

Selection and Use of Native Warm-Season Grass Varieties for the Mid-Atlantic Region

IMPORTANCE OF PROPER SPECIES AND VARIETY SELECTION

Native warm-season grasses are the primary components of many of the conservation plant mixes used in the Mid-Atlantic United States. Native warm-season grasses are very versatile and are used for a wide array of purposes including wildlife habitat, forage and pasture, soil stabilization, low maintenance landscaping, carbon sequestration, biofuels, air and water quality, and many more. There are many cultivars, selected ecotypes, and source-identified native warm-season grasses available. We will refer to these collectively as varieties. With the many varieties available it can be difficult to decide which will best meet the specific planting objectives. This technical note provides guidance for the selection of warm-season grasses with a summary of selection criteria, species descriptions, and two tables describing available varieties. The varieties in Table 1 are known to be adapted to the Mid-Atlantic region, as defined here to include the states of Pennsylvania, New Jersey, Maryland, Delaware, Virginia, and North Carolina. The origin of each variety is included in Table 1. Table 2 provides recommended uses and soil drainage classes for each variety.

SELECTION CRITERIA

The criteria for selecting varieties will largely be dictated by the planting objectives and the site conditions. Often several objectives will apply to a planting and prioritizing these objectives will help ensure that varieties are chosen that will meet the primary objective first and foremost. A variety that may be very well suited for one purpose may sometimes be poorly suited for another.

Wildlife Food and Cover

For wildlife plantings, in general it is best to use seed from plants that are as locally adapted as possible. As a rule of thumb, when locally adapted material is desired, it is best to use seed propagated from materials collected within 100 miles north or south and 500 miles east or west, or wild-collected seed from within this range. This will help ensure that plants are adapted to the climate and will be useful to wildlife, such as the proper timing of flowering and seed maturity. For wildlife plantings where complete cover is not desirable, choose varieties that form clumps and seed at a low rate to leave spaces between plants for wildlife movement. For diverse wildflower and grass plantings, avoid using tall warm-season grasses that were selected for vigorous growth for forage as they may out-compete the wildflowers over time. Instead, use local ecotypes, lower seeding rates, or shorter and less aggressive species of warm-season grasses such as

little bluestem and deertongue. Very competitive tall forage grasses include varieties of switchgrass, and to a lesser extent, big bluestem and indiagrass. Eastern gamagrass has a more open growth habit that is more compatible with wildflowers than other tall forage grasses.

Conservation of Soil/Water/Air

Conservation plantings that will be used for a specific function such as soil stabilization may require varieties with higher levels of tested performance. Cultivars with proven performance are generally more desirable, especially for extraordinary site conditions, than a local ecotype or source-identified material with little known performance. For example, 'Tioga' deertongue, a cultivar that was selected for its good growth characteristics on highly degraded and acidic mine-land soils, may be a much better choice than a local ecotype when site conditions are less than ideal.

Forage

For forage plantings, it is best to utilize varieties that were specifically selected for forage production. These varieties should have desirable traits such as greater leafiness, thinner stems and vigorous growth and re-growth. Most varieties of gamagrass produce excellent forage, but the forage quality of other warm-season grasses may depend on the variety. Upland types of switchgrass such as 'Carthage,' 'Shawnee,' 'Blackwell,' and 'Cave-In-Rock' tend to have finer stems and are more suitable for forage.

SPECIES DESCRIPTIONS

Warm-season grasses can be categorized into three groups, based on method of planting. All of the grasses described in Groups A, B, and C are native to the Mid-Atlantic, have extensive, deep fibrous roots, and are bunchgrasses or have short rhizomes (the cordgrasses are very rhizomatous). Warm-season grasses are generally slow to establish, long lived, and tolerant of droughty and acid to alkaline conditions, but not to shade. Most are tall grasses that provide outstanding wildlife cover.

Group A. Smooth seeded species that can be planted with common drills

Switchgrass (*Panicum virgatum*) – a tall, stiff-stemmed, smooth-seeded, and widely adapted grass that reaches a mature height of 3 to 8 feet. Although bunch-like in appearance, switchgrass produces short rhizomes, especially when grazed. This perennial grass can tolerate poorly drained soils and has good drought tolerance. Specific cultivars can also withstand occasional flooding and perched water tables. Forage quality is good when immature but both palatability and nutrient content decline after seed head formation. Late season leafy re-growth arises from basal tillers and shoots will emerge along the lower stems at leaf nodes.





Coastal panicgrass (*Panicum amarum* var. *amarulum*) – much like switchgrass but with better seedling vigor, however not reliably hardy beyond zone 6. It can be used to provide initial temporary cover in mixes with other warm-season grasses. This grass is deep rooted (± 6 feet), robust, long lived, and grows to heights of 3 to 6 feet. It has excellent drought tolerance and does well on very coarse, well to excessively drained soils. It is used for dune stabilization, and gravel pit and mineland stabilization. The stems may be as thick as 1/2 inch, with bluish green leaves from 8 to 20 inches long and 1/4 to 1/2 inch wide. It produces short outwardly spreading rhizomes and forms clumps or bunches. Like most other species in the genus *Panicum*, coastal panicgrass has a large terminal branched inflorescence, but in coastal panicgrass the branches are held close together in a tight arrangement.

Deertongue

(*Dicanthelium clandestinum*) – wide-leaved and shorter than switchgrass, but the seed is very similar in appearance. Tolerant of wet sites as well as drier conditions. One of the more acid soil tolerant species. Poor for forage uses. The midsummer growth normally reaches a height of one to three feet. The leaf sheath and stem are hairy. Leaves are 1/2 to 1 1/4 inches wide and 4 to 8 inches long. In autumn, culms form a very leafy rosette 4 to 6 inches in height. Deertongue produces short, strong rhizomes. Two seed crops are produced annually: an early crop on an open terminal panicle and a later crop in a panicle enclosed in the swollen leaf sheath. The second crop, produced in the enclosed panicle, produces an abundance of seed. Deertongue lodges over in winter and forms a mat of vegetative cover. Some of the stems break off and are carried away by wind or water. Much of the seed is retained in the leaf sheaths of the old stems. Deertongue grows well on non-cultivated soil. Because of its tolerance to low pH, high concentrations of aluminum, and droughty infertile conditions, it is commonly found to volunteer on such sites.



Eastern gamagrass (*Tripsacum dactyloides*) – a very large, robust grass with wide leaves and thick stems that grow 4 to 8 feet tall. Plants form large clumps with sizeable space between plants. It is among the earliest of warm season grasses to begin growth each spring and has excellent forage quality. Although tolerant to drought, ideal growing sites include fertile bottomlands and alongside streams. It is a relative of corn (*Zea mays*), with seed close in size to corn that requires greater seeding depths than other warm season grasses. Eastern gamagrass is very slow to establish and has a high percentage of seed dormancy.

Group B. Chaffy seeded species that require de-bearding or specialized drills

Big bluestem (*Andropogon gerardii*) – like switchgrass, it is one of the major grasses of the tallgrass prairie and eastern native grasslands. Big bluestem is a tall upright bunchgrass with short rhizomes to expand the basal cover. It typically grows from 5 to 8 feet, but can reach up to 12 feet, and often takes on an attractive reddish purple color at maturity. Big bluestem can be used on sites with excessively well drained soils and has moderate drought tolerance. It is most abundant on moist, well drained, fertile loamy soils. Highly preferred forage, second only to gamagrass, it also retains its palatability after reaching maturity better than switchgrass or indiangrass.



Indiangrass (*Sorghastrum nutans*) – a tall upright grass that matures at 3 to 6 feet, sometimes up to 8 feet. Like big bluestem, it is slowly spreading and produces short, knobby rhizomes. It is later in growth and flowering than the other warm-season grasses, adding significantly to diversity. Moderately well-drained soils are preferred but indiangrass can withstand occasional flooding. It begins growth later than switchgrass or big bluestem but produces good quality forage throughout most of the summer, retaining moderate palatability after seed head formation.

Little bluestem (*Schizachyrium scoparium*) – a long-lived, perennial warm-season, bunchgrass that grows to a height of 1½ to 5 feet. Little bluestem plants are slender, with flattened basal shoots that are often purplish at the base. The entire plants have a reddish cast after frost. Seeds with very hairy appendages are held in 3-inch long racemes along each stem. Having exceptional drought tolerance, little bluestem can be successful on very dry sites with thin or coarse soils. Full stands develop where moisture is sufficient but gets clumpy on drier sites. It has value as persistent low maintenance cover and as summer forage. It is very compatible with forbs due to its shorter growth. It is easily mistaken for common broomsedge (*Andropogon virginicus*), which has low forage value.





Coastal little bluestem (*Schizachyrium littorale*)

Coastal little bluestem is a short (1-2 foot) bunch grass with coarse blue-green stems and basal leaves which often appear purplish. It is very similar to little bluestem, but can be distinguished by stems that point outward at their base and then bend to point upward. Leaves are smooth, but frequently are covered with hair at the base. Leaves tend to fold with maturity. Seed head clusters are about three inches long and have a number of short, silvery hairs (awns) when the seeds are ripe. In the late summer to early fall a low sun shining across the seed heads of this grass give the plant a frosty appearance. Like most dune adapted species, it will survive on droughty, hot and infertile sites.

Coastal little blue can be used for diversifying sand dune plant communities, beach replenishment projects, and critical area stabilization within coastal zone areas or on droughty inland sites such as sand and gravel mines.

Sideoats grama (*Bouteloua curtipendula*) – a medium-size perennial bunchgrass, 15 to 30 inches tall or occasionally taller, with leaves that are straight, comparatively stiff, and mostly basal. Plants spread very slowly with extremely short, stout rhizomes. It has a bluish-green color, sometimes with a purplish cast (especially in the spring), and turns to a reddish-brown or straw color in the fall. Ten to thirty small, spikes are borne mostly along one side of each central seed stalk. These spikes drop when mature, leaving a long zigzag stalk. Sideoats grama grows best on well drained soils and is very drought tolerant. It establishes quickly and is good forage on very dry soils.



Group C. Vegetatively planted species

Saltmeadow cordgrass (*Spartina patens*) – This short warm season perennial grows from 1 to 3 feet tall, and spreads extensively by long slender rhizomes, spreading about 1 foot per year. It grows immediately above the intertidal zone, commonly forming solid stands in estuarine marshes, and also grows on secondary and back dunes. Dark green stems emerge from the rhizomes. The rolled leaf blades are typically 1/2 to 1 foot long, and 0.1 to 0.2 inches wide. Leaves are drooping and wiry in appearance. In late summer the inflorescence emerges at the end of the stem, which is composed of 2 to 10, 2- inch long spikelets.

Table 1. Warm Season Grass Varieties for the Mid-Atlantic Region.

SPECIES	COMMON NAME	VARIETY NAME	ORIGIN / SOURCE
<i>Andropogon gerardii</i>	Big Bluestem	'Niagara'	NY
<i>Andropogon gerardii</i>	Big Bluestem	Suther Germplasm	NC
<i>Bouteloua curtipendula</i>	Sideoats Grama	'El Reno'	OK
<i>Dichanthelium clandestinum</i>	Deertongue	'Tioga'	PA/NY/NH
<i>Panicum amarum</i> var. <i>amarulum</i>	Coastal Panicgrass	'Atlantic'	VA
<i>Panicum virgatum</i>	Switchgrass	'Blackwell'	OK
<i>Panicum virgatum</i>	Switchgrass	'Cave-In-Rock'	IL
<i>Panicum virgatum</i>	Switchgrass	'Shelter'	WV
<i>Panicum virgatum</i>	Switchgrass	'Carthage'	NC
<i>Panicum virgatum</i>	Switchgrass	High Tide Germplasm	MD
<i>Schizachyrium scoparium</i>	Little Bluestem	'Aldous'	KS
<i>Schizachyrium scoparium</i>	Little Bluestem	Suther Germplasm	NC
<i>Schizachyrium littorale</i>	Coastal Bluestem	Dune Crest Germplasm	NJ/DE
<i>Sorghastrum nutans</i>	Indiangrass	'Americus'	AL/GA
<i>Sorghastrum nutans</i>	Indiangrass	'NE-54'	NE
<i>Sorghastrum nutans</i>	Indiangrass	'Rumsey'	IL
<i>Sorghastrum nutans</i>	Indiangrass	Suther Germplasm	NC
<i>Spartina patens</i>	Saltmeadow Cordgrass	'Avalon'	NJ
<i>Tripsacum dactyloides</i>	Eastern gamagrass	'Highlander'	TN
<i>Tripsacum dactyloides</i>	Eastern gamagrass	'Pete'	KS
<i>Tripsacum dactyloides</i>	Eastern gamagrass	'Meadowcrest'	MD

Table 2. Drainage Classes and Intended Uses of Varieties.

SPECIES	VARIETY NAME	ED = excessively drained	WD = well drained	MWD = moderately well drained	SPD = somewhat poorly drained	PD = poorly drained	VPD = very poorly drained	PASTURE AND HAY	WILDLIFE FOOD AND COVER	STREAMBANK / SHORELINE STABILIZATION	RIPARIAN HERBACEOUS BUFFER	FIELD BUFFERS / FILTER STRIPS	HERBACEOUS WIND BARRIER	MINELAND / DEGRADED SOILS	SALT TOLERANT VEGETATION	WASTE MANAGEMENT
		SOIL DRAINAGE CLASS						RECOMMENDED USES								
<i>Andropogon gerardii</i>	'Niagara'	♦	◆	◆	♦			◆	♦		◆	◆	◆			
<i>Andropogon gerardii</i>	Suther Germplasm	♦	◆	◆	♦			♦	◆		◆	◆	♦			
<i>Bouteloua curtipendula</i>	'El Reno'	◆	◆					♦	◆			◆		◆		
<i>Dichantherium clandestinum</i>	'Tioga'	♦	◆	◆	♦				◆		◆			◆		
<i>Panicum amarum</i> var. <i>amarulum</i>	'Atlantic'	◆	◆	◆	♦				♦	◆			◆	◆	◆	
<i>Panicum virgatum</i>	'Blackwell'	◆	◆	◆	◆	♦		◆	♦		◆	◆	◆			
<i>Panicum virgatum</i>	'Cave-In-Rock'	♦	◆	◆	◆	◆	♦	♦	◆	◆	◆	◆	◆			
<i>Panicum virgatum</i>	'Shelter'	◆	◆	◆	◆	♦		♦	◆		◆	◆	◆			
<i>Panicum virgatum</i>	'Carthage'	◆	◆	◆	◆	♦		◆	♦		◆	◆	◆			
<i>Panicum virgatum</i>	High Tide Germplasm		♦	◆	◆	◆	◆			◆	◆	◆	♦		♦	
<i>Schizachyrium scoparium</i>	'Aldous'	◆	◆					◆	◆		◆	◆		♦		
<i>Schizachyrium scoparium</i>	Suther Germplasm	◆	◆					♦	◆		◆	◆		♦		
<i>Schizachyrium littorale</i>	Dune Crest Germplasm	◆	◆						♦					◆	◆	
<i>Sorghastrum nutans</i>	'Americus'	♦	◆	◆				◆	♦		◆	◆	◆			
<i>Sorghastrum nutans</i>	'NE-54'	♦	◆	◆				◆	♦		◆	◆	◆			
<i>Sorghastrum nutans</i>	'Rumsey'	♦	◆	◆				◆	♦		◆	◆	◆			
<i>Sorghastrum nutans</i>	Suther Germplasm	♦	◆	◆				♦	◆		◆	◆	♦			
<i>Spartina patens</i>	'Avalon'				♦	◆	◆		◆	◆					◆	
<i>Tripsacum dactyloides</i>	'Highlander'		♦	◆	◆	♦		◆	◆	◆	◆	◆	◆			◆
<i>Tripsacum dactyloides</i>	'Pete'		♦	◆	◆	♦		◆	◆	◆	◆	◆	◆			◆
<i>Tripsacum dactyloides</i>	'Meadowcrest'		♦	◆	◆	♦		◆	◆	◆	◆	◆	◆			◆

(◆) optimum (♦) acceptable

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