

Shedding a little light on bahiagrass: Bahiagrass Breeding at UF

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Significance:

Bahiagrass is one of the predominant pasture grasses utilized by the beef cattle industry in the southern parts of Georgia and Alabama, and throughout Florida. Its popularity is attributed to its tolerance of low soil fertility, establishment by seed, persistence under grazing, long-lived stands and good disease and nematode resistances. It is used as a pasture, hay, seed or sod crop. Although bahiagrass is native to South America, it has proved to be remarkably adapted to the southern Coastal Plain and, particularly, to our Florida environment. This species is estimated to cover at least 6.0 million acres throughout the southeastern United States.

The variety 'Pensacola' dominates the bahiagrass acreage in the southeastern U.S. In Florida, an estimated 60% of the bahiagrass acreage is planted in Pensacola, about 25% in 'Argentine', 10% in 'Tifton 9', and 5% in 'Paraguay 22'. A new bahiagrass, 'AU Sand Mountain', recently released from Auburn University, has out-yielded Pensacola and Argentine varieties in several Florida variety trials; however, it is less productive than Tifton 9 and is not expected to impact bahiagrass acreage in Florida.

Strong support from the beef cattle industry in the southeastern U.S. has prompted a Florida-wide UF/IFAS and USDA-ARS emphasis on bahiagrass variety development. The team approach emphasizes plant improvement in seedling vigor and establishment, cold tolerance, reduced photoperiod sensitivity, seasonal distribution of forage production, forage quality, and insect, nematode and disease resistance.

Rationale:

The bahiagrass breeding program focuses on three areas of bahiagrass improvement; diploid breeding, tetraploid breeding, and the evaluation of newly imported germplasm.

Diploid Breeding

The first focus area is based on the selection for leaf tissue tolerance to frosting, early spring and late fall forage growth, and improved rooting in a "Pensacola"-type (diploid) bahiagrass. At present, there are several forage and turfgrass populations in various stages (years) of selection for these desirable traits. We have termed these "PCA" cycles for "photoperiod and cold adapted". These cycles have been grown, alternating between Marianna and Ona, FL selecting

over wide environments to improve cold tolerance and photoperiod response. In addition to those physiological traits, progress has been made in selecting for resistance to the dollar spot fungus, rooting/stolon mass, and more rapid germination of the seed. PCA Cycle 4 is now in trials at the Range Cattle Research and Education Center at Ona, the Coastal Plain Experiment Station at Tifton, at the North Florida Research and Education Center at Marianna, the Agronomy Forage Research Unit near Gainesville, and is also being evaluated at Mississippi State University for winter survival. Breeder's seed increases of PCA Cycle 4 have been established at two locations in Florida.

Tetraploid Breeding

The second area of focus in our forage and turf breeding program involves bahiagrass similar in appearance to Argentine, Paraguay and Paraguay 22 or the tetraploid bahiagrass types. A survey of nearly 1200 Florida cattlemen, taken at cattlemen meetings and field days across the state, indicated that about 80% of the ranchers prefer the 'Argentine-type' bahiagrass. This robust plant germinates quickly and spreads rapidly to cover new land within the first year of establishment. Breeding improvement has been limited with Argentine and Paraguay 22 due to the chromosome number and type of reproduction (apomixis) in the plant. We recently imported new germplasm from Argentina to use in our tetraploid crossing program. In addition, to the new acquisitions, we have been able to successfully use chemicals on "Tifton 9" to create new tetraploid lines. These lines are being crossed with the new materials from Argentina, and several other tetraploid types that have desirable features for forage and turf. We hope that the new developments in tetraploid germplasm will allow us to actively breed new strains of bahiagrass with the desirable attributes that cattlemen seem to prefer in Argentine bahiagrass.

New Germplasm Evaluation

The third area of focus involves the evaluation of other bahiagrass plant introductions and new closely-related *Paspalum* species. Seed has been obtained for plant accessions from the National Plant Germplasm System and from other scientists working with *Paspalum* species in Australia, Uruguay and Argentina. These materials are being evaluated at a number of locations in Florida in various environments to better determine where they are best suited. Some of these new species have shown superior winter growth and better seasonal forage distribution, compared to bahiagrass. Selection has been directed at winter survival, frost tolerance, forage yield, forage quality, seasonal forage distribution, seed production, and persistence under grazing.

The overall goal of the Bahiagrass Program is to supply the livestock producer, sodsman and home owner with a selection of different bahiagrass, and possibly other *Paspalum* cultivars, that fit well for a variety of uses.

Impact:

Anticipated outcomes of this project include the development and eventual release of more productive cultivars of bahiagrass and other *Paspalum* species that should be useful in:

1. Minimizing the need for conserved forage or winter grazing for livestock in the southern Coastal Plain
2. Improving forage quality of bahiagrass-based pasture systems
3. sod-based rotation systems as short-duration, hay crops
4. Utility turf application
5. Attenuating agricultural nutrient losses to the environment

Collaborators:

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