

Evaluations of Various Native Warm-Season Grass Varieties (2015 – 2017)



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Introduction

Native warm-season grasses (WSG) are highly diverse and form a basic part of many conservation plant mixes to accomplish a variety of conservation objectives (e.g. biofuels, forage, wildlife habitat). Variation exists between species and varieties regarding establishment, performance, size, and phenology of growth stages (ie. relationship between temperature and plant development). This study evaluated the survival, performance, and phenology of several warm-season grass species and varieties at Beltsville, MD. Data collection includes - dates of green-up, boot stage (75%), size (at boot), flowering (75%) and seed maturity. Growing degree days (GDD) were calculated for each date to make phenological comparisons.

Materials and Methods

Evaluation plot consists of one replication of each variety (Table 1) consisting of 20 plants on one-foot centers (Figure 3). Plugs received minimal irrigation during a two year establishment period. Growing Degree Days calculated (Monthly Accumulated) Base 50/86° F (1981 – 2010) NOAA. Weekly data collection began in 2015 continued in 2016 and 2017.

Table 1. Native Warm-Season Grasses Tested

	Variety	Origin, Year	Origin's Annual GDD*	Developer
Indiangrass	Coastal	CT, RI, & MA, 2007	2687	NJ PMC
	NY PMC (unreleased)	Upper New Engl. composite	2936	NY PMC
	Southlow Michigan	Lower peninsula MI. 2001	2957	MI PMC
	Nebraska-54	Nebraska composite, 1957	3316	Harold Hummel
	NJ PMC (unreleased)	Lower New Eng. Composite	3841	NJ PMC
	Prairie View	Central and Southern IN, 2005	3912	MI PMC
Switchgrass	Rumsey	Jefferson Co., IL, 1983	4086	MO PMC
	Americus	AL & GA, 2002	6255	GA PMC
	Shelter	Pleasants Co., WV., 1978	3748	NY PMC
	High Tide	Perryville, MD. 2007	3978	NJ PMC
	Cave In Rock	Southern IL, 1974	4390	MO PMC
	Shawnee	Southern IL, 1995	4390	ARS/Univ. of Lincoln
	Blackwell	Blackwell, OK, 1944	4792	KS PMC
	Timber	NC, 2009	5165	NJ PMC
	Bo Master	South Eastern US, 2006	5165	ARS/NC State Univ.
	Kanlow	Wetumah, OK, 1963	5467	KS PMC
	Carthage	Carthage, NC, 2006	5639	NJ PMC
	Alamo	Frio River TX, 1978	7430	TX PMC
	EG 1101	Proprietary, 2009		Blade Energy Co.
	EG 1102	Proprietary, 2009		Blade Energy Co.
Big Bluestem	NJ PMC (unreleased)	South MA	2687	NJ PMC
	WV PMC (unreleased)	Kingwood, WV	2777	WV PMC
	Niagara	Erie Co., NY, 1986	2815	NY PMC
	NY PMC (unreleased)	New Eng. composite	2936	NY PMC
	Southlow Germplasm	Lower peninsula, MI, 2001	2957	MI PMC
	Bonilla	Bonilla, SD, 1986	3063	ND PMC
	Goldmine	Moorehead, IA, 2006	3482	USDA, ARS
	OZ-70	Pawnee Co., NE, 2004	3922	MO PMC
	Bonanza	Kaw derivation, 2004	4373	USDA, ARS
	Roundtree	Manhattan KS, 1950	4373	MO PMC
	Kaw	Riley Co., KS., 1950	4373	KS PMC
	Roundstone	Hart Co., KY	4666	Roundstone Seed Co.
	Earl	Parker Co., TX, 1996	5107	TX PMC
	Suther Germplasm	Cabarrus Co., NC, 2002	5136	NJ PMC

*Growing Degree Day Base 50/86° F (1981 – 2010 Nat'l. Oceanic & Atmospheric Administration)

Results

Although individual varieties show phenological variability, generally:

- 1) Big bluestem and switchgrass green up and flower about the same time, whereas Indiangrass is several weeks later (Table 2).
- 2) Big bluestem and indiangrass boot stage vary about 1000 GDD (about 5 weeks) (Figure 1), whereas switchgrass is less variable.
- 3) Plant size varies between species, generally switchgrass is largest (51.5" tall x 38.9" wide), followed by big bluestem (42.8" tall x 30" wide), and Indiangrass (41.3" tall x 27.5" wide) (Figure 2).

Figure 1. Growing Degree Days (50/86°F) at Boot Stage (75%)

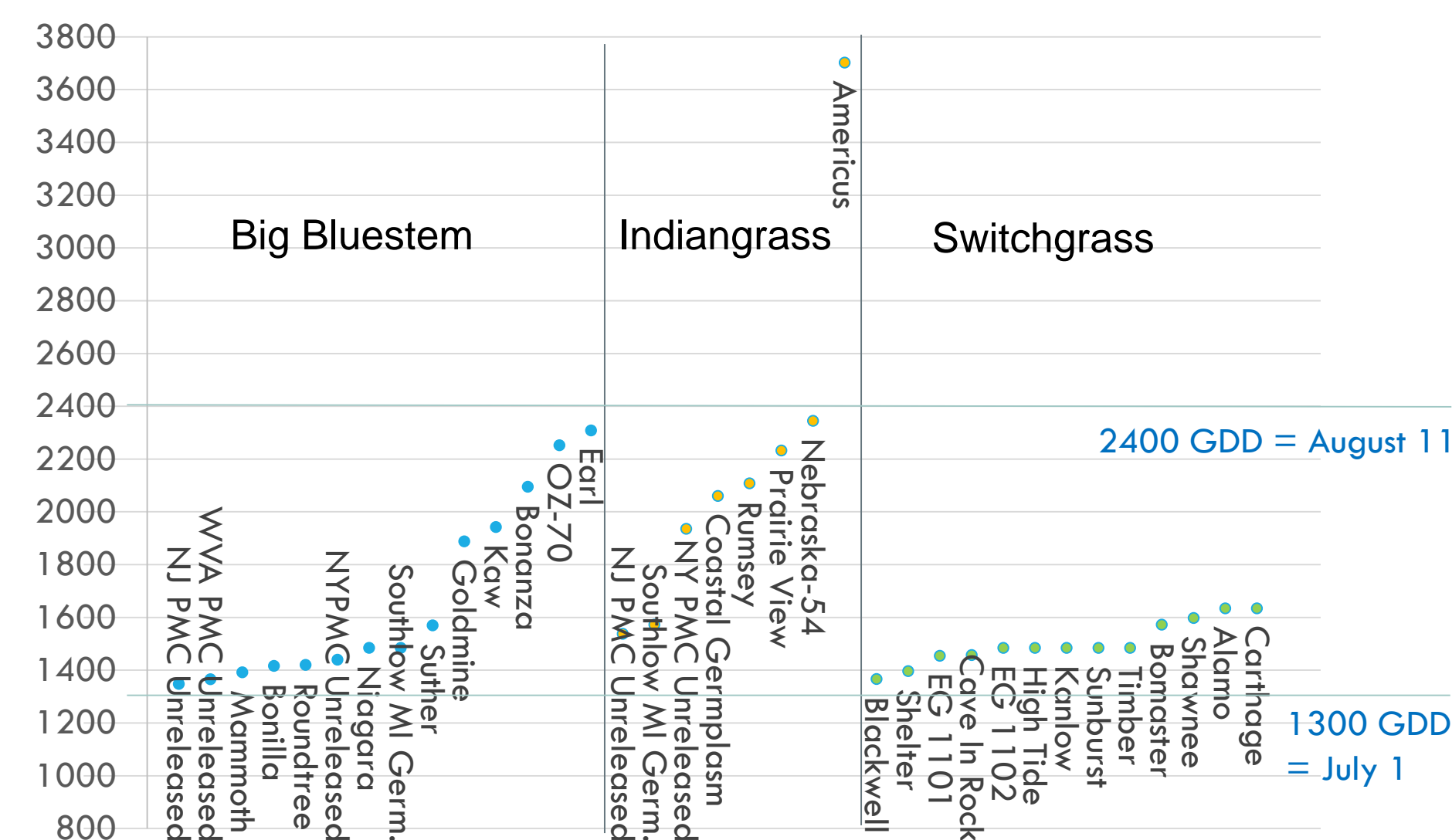
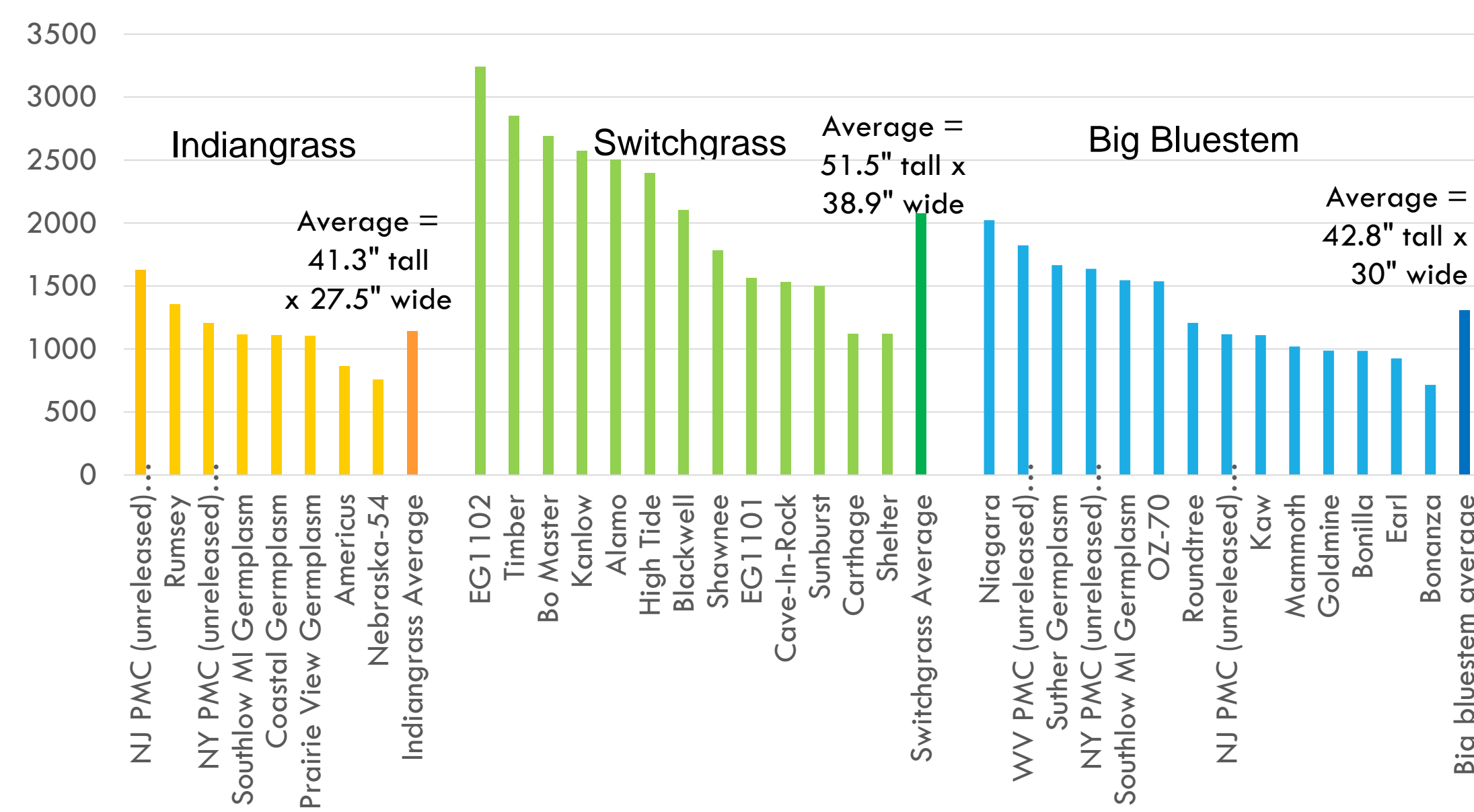


Figure 2. Average Size (in²) at Boot Stage (75%)



Conclusions

WSG varieties are fairly variable. Certain varieties may be superior for grazing (Figure 1, delayed boot stage) and more productive (e.g. OZ-70, Kaw and Goldmine big bluestems, Rumsey indiangrass). Several switchgrass varieties show potential for biomass production and a few big bluestem varieties may also be useful for biomass (e.g. Niagara and Suther). Switchgrass persistence – Dacotah, Forestburg, Pathfinder, Trail Blazer and Southlow Germplasm varieties had poor longevity necessitating removal. Several smaller, less competitive WSG varieties may allow greater forb diversity for improved wildlife habitat.

Figure 3. Warm-Season Grass Evaluation Plot



Table 2. Avg. GDD and Equivalent Dates for Phenological Stages

	Average Growing Degree Days (Corn) for phenological stages of native warm season grass							
	Greenup (°F)	Equivalent Date	Boot Stage (°F)	Equivalent Date	Flower (°F)	Equivalent Date	Fruit (°F)	Equivalent Date
Big bluestem	354	April 30	1672	July 10	2240	August 1	3391	Sept. 21
Switchgrass	381	May 2	1502	July 3	2392	August 7	3418	Sept. 23
Indiangrass	461	May 22	2187	July 30	2951	August 30	3377	Sept. 20