

2005 Final Report Corn and Grain Sorghum Research and Promotion Board

Title: Impact of management practices and disease resistance on the incidence and severity of diseases of corn and grain sorghum.

Investigator: D. O. TeBeest, Department of Plant Pathology, University of Arkansas, Fayetteville

Cooperators: D. Dombek, UA-F Variety Testing Program, Fayetteville

J. Kelley and R. Cartwright, UA Cooperative Extension Service, Little Rock

Objectives:

1. Survey and identify the important diseases of corn and grain sorghum
2. Screen potentially useful hybrids for resistance to the important diseases
3. Determine the effect of rotations, fungicides and irrigation methods on development and severity of diseases.

Results:

1. Surveys.

Surveys indicate that anthracnose is by all standards the most important pathogen of grain sorghum in Arkansas. New isolates of the anthracnose fungus and several other pathogens were obtained for race determinations and for future reference.

2 Screening hybrids for Resistance to Anthracnose.

Grain Sorghum: Thirty grain sorghum hybrids were screened for resistance to anthracnose, blight, charcoal rot, gray leaf spot, zonate leaf spot, head blight and stem rot. Resistance to these pathogens has been identified within these 30 hybrids to each of these diseases. However, the level of resistance in any one hybrid is not consistent across the state due to the presence of important new and old races of these pathogens. Only Cargill 888Y was resistant to all known races of Anthracnose in Arkansas. Information on the new races of anthracnose and the findings on 888Y has been given to grain sorghum breeders. The new races of anthracnose attacked all hybrids except Cargill 888Y and we have taken steps to contain these races.

Corn: Twenty six corn hybrids were grown in replicated field tests at Rohwer, Pine Tree and Marianna. The incidence of corn diseases was very low in these tests in 2005. However, comparison of the data from these tests with the tests conducted by J. Kelley indicated clearly that rust was more severe in late planted corn. Future tests will be planted later in order to increase the incidence and severity of disease to evaluate hybrids.

3. Controlling diseases with rotation and affects on yields.

Rotations of grain sorghum and corn followed sorghum, corn, rice and soybeans were studied at Pine Tree while rotations of corn and grain sorghum following sorghum and corn were tested at Marianna. The incidence of disease in grain sorghum increased sharply, and yields decreased in many hybrids when following grain sorghum. Preliminary evidence suggested slight increases in yields when grain sorghum followed soybeans. Corn diseases were in low incidence in 2005, but previous information suggests planting behind corn increases disease incidence.

4. Locations: Tests were conducted and supported by assistance of personnel at Rohwer, Marianna, Pine Tree and Fayetteville. Rotation studies will be conducted at Rohwer in 2006 in addition to the other locations in order to take advantage of the races present at the location and management practices at this station..

5. Yields: An overall goal of this project on diseases of corn and grain sorghum was to identify diseases, hybrids and management practices that increase yields. We set 10,000 pounds per acre as a goal when state yields were averaging less than 5000 lb/A. In 2005, four separate entries at Rohwer produced more than 10,000 lb/acre after combine harvesting while another 14 entries produced between 9000 and 10,000 lb/A.

6. Information Sharing. We have already or will provide summaries of these results to the University of Arkansas Extension Service for* Handbooks * Fact Sheets, and * other means on 1) resistance of corn to rust,2) resistance of sorghum to anthracnose, effects of rotations on diseases of both crops, important sorghum anthracnose haplotypes in the state, effects of fungicides. In addition, a paper was presented at the Annual Meeting of the American Phytopathological Society in Austin, TX and posters were presented at Field Days in Stuttgart, Pine Tree and Rohwer in 2005. Station managers have also been informed of the results. Four research papers have been prepared for publication, one has been accepted and has been published.