EVALUATION OF LOUISIANA ECOTYPES OF SALTGRASS FOR SELECTION AND USE IN SALT MARSHES OF THE COASTAL ZONE OF LOUISIANA

Garret Thomassie - USDA-NRCS Golden Meadow Plant Materials Center



Figure 1. Saltgrass is a highly desired plant for coastal and saline wetland restoration projects

Introduction

Saltgrass (*Distichlis spicata*) is a mat-forming, strongly rhizomatous, perennial grass that prefers moist, saline soils, but occurs in sandy, alkaline locations (Figure 1). In salt marshes, it provides nesting for birds and fish habitat. Saltgrass is a highly desired plant for coastal and saline wetland restoration projects. It is one of the key species requested by revegetation contractors including those representing governmental agencies and private consultants in Louisiana. However, there is no commercial release of a quality tested source of saltgrass for coastal and saline wetland restoration.



Figure 2. Map showing where original collections of saltgrass were obtained from 10 parishes

Objective

Evaluate, select and release a superior accession of saltgrass to add diversity of available species for coastal restoration projects in Louisiana parishes and adjoining states in the gulf coast region.

Materials and Methods

Twenty-five collections of saltgrass were obtained from coastal parishes in Louisiana (Figure 2). Collections were assigned an accession number and planted in 5-ft x 5-ft plots in a randomized complete block design with 3 replications at the USDA-Natural Resources Conservation Service Golden Meadow Plant Materials Center (PMC), Galliano, LA (Figure 3). Water level in the ponds can be managed to simulate the tidal flux associated with the marsh ecosystem and flooded to prevent drought stress. Herbicides (2,4-Dichlorophenoxyacetic acid dimethylamine salt 46.8% @ 2% V/V and Glyphosate N phosphonomethylglycine (isopropylaminemine salt) 41% @ 2% V/V) are used as needed to control weeds and prevent accessions from growing into adjacent plots (Figure 4). Accessions are evaluated for overall vigor, drought and flood tolerance, seed production and viability plant density and cover, and rhizomatous spread.

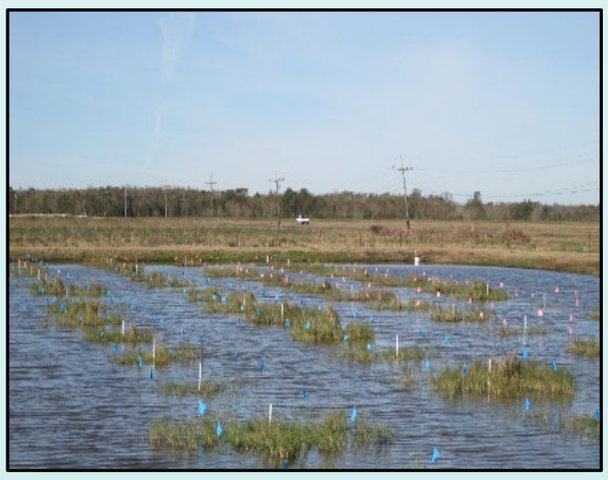


Figure 3. Twenty-five collections planted in randomized complete block design with 3 replications at the USDA NRCS Golden Meadow Plant Materials Center

Results and Discussion

Ten of the 25 accessions exhibited superior growth characteristics and worthy of further evaluation and selection on the basis of height, canopy cover and plant vigor (Tables 1, 2 and 3). These 10 accessions include: 9068011 (Terrebonne), 9068112 (Cameron), 9068306 (St. Bernard), 9089474 (Cameron), 9089475 (Cameron), 9089476 (Cameron), 9089480 (Cameron), 9089515 (Lafourche), 9089517 (St. Bernard) and 9089535 (Terrebonne). Evaluations of the 10 promising accessions from Louisiana parishes will continue in 2022 by comparing their performance and adaptation at multiple sites in coastal south Louisiana. The PMC plans to release a saltgrass for coastal restoration projects.

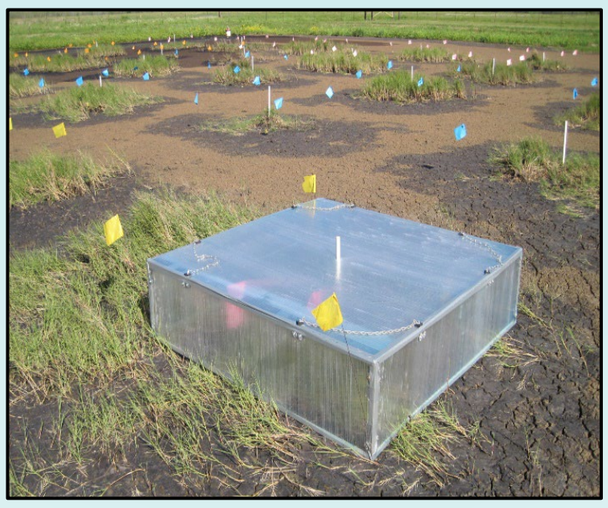


Figure 4. Polycarbonate box used to protect vegetative plot while applying herbicides to control surrounding weeds

Table 1 - Mean plant height of 25 accessions of Inland saltgrass (*Distichlis spicata*) by month and year, USDA-NRCS Golden Meadow Plant Materials Center, Galliano, LA.

Accession #	Date							
	Aug 2016	Nov 2016	May 2017	Nov 2017	Mar 2018	May 2018	Aug 2018	May 2019
	inches							
9067624	14.3	14.6	13.3	10.0	6.3	10.7	15.7	11.3
9068003	13.0	14.0	12.0	8.0	8.6	11.0	12.7	7.3
9068004	19.6	19.3	17.3	23.3	10.6	14.7	20.7	10.7
9068005	12.6	13.6	10.0	18.3	8.3	14.0	18.0	11.3
9068009	20.6	17.3	17.3	26.0	13.3	19.3	24.7	16.0
9068011	23.3	22.6	20.0	28.0	16.3	22.7	24.7	17.3
9068012	14.0	9.0	13.3	20.0	8.3	14.7	18.7	10.0
9068031	21.3	20.0	20.6	26.0	12.6	17.3	19.3	16.7
9068112	24.0	17.6	20.0	24.0	17.3	24.0	25.7	18.7
9068113	22.0	23.6	22.0	26.6	12.6	20.7	23.3	16.7
9068306	23.6	19.3	20.6	22.6	17.3	24.7	29.3	23.3
9089473	22.3	21.0	24.6	23.3	15.6	23.0	28.3	18.0
9089474	24.3	23.0	22.0	23.3	16.6	20.0	22.7	16.7
9089475	22.3	23.3	23.0	32.0	18.0	22.0	22.7	19.3
9089476	19.0	20.0	18.0	26.6	16.6	22.3	24.0	17.3
9089480	21.6	21.6	21.0	24.0	15.3	20.7	22.7	17.3
9089484	19.6	16.3	16.6	23.3	10.0	15.3	21.3	13.3
9089485	22.0	16.6	16.6	28.0	11.6	19.3	22.7	13.3
9089487	23.3	23.3	23.3	24.0	13.6	15.7	20.7	16.0
9089515	19.0	20.6	20.0	26.0	19.3	20.0	23.7	16.7
9089516	20.6	22.0	19.0	24.0	13.3	18.7	22.0	15.3
9089517	17.3	16.3	19.3	20.0	14.0	20.7	23.3	18.0
9089535	19.0	18.6	20.6	19.6	12.3	17.3	22.0	16.7
9089536	17.0	16.6	18.0	16.3	11.3	16.0	14.7	14.0
9089541	21.3	21.6	22.6	21.3	14.6	19.3	24.3	16.0
Mean	19.9	18.9	18.9	22.6	13.4	18.6	21.9	15.5
LSD $_{(0.05)}$	8.3	8.6	9.4	11.4	8.3	4.4	4.7	5.8

Table 2 - Mean plant cover of 25 accessions of Inland saltgrass (*Distichlis spicata*) by month and year, USDA-NRCS Golden Meadow Plant Materials Center, Galliano, LA.

Accession #	Date							
	Aug 2016	Nov 2016	May 2017	Nov 2017	Mar 2018	May 2018	Aug 2018	May 2019
	inches							
9067624	9.6	18.3	21.6	16.6	15.0	26.7	40.0	21.7
9068003	4.6	6.0	10.0	17.3	8.3	15.0	25.7	4.0
9068004	43.3	65.0	80.0	83.3	70.0	93.3	93.3	53.3
9068005	83.3	51.6	35.0	63.3	41.6	66.7	86.7	31.7
9068009	63.3	36.6	46.6	73.3	53.3	83.3	100.0	66.7
9068011	60.0	75.0	73.3	86.6	80.0	90.0	100.0	83.3
9068012	61.6	55.0	61.6	75.0	48.3	80.0	93.3	33.7
9068031	55.0	31.6	45.0	83.3	63.3	80.0	93.3	56.7
9068112	50.0	51.6	65.0	81.6	75.0	93.3	93.3	78.3
9068113	36.6	36.6	60.0	86.6	76.6	86.7	100.0	61.7
9068306	78.3	73.3	65.0	78.3	83.3	93.3	100.0	83.3
9089473	50.0	40.0	35.3	81.6	70.0	86.7	100.0	65.0
9089474	38.3	31.6	51.6	78.3	78.3	90.0	90.0	68.3
9089475	68.3	55.0	55.0	76.6	83.3	90.0	100.0	95.0
9089476	63.3	73.3	78.3	88.3	85.0	93.3	100.0	85.0
9089480	50.0	41.6	56.6	93.3	81.6	93.3	100.0	90.0
9089484	56.6	41.6	40.0	78.3	66.6	88.3	100.0	61.7
9089485	81.6	65.0	66.6	76.6	63.3	83.3	96.7	55.0
9089487	51.6	56.6	65.0	76.6	68.3	83.3	90.0	80.0
9089515	46.6	31.6	63.3	85.0	83.3	93.3	93.3	75.0
9089516	33.3	50.0	61.6	70.0	73.3	86.7	83.3	61.7
9089517	40.0	33.3	45.0	86.6	75.0	90.0	100.0	86.7
9089535	23.3	45.0	58.3	83.3	70.0	80.0	100.0	80.0
9089536	32.3	41.6	48.3	64.0	50.0	66.7	70.0	48.3
9089541	36.6	46.6	68.3	78.3	85.0	90.0	100.0	78.3
Mean	48.7	46.2	54.3	74.5	65.9	80.9	90.0	64.2
LSD $_{(0.05)}$	61.8	52.4	52.5	61.4	39.7	19.3	22.0	28.3

Table 3 - Mean vigor rating of 25 accessions of Inland saltgrass (*Distichlis spicata*) by month and year, USDA-NRCS Golden Meadow Plant Materials Center, Galliano, LA.

Accession #	Date							
	Aug 2016	Nov 2016	May 2017	Nov 2017	Mar 2018	May 2018	Aug 2018	May 2019
9067624	8*	5	7	8	8	8	8	8
9068003	9	8	8	9	9	8	8	9
9068004	4	3	2	4	5	3	3	6
9068005	2	7	6	6	7	4	4	8
9068009	3	5	5	4	5	3	3	5
9068011	4	3	3	3	3	2	3	3
9068012	4	5	4	5	6	3	4	7
9068031	4	6	5	3	5	3	4	6
9068112	4	4	3	3	4	2	2	3
9068113	5	4	4	3	3	3	4	6
9068306	2	4	3	4	3	2	2	2
9089473	4	3	4	4	4	3	3	4
9089474	5	5	5	4	3	3	4	5
9089475	4	3	4	3	3	3	2	2
9089476	3	4	3	2	3	2	2	3
9089480	4	4	4	2	3	3	3	2
9089484	4	7	6	4	5	4	3	6
9089485	2	4	4	4	6	3	3	6
9089487	4	4	4	3	4	3	4	4
9089515	6	5	4	3	3	3	3	3
9089516	5	3	4	5	4	3	5	5
9089517	5	3	5	3	3	3	3	3
9089535	6	3	4	3	4	3	2	3
9089536	6	4	5	4	5	4	5	5
9089541	4	4	4	4	3	3	2	4
Mean	4	4	4	4	4	3	3	5

* = vigor rating of 1–9 where 1 equals best and 9 equals poor.

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