

Genetic Improvement of Centipedegrass Through Chemical Mutagenesis



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Introduction

- Centipedegrass [*Eremochloa ohiuroides* (Munro) Hack.] is a warm-season, perennial grass well adapted for turf across the southern United States.
- It has great potential as low input turf within the U.S. because of its low input requirements and its tolerance to an array of environmental stresses [1].
- As most U.S. centipede germplasm originates from an accession introduced from China in 1916 [2], limited morphological variation exists in these





Results

- Germination rates decreased with higher concentrations of EMS: 0, 0.125, 0.25, 0.375 and 0.50% EMS had germination rates of 90, 83, 78, 75 and 58%, respectively. Out of 500 seeds treated, 450 plants were regenerated.
- Variation was observed for leaf



Control: No EMS

EMS 0.5%



- germplasm [3].
- Molecular marker studies have identified low levels of genetic variation present in the species [4,5,6].
- The lack of morphological variation in the species has hampered breeding efforts and only a few cultivars have been released after decades of selection.
- In an effort to increase phenotypic variability, the use of physical mutagens was introduced in the late eighties. 'Tifblair' was a result of these efforts [7]. While chemical mutagens have been applied in other crops [8,9,10], their use has not been reported in centipedegrass.



Objectives:

- Use chemical mutagen ethyl methane-sulfonate (EMS) to generate
 - morphological and adaptive variation in centipedegrass.

Materials & Methods



color, leaf texture, and plant type as well as for abiotic stress tolerance.

 Evaluation of selected M₁ lines in replicated trials at the Upper Mountain Research Station (Laurel Springs), Sandhills Research Station (Jackson Springs) and Lake Wheeler Field Lab (Raleigh) over 2017 – 2018 identified significant variation for all traits analyzed.



	LW SH LS	SHLS	LS	LW	LW
ntry	TQ	Establishment	WK	Yield (lb/acre)	Germ Rate
ommon	4.89	47.29	3.00	91.23	95
ovington	5.00	45.71	2.50	75.91	99
antee	4.67	48.50	3.33	139.92	97
falain	2 00	50.77	2.04	40.51	07

Preliminary data analysis identified several lines (orange) with superior turf quality (TQ), establishment rates,

100 seeds of 'Common' were treated with each 0, 0.125, 0.25, 0.375, or 0.50% (w/v) of EMS for 16hrs







50 plants each from the three highest concentration treatments were planted in a nursery at the Lake Wheeler Turf Field Lab (Raleigh, NC)

Surviving plants were transferred to the greenhouse

Seed was





In order to expose mutations, plants were enclosed in pollination exclusion cages and allowed to self pollinate Plots were handharvested in Fall 2012





A nursery of 3,000 M_1 lines was planted at





and winterkill (WK) over the commercial checks evaluated in the trial. Additionally, lines with high seed yield (green) have been identified. Seven of the lines (CEN 15116, CEN 151306, CEN 15453, CEN 15522, CEN 15773, GC 12844, and GC 12861) are present in both groups.

On-going Work

- → Evaluation of these lines will continue over 2018-2019.
- → In addition to the traits listed above, we will be evaluating drought and pest tolerances as well as establishment rates from seed.
- → A regional centipedegrass trial to be evaluated in Florida, Georgia, and North Carolina is in the planning





the Sandhills Research Station (Jacksonville,



 Plots were evaluated for establishment, color, texture, turf quality, winter survival and drought tolerance

NC) in summer 2013

 100 individuals with superior performance across traits were planted in replicated trials at three locations for further evaluation.



stages and will be planted in 2020.



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