POLYPLOID ST. AUGUSTINEGRASS HYBRIDS DEVELOPED THROUGH EMBRYO RESCUE

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Background/ Rationale

- St. Augustinegrass [*Stenotaphrum secundatum*] is uniquely adapted to sub-tropical regions.
- It is the most commonly used turfgrass in Florida, accounting for 50% of the sod produced and sold.
- St. Augustinegrass ranges in ploidy from (2n=2x=18) to (2n=4x=36) along with various aneuploids.
- Typically, diploids are morphologically smaller and more shade tolerant than the larger polyploid types.
- Polyploids are typically more resistant to diseases and insects and exhibit better drought resistance.
- The project goal was to obtain interploid hybrids using embryo rescue to facilitate crosses.

Materials & Methods

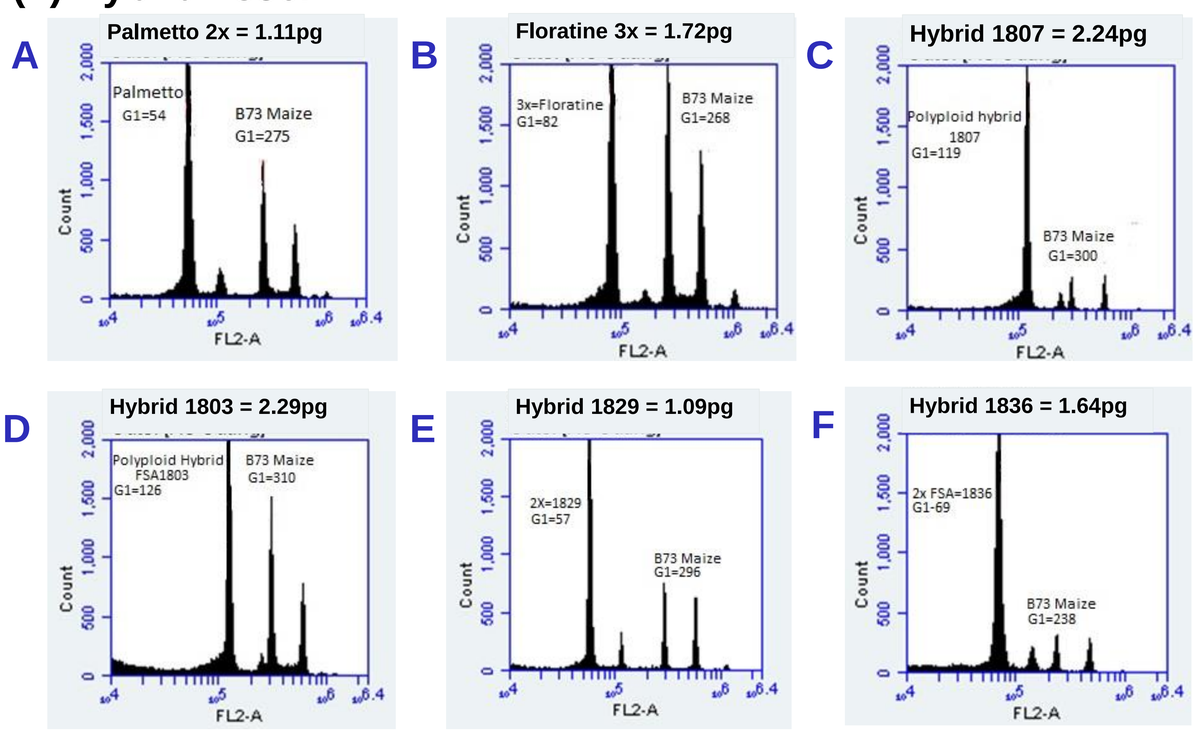
Embryo Rescue

- Aneu-polyploid lines were principally used as female parents.
- Ten d after pollination, racemes were harvested, sterilized (70% ETOH, 0.5% NaClO), and rinsed in sterile water.
- Developing embryos were dissected from florets and placed on half strength MS medium without growth regulators.
- Germinated plantlets were acclimatized in peat under high humidity then transplanted to greenhouse pots (Figure 1).

Flow Cytometry

- Meristems from actively growing stolons were excised, chopped, and incubated per the Sysmex CyStain PI Absolute P kit protocol.
- Each tube received 1.5 mL of propidium iodide staining solution then was analyzed using an Accuri C6 flow cytometer.

Figure 2. Flow cytometry histograms of (A) Palmetto (B) Floratine, (C) Hybrid 1807, (D) Hybrid 1803, (E) Hybrid 1829, (F) Hybrid 1836.



Results

- From 36 racemes of aneu-polyploid x diploid crosses, 173 developing embryos were dissected with 15 germinating (Table 1).
- From 14 racemes of diploid x diploid crosses, 60 embryos were dissected with 23 germinating (Table 1).
- Flow cytometry of diploid x diploid progeny had values similar to the diploid parents (Figure 2).
- Hybrids from aneu-polyploid x diploid crosses had FC values greater than the diploid parent. Values varied between same cross hybrids.
- Progeny from the aneu-polyploid x diploid crosses showed phenotypic variability.

Summary & Future Research

- The data suggests that female aneuploid gametes may have functioned to combine with normal haploid gametes from the diploid parent.
- Further research is needed to investigate exactly what is occurring to cause FC variations from hybrids of the same cross.
- Progeny from the aneu-polyploid x diploid crosses showed marked phenotypic variability with potentially useful turfgrass attributes.
- The range of attributes of progeny need to be investigated.
- Sun and shade field evaluations in small turfgrass plots has been initiated.

Figure 1. Germinating embryos, juvenile plants, and mature plants of embryo hybrids.

Table 1. Characteristics of diploid and polyploidy embryo hybrids.

Female	Male	Embryos rescued	Plantlets obtained	Ploidy
1602	FX10	25	6	P
1602	2/4	14	3	P
1602	Palmetto	8	2	P
Palmetto	Classic	7	3	D
Palmetto	2/4	7	2	D
NUF33	2/4	10	5	D
NUF33	Palmetto	15	12	D
Floratam	NUF254	6	1	P
Floratam	Palmetto	22	2	P
1602	NUF105	10	1	P
1601	Palmetto	10	1	D