
Research Priorities for the National Sorghum Producers

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By

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The National Sorghum Producers would like to thank CSREES for providing this opportunity to discuss our research priorities with the Agency and other commodities through this particular forum.

Sorghum acres have been declining in recent years due to several factors, some of which are farm policy related, while others relate to a decline both private and public research funding opportunities for the crop. NSP has worked to highlight the inequities within farm policy that have stymied the growth of planted acres and has continued to support Congressional support for funding for research. While sorghum acres have declined, both maize and soybean acres have increased. One reason for that growth has been the lack of a comprehensive public and private research program in sorghum. The lack of a comprehensive program has led to sorghum yields increasing at half the annual rate of corn and to fewer new uses (non-feed, non-food) for sorghum. This fact contributes to the sorghum acreage falling behind the other major crops like corn, soybeans and cotton.

A disparity between private corn and sorghum research exists. The largest privately owned corn breeding company spent over a \$100 million on corn breeding research last year, while the entire sorghum research budget (public and private) is roughly \$20-25 million. A commitment to the research mentioned above allows the corn industry to have over 550 scientists working on improving that crop, while sorghum has approximately 20 scientists. Dedicated resources to research have increased corn yields 1.4 bushels per acre per year, while sorghum yields have increased at half of that rate 7/10ths of 1%.

NSP has identified five major areas of research: 1) yield within a semi-arid cropping system; 2) sorghum's role in renewable biofuels; 3) biotic stresses, with renewed emphasis on weed control; 4) human and animal nutrition; and 5) genomics.

- 1) Yield within a semi-arid cropping system: Sorghum has traditionally been a crop of marginal lands and therefore has developed some unique characteristics that provide the crop with coping mechanisms that provide competitive advantages to other crops when faced with various abiotic stresses, especially drought. Understanding these coping mechanisms is a major priority for both our research community and our producers. The "Blue Revolution" will be the next big challenge for agriculture in the US and crops that can make more efficient use of less water will become a more important tool for farmers as they cope with this new reality within agriculture. This applies to not only grain crops, but forage crops as well. We also see early season cold tolerances as a priority. If we could plant sorghum earlier, much like corn, we could take advantage of a longer growing season through use of later maturing sorghums, which tend to have greater yield potential. Finally, we need greater research into the diverse germplasm of sorghum to discover new heterotic pools that can be exploited by plant breeders to improve yield.
- 2) Sorghum's role in renewable biofuels: Domestically, approximately 10% of our crop is used in ethanol production. While sorghum ethanol yields are comparable to corn, the crop continues to always be behind corn in research emphasis concerning enzymes, fermentation, and co-product evaluation. Sweet sorghum and unique forage sorghums also have potential use in biomass facilities producing ethanol. Sweet sorghums have been used in both India and Brazil to produce ethanol and research into these biomass crops needs further funding and emphasis.
- 3) Biotic stresses, with renewed emphasis on weed control: Weed technology, in the form of GMO resistant sorghum, is not currently available for sorghum and little new chemistry is being developed that will benefit sorghum. Therefore, new technologies and weed strategies must be developed to help producers control weeds in a timely and efficient manner. New uses of current products, new weed strategies, and bringing new technologies to the crop are essential to the success of our producers in the future. Downy mildew, a long

time pathogen of sorghum, has become a new problem in the southern region of Texas with a new pathotype that is resistant to chemical treatment. New germplasm must be screened and introduced into hybrids in the areas susceptible to this new pathotype.

- 4) Human and animal nutrition: Most of the world consumes sorghum in various food products. Sorghum is used primarily as an animal feed in the US. Sorghum is a gluten-free product and new uses for sorghum in this area of the health market are meeting the needs for this particular market. Because of its bland flavor and easy of use, sorghum flour may be substituted for wheat flour in many products that can produce a healthy alternative to those suffering from gluten intolerance. Unique sorghums have also been found with high levels of antioxidants and research programs are under way to understand how these characteristics operate in animal systems. These antioxidants may also have a role in animal health nutrition and further research in this area is also needed. In preliminary research, sorghums with unique polyphenols, waxes, and feeding characteristics have been found and further research is needed to study how these properties may be used in food systems.
- 5) Genomics: The sorghum genome will be the second major cereal crop to be sequenced. While this is extremely exciting news, the work is only just beginning to understand what this elucidation of the sequence will mean. Areas of research include functional genomics, genomic panels for exploitation, and micro-arrays to evaluate how genes are expressed under various growing conditions are needed to add meaning to the sequence.

Though this is not a comprehensive list of all the needs of our producers, each priority contains several avenues of research that will benefit our producers and ensure that sorghum will continue to play a vital role in their profitability in the future.