

Performance of Small Grain Varieties in Louisiana, 2003-04

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INTRODUCTION

Small grain variety trials are conducted annually by scientists of the Louisiana Agricultural Experiment Station (LAES) to evaluate grain yield, agronomic performance, and disease reaction of varieties and advanced lines. The trials are conducted at seven LAES research stations representative of the major soil and climate regions of the state (map). Entries are included in the trials based upon previous performance or at the request of the originating agency. Inclusion of an entry in the trials does not constitute an endorsement by the LAES. The 2004 statewide wheat performance trials included 72 varieties and experimental lines. This is the largest number of entries ever tested.

Data from these trials are used by a committee of scientists from the Louisiana Cooperative Extension Service (LCES) and the LAES to make variety recommendations published by the LCES. Recommendations are based on the relative performance of an entry for three years on a regional basis, to offset the interaction of variety performance with environmental variations that occur across years and locations. Louisiana is divided into Northern and Southern regions for the purpose of variety recommendations. New entries in the statewide trials are tested at all locations, but may be dropped from a region if they do not show potential in that area. South Louisiana consists of the Baton Rouge, Crowley, and Jeanerette locations; whereas North Louisiana consists of locations at Alexandria, Bossier City, St. Joseph, and Winnsboro. When choosing varieties, growers should consult their local LCES agents and the variety should be chosen from those recommended and promising varieties for a given region (north or south Louisiana). Growers should also consider specific data from the LAES variety trial location that most closely match the weather and soil conditions of their farm and should avoid growing a single variety on a large acreage. Growing several varieties will help ensure that the entire crop is not severely damaged by chance occurrences in weather or by shifts in pathogen races or virulence patterns. Yield, test weight, maturity, and disease resistance are important traits to consider when selecting varieties. If a grower plans to plant wheat early, he should avoid varieties that have a very early heading date to reduce the danger of freeze damage.

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6 Research Associate, and Professor. Iberia Research Station, Jeanerette.

Specific management and cultural practices for a location are presented at the bottom of the tables, along with unusual or key observations about that test. The oat variety trial was grown at Baton Rouge, Bossier City, and Winnsboro. Rainfall and temperature information for each location is presented in Figure 1. All plots were seeded at the recommended rate with seed provided by the originating agency or company (Table 1).

Characters Evaluated and Statistics Reported:

Data were collected on grain yield, test weight, heading and maturity dates, plant height, lodging, and disease reaction, as appropriate at each location. Grain yield was adjusted to 13% moisture. **Least significant differences (LSD's)** are reported at the 10% probability level. An LSD of 10% probability ($\alpha=0.10$) is the level of difference in a trait that occurs between two varieties once in every 10 comparisons as a result of random chance due to greater soil fertility, better drainage, slightly greater harvest length, or any other "uncontrollable or unmeasurable factors," even if the varieties had the same genetic yield potential. If the LSD (0.10) for yield in a trial is 7.0 bu/a, there is a 10% chance that two varieties with a reported yield difference of 7.0 bu/acre are genetically equal and a 90% probability they have differences in genetic potential in that particular environment. LSD values are influenced by the degree of precision that soil fertility, stand establishment, plot length, harvest efficiency, and other variables of the trials are controlled, and by the number of replications of each variety or treatment. The letters '**ns**' are used in the text and tables to indicate lack of significance (**not significantly different**) at the 10% probability level. Correlations are sometimes given to indicate the degree to which two traits, such as rust rating and yield, are related. A correlation between rust rating and yield of $r = -1.0$ would indicate that for every unit increase in rust there was a proportional decrease in yield.

Wheat leaf rust (*Puccinia triticina*) and oat crown rust (*Puccinia coronata*) are reported as percentage of the upper three leaves affected by the disease. Two replications are evaluated for leaf rust, between flowering and the early dough stage of kernel development. Wheat and oat stem rust (*Puccinia graminis*) are reported on a scale of 0-9, where a 0 indicates no disease and a 9 indicates that the plant was killed by the disease. Stem rust is normally rated somewhat later than leaf rust.

Bacterial streak (*Xanthomonas campestris* pv. *translucens*), Septoria leaf (*Mycosphaerella graminicola*) and glume blotch (*Leptosphaeria nodorum*) are rated on a scale of 0 to 9 during the dough stage of development. A rating of 1 indicates that no disease was present, while a 9 indicates very severe disease. The upper few leaves, heads, and stems below the head are the portions rated for these two diseases. Since bacterial streak (black chaff) is not controlled by fungicides, it is important that the disease be distinguished from septoria blotch. Heading day is given as calendar day (day of year). Lodging is rated on a 0-9 scale, where a 0 indicates that all plants were completely upright.

| Traits and Rating Scales for LAES Wheat and Oat Performance Trials. | | |
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| Trait | Abbreviation | Description |
| Yield | Yield | Grain yield in bushels per acre adjusted to 13% moisture. |
| Test weight | Test wt | Volume weight of grain in pounds per bushel |
| Heading day | Head day | Day of calendar year (days after December 31) until 50% heading. |
| Plant height | Ht | Plant height in inches. |
| Lodging rating | Lod | Lodging rated on a scale of 0 - 9, where a 0 indicates no lodging and a 9 indicates complete lodging (all plants flat). |
| Leaf rust | Leaf rust | Percent of upper two leaves affected by leaf rust, rated during grain fill. This rating is generally taken during soft to mid-dough, but varies somewhat by location and variety. |
| Stripe rust | Stripe rust | Severity of disease on upper two leaves affected by stripe rust, rated during grain fill on a scale of 0 - 9, where 0 indicates no disease |
| Septoria | Sept | Septoria leaf & glume blotch rated on a scale of 0 - 9, where 0 indicates no disease and 9 indicates severe disease on the flag leaf and head. |
| Bacterial Streak | Bact | Bacterial streak (black chaff) rated on a scale of 0 - 9, where 0 indicates no disease and 9 indicates severe disease on the flag leaf and head. |
| Powdery mildew | Powd mild | Powdery mildew rating on a scale of 0 - 9, where 0 indicates no disease. Rated in early to mid spring. |
| Phenotype | Phe | Phenotypic rating, an overall visual rating prior to harvest. 0=excellent, 9=poor. This rating is a visual rating of 'eye-appeal'. |

Growing Conditions and General Comments for 2003-2004:

The early fall was generally dry (Figure 1a - 1f) but heavy rains fell in mid-November. Very heavy rains occurred in February and again in May, with a dry period from early March through mid April. This dry period occurred during flag leaf to early grain fill and reduced disease pressure. The wheat trials at Crowley and Baton Rouge were lost to severe lodging and pre-harvest sprouting that resulted from torrential rains that occurred in mid-May. Tests at Alexandria and St. Joseph were lost to RoundUp herbicide drift.