 test site locations. Wages are for student labor and provide agronomy students with hands on experience in wheat production that will be used once they graduate.

Wages	12,000
Services, supplies, & equipment	13,000
Travel	<u>20,000</u>
Total	\$45,000

RELATION TO OTHER RESEARCH: The funding provided by the OWRF and OWC for this program is used as a base to secure nationally competitive grants. Most recently, we applied for a USDA CARE grant to evaluate the use of cereal rye as a cover crop in our Oklahoma agro-ecosystem which is already dominated by a cereal cash crop. Without the small grains Extension base supported by the wheat variety-testing program, successfully securing these grants makes it much more difficult.

Finally, the support of undergraduate labor in this project provides learning opportunities and support for tomorrow's consultants and scientists. Having well-trained individuals in industry positions is becoming more and more important and student training funded by this project will help ensure qualified individuals are available.

SIGNATURE PAGE

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Proposed funding level: \$45,000

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