

Mimeographed Circular M-273

February , 1956

BROOMCORN TESTS IN GARVIN COUNTY

Progress Report

1954 and 1955

By

**John B. Sieglinger
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Departments of Agronomy and Plant Pathology

The tests of broomcorn started in 1952 in Garvin County were continued. (See mimeograph circular M-248). The tests in 1954 and 1955 consisted of variety trials on good Washita bottom land that produced broomcorn the preceding year.

The 1954 season was so drouthy that the later varieties of broomcorn failed to mature good seed. Also no disease developed. In 1955, for the first time since these tests have been conducted, there was a showing of the disease and selection for disease resistance was possible.

1954 Variety Trials

In 1954, 45 varieties and selections of broomcorn were planted April 20, on Mr. J. M. Brown's farm east of Lindsay. The land used was in broomcorn in 1953 and the planting was duplicated with Arasan treated seed. Most of the seed used was from bagged (selfed) heads grown in the 1953 test.

The varieties and selections of broomcorn in 1954 were: 2 Black Spanish; 3 Standard Evergreen; Okaw; Foreign Standard; 2 Dwarf (Fultip, Rennels); 3 tall selections from the Woodward breeding project; 13 F₃ selections from a cross of Foreign Standard and Dwarf Tan; 17 F₂ selections from two crosses; and three F₁ crosses.

Comparable stands were obtained and heads were bagged for seed on July 9. Further bagging was planned for later but July was so dry that the later varieties and selections did not produce good brush or seed and much of the late material was eliminated in 1954. The bagged seed heads were harvested August 10. Because of the severe drouth no disease developed in the 1954 broomcorn test.

1955 Variety Trials

Thirty varieties and selections of broomcorn were planted April 15 on soil that produced broomcorn in 1954.

The planting was in duplicate and the second replication was with Arasan treated seed. The rate of planting was approximately 8 seeds per foot (130 per rod).

Of the 30 varieties and selections used, 7 were fixed true-breeding standard broomcorns, 7 were F₄ generation selections, 10 were F₃ selections, 3 were selections from an F₂ progeny, and 3 were from F₁ seed. The F₂ and F₁ seed was grown at Perkins in 1954 and the 24 lots of F₃, F₄, and fixed selections and varieties were from heads bagged at Lindsay in 1954.

On July 5, heads were bagged for seed and at that time disease was showing in 9 of the 30 broomcorns. By July 27, when the seed heads were harvested, effects of the disease were definite and selection for resistance to the disease was possible.

Under the conditions of the 1955 test at Lindsay, severe lodging occurred in Black Spanish, an Evergreen Standard, Foreign Standard, and Standard selection, Woodward 149, California Golden and an Evergreen Standard were less than 50% down, and Okaw was standing 100%. Of the 7 F₅ selections from the cross of Foreign Standard and Dwarf Tan, one was down as badly as Black Spanish, one selection was standing 100%, and the other five varied in their resistance to lodging. Of the 10 F₄ selections from a cross of Dwarf Tan broomcorn and a broomcorn derivative from a chinese sorghum (Kaoliang), 9 were standing 100% and one had less than 5% down plants. The 3 F₃ selections and 3 F₂ progenies were segregating for disease reaction and selfed heads from standing plants were obtained for further selection.

Studies On the Cause Of The Disease

During the 1954 and 1955 seasons, tests were made at the Perkins Agronomy Farm which definitely established that there are two different fungi involved in the broomcorn stalk rot disease. These two organisms attack broomcorn at different times. The first to appear is one called Colletotrichum graminicolum, which also is called anthracnose. In the Perkins area infections began to occur early in July and continued through early August. This disease organism causes severe stalk rotting and will cause Black Spanish and many other varieties of broomcorn to lodge 100%. It does not cause any discoloration, or other evidence of disease; in fact, the stalks simply look like they matured and dried up.

The second organism to attack broomcorn starts about the first week in August at Perkins and continues to attack on into September. This fungus is called Sclerotium bataticola and is the one which causes the charcoal rot disease. Attacks by this fungus are not so severe as the stalk rot caused by anthracnose, and several broomcorn strains, notably Okaw, appear to be quite resistant.

Sufficient progress has been made in the study of these organisms so that artificial epidemics can now be established in the plots at Lindsay where the main variety and hybrid tests have been planted.