END OF YEAR REPORT

DISEASES OF GRAIN AND SWEET SORGHUM HBRIDS IN ARKANSAS

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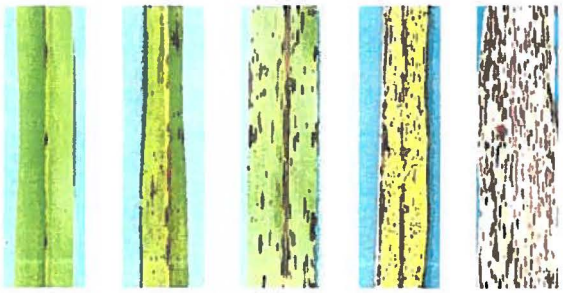
STATUS: New project; 2013

VALUE TO THE GROWER IN ARKANSAS:

Sorghum once was a valuable crop to Arkansas row-crop producers. Sorghum has continued to have interest and support in the agricultural industry. Its value to producers results from high quality and marketable grain with minimal input costs from the best hybrids. It is also a valuable rotation crop that usually requires little input and irrigation. Unfortunately, a number of diseases, including anthracnose, blight, charcoal rot, head blights, target spot and zonate leaf spot have reduced the yield and quality of grain sorghum. Of these, anthracnose is usually ranked as the most important of all, infecting seeds, seedlings, leaves, stalks and flowering heads (Figures 1,left, center and right). Figure 1, right, shows the rating scale used to evaluate each of the hybrids for resistance to anthracnose. Ratings of 1 equals resistance and ratings of 5 are susceptible.



Our research has shown that yields and anthracnose severity are affected by cropping history (Moore and TeBeest, Crop Protection 28:737-743) and that 19 different pathotypes of anthracnose exist in Arkansas (Moore and TeBeest, Plant Disease 92:1415-1420).

PROGRESS BY OBJECTIVES in 2013:

1. Determine impact of diseases and screen hybrids and cultivars of grain sorghum and sweet sorghum for resistance to the diseases.

We completed disease surveys of the 29 hybrids entered in the Arkansas Variety Test administered by D. Dombek at Rohwer and Mariannna. Of the 29 hybrids surveyed, many showed the presence of anthracnose and blight diseases at Rohwer and Marianna. Disease incidence and resistance data (based on lesion types shown above) were recorded and prepared for publication following statistical analysis. Anthracnose began to develop in early summer and reached maximum levels at heading. Disease severity levels were significant enough to reduce yields in the most susceptible hybrids. To determine the level of resistance to anthracnose in the 26 hybrids tested, we inoculated each hybrid in fully replicated experiments with 5 different pathotypes (races) of *C. sublineolum*. Pathotype 4 (identified in 1984 by Dale and Cartwright, Ark. Farm. Res.) while pathotypes 7,9,10 and 12 were identified by Moore et al. in 2009. The results show that only two hybrids (GA 5556 and Pioneer 84G62) were susceptible to this pathotype (rating greater than 2.5). Five hybrids (BH 3822, RV9803, TR 481, White no. 2 and 3 (315.10 and 366/58) were rated as susceptible to pathotype 10. Pathotypes 7, 9 and 12 were the most virulent of the 5 races tested. These races infected BH 3822, BH5566, DG M77G52. Golden Acres 5613, Pioneer 83P99, Pioneer 84G62, Pioneer 84P80, RV 9794, RV9803, RV9924, RV9973, TR 481, and White No. 2 (315/10) at levels greater than a rating of 3 in the greenhouse. Of these 13 hybrids (50% of the hybrids tested), the following hybrids including BH 3822, BH 5566, DG M77G62, Golden Acres 5613, Pioneer 83P99, Pioneer 84G62, Pioneer 84P80, TR 481 and White No. 2 were among the most severely infected of all of the hybrids by 4 of the 5 pathotypes known to be in Arkansas in the test. The impact of this test revealed that most of the hybrids are resistant to race 4, a race that was **once dominant** in the C. sublineolum population in the US. However, we know that we have many other races of this fungus in Arkansas and that many of these are very virulent to many of the hybrids being grown. A summary of this research will be presented at the southern meeting of the American Phytopathological Society in Dallas, Feb. 2013. Summaries of the occurrences and incidences of the diseases and results of the evaluations of resistance of 26 cultivars across 5 different pathotypes and at two different locations have been sent to Extension Cooperators.