

Production of Cereal Cultivars, Corn Sunflower, Safflower and Miscellaneous Minor and New Crops in Southwestern North Dakota

New crop cultivars and advanced experimentals from public and private agencies must be evaluated for their economic merit and usefulness in processed products as compared to varieties now grown. The North Dakota Agricultural Experiment Station is obligated to obtain information and make recommendations based on unbiased data and interpretations which the producer may use to choose cultivars for farm production. This project collects the necessary information on comparative performance of cultivars of cereals in southwestern North Dakota (1) to assist in evaluation of unnamed cultivars for possible release to North Dakota farmers; (2) to provide grain for quality analysis; and, (3) to provide production recommendations of varieties released by both public and private sources.

The project includes three separate experimental categories for cereal cultivars, including (1) regional nursery trials to evaluate advanced experimental genotypes of cereal grains; (2) comparison trials of named cereal cultivars and advanced experimentals in the final testing stages preparatory to release as named varieties; and, (3) off-station testing of newly released varieties from both public and private sources.

Regional Nursery Trials

Each year the regional nursery testing is done by agronomists in the U.S. and Canada cooperating with regional project leaders in North Dakota, South Dakota, Montana and Minnesota. Nurseries presently under test include:

The Uniform Regional Hard Red Spring Wheat Nursery

The Uniform Regional Durum Nursery

The Elite Hard Red Winter Wheat Nursery

The Intermediate Hard Red Winter Wheat Nursery

The Western Spring Barley Nursery

The Western Dryland Barley Nursery
The Advanced Two Row Barley Nursery
The Early Oat Nursery
The Midseason Oat Nursery

Variety Comparison Trials

This project provided much of the early yield, quality and agronomic evaluation of crop varieties in North Dakota. Each year this project evaluates approximately 40 or more hard red spring wheat (Triticum aestivum L.), 25 to 30 durum wheat (Triticum turgidum L.), 10 to 15 oat (Avena sativa L.), 10 to 15 six-rowed barley (Hordeum vulgare L.) 10 to 15 two-rowed barley (Hordeum distichon L.) 8 to 12 winter wheat (Triticum aestivum L.) And 6 to 10 winter rye (Secale cereale L.) cultivars. Genotypes evaluated include both named cultivars and experimental lines from NDSU, and other public and private breeding programs in the United States and Canada. Evaluations are used to make varietal recommendations. The grain produced from the hard red spring wheat, durum wheat and both two and six rowed barley plots is important because it is used in quality evaluations. Quality evaluations of experimental lines are compared to cultivars now grown by producers. The quality and agronomic performance of a genotype at various locations are the major bases for the recommended release of that line as a named variety or its removal from consideration for further testing. Data from this project in part determine which cultivars of these major crops will be released by the experiment station for commercial production. Experimental lines from other state universities and private plant breeding companies also are evaluated for quality. Although data from this project are not instrumental in the eventual release or rejection of private varieties they provide information on genotype and agronomic characteristics prior to release and assist in making cultivar recommendations.

Off Station Testing

The principal objective of off-station trials is to provide a wider base for interpretation of yield data as it relates to varied soil types and growing conditions over the 14 counties of the Missouri Slope area. While the soils at the Dickinson Branch Station are representative of a large percent of those of southwestern North Dakota they are not representative of all soil types being used for crop production in the region. Five different soil types are represented in the off-station trials. Local climatic differences also influence crop growth response. Data from these trials are

combined with data from the off-station trials of the Hettinger Branch Station to provide a diverse test of crop performance at eleven locations in southwestern North Dakota.

Demonstration Plots

The same field plots used for yield and quality evaluations also serve as demonstration plots. This allows producers and scientists to observe the varieties and experimental lines of cereal crops grown in comparison trials for reaction to disease and insect pests.

Corn and Sunflower

Corn and Sunflower are major crops in southwestern North Dakota. Corn acreage in the three southwestern crop reporting districts increased from 166,000 acres in 1980 to 207,000 acres in 1984, and averaged 194,500 acres for that five year period. Average annual value of the corn crop in these districts for this period was \$21,750,000.00.

Sunflower acreage has increased from 160,000 acres in 1980 to 460,000 acres in 1984 and has averaged 307,600 acres annually in the three southwestern Districts during that five year period.

The average annual value of the sunflower crop in those districts has been slightly over \$32,000,000.00.

Modern production technology demands new types of hybrids of both corn and sunflower which will withstand high plant densities, be adapted for narrow row spacing, use fertilizers effectively, be adapted to combine harvesting and be capable of economical seed production.

New hybrids of both crops are being developed by private seed companies and are evaluated for adaption to southwestern North Dakota growing conditions. Production practices are also evaluated.

Farmers of this area use the data collected from these trials to decide which hybrids to grow.

Miscellaneous Minor and New Crops

Safflower, sorghum, proso millet, buckwheat and dry beans are minor crops in southwestern North Dakota. Agronomic evaluation of new varieties and experimental lines of these and other miscellaneous crops is needed. Producers and potential processors require information on these crops to assist in making management decisions. New and improved production techniques for use by producers need to be discovered and their impact determined.

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