CORN and GRAIN SORGHUM PROMOTION BOARD
2004 Annual Summary Report

TITLE: Impact of selected management practices and disease resistance on the incidence and severity of diseases of corn and sorghum (emphasis on sorghum anthracnose and corn rusts).

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CROP: Corn and Sorghum

Highlights from work conducted in 2003 and 2004.

Research activities.

1. Corn and sorghum plots containing the top 15 production hybrids of each crop were planted and monitored for specific diseases at Fayetteville, Rohwer, Marianna and Pine Tree.
2. Sorghum treatments consisted of all hybrids in blocks as controls, inoculated with anthracnose and fungicide treated. Corn treatments consisted of blocks inoculated with an aflatoxin producing fungus and field controls.
3. Two locations (Fayetteville and Rohwer) were overhead irrigated, while two were furrow irrigated.
4. Rust was the predominant disease on corn at all locations in 2003 and 2004; it was more severe at Rohwer than at Pine Tree or Marianna. Specific hybrids were more susceptible than other hybrids in all locations but all hybrids were rated as susceptible or moderately susceptible to southern rust.
5. Anthracnose and zonate leaf spot were the most severe diseases on grain sorghum at all locations. Fungicide (Quadris) appeared to reduce the severity of anthracnose, zonate leaf spot and head molds at all locations.
6. On-site investigations of sorghum fields were investigated and confirmed to be anthracnose. Epidemics were occurring on hybrids previously considered to be resistant or moderately resistant to anthracnose.
7. Molecular techniques confirmed that the epidemics were caused by several new haplotypes of the anthracnose fungus not previously found in Arkansas.
8. Pathotyping of the isolates from field collected within Arkansas confirm the presence of new races. One of these is virulent to all differentials in the breeding programs.
9. Yield data (weights of randomly selected heads and ears) and the incidences of head molds of grain sorghum and ear molds of corn are being compiled in the laboratory. The work also identifies the degree of infection of panicles and ears with several head and ear mold fungi in assist in developing recommendations.
10. Greenhouse evaluations of selected grain sorghum hybrids are being conducted with 71 new isolates of the anthracnose fungus collected in fields with epidemics and in test plots with epidemics to assist in developing better recommendations for producers.
11. The first and second years of rotation studies with corn, sorghum, rice and soybeans has been completed. The results from 2004 confirm that rotations can effectively control several important diseases and that some rotations may increase the prevalence of stalk rot in some corn hybrids.

Extension activities

1. Conducted in-service training for county agents on common corn and sorghum diseases.
2. Published a fact sheet on corn and sorghum diseases and hybrid reactions to common diseases.
3. Completed a chapter on sorghum diseases and recommendations for the Handbook on Sorghum Production.
4. Participated in Field Days at Marianna and Pine Tree, demonstrating corn and sorghum research on plant diseases. We were on the program at Marianna.
5. New fact sheets or corn and grain sorghum are being prepared for distribution in 2004.
6. Prepared 5 new updates on corn and sorghum diseases and management for the Extension Service in 2004.

We have made significant progress during the first two years of the three year proposal funded in 2003 and request additional support to verify work over several years and to report it effectively to Extension.