

The average yield per acre for these comparisons were as follows:

#217 - 9.612 Tons Commercial - 8.199 Tons 1.4 Tons in favor #217

Sugar Content:

#217 - 15.40% Commercial - 14.66% .74% in favor #217

Sugar per Acre

#217 - 2959 Lbs. Commercial - 2431 Lbs. 528 lbs. in favor #217

Leaf spot infestation was from medium to severe throughout our territory last season. Number 217 proved to be just what the name implies, blight resistant, but not immune to this disease of sugar beets. It showed resistant qualities when the disease became prevalent and made a quicker recovery than other varieties where the crop was hard hit. These field trials aroused considerable interest among our beet growers and we already have many requests for this seed for the next crop. We plan on planting about 200 acres of this variety for 1938 and now we are interested in seeing how #217 yields in comparison with other varieties in a season when there is no leaf blight.

THE MINNESOTA SYSTEM FOR TESTING AND RECOMMENDING VARIETIES*

F. R. Immer

Division of Agronomy and Plant Genetics, University of Minnesota

Testing of varieties of grain or of corn hybrids is carried on at the central experiment station located at University Farm, St. Paul, and in cooperation with the branch experiment stations in southeast, west central, northwest, north central, and northeast Minnesota. In some cases, particularly with corn, tests are arranged on farmers' fields located in strategic regions of the state. The plan is to test over as wide an area of the state as the varieties would seem to be adapted to.

A uniform yield test of promising new strains of spring wheat and standard varieties, entered by the different states in the hard red spring wheat area, is conducted in 20 places in the 7 states cooperating in spring wheat improvement. Such tests furnish advance information on new strains which seem most promising in adjoining states as well as information on regional adaptation both between and within states. A representative of the U.S. Dept. of Agriculture acts as the coordinator in these uniform yield trials of spring wheat.

The decision to recommend a new variety for distribution to the farmers rests with the annual conference of workers from the Divisions of Agronomy & Plant Genetics and of Plant Pathology & Botany, the cereal technologists (in the case of wheat), and the agronomists of the branch experiment

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stations. To this conference is presented all available information regarding the new variety and the vote of this conference alone can recommend its release and distribution. No variety of grain or corn hybrid can be recommended for release to the farmers of Minnesota until it has been tested for a minimum of three years and in several places in the state. This same annual conference draws up a recommended list of varieties with their characteristics and specifies in which regions of the state they are to be recommended for growing.

After a new variety of grain has been recommended for distribution to the farmers the seed supply is increased at the central and branch experiment stations. The seed is then sold to the farmers, at a fair price for pure seed. When the demand for the new variety is great the seed is distributed under the Approved Grower Plan. Under this plan the experiment station decides how much seed shall be allocated to each county. The distribution within the counties is then placed in the hands of a committee of five, consisting of the county agent, the state extension agronomist, and three farmers appointed by the president of the Minnesota Crop Improvement Association.

The central and branch experiment stations maintain stocks of pure seed of all the recommended varieties. These are for sale as foundation seed stocks for growers interested in producing registered seed.

The present plan for the distribution and control of the seed of corn hybrids calls for the initial increase and control of the inbred lines under the revolving fund of the Division of Agronomy & Plant Genetics and in cooperation with the Minnesota Crop Improvement Association. It is the intention to produce sufficient seed of the first crosses (used in the production of 3-way and double crosses), to supply the needs of the growers, these increases being made under the direction of the certification official of the Crop Improvement Association. This official is furnished by the University and is in charge of seed distribution at University Farm. Seed of the F_1 crosses is sold to the growers who are interested in producing seed of the double crosses or 3-way crosses.

The testing program for the small grains involves preliminary yield tests in replicated rod row tests. Except during the first year, when insufficient seed compels the use of single rod row plots, plots of 3 rod rows are used and only the central row harvested. Three replicates are used, usually, and the tests conducted at two or three branch experiment stations in the state after the first year as well as at the central station located at University Farm. The total number of replications in all tests in a given year is usually twelve.

Studies on reaction to diseases are made in a special disease garden, under epidemic conditions, at University Farm, in cooperation with the Division of Plant Pathology. These studies are conducted both during the segregating generations as an aid in selection and during the period that purified hybrids are grown in yield trials. Wheat is tested for resistance to stem rust, leaf rust, black chaff, bunt, loose smut, scab and stripe. Oats is tested under epidemics of stem rust, crown rust and the smuts. Barley is tested for resistance to stem rust, loose smut, scab and stripe. Flax is tested for resistance to rust and wilt.

After one to three years in rod rows, usually three, the most promis-

ing strains are placed in 1/40 acre plots replicated three times at three to six places in the state. Yield tests are conducted for a period of three years before a new variety can be recommended for distribution to the farmers.

Milling and baking tests are made on the most promising wheat varieties in cooperation with the Division of Agricultural Biochemistry. In the future promising new varieties of barley will be tested for malting quality in cooperation with the malting barley laboratory located at Madison, Wisconsin. The oil percentage and iodine number of varieties and hybrids of flax is determined by a commercial linseed oil company in Minneapolis.

In the breeding of corn hybrids the most promising inbred lines are top crossed to an adapted commercial variety and the general combining ability of the inbreds determined from such top cross tests. Such tests are made in replicated yield trials using three or four replications in each of several places in the state, usually having ten or twelve replications in all. The inbred lines which have the best combining ability are selected from this test and crossed in all combinations to provide F_1 crosses. These are in turn tested in the same type of experiments as the top crosses with about the same number of replications. From the yield data on the F_1 crosses it is possible to predict with fair accuracy which F_1 crosses should be combined to produce double crosses.

Double crosses are made in such a way that the predicted yield is the greatest. These double crosses are then tested in about ten or twelve replications, as a total of several places in the state, for a three year period. The poorest crosses are discarded after the first or second year of test. Notes on diseases and agronomic characters are taken in all of the above corn yield trials. Data on smut reaction is taken under smut epidemic conditions.

In the rod row tests with small grains and in the corn tests of top crosses, F_1 crosses and the initial double crosses tests the number of strains to be tested is relatively large. For such yield trials the two dimensional quasi-factorial design is to be employed for future experiments. In the 1/40 acre plot trials with small grains and the advanced double cross tests where the number of strains to be tested does not, usually, exceed twenty the ordinary randomized block methods are used.

RELATIONSHIP OF SEED BALL SIZE TO GERMINATION AS
FOUND TO BE COMMON TO BEET SEED GROWN OVER THE
ST. GEORGE AREAS

F. S. Ingalls, Utah-Idaho Sugar Company

In discussing relative germination as between standard seed and small seed fractions, we will deal with relative germination values established between the standard seed and small seed resulting from process during periods the various types of seed were cleaned. We shall consider the standard seed and the small seed associated with a particular standard in two series— Series "A" to be representative of the higher germinating lots of standard seed from each type considered, and the "B" Series representative of the lower