2003 Annual Report
Corn and Sorghum Research and Promotion Board

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

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CROPS: corn and sorghum
STATUS: New
OBJECTIVES

Corn

1. To survey and identify the diseases of corn in Arkansas and to determine when and where they occur during the growing season,
2. To screen potentially useful hybrids for resistance to diseases emphasizing blight and ear rots, and
3. To determine the effect of irrigation methods and rotation on development and severity of several diseases including blight, rust, anthracnose and ear molds and aflatoxin.

Sorghum

1. To continue to monitor and identify the new and old diseases of sorghum in Arkansas and to determine if the incidence is changing within the state, and
2. To evaluate the highest yielding hybrids for resistance to anthracnose and *Fusarium* head mold in replicated field tests, and
3. To determine whether planting date, harvesting date and rotations have positive effects on development and incidence of anthracnose and *Fusarium* head blight on yield and yield parameters such as seed weight, germinability and seed head weight.

RESEARCH PROGRESS

New Research. Corn and Sorghum field plots have been planted at Rohwer, Marianna, Pine Tree and at Fayetteville. The corn tests contain 20 of the highest yielding hybrids including, TV2160BT, DKC 69-70, Pioneer 31R88, FFR 736BT, TV2155BT, Asgrow RX828YG, Triumph 141G, DKC 6525, Pioneer 3223, Pioneer 31B12, DK 697, Terrel 2140, Pioneer 31G98, FFR 726, Pioneer 32P76, Pioneer 33R88, Pioneer 3245, Pioneer 33R77, UAP DG 5515 and Dyna Gro 5518 that account for nearly 90% of the acreage in the state. The sorghum tests contain 15 hybrids including, TV1050, Triumph 82G, TV 9421, DG 780B, FFR 322, DG 751B, Pioneer 8282, Asgrow A571, Pioneer 84G62, SS 800, DKS 54, Golden Acre 444E and DK 53S-11 that are consistently among the highest yielding hybrids in the Variety Test Program. An overhead fixed irrigation system, is being set up at the Fayetteville Experiment Station to determine the influence of overhead irrigation on the incidence of ear and head molds on corn and sorghum.

Surveys conducted in plots and production fields indicated the presence of one viral disease, anthracnose, blight, and sorghum downy mildew on sorghum in production fields. Leaf rust on corn was noted for the first time on six different corn hybrids in plots just at the beginning of tasseling out. A sample of corn infected by downy mildew has been received.

Presentation of Research. We have nearly completed four full color posters describing the common corn and sorghum diseases to be distributed to the Extension Service and for use in Field Days at Rohwer, Marianna, Pine Tree and Keiser in 2003 and at other Producers Meetings. The posters will be made available to Extension personnel on CD-ROMs.

Highlights from work conducted in 2003.

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; it was more severe at Rohwer than at Pine Tree or Marianna. Specific hybrids were more susceptible than other hybrids in all locations.
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. This is being verified by weighing heads at this time.
6. Three separate 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. 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.
9. 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.
10. The first year of rotation studies with corn, sorghum, rice and soybeans has been completed.

Extension activities

1. We presented an In-Service Training Session to approximately 20 county extension agents at Keiser, Arkansas on June 10, 2003.
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.

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