

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
BROOKSVILLE, FLORIDA

and

THE UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
GAINESVILLE, FLORIDA

NOTICE OF RELEASE OF PURPLE HAZE GERmplasm HAIRAWN MUHLY
TESTED CLASS OF NATURAL GERmplasm

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), and the University of Florida Institute of Food and Agricultural Sciences announce the release of a tested ecotype of *Muhlenbergia capillaris* (Lam.) Trin. [synonym *M. capillaris* (Lam.) Trin. var. *capillaris*] (USDA, NRCS, 2011).

This plant will be referred to as Purple Haze Germplasm hairawn muhly. It was tested under the NRCS accession number 9059929. This hairawn muhly may be useful for conservation of native grassland sites and for its value as an ornamental grass. It is being released as a vegetatively propagated material because the plant is cross-pollinated and will not breed true (Dr. Ann Blount, personal communication). Distribution of plant material as plantlets will be made by the NRCS and University of Florida's North Florida Research and Education Center from established isolation nurseries.

Hairawn muhly is widely sold in the nursery trade in Florida and other states in the southeastern United States. However, there are no named purple-flowered selections that have been evaluated and selected for superior landscape performance. The release of Purple Haze Germplasm is justified based on its proven performance compared to commercially available plants and it has the potential to provide a niche marketing opportunity for local nursery producers. Additionally, grassland restoration and wildlife habitat sites require plants for re-vegetation or enhancement of impacted areas. Nursery production of Purple Haze hairawn muhly may provide an available local ecotype to use at these types of sites.

Collection Site Information: Accession 9059929 was collected in southern Jefferson County, Florida. The collection site was on the northeastern side of U.S. Highway 98, 2.4 miles west of the Aucilla River. In this portion of Jefferson County, the river marks the county line between Jefferson and Taylor Counties. The site was described as a wet hardwood hammock and the hairawn muhly plants were found growing with wax myrtle [*Morella cerifera* (L.) Small], saw palmetto [*Serenoa repens* (Bartram) Small], bluestem (*Andropogon* L. spp.), pine (*Pinus* L. spp.), blackberry (*Rubus* L. spp.), and sweetgum (*Liquidambar styraciflua* L.). The soil type at this site is Nutall-Tooles complex, which is a poorly drained and very poorly drained, nearly level soil, underlain by limestone bedrock. The seasonal high water table is at 0 to 10 inches for 6 to 8 months of the year.

Description: Hairawn muhly is a caespitose perennial grass. The leaves are mainly basal and the blades are flat at the base, becoming involute distally, 1- to 2-mm wide, terminating in a sharp, pointed tip (Radford et al. 1968; Taylor, 2009). Those of accession 9059929 are strongly erect and remain green throughout the growing season. The sheaths are open, general glabrous or with scattered hairs, and a prominent ligule that is 1- to 5-mm long

(Taylor, 2009). The slender culms are erect and the inflorescence is a diffuse to oblong panicle, with numerous fine, airy branches. The spikelets are purple, lanceolate to narrowly ellipsoid, and 4-to 5-mm long, not including the awn. The glumes are usually 1-nerved, membranous, and generally have short awns. The lemma is 3-nerved, purplish in color, 3-to 4-mm long, with a delicate awn that is 3-12 (15) mm long, with no bristle-like teeth. The palea is also 3- to 4-mm long. The caryopsis is elongated, purplish, and 2.5- to 3-mm in length (Radford et al., 1968). Following seed dehiscence, the persistent panicles become light tan in color and remain somewhat showy (Yarlett, 1996).

Method of Breeding and/or Selection: Muhly plants were collected throughout the state of Florida by PMC and other NRCS personnel from 1997 to 1999. Hairawn muhly and sweetgrass or gulf hairawn muhly [*Muhlenbergia sericea* (Michx.) P.M. Peterson, synonym *M. filipes* M.A. Curtis] are both found in Florida. These two species can only be visually distinguished from one another by examination of the spikelets under magnification (Yarlett, 1996). However, they have slightly different habitat preferences; sweetgrass generally occurs in coastal habitats, whereas hairawn muhly, can be found in both coastal and inland areas (Barkworth et al., 2007). Due to these similarities, there was no attempt to categorize each accession to species level at the time of collection. The plants of each accession were held in pots outdoors in the PMC shadehouse until planting.

Initial evaluation blocks were planted at the Brooksville PMC in March of 2000. A total of 91 Florida muhly accessions were planted. Plants of three additional *Muhlenbergia* spp. accessions were received from the Jimmy Carter PMC in Americus, GA, for inclusion in the test; two of these (9057241 and 9057242) were identified by the contributors as sweetgrass and one (9057244) was identified as hairawn muhly. There were no named releases of hairawn muhly being marketed at the time, so 'Sharp' marshhay cordgrass [*Spartina patens* (Aiton) Muhl.], a plant release from the Brooksville PMC that has a roughly similar appearance, was used as the commercial standard of comparison. Each plot consisted of a single plant and each accession was replicated three times.

These accessions were being evaluated for a wide range of conservation uses, including wildlife cover, rangeland and forest understory development, and as an ornamental for use in landscapes. Since Purple Haze Germplasm is being released for use as an ornamental, Table 1 and Table 2 only present initial evaluation data for those characteristics pertinent to utilization of these plants as an ornamental (e.g., seed production is not critical for an ornamental and this data was therefore excluded). The visual scoring method in use at the time was a scale of 1 to 9, with the lowest score ranked the highest in each evaluation characteristic. The data for 'Sharp' is excluded from these tables.

Following the second year of initial evaluation testing, 11 accessions were selected for advanced evaluation as ornamentals (Table 3). These selected accessions are indicated in bold print in Tables 1 and 2. Accession 9057242 rated highly in both years, but was dropped from the advanced evaluation because the objective of this study was to release a hairawn muhly selection from Florida; this accession was a sweetgrass that came from Georgia. Accession 9059717 was a white-flowered accession that was released by the Brooksville PMC as Morning Mist Germplasm in 2006.

Table 1. 2000 Results of initial evaluation of 89 hairawn muhly accessions at Brooksville, FL.

Accession	Foliage		Vigor ¹		Seedhead Production ¹		Seedhead Attractiveness ¹		Lodging ¹	
	Attractiveness ¹									
9057241 (GA)	4.3	BCDE	4.0	EFGH	3.7	CDE	4.3	BC	2.0	AB
9057242 (GA)	3.3	E	4.0	EFGH	3.3	DE	4.3	BC	1.7	B
9057244 (GA)	5.3	ABCDE	5.3	ABCDEFGH	5.7	ABCDE	5.7	ABC	2.0	AB
9059168	5.7	ABCDE	6.2	ABCDEF	6.7	ABC	5.7	ABC	3.3	AB
9059190	3.3	E	3.3	GH	4.3	ABCDE	4.0	C	4.0	AB
9059221	6.0	ABCD	6.3	ABCDE	6.7	ABC	6.3	AB	2.3	AB
9059223	6.7	AB	7.3	A	7.0	AB	6.3	AB	4.7	AB
9059224	4.0	CDE	3.7	FGH	4.0	BCDE	4.0	C	3.7	AB
9059228	4.3	BCDE	4.7	BCDEFGH	5.7	ABCDE	5.0	ABC	3.7	AB
9059237	3.3	E	3.7	FGH	4.7	ABCDE	4.0	C	4.0	AB
9059239	3.5	E	3.0	H	4.0	BCDE	4.0	C	5.0	AB
9059513	5.0	ABCDE	5.7	ABCDEFGH	6.7	ABC	5.0	ABC	4.0	AB
9059514	4.0	CDE	4.3	DEFGH	5.0	ABCDE	4.3	BC	3.0	AB
9059516	4.3	BCDE	4.3	DEFGH	5.0	ABCDE	4.3	BC	3.0	AB
9059523	4.3	BCDE	5.0	ABCDEFGH	4.7	ABCDE	4.7	BC	3.0	AB
9059524	4.7	ABCDE	4.2	DEFGH	5.3	ABCDE	4.7	BC	4.3	AB
9059532	3.7	DE	4.0	EFGH	4.3	ABCDE	4.7	BC	4.3	AB
9059544	5.0	ABCDE	4.0	EFGH	3.5	CDE	4.5	BC	3.5	AB
9059558	4.3	BCDE	5.0	ABCDEFGH	5.3	ABCDE	5.3	ABC	3.0	AB
9059694	5.7	ABCDE	5.3	ABCDEFGH	4.8	ABCDE	5.0	ABC	3.3	AB
9059716	3.3	E	4.0	EFGH	4.3	ABCDE	4.0	C	2.0	AB
9059717	4.7	ABCDE	5.0	ABCDEFGH	5.2	ABCDE	4.0	C	3.3	AB
9059720	5.0	ABCDE	4.0	EFGH	3.0	E	4.5	BC	2.5	AB
9059755	6.0	ABCD	6.0	ABCDEF	5.5	ABCDE	5.5	ABC	3.0	AB
9059767	5.0	ABCDE	5.3	ABCDEFGH	6.3	ABCD	5.3	ABC	3.3	AB
9059785	6.7	AB	7.2	AB	7.3	A	6.3	AB	4.3	AB
9059787	4.7	ABCDE	5.7	ABCDEFGH	6.0	ABCDE	5.0	ABC	3.3	AB
9059801	6.7	AB	7.3	A	7.0	AB	6.0	ABC	3.7	AB
9059805	6.7	AB	6.7	ABCD	6.0	ABCDE	5.7	ABC	3.7	AB
9059806	5.7	ABCDE	5.8	ABCDEFGH	5.0	ABCDE	5.0	ABC	3.3	AB
9059808	6.3	ABC	5.8	ABCDEFGH	5.0	ABCDE	5.0	ABC	3.3	AB
9059812	5.0	ABCDE	4.7	BCDEFGH	4.7	ABCDE	4.3	BC	4.7	AB
9059813	6.0	ABCD	5.7	ABCDEFGH	5.3	ABCDE	5.0	ABC	5.7	A
9059822	5.7	ABCDE	6.2	ABCDEF	5.7	ABCDE	5.3	ABC	3.7	AB
9059825	5.0	ABCDE	5.0	ABCDEFGH	5.0	ABCDE	5.0	ABC	5.0	AB
9059826	5.0	ABCDE	4.7	BCDEFGH	4.3	ABCDE	5.0	ABC	3.7	AB
9059829	5.0	ABCDE	6.7	ABCD	7.0	AB	5.3	ABC	4.3	AB
9059850	6.7	AB	7.3	A	7.2	AB	6.0	ABC	3.7	AB
9059870	4.7	ABCDE	5.2	ABCDEFGH	6.0	ABCDE	5.0	ABC	2.7	AB
9059877	4.8	ABCDE	5.8	ABCDEFGH	7.0	AB	5.3	ABC	3.3	AB
9059879	4.7	ABCDE	5.3	ABCDEFGH	6.0	ABCDE	5.3	ABC	3.0	AB
9059885	5.0	ABCDE	5.5	ABCDEFGH	6.0	ABCDE	5.3	ABC	4.0	AB
9059897	3.8	DE	4.5	CDEFGH	5.0	ABCDE	4.7	BC	2.7	AB
9059898	4.3	BCDE	5.5	ABCDEFGH	6.0	ABCDE	5.0	ABC	2.3	AB
9059899	5.0	ABCDE	5.0	ABCDEFGH	5.0	ABCDE	4.7	BC	3.0	AB
9059923	4.3	BCDE	5.0	ABCDEFGH	5.2	ABCDE	4.7	BC	3.0	AB
9059928	4.0	CDE	5.0	ABCDEFGH	5.7	ABCDE	4.7	BC	2.7	AB

Table 1. 2000 Results of initial evaluation of 89 hairawn muhly accessions at Brooksville, FL.

Accession	Foliage		Vigor ¹		Seedhead Production ¹		Seedhead Attractiveness ¹		Lodging ¹	
	Attractiveness ¹									
Purple Haze	4.0	CDE	4.3	DEFGH	4.7	ABCDE	4.7	BC	3.0	AB
9059931	5.3	ABCDE	5.0	ABCDEF	5.7	ABCDE	5.2	ABC	3.3	AB
9059942	6.7	AB	6.3	ABCDE	6.3	ABCD	6.3	AB	3.3	AB
9059950	5.3	ABCDE	5.3	ABCDEF	5.0	ABCDE	5.3	ABC	3.3	AB
9059963	5.7	ABCDE	6.3	ABCDE	6.7	ABC	6.0	ABC	3.3	AB
9059966	6.0	ABCD	5.7	ABCDEF	4.7	ABCDE	5.3	ABC	4.0	AB
9059973	5.3	ABCDE	5.0	ABCDEF	3.7	CDE	4.3	BC	3.7	AB
9060002	4.7	ABCDE	5.2	ABCDEF	6.0	ABCDE	5.0	ABC	3.7	AB
9060037	5.3	ABCDE	5.3	ABCDEF	5.7	ABCDE	5.0	ABC	2.7	AB
9060044	4.5	BCDE	5.0	ABCDEF	5.8	ABCDE	5.0	ABC	2.5	AB
9060045	5.0	ABCDE	5.3	ABCDEF	6.7	ABC	5.0	ABC	4.0	AB
9060047	4.7	ABCDE	5.2	ABCDEF	5.8	ABCDE	5.0	ABC	4.0	AB
9060048	4.0	CDE	4.3	DEFGH	5.7	ABCDE	5.3	ABC	3.3	AB
9060054	4.5	BCDE	5.0	ABCDEF	5.8	ABCDE	5.0	ABC	2.5	AB
9060058	5.7	ABCDE	6.0	ABCDEF	7.0	AB	5.7	ABC	2.3	AB
9060062	7.0	A	7.3	A	7.3	A	7.0	A	3.3	AB
9060064	6.0	ABCD	6.0	ABCDEF	5.7	ABCDE	5.7	ABC	2.7	AB
9060074	5.7	ABCDE	5.7	ABCDEF	5.3	ABCDE	5.0	ABC	3.0	AB
9060079	6.0	ABCD	5.7	ABCDEF	4.8	ABCDE	5.3	ABC	4.3	AB
9060214	5.0	ABCDE	4.8	ABCDEF	5.2	ABCDE	5.0	ABC	5.0	AB
9060232	5.7	ABCDE	6.0	ABCDEF	5.3	ABCDE	5.0	ABC	5.0	AB
9060300	5.0	ABCDE	4.5	CDEF	4.3	ABCDE	4.7	BC	3.7	AB
9060304	5.3	ABCDE	5.0	ABCDEF	3.3	DE	5.0	ABC	2.7	AB
9060316	4.7	ABCDE	4.8	ABCDEF	5.7	ABCDE	5.0	ABC	4.3	AB
9060317	4.7	ABCDE	6.0	ABCDEF	6.3	ABCD	5.0	ABC	3.0	AB
9060377	4.3	BCDE	4.0	EFGH	5.0	ABCDE	5.0	ABC	3.0	AB
9060419	5.3	ABCDE	5.0	ABCDEF	4.3	ABCDE	4.7	BC	2.7	AB
9060420	6.3	ABC	6.7	ABCD	6.7	ABC	5.7	ABC	3.3	AB
9060423	6.0	ABCD	5.3	ABCDEF	3.7	CDE	5.0	ABC	4.0	AB
9060424	5.3	ABCDE	5.0	ABCDEF	4.7	ABCDE	5.0	ABC	4.7	AB
9060425	5.7	ABCDE	5.3	ABCDEF	4.5	ABCDE	5.3	ABC	4.3	AB
9060426	6.3	ABC	6.0	ABCDEF	6.3	ABCD	5.3	ABC	5.7	A
9060428	5.7	ABCDE	6.0	ABCDEF	5.3	ABCDE	5.0	ABC	3.3	AB
9060429	6.3	ABC	6.3	ABCDE	6.0	ABCDE	5.8	ABC	3.7	AB
9060430	6.0	ABCD	6.0	ABCDEF	5.7	ABCDE	5.3	ABC	4.0	AB
9060431	6.3	ABC	7.3	A	6.7	ABC	6.0	ABC	4.0	AB
9060433	5.7	ABCDE	5.3	ABCDEF	5.7	ABCDE	5.7	ABC	3.3	AB
9060434	6.5	AB	7.0	ABC	6.0	ABCDE	5.5	ABC	3.0	AB
9060437	4.7	ABCDE	6.0	ABCDEF	5.7	ABCDE	5.3	ABC	2.7	AB
9060438	5.3	ABCDE	6.0	ABCDEF	6.0	ABCDE	5.3	ABC	2.3	AB
9060448	5.3	ABCDE	6.3	ABCDE	6.3	ABCD	5.0	ABC	4.7	AB
9060457	4.0	CDE	4.3	DEFGH	5.7	ABCDE	4.7	BC	3.3	AB

¹ Rating scale used was 1-9 with 1 = High, 5 = Medium, and 9 = Low.

Table 2. 2001 Results of initial evaluation of 80 hairawn muhly accessions at Brooksville, FL.

Accession	Foliage		Vigor ¹		Seedhead Production ¹		Seedhead Attractiveness ¹		Lodging ¹	
	Attractiveness ¹									
9057241(GA)	5.3	BCDE	4.7	CDEF	5.3	BCDEFG	6.7	AB	4.0	FGH
9057242 (GA)	3.3	HI	4.0	EFG	4.3	EFGH	4.3	EFGH	3.3	H
9057244 (GA)	4.3	EFGH	4.7	CDEF	4.3	EFGH	4.7	DEFGH	4.0	FGH
9059190	5.0	CDEF	3.7	FG	5.3	BCDEFG	5.0	CDEFG	5.0	CDEFG
9059221	5.0	CDEF	6.3	A	6.7	ABC	5.0	CDEFG	5.7	BCDE
9059223	6.3	AB	6.3	A	6.7	ABC	5.3	BCDEF	4.3	EFGH
9059224	5.0	CDEF	4.0	EFG	5.0	CDEFGH	5.0	CDEFG	5.0	CDEFG
9059228	5.0	CDEF	4.3	DEFG	5.7	ABCDEF	5.0	CDEFG	5.0	CDEFG
9059237	4.7	DEFG	3.7	FG	4.3	EFGH	3.7	GHI	5.3	CDEF
9059239	5.0	CDEF	4.0	EFG	5.7	ABCDEF	4.7	DEFGH	7.0	A
9059513	5.0	CDEF	5.3	ABCD	6.7	ABC	5.3	BCDEF	4.7	DEFGH
9059514	5.0	CDEF	4.7	CDEF	5.7	ABCDEF	6.3	ABC	4.3	EFGH
9059516	4.7	DEFG	3.7	FG	4.0	FGH	4.3	EFGH	4.0	FGH
9059523	5.0	CDEF	4.7	CDEF	5.0	CDEFGH	5.3	BCDEF	4.0	FGH
9059524	3.7	GHI	3.7	FG	4.3	EFGH	4.3	EFGH	5.0	CDEFG
9059532	5.0	CDEF	4.7	CDEF	4.7	DEFGH	5.0	CDEFG	6.7	AB
9059544	4.7	DEFG	5.0	BCDE	5.0	CDEFGH	4.7	DEFGH	5.0	CDEFG
9059558	6.0	ABC	5.7	ABC	7.3	A	6.7	AB	3.3	H
9059694	5.7	ABCD	4.7	CDEF	5.3	BCDEFG	5.3	BCDEF	5.0	CDEFG
9059716	4.3	EFGH	5.0	BCDE	5.3	BCDEFG	4.7	DEFGH	4.0	FGH
9059717	4.3	EFGH	5.0	BCDE	5.7	ABCDEF	4.3	EFGH	4.7	DEFGH
9059720	4.7	DEFG	3.7	FG	3.3	H	5.0	CDEFG	4.0	FGH
9059755	6.0	ABC	6.0	AB	5.7	ABCDEF	5.3	BCDEF	5.3	CDEF
9059767	5.0	CDEF	4.3	DEFG	6.7	ABC	5.0	CDEFG	5.3	CDEF
9059785	5.3	BCDE	5.7	ABC	5.7	ABCDEF	5.3	BCDEF	5.3	CDEF
9059787	4.3	EFGH	4.7	CDEF	5.7	ABCDEF	4.7	DEFGH	4.7	DEFGH
9059801	6.0	ABC	5.7	ABC	5.7	ABCDEF	6.0	ABCD	5.0	CDEFG
9059805	6.3	AB	5.0	BCDE	4.7	DEFGH	5.3	BCDEF	4.7	DEFGH
9059806	5.3	BCDE	4.7	CDEF	4.3	EFGH	4.3	EFGH	5.7	BCDE
9059808	6.0	ABC	4.7	CDEF	3.7	GH	5.7	ABCDE	5.7	BCDE
9059812	4.0	FGHI	4.0	EFG	3.7	GH	4.0	FGHI	4.7	DEFGH
9059813	5.0	CDEF	5.3	ABCD	5.3	BCDEFG	5.7	ABCDE	5.3	CDEF
9059822	5.0	CDEF	4.3	DEFG	4.0	FGH	4.3	EFGH	5.3	CDEF
9059825	4.7	DEFG	4.7	CDEF	5.0	CDEFGH	4.0	FGHI	5.0	CDEFG
9059826	4.0	FGHI	3.3	G	3.7	GH	3.3	HI	5.0	CDEFG
9059829	4.3	EFGH	4.3	DEFG	4.3	EFGH	4.3	EFGH	4.7	DEFGH
9059870	5.3	BCDE	5.7	ABC	6.7	ABC	5.7	ABCDE	4.0	FGH
9059877	5.0	CDEF	5.3	ABCD	7.0	AB	6.3	ABC	4.7	DEFGH
9059879	4.7	DEFG	5.0	BCDE	6.3	ABCD	5.0	CDEFG	4.7	DEFGH
9059885	5.3	BCDE	5.0	BCDE	5.7	ABCDEF	5.0	CDEFG	4.3	EFGH
9059897	4.0	FGHI	4.0	EFG	4.7	DEFGH	4.3	EFGH	4.3	EFGH
9059898	5.3	BCDE	5.0	BCDE	5.7	ABCDEF	6.3	ABC	4.0	FGH
9059899	5.3	BCDE	5.0	BCDE	5.7	ABCDEF	6.0	ABCD	4.7	DEFGH
9059923	5.0	CDEF	4.3	DEFG	5.3	BCDEFG	5.7	ABCDE	4.7	DEFGH
9059928	3.7	GHI	4.3	DEFG	4.7	DEFGH	3.3	HI	4.0	FGH
Purple Haze	3.0	I	4.0	EFG	3.3	H	2.7	I	3.3	H
9059931	6.0	ABC	5.3	ABCD	6.7	ABC	7.0	A	5.7	BCDE

Table 2. 2001 Results of initial evaluation of 80 hairawn muhly accessions at Brooksville, FL.

Accession	Foliage		Vigor ¹		Seedhead Production ¹		Seedhead Attractiveness ¹		Lodging ¹	
	Attractiveness ¹									
9059950	6.0	ABC	6.0	AB	5.7	ABCDEF	5.0	CDEFG	4.7	DEFGH
9059963	5.0	CDEF	5.7	ABC	6.0	ABCDE	4.7	DEFGH	5.0	CDEFG
9059966	6.3	AB	5.7	ABC	5.0	CDEFGH	6.0	ABCD	5.0	CDEFG
9059973	4.3	EFGH	4.7	CDEF	4.3	EFGH	4.0	FGHI	4.3	EFGH
9060002	5.3	BCDE	4.7	CDEF	5.3	BCDEFG	7.0	A	5.0	CDEFG
9060044	4.7	DEFG	5.7	ABC	5.7	ABCDEF	5.0	CDEFG	4.7	DEFGH
9060045	5.0	CDEF	5.3	ABCD	6.7	ABC	5.3	BCDEF	4.3	EFGH
9060047	5.0	CDEF	4.3	DEFG	5.7	ABCDEF	5.0	CDEFG	6.3	ABC
9060048	4.0	FGHI	4.0	EFG	4.7	DEFGH	4.7	DEFGH	5.0	CDEFG
9060058	4.7	DEFG	5.0	BCDE	7.0	AB	4.7	DEFGH	5.0	CDEFG
9060074	5.0	CDEF	5.3	ABCD	5.0	CDEFGH	4.7	DEFGH	4.7	DEFGH
9060079	4.7	DEFG	4.3	DEFG	4.3	EFGH	4.0	FGHI	5.0	CDEFG
9060214	5.0	CDEF	5.0	BCDE	5.7	ABCDEF	5.7	ABCDE	5.3	CDEF
9060232	4.7	DEFG	4.3	DEFG	4.3	EFGH	4.7	DEFGH	6.0	ABCD
9060300	4.7	DEFG	4.7	CDEF	5.0	CDEFGH	4.7	DEFGH	4.3	EFGH
9060304	5.0	CDEF	5.3	ABCD	5.3	BCDEFG	4.3	EFGH	4.3	EFGH
9060316	5.0	CDEF	4.0	EFG	4.7	DEFGH	5.0	CDEFG	5.7	BCDE
9060317	4.3	EFGH	5.0	BCDE	5.0	CDEFGH	4.0	FGHI	4.3	EFGH
9060377	5.0	CDEF	4.3	DEFG	7.0	AB	6.7	AB	3.7	GH
9060419	5.0	CDEF	4.7	CDEF	4.3	EFGH	4.3	EFGH	4.3	EFGH
9060420	5.7	ABCD	5.7	ABC	5.7	ABCDEF	5.3	BCDEF	5.3	CDEF
9060423	6.7	A	6.0	AB	6.3	ABCD	6.3	ABC	5.7	BCDE
9060424	4.7	DEFG	4.0	EFG	4.3	EFGH	4.0	FGHI	4.7	DEFGH
9060425	4.3	EFGH	5.0	BCDE	4.0	FGH	3.7	GHI	4.3	EFGH
9060428	4.0	FGHI	4.3	DEFG	4.3	EFGH	3.7	GHI	4.3	EFGH
9060429	4.7	DEFG	5.7	ABC	6.0	ABCDE	4.7	DEFGH	4.7	DEFGH
9060430	6.0	ABC	6.0	AB	6.0	ABCDE	6.0	ABCD	5.0	CDEFG
9060433	5.0	CDEF	6.3	A	6.0	ABCDE	5.0	CDEFG	5.0	CDEFG
9060434	6.0	ABC	6.0	AB	6.7	ABC	5.3	BCDEF	4.3	EFGH
9060437	4.0	FGHI	4.7	CDEF	5.3	BCDEFG	5.3	BCDEF	4.0	FGH
9060438	4.7	DEFG	5.0	BCDE	6.0	ABCDE	4.7	DEFGH	4.7	DEFGH
9060448	5.0	CDEF	4.0	EFG	3.3	H	4.0	FGHI	7.0	A
9060457	5.0	CDEF	5.0	BCDE	6.0	ABCDE	5.3	BCDEF	4.7	DEFGH

¹ Rating scale used was 1-9 with 1 = High, 5 = Medium, and 9 = Low.

Table 3. Hairawn muhly accessions selected for superior ornamental qualities following two years of initial evaluation testing at Brooksville, FL. (Adapted from Brooksville, FL, PMC, 2002).

Accession	Overall Score ¹	County of collection	Collectors
9059237	26	Pasco	Borst, Stankey, and Maura
9059516	25	Manatee	Stankey and Maura
Morning Mist	28	Citrus	Gonter and Maura
9059812	24	Marion	Pfaff
9059825	27	Gilchrist	Pfaff and Gonter
9059826	23	Suwanee	Pfaff and Gonter
Purple Haze	20	Jefferson	Gonter and Black
9060317	27	Hernando	Santucci
9060424	25	Putnam	Pfaff and Santucci
9060425	26	Putnam	Pfaff and Santucci
9060428	24	Bradford	Pfaff and Santucci

¹ Overall score derived from the sum of seed production and growth characteristic scores. The best overall score in the assembly was 20 and the poorest¹ was 36.

Advanced evaluation testing was conducted at two locations, the PMC and the North Florida Research and Education Center (NFREC) in Quincy. The eleven PMC accessions were compared to two commercial hairawn muhly types, 'White Cloud' from Superior Trees, Lee, FL, and an unnamed purple flowering selection from Monrovia Nursery, Cairo, GA. Plants for testing were grown in the shadehouse at the PMC in 6-inch pots. Plants of the commercial cultivars were purchased in 1 gallon pots. The plots at NFREC were planted on 3 April 2006 and the PMC plots were planted 11 April 2006. Woven ground cloth, 6-foot wide (DeWitt Co. Sikeston, MO), was utilized at both locations to control weed competition. Each strip of ground cloth was a single replication and the plots consisted of five plants of each accession arranged in a single line along the center of the ground cloth. Holes were cut in the cloth to allow planting of the muhly plants. There were three replications (rows of cloth) at each location. Spacing within the plots was 2 foot on center. Spacing between plots and the size of the alleyways between rows of cloth varied at each location. Irrigation at the NFREC was by means of drip irrigation through lines run under the center the ground cloth. At the PMC, overhead irrigation was used. Plots were irrigated weekly until 8 May. To simulate typical landscape planting practices, no irrigation was to be applied thereafter; however, an unusually dry winter threatened survival, so the plots were irrigated on the weekends only from 14 April to 8 May 2007. Plants were cut back in February of each year to a height of 12 inches and were fertilized with slow release fertilizer (Osmocote 15-9-12, 12 to 14 month release; The Scotts Co., LLC, Marysville, OH) soon after they were cut. Early survival and growth of accession 9059717 (Morning Mist) plants were very poor and they were replaced as needed for the second year of evaluation. The new plants were planted on 10 April 2007 and these were hand watered daily on the weekdays for four weeks after planting. Plots at both locations were hand weeded as necessary throughout the evaluation period.

All assessments were made on the three center plants in each plot. Clump diameter (average of two, perpendicular diameter measurements at ground level) was measured annually in February 2007-2009, after the plants were cut back (Table 4). Surviving plants were also counted at this time (Table 5). In October 2006 and monthly starting in April of 2007 and 2008, at least three individual raters at each location visually examined the plots and independently assigned overall quality ratings (1=poor, 3=average, 5=excellent; 0.5 increments). These quality ratings continued monthly through November of each year at the PMC and through December at NFREC (Tables 6 and 7). Weekly starting in August 2006 and for each year thereafter, date of first plant and last plant of the accession within a replication to show inflorescence color was recorded (Table 8). In late October or

Table 4. Clump diameter (cm) of 13 hairawn muhly accessions at Quincy, FL (NFREC) and Brooksville, FL (PMC). Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a year and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively.

Accession	Feb 2007		Feb 2008		Feb 2009	
	NFREC	PMC	NFREC	PMC	NFREC	PMC
-----Purple-----						
Commercial	20.1 ± 0.9	11.6 ± 0.8	46.9 ± 1.9	17.4 ± 1.2	23.7 ± 1.3	31.6 ± 3.6
9059237	<u>14.1 ± 1.3</u>	14.5 ± 1.2	47 ± 2.5	21.3 ± 2.6	24.7 ± 1.0	31.9 ± 1.4
9059516	<u>13.9 ± 1.0</u>	11.8 ± 0.8	39.9 ± 2.6	17.7 ± 0.9	22.1 ± 1.0	29.1 ± 1.7
9059812	<u>12.7 ± 1.2</u>	9.4 ± 1.2	42.8 ± 2.3	15.3 ± 2.2	21.5 ± 1.4	30.6 ± 2.2
9059825	<u>10.8 ± 0.6</u>	7.9 ± 0.9	37.6 ± 2.6	16.1 ± 0.6	<u>17.9 ± 1.1</u>	29.2 ± 2.2
9059826	<u>14.3 ± 1.4</u>	11.4 ± 2.1	47.2 ± 2.5	21.4 ± 3.4	23.0 ± 1.2	29.4 ± 1.9
Purple Haze	<u>11.1 ± 0.7</u>	9.8 ± 0.7	<u>44.4 ± 2.4</u>	15.4 ± 2.1	22.4 ± 1.2	27.4 ± 1.3
9060317	<u>7.6 ± 1.1</u>	11.5 ± 1.4	32.8 ± 4.0	17.3 ± 2.4	19.2 ± 2.5	27.9 ± 1.1
9060424	<u>10.2 ± 1.4</u>	<u>5.1 ± 1.8</u>	46.8 ± 3.1	14.1 ± 2.1	23.1 ± 2.2	30.6 ± 1.5
9060425	<u>11.8 ± 2.1</u>	<u>4.8 ± 1.2</u>	41.9 ± 4.7	<u>8.5 ± 2.4</u>	20.9 ± 2.5	26.5 ± 0.7
9060428	<u>6.8 ± 1.0</u>	<u>5.4 ± 0.7</u>	<u>33.6 ± 3.9</u>	9.6 ± 2.6	<u>15.9 ± 1.7</u>	24.2 ± 4.2
-----White-----						
White Cloud	16.2 ± 0.7	11.8 ± 1.4	44.0 ± 2.4	19.2 ± 2.5	22.8 ± 1.0	28.5 ± 2.2
Morning Mist ¹	<u>8.4 ± 0.7</u>	<u>6.3 ± 0.6</u>	<u>32.1 ± 1.9</u>	<u>10.3 ± 0.9</u>	<u>17.6 ± 1.2</u>	<u>16.5 ± 1.4</u>

¹ Plants were replaced 10 April 2007 due to poor winter survival.

Table 5. Survival per growing season of 13 hairawn muhly at and North Florida Research and Education Center (NFREC), Quincy and Brooksville Plant Materials Center (PMC, Brooksville, FL). Plots at Quincy were planted 3 April 2006 and plots at Brooksville were planted 11 April 2006. Maximum possible survival is 9.

Accession	Feb. 2007		Feb. 2008		Feb. 2009	
	NFREC	PMC	NFREC	PMC	NFREC	PMC
-----Purple-----						
Commercial	9	9	9	9	9	9
9059237	9	9	8	9	8	9
9059516	9	9	9	9	9	8
9059812	9	9	9	9	9	8
9059825	9	9	9	9	9	9
9059826	9	9	9	9	9	9
Purple Haze	9	9	9	9	9	8
9060317	6	9	5	9	5	8
9060424	7	9	6	9	6	8
9060425	7	9	7	9	7	5
9060428	8	9	7	9	7	7
-----White-----						
White Cloud	9	9	9	9	9	9
9059717	⁻¹	-	9	9	9	9

¹ Accession 9059717 was replanted 10 April 2007 at both sites due to higher than expected plant losses.

Table 6. Quality rating means for hairawn muhly accessions evaluated at Quincy, FL (NFREC) and Brooksville, FL (PMC) from October 2006 through December 2007. At least three individuals rated each plot at each evaluation date. Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a month and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively. Quality rating means greater than the commercial muhly are highlighted in yellow.

Accession	Oct 2006		April		May		June		July		August		September		October		November		December	
	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC
Purple																				
Commercial	3.8 ¹	2.4	1.9	2.8	2.3	2.7	2.7	2.8	3.1	2.8	3.3	3.1	3.4	2.9	3.4	3.2	3.9	3.1	3.6	---
9059237	<u>2.5</u>	3.0	1.8	3.9	2.4	4.1	2.9	4.4	3.2	4.2	3.4	4.2	3.5	4.3	3.6	3.9	3.5	4.0	3.9	---
9059516	3.2	2.7	2.1	3.4	2.4	3.1	2.8	3.4	3.3	3.5	3.4	3.8	3.3	3.7	3.7	3.8	3.8	3.0	3.4	---
9059812	<u>1.9</u>	1.9	<u>1.3</u>	2.5	1.6	2.4	2.3	2.7	2.7	2.7	2.8	3.0	3.2	2.9	3.9	3.2	3.7	2.4	3.3	---
9059825	<u>2.4</u>	1.9	<u>1.2</u>	2.0	1.7	1.8	2.2	2.1	2.6	2.0	2.9	2.4	3.3	<u>2.1</u>	3.7	2.3	3.5	<u>1.7</u>	3.2	---
9059826	<u>2.6</u>	2.1	1.5	2.8	2.1	2.4	2.6	2.7	2.9	2.7	3.1	3.2	3.7	2.9	4.3	3.1	4.2	2.6	3.6	---
Purple Haze	<u>1.8</u>	3.4	1.6	3.4	1.9	2.9	2.4	3.4	2.7	3.1	3.0	3.3	3.1	3.3	3.9	4.0	3.8	3.8	3.4	---
9060317	<u>1.3</u>	3.1	<u>1.1</u>	3.1	<u>1.3</u>	2.6	<u>1.6</u>	3.3	<u>1.8</u>	3.2	<u>1.9</u>	3.2	2.3	3.2	2.8	3.5	2.9	3.6	2.7	---
9060424	<u>1.5</u>	<u>1.3</u>	<u>1.1</u>	1.6	<u>1.2</u>	<u>1.6</u>	1.9	2.0	2.2	<u>1.9</u>	2.3	2.6	2.7	2.2	3.2	2.7	3.0	<u>2.2</u>	2.7	---
9060425	<u>1.6</u>	<u>1.1</u>	<u>1.2</u>	<u>1.4</u>	1.7	<u>1.4</u>	1.8	<u>1.6</u>	2.3	<u>1.4</u>	2.4	<u>1.8</u>	2.6	<u>1.7</u>	2.9	<u>2.1</u>	2.8	<u>1.7</u>	<u>2.4</u>	---
9060428	<u>1.4</u>	<u>1.4</u>	<u>0.9</u>	<u>1.4</u>	<u>1.0</u>	<u>1.3</u>	<u>1.2</u>	<u>1.5</u>	<u>1.4</u>	<u>1.3</u>	<u>1.6</u>	<u>2.1</u>	<u>2.1</u>	<u>1.9</u>	2.4	2.3	<u>2.4</u>	<u>1.5</u>	<u>2.2</u>	---
White																				
White Cloud	4.5	3.8	2.2	3.4	2.8	3.1	3.2	3.3	3.7	3.4	3.8	3.7	3.7	3.9	3.8	4.2	4.6	4.1	4.1	---
9059717	<u>1.0</u>	<u>2.4</u>	<u>1.0</u>	---	<u>1.0</u>	<u>1.4</u>	<u>1.3</u>	<u>1.7</u>	<u>1.5</u>	<u>1.3</u>	<u>1.7</u>	<u>2.0</u>	<u>2.3</u>	<u>1.8</u>	<u>2.6</u>	<u>2.1</u>	<u>3.1</u>	<u>2.3</u>	<u>2.8</u>	---

¹ Rating scale used was 1-5 in 0.5 increments, where 1 = poor, 3 = average, and 5 = excellent.

Table 7. Quality rating means for hairawn muhly accessions evaluated at Quincy, FL (NFREC) and Brooksville, FL (PMC) from April through December 2008. At least three individuals rated each plot at each evaluation date. Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a month and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively. **Quality rating means greater than the commercial muhly are highlighted in yellow.**

Accession	April		May		June		July		August		September		October		November		December		
	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	NFREC	PMC	
	Purple																		
Commercial	1.2 ¹	2.4	1.6	2.3	1.7	2.6	2.1	2.8	2.2	3.2	2.3	3.2	3.4	2.9	3.8	3.4	3.4	--	
9059237	1.5	3.2	2.3	3.2	2.7	3.8	3.1	4.1	3.3	4.1	3.3	3.9	3.6	3.4	4.0	3.8	3.4	--	
9059516	1.2	2.6	1.7	2.6*	2.1	2.7	2.6	3.2	2.7	3.2*	2.7	3.3	3.7	3.2	3.4	3.3	2.7	--	
9059812	1.3	2.6	1.6	2.7	2.0	3.1	2.3	3.5	2.6	2.9	2.2	2.4	3.8	2.5	3.5	2.9	2.7	--	
9059825	1.1	1.8	1.4	1.5	1.7	2.3	2.3	2.4	2.5	2.1	2.7	2.2	3.7	1.6	3.5	2.2	2.8	--	
9059826	1.3	1.8	1.7	2.1	2.2	2.4	2.5	3.0	2.7	2.7	2.9	2.8	4.4	2.6	3.7	2.3	2.8	--	
Purple Haze	1.4	2.4	1.8	2.8	2.3	3.1	2.6	3.2	2.6	3.9	2.9	3.8	4.8	3.7	4.7	4.4	4.2	--	
9060317	1.0	2.6	1.3	2.8	1.5	2.9	1.8	3.2	1.9	3.3	2.1	3.4	3.2	3.6	3.4	3.9	3.1	--	
9060424	1.1	2.0	1.5	1.8	1.8	2.6	2.0	2.6	2.1	2.4	2.4	2.2	3.5	2.2	3.5	2.3	3.0	--	
9060425	1.1	1.4	1.3	1.4	1.7	1.9	2.0	1.9	1.9	1.9	1.9	1.9	3.4	1.9	3.3	2.1	2.8	--	
9060428	0.8	1.6*	0.8	1.6	0.9	1.9	1.2	2.1	1.3	2.1	1.4	2.1	2.8	1.7	2.8	2.2	2.1	--	
	White																		
White Cloud	1.4	2.6	1.9	2.4	2.4	2.6	2.5	3.0	2.7	3.2	2.9	3.2	3.9	3.7	4.2	3.7	3.3	--	
9059717	1.2	1.9	1.7	1.9	1.9	2.2	2.4	2.3	2.6	2.1	2.7	2.3	3.9	2.3	4.2	2.1	3.3	--	

¹ Rating scale used was 1-5 in 0.5 increments, where 1 = poor, 3 = average, and 5 = excellent.

Table 8. Average week of year that an inflorescence culm first showed color during three years of evaluations at Quincy, FL (NFREC) and Brooksville, FL (PMC). The two numbers in parentheses represent the first and last week that an inflorescence of any one of the plants within an accession showed color. Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a year and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively. NOTE: The 32nd week of the year is the first week of August.

Accession	2007		2008		2009	
	NFREC	PMC	NFREC	PMC	NFREC	PMC
----- Purple -----						
Commercial	39.3 ± 0.3 (38 – 40)	41.4 ± 0.4 (40 – 42)	39.3 ± 1.0 (32 – 42)	41.3 ± 0.5 (40 – 43)	41.0 ± 0.6 (38 – 47)	40.8 ± 0.3 (39 – 42)
9059237	41.7 ± 3.8 (40 – 43)	41.1 ± 0.1 (40 – 42)	40.6 ± 0.4 (39 – 41)	40.9 ± 0.1 (40 – 41)	<u>37.2 ± 2.2</u> (33 – 41)	41.2 ± 0.2 (41 – 42)
9059516	38.8 ± 0.5 (37 – 41)	40.3 ± 0.2 (40 – 41)	36.2 ± 1.1 (34 – 38)	39.6 ± 1.6 (35 – 43)	<u>37.0 ± 0.2</u> (36 – 39)	<u>37.8 ± 0.2</u> (36 – 40)
9059812	36.9 ± 0.4 (36 – 39)	40.0 ± 0.7 (38 – 43)	36.6 ± 0.4 (35 – 38)	39.1 ± 0.3 (38 – 40)	<u>37.2 ± 0.7</u> (34 – 40)	<u>38.2 ± 0.6</u> (37 – 39)
9059825	<u>36.1 ± 0.3</u> (35 – 38)	<u>38.1 ± 0.3</u> (37 – 40)	34.2 ± 0.3 (33 – 35)	<u>36.3 ± 0.8</u> (33 – 39)	<u>34.3 ± 0.4</u> (33 – 37)	<u>37.4 ± 1.2</u> (34 – 39)
9059826	37.0 ± 0.6 (36 – 41)	<u>39.2 ± 0.3</u> (38 – 40)	35.1 ± 0.6 (32 – 37)	<u>38.2 ± 0.8</u> (35 – 41)	<u>36.2 ± 0.2</u> (35 – 38)	<u>38.3 ± 0.5</u> (36 – 40)
Purple Haze	39.2 ± 0.1 (38 – 40)	40.4 ± 0.4 (39 – 41)	37.6 ± 0.3 (35 – 39)	<u>37.8 ± 0.4</u> (37 – 39)	<u>35.2 ± 0.5</u> (33 – 37)	38.5 ± 0.5 (37 – 40)
9060317	40.8 ± 0.2 (39 – 43)	<u>39.7 ± 0.5</u> (39 – 41)	42.0 ± 1.1 (40 – 46)	39.7 ± 0.2 (38 – 40)	38.8 ± 0.9 (33 – 40)	39.3 ± 0.3 (39 – 40)
9060424	37.8 ± 1.5 (34 – 42)	<u>39.2 ± 0.2</u> (38 – 41)	34.6 ± 1.8 (32 – 46)	<u>36.9 ± 0.4</u> (35 – 40)	<u>36.1 ± 0.2</u> (34 – 38)	<u>38.1 ± 0.6</u> (37 – 39)
9060425	37.4 ± 0.3 (37 – 39)	<u>39.2 ± 0.4</u> (38 – 40)	36.9 ± 2.8 (32 – 46)	<u>37.7 ± 0.3</u> (35 – 40)	<u>34.8 ± 0.9</u> (33 – 39)	<u>37.2 ± 0.8</u> (35 – 39)
9060428	38.1 ± 1.2 (36 – 45)	<u>39.7 ± 0.3</u> (38 – 43)	36.4 ± 1.7 (33 – 39)	38.5 ± 1.0 (35 – 40)	38.7 ± 0.7 (36 – 40)	<u>38.2 ± 0.2</u> (38 – 39)
----- White -----						
White Cloud	36.6 ± 0.8 (33 – 40)	38.7 ± 0.8 (37 – 42)	38.4 ± 0.2 (32 – 42)	40.1 ± 0.6 (38 – 41)	38.0 ± 0.7 (36 – 40)	40.4 ± 0.6 (38 – 42)
9059717	<u>42.7 ± 1.3</u> (34 – 49)	42.2 ± 0.8 (41 – 43)	<u>40.9 ± 0.4</u> (39 – 42)	<u>42.9 ± 0.1</u> (42 – 43)	39.6 ± 0.3 (37 – 42)	41.3 ± 0.2* (41 – 42)

early November 2006 to 2008 and 2008, foliar height (height of tallest erect or arched leaf) and plant spread (average of the measurement of maximum plant leaf spread and the leaf spread perpendicular to maximum spread) was determined (Tables 9 and 10). Additionally at that time in 2007 and 2008, average inflorescence height (estimated average height of all inflorescences on plant), height of the tallest inflorescence, and maximum spread distance of the inflorescences on the clump were measured (Table 11).

For all indices measured, there were some treatment by location interactions. In general, the plants tended to be larger in terms of clump diameter, foliar height and spread, inflorescence height, etc. (Tables 4, 9, 10, and 11), at NFREC than the PMC. This was probably due to better initial growing conditions (e.g., moisture due to soil and irrigation type) between the locations. These differences tended to diminish over the years of the study. Regardless of this interaction, specific trends across location were noted.

Essentially all of the experimental accessions were smaller than their respective control (e.g., commercial purple and White Cloud for the purple accessions and Morning Mist, respectively) at the end of the first growing season (Table 4, 9, 10, and 11) due to the initially larger plant size (gallon pots vs. 6-inch pots) at planting. After two more growing seasons, this difference disappeared for most accessions at both locations except for Morning Mist (Tables 4, 9, 10, and 11). Low vigor has been reported for this accession previously when compared to the typical purple material and apparently is an issue compared to commercially available White Cloud. This lower vigor was also observed for plant survival; low survival of Morning Mist after the 2006 growing season necessitated replanting most of the plants in 2007 (Table 5). With the exception of first year survival of Morning Mist, survival of all the other experimental lines and their respective controls was similar (Table 5).

Within the purple accessions, 9059237 was one of the highest rating accessions early in the year at both locations throughout the study (Tables 6 and 7). This early quality rating was primarily based on superior shape and leaf color. However, its quality ratings declined in the late summer because the foliage did not remain uniformly green. Often the tips would turn brown, or occasionally, entire leaves would die to the base. Several experimental accessions followed a similar trend in their appearance throughout the growing season. In 2006, the leaves on the commercial muhly from Monrovia Nursery developed lesions. Samples were sent to the phytopathology lab at the University of Florida and the causal organism was identified as *Puccinia* spp. (rust). The source location of this accession was unknown and it might have come from an area with a climate that differs from that of the two test locations. In contrast to the other accessions, the leaves of Purple Haze remained green and largely unblemished throughout the growing season at both locations all years. This accounts for the similar quality rating for this accession compared to the commercial material in 2007, even though the plants were smaller, and the generally higher quality score for Purple Haze at both locations late in the 2008 growing season when the plants were of similar size (Table 4).

In addition to foliar disease issues, some accessions tended to flop over (lodge) when in flower, which also reduced their late-season quality ratings. White Cloud was especially prone to this problem. The foliage of accession Purple Haze remained upright to upright divergent throughout the growing season (Trinklein, 2006).

After the establishment year, there was a trend for Purple Haze to flower about 1 month earlier than the commercial accession (Table 8). This earlier flowering for Purple Haze was significant in 2008 at the PMC and 2009 at NFREC (Table 8). In fact, most of the purple experimental accessions flowered earlier than the commercial purple material, which also supports the theory that this line of muhly was collected outside of Florida. In addition to an earlier flowering date, Purple Haze also seemed to have a more concise flower emergence period than the commercial purple (3 to 5 wks for Purple Haze vs. 3 to 11 wks for commercial purple; Table 8).

Table 9. Foliage height¹ (cm) of hairawn muhly accessions at the end of the growing season (late Oct/early Nov) measured at Quincy, FL (NFREC) and Brooksville, FL (PMC). Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a year and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively. **Means greater than the commercial muhly are highlighted in yellow**

Accession	2006		2007		2008	
	NFREC	PMC	NFREC	PMC	NFREC	PMC
	----- Purple -----					
Commercial	83.9 ± 0.8	46.1 ± 8.3	92.3 ± 8.9	98.1 ± 5.5	83.6 ± 7.3	84.4 ± 0.1
9059237	60.6 ± 11.5	48.2 ± 6.7	106.1 ± 2.6	<u>145. ± 4.2</u>	<u>111.4 ± 8.8</u>	83.6 ± 4.7
9059516	74.0 ± 5.1	50.3 ± 5.3	95.1 ± 7.4	112.5 ± 3.9	85.3 ± 7.0	79.1 ±
9059812	<u>48.9 ± 4.7</u>	32.8 ± 6.1	66.1 ± 3.7	98.1 ± 4.8	67.8 ± 2.9	74.2 ± 5.1
9059825	<u>41.2 ± 5.1</u>	31.2 ± 1.6	76.2 ± 5.8	90.3 ± 3.6	66.8 ± 1.4	<u>61.8 ± 5.5</u>
9059826	<u>58.4 ± 10.2</u>	35.9 ± 2.8	89.1 ± 3.3	105.6 ± 4.4	80.0 ± 4.6	66.0 ± 3.5
Purple Haze	<u>48.8 ± 1.6</u>	45.8 ± 5.4	70.1 ± 2.6	116.1 ± 5.4	69.7 ± 4.2	77.6 ± 1.4
9060317	<u>41.2 ± 3.4</u>	45.6 ± 5.7	72.0 ± 6.7	<u>121.5 ± 8.8</u>	76.5 ± 3.6	76.3 ± 5.2
9060424	<u>46.8 ± 7.2</u>	<u>17.9 ± 4.0</u>	83.7 ± 8.2	94.6 ± 3.5	73.7 ± 8.8	<u>59.3 ± 4.7</u>
9060425	<u>38.8 ± 2.5</u>	<u>14.0 ± 4.0</u>	65.7 ± 3.1	<u>76.4 ± 1.8</u>	65.4 ± 1.8	<u>50.7 ± 0.3</u>
9060428	<u>27.8 ± 3.0</u>	<u>23.0 ± 3.7</u>	<u>56.2 ± 12.5</u>	80.0 ± 2.9	<u>52.4 ± 5.0</u>	<u>49.0 ± 7.8</u>
	----- White -----					
White Cloud	94.4 ± 4.6	54.0 ± 10.1	104.2 ± 8.9	136.9 ± 4.0	91.9 ± 1.9	87.2 ± 6.4
9059717	<u>56.0 ± 5.2</u>	20.7 ± 12.7	88.8 ± 4.0	<u>68.3 ± 3.5</u>	82.0 ± 5.2	<u>63.8 ± 3.2</u>

¹Height of tallest erect or arched leaf.

Table 10. Average spread¹ (cm) of hairawn muhly accessions growing at Quincy, FL (NFREC) and Brooksville, FL (PMC) at end of growing season (late Oct/early Nov). Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a year and site, as determined by Dunnett's test (5% level) or t-test (5% level), respectively **Means greater than the commercial muhly are highlighted in yellow.**

Accession	2006		2007		2008	
	NFREC	PMC	NFREC	PMC	NFREC	PMC
	----- Purple -----					
Commercial	137.0 ± 4.4	16.0 ± 2.0	179.0 ± 8.3	124.6 ± 2.1	150.2 ± 3.0	110.2 ± 9.2
9059237	96.7 ± 19.9	16.1 ± 2.4	169.7 ± 20.8	<u>168.3 ± 11.4</u>	<u>202.3 ± 9.3</u>	140.7 ± 8.8
9059516	106.7 ± 2.1	13.5 ± 1.6	146.3 ± 7.3	147.1 ± 9.0	140.0 ± 2.7	104.7 ± 4.9
9059812	<u>85.7 ± 15.9</u>	9.7 ± 2.4	141.2 ± 9.7	134.4 ± 4.2	137.6 ± 2.4	119.7 ± 5.9
9059825	<u>69.8 ± 5.1</u>	10.8 ± 0.8	128.8 ± 4.4	126.7 ± 4.2	125.7 ± 6.8	100.7 ± 6.5
9059826	<u>90.8 ± 7.4</u>	15.0 ± 3.6	146.4 ± 13.6	147.6 ± 10.6	163.3 ± 5.5	108.6 ± 6.0
Purple Haze	<u>72.9 ± 4.1</u>	11.4 ± 0.4	154.6 ± 14.5	131.0 ± 1.3	124.3 ± 7.4	117.3 ± 13.0
9060317	<u>53.6 ± 2.2</u>	10.7 ± 1.3	117.3 ± 15.8	147.6 ± 10.9	127.8 ± 4.5	118.9 ± 5.0
9060424	<u>55.4 ± 10.0</u>	<u>5.1 ± 0.7</u>	147.4 ± 22.4	136.0 ± 5.5	130.3 ± 16.4	114.9 ± 10.4
9060425	<u>63.1 ± 9.5</u>	<u>5.6 ± 2.0</u>	<u>109.9 ± 21.1</u>	115.6 ± 2.2	<u>102.0 ± 19.1</u>	107.5 ± 15.4
9060428	<u>35.8 ± 8.8</u>	<u>5.6 ± 0.7</u>	<u>79.7 ± 25.5</u>	78.0 ± 15.3	<u>103.7 ± 5.8</u>	131.9 ± 3.1
	----- White -----					
White Cloud	131.9 ± 3.1	16.8 ± 4.6	171.1 ± 4.6	176.2 ± 6.7	153.4 ± 5.8	112.8 ± 9.9
9059717	<u>47.3 ± 4.9</u>	3.6 ± 3.1	<u>114.8 ± 8.1</u>	<u>70.4 ± 4.2</u>	142.6 ± 7.2	<u>64.5 ± 10.3</u>

¹Average of the measurement of maximum plant leaf spread and the leaf spread perpendicular to maximum spread.

Table 11. Estimated average inflorescence height, height of tallest inflorescence, and maximum spread distance of the inflorescences for the hairawn muhly accessions evaluated at Quincy, FL (NFREC) and Brooksville, FL (PMC). Means in bold/underline are significantly different than the commercial purple or White Cloud, respectively (5% level), within a year and site, as determined by Dunnett's test (5% level) or a t-test (5% level), respectively. Means greater than the commercial muhly are highlighted in yellow.

Accession	Average height, cm				Maximum height, cm				Maximum width, cm			
	2007		2008		2007		2008		2007		2008	
	NFREC	PMC	NFREC	PMC								
----- Purple -----												
Commercial	93.6 ± 8.4	39.2 ± 2.2	112.4 ± 3.8	40.8 ± 1.8	125.7 ± 15.8	45.3 ± 1.6	128.1 ± 6.2	45.9 ± 3.2	176.8 ± 12.0	54.1 ± 3.4	188.2 ± 12.7	57.1 ± 2.2
9059237	117.6 ± 4.8	58.1 ± 1.7	136.2 ± 5.0	51.8 ± 7.1	146.2 ± 3.6	68.0 ± 3.7	159.8 ± 4.7	63.6 ± 6.0	154.4 ± 27.0	67.0 ± 5.8	224.2 ± 11.7	58.9 ± 8.6
9059516	128.7 ± 9.3	45.0 ± 1.6	114.8 ± 5.2	44.1 ± 1.8	147.7 ± 10.5	56.3 ± 1.0	132.3 ± 6.2	54.9 ± 1.2	137.3 ± 8.7	61.3 ± 6.3	157.1 ± 24.4	59.4 ± 5.6
9059812	107.3 ± 16.7	39.2 ± 1.9	99.7 ± 1.5	38.5 ± 2.8	126.4 ± 18.1	46.6 ± 2.3	114.9 ± 4.1	45.5 ± 4.0	174.3 ± 7.8	60.9 ± 1.5	168.0 ± 2.7	57.7 ± 3.8
9059825	106.7 ± 6.6	36.4 ± 1.6	104.4 ± 5.0	38.6 ± 1.4	133.8 ± 9.6	42.2 ± 1.1	127.9 ± 7.9	43.0 ± 1.7	160.8 ± 6.1	59.1 ± 2.9	177.6 ± 8.7	61.3 ± 3.0
9059826	113.4 ± 7.7	42.2 ± 1.8	116.1 ± 4.8	42.4 ± 2.4	146.1 ± 11.8	50.2 ± 2.4	132.2 ± 6.2	48.3 ± 2.1	190.1 ± 15.3	67.9 ± 7.2	199.1 ± 3.9	60.6 ± 2.6
Purple Haze	98.2 ± 8.0	46.4 ± 2.2	112.8 ± 6.8	49.9 ± 4.3	123.9 ± 4.4	54.3 ± 1.9	133.1 ± 4.8	56.4 ± 3.9	162.7 ± 10.6	50.4 ± 2.6	199.2 ± 11.3	51.6 ± 2.1
9060317	93.3 ± 3.0	44.4 ± 1.7	107.5 ± 4.0	43.6 ± 2.2	109.5 ± 1.9	55.3 ± 4.4	125.8 ± 6.4	52.3 ± 3.9	130.8 ± 13.4	62.8 ± 5.4	139.2 ± 17.4	59.4 ± 5.2
9060424	101.3 ± 12.2	37.1 ± 0.8	104.7 ± 16.0	39.8 ± 0.2	127.3 ± 14.9	43.6 ± 0.8	121.7 ± 17.4	41.8 ± 2.3	170.3 ± 18.7	65.3 ± 3.8	170.3 ± 19.5	59.1 ± 2.0
9060425	88.3 ± 4.2	30.6 ± 0.7	90.8 ± 4.4	30.9 ± 0.6	109.1 ± 1.7	38.2 ± 2.7	108.3 ± 3.8	37.3 ± 2.6	140.8 ± 16.0	48.3 ± 3.3	150.4 ± 15.8	50.2 ± 1.2
9060428	75.0 ± 6.2	28.2 ± 2.8	79.6 ± 1.4	33.3 ± 1.4	102.9 ± 7.1	31.9 ± 3.6	91.3 ± 1.1	36.7 ± 1.3	133.6 ± 21.6	50.6 ± 11.5	146.2 ± 21.0	51.8 ± 8.9
----- White -----												
White Cloud	136.1 ± 2.2	54.8 ± 1.6	127.9 ± 3.1	54.4 ± 1.4	161.0 ± 5.5	65.2 ± 1.9	153.0 ± 4.2	62.6 ± 1.7	190.0 ± 4.3	75.8 ± 7.2	209.0 ± 20.0	74.6 ± 3.6
9059717	108.3 ± 3.5	27.3 ± 1.4	117.6 ± 1.1	28.8 ± 1.5	120.9 ± 1.6	32.0 ± 0.9	139.4 ± 2.2	30.6 ± 2.4	114.7 ± 8.9	24.3 ± 3.3	163.8 ± 11.7	27.0 ± 1.3

Upright divergent appearance, overall plant quality, and early concise flower emergence compared to commercial control at both locations in the state are basis for the release of this Florida selection of hairawn muhly as Purple Haze Germplasm.

Ecological Considerations and Evaluation: There is limited potential for Purple Haze Germplasm to become invasive because: 1) Purple Haze Germplasm is a clonal line increased from plants collected in the region of its anticipated use; and 2) it is a bunch grass, and spread by vegetative means is very limited due to its essentially lacking rhizomes or stolons. Although it does produce viable seed, its invasive potential from seed is considered to be very low. This is based on the observation that common hairawn muhly plants, which have been widely used in the landscape for at least the past 10 years, have shown little potential to spread by seedlings. The USDA, NRCS Plant Materials Program Environmental Assessment has rated this plant to have a low potential for invasiveness.

Conservation Use: Purple Haze Germplasm is mainly being released for use as an ornamental. It is especially well adapted for use in plantings that are designed for low or reduced water usage. Purple Haze Germplasm may also be useful for conservation of wildlife habitat and native grasslands in Florida, where planting plugs or other containerized material is a fairly common practice used to establish native grass species.

Anticipated Area of Adaptation: Hairawn muhly can be found growing in rocky or sandy soils, Massachusetts to Indiana and Kansas, south to Florida and Texas, also in the West Indies and eastern Mexico (Hitchcock, 1971). It is frequently found nearly throughout Florida, but it is more common in coastal areas (Wunderlin, 1997). Purple Haze Germplasm is recommended for use throughout Florida. It has not been tested outside the state, but will probably grow well throughout the coastal plain of Georgia, Alabama, and Mississippi, as well as along the Atlantic coast, as far north as South Carolina.

Availability of Plant Materials: G0 planting stock will be maintained at the Brooksville Plant Materials Center and the University of Florida's North Florida Research and Education Center, Marianna location. Divisions can be requested from the Florida Plant Materials Specialist, Gainesville, Florida or Dr. Ann Blount, Forage Breeder, Marianna, Florida.

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