Introduction

Species and biotypes of the genus *Tripsacum* include: eastern gamagrass (*T. dactyloides*) in North and Central America; Guatemala grass (*T. fasciculatum* syn. *T. andersonii*) in Latin America and the West Indies; and wide-leaf gamagrass (*T. latifolium*) throughout Mesoamerica. Of these, Guatemala grass has become widely popular throughout the tropics as a fodder plant and for its benefits related to environmental and ecosystem services.

**Objectives**

This shortfall in seed production necessitates vegetative production of all stands. Rapid establishment and growth of vegetative propagules is of key importance to reduce competition from non-desirable weed species. Recent research in *Tripsacum* has shown that nitrogen use efficiency (NUE) is maximized through early season fertility, which may also increase the days to maturity, extending the quality lifespan of a stand. Also, very-early season, late season, and very-late season applications of triazine-class herbicides (atrazine) have been shown to increase seasonal yields as well as decrease overall herbicide use. Selecting early season applications of triazine-class herbicides (atrazine) have been shown to increase seasonal yields as well as decrease overall herbicide use. Selecting early season applications of triazine-class herbicides (atrazine) have been shown to increase seasonal yields as well as decrease overall herbicide use.

**Experimental Design and Methods**

*Figure 1. In vitro dry matter digestibility (IVDMD) of *Tripsacum* forage in southeastern United States when harvested in 30d intervals. All plots were harvested to 15cm stubble height and fertilized with 56 kg ha-1 of N following each harvest. LSD = 0.8184*

*Figure 2. In vitro dry matter digestibility (IVDMD) of *Tripsacum* clones in southeastern United States when harvested in 30d intervals. All plots consisted of five fully mature clones, planted in rows at 0.61m intervals and 1.2m row spacing. Each plot was replicated three times. LSD = 1.48*

**Results**

It is believed that the genome of *T. andersonii* is of rather ancient origin, sharing both triploid *Tripsacum* (*2n = 3x = 54*) and haploid *Zea* (*2n = 10*) genomes. This product is likely the result of a hybridization event between a *Tripsacum* (*2n = 36*) (most likely *T. latifolium*) and either domesticated maize (*Z. mays L. ssp. mays* (Schrad.)) or annual teosinte (*Z. mays L. ssp. mexicana* (Schrad.)) because of its increased tolerance to drought. The major impediment to more widespread use of Guatemala grass extends from its trihybrid genetic origin, which causes plants to develop mostly sterile seed. There are no known commercial suppliers of seed in the Americas or Asia.

**Image A.** Two joined *Tripsacum* seed units, ventral rachis, dorsal glume, entire seed

**Image B.** Crown and root structure of mature *Tripsacum* plant

**Image C.** Arrangement and structure of seed in mature *Tripsacum*

**Image D.** Structural detail of vegetative propagule of *Tripsacum*; commonly referred to as a proax. The proax is a thick, scaly, rhizome-like structure which is commonly used for vegetative propagation, especially in *Tripsacum*-species that do not reliably produce viable seed, such as *T. andersonii*.

**Acknowledgments**

Mississippi State University (MSU)

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Mississippi Agricultural and Forestry Experiment Station

**Genetic Resources and Breeding**

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*Figure 1. In vitro dry matter digestibility (IVDMD) of *Tripsacum* forage (for cut-and-carry and green feed during dry conditions), environmental management (as contour strips for soil erosion) and for wildlife.*

**Discussion**

*Figure 2. In vitro dry matter digestibility (IVDMD) of *Tripsacum* clones in southeastern United States when harvested in 30d intervals. All plots consisted of five fully mature clones, planted in rows at 0.61m intervals and 1.2m row spacing. Each plot was replicated three times. LSD = 1.48*

Guatemala grass is established almost entirely through vegetative propagation, either through rooted tillers, rhizomes, or stem cuttings containing multiple nodes. This characteristic makes improvement breeding difficult, but not impossible. The collection, evaluation, and identification of elite germplasm will be key to further improvement of the species.

Further evaluation goals

- Fertilizer use efficiency
- Quality improvement via incorporation of forage legumes in polyculture
- Post-harvest recovery and regrowth initiation

**Strategies to decrease management inputs and improve quality of *Tripsacum* for fodder production and ecosystem services**

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