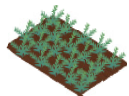


Little bluestem

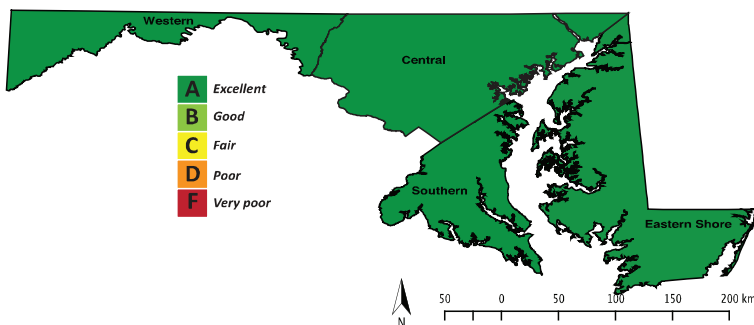
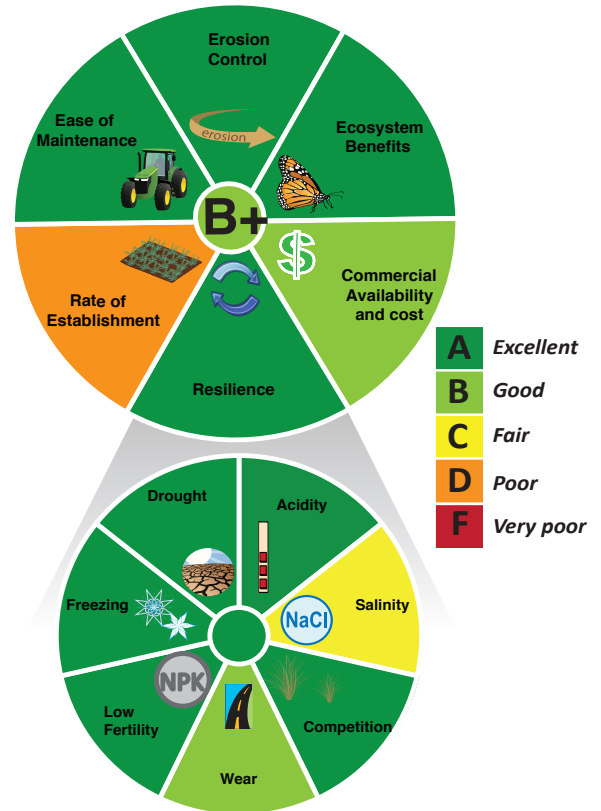
Schizachyrium scoparium = *Andropogon scoparius*

Little bluestem is a native grass that provides excellent ecosystem benefits for wildlife and disturbed soils reclamation. It can be mixed with other native species for biodiversity enhancement. Plants are short-statured requiring little maintenance, deep-rooting for anchoring soil, and resilient to many stressful environmental conditions including low fertility and acid soils, freezing temperatures, and drought. Little bluestem is rated as Good to Excellent (grade = B+) for use as a roadside species with a few management concerns:

\$ Little bluestem seed is commercially available but the cost of seeds is high. Due to low sowing rates, it is affordable when planted in large areas.

 Germination rate can be low and rate of establishment is slow, typically requiring > 2 years. Once established, however, it is a superior performer.

NaCl Little bluestem is sensitive to salinity, which decreases its resilience in areas that receive road salt in high concentrations.



Little bluestem is adapted to environmental conditions throughout Maryland.



Cultivars that are available commercially are Carousel, The Blues, Standing Ovation and Pastura, but none are native to the mid-Atlantic region. Local ecotypes should be used to maximize plant adaptation to local environmental conditions.

Biology: Little bluestem is a native perennial warm season (C₄) bunchgrass that is wide-spread in North America (Leithead et al. 1971, Steinberg 2002, Tober and Jensen 2013) and can grow in the eastern United States at low elevations in coastal prairie up into the higher elevations of the Appalachian Mountains (Small and Wentworth 1998). Little bluestem occurs most commonly on dry sites, especially ridges, hilltops and steep slopes (Tober and Jensen 2013). It is commonly used in restoration plantings and native turf meadow mixes (Johnson 2008, Tober and Jensen 2013). Little bluestem is so common in native prairie that it is the official state grass for Nebraska and Kansas.

Seeds per pound: 225,000-250,000 (Steinberg 2002, Tober and Jensen 2013)

Cost per pound: \$16 per pound from Chesapeake Valley Seed and Ernst Conservation Seed

Cost per acre: \$192.00 per acre

Suggested sowing rate: 12 pounds per acre (Chesapeake Valley Seed); 2.5 to 4.5 pounds per acre (Tober and Jensen (2013), or when broadcasting 7-12 pounds per acre (USDA plant fact sheet).

Sowing depth: ¼ to ¾ inch (USDA plant fact sheet)

Germination time: 6 days with proper stratification (30-60 days at 105.8°F) and daytime temperature of 86°F (Steinberg 2002)

Seeding timing: Little bluestem should be seeded as early in the spring as possible (USDA plant fact sheet).

Length of growing season: Late spring to fall if moisture is adequate (Leithead et al. 1971) until the first killing frost (USDA plant fact sheet).

Leaf height: 6-10 inches (Leithead et al. 1971), 3-20 inches (Steinberg 2002), 2-12 inches (Tober and Jensen 2012)

Height at seed head stage: 2-4 feet (Leithead et al. 1971), 1.6-6.6 feet (Steinberg 2002), 1-3 feet (Tober and Jensen (2013)

Shade tolerance: Little bluestem grows best in full sun.

Suggested mowing height: unknown

Tolerance of wet conditions: Little bluestem is adapted to well-drained soil. It has poor to fair flooding tolerance (USDA plant fact sheet).

Humidity tolerance: unknown

Disease resistance: Little bluestem is susceptible to leaf spot (Tober and Jensen 2013).

Services:



Commercial availability and cost: Little bluestem seed production is consistent and is sold by most native plant nurseries. The cost of seeding a large area is affordable given the low sowing rates of little bluestem.



Rate of establishment: Germination in the field appears to be low (Steinberg 2002) and requires stratification as well as daytime temperatures between 20-30°C (68-86°F). Tinsley et al. (2006) report a germination rate of 66% for little bluestem; however, when sown in field plots in Texas, little bluestem establishment success relative to initial sowing was only 0.7% within a 60-day period and composed 1-6% of total plant density. Biesboer and Jacobson observed 50% germination in field plots in Minnesota; and Gibson and Carrington (2008) observed 9-14% germination in laboratory petri dishes and 1-3% germination in field plots. Little bluestem

establishes slowly (Mischkolz et al. 2013, Miller et al. 2013, Tober and Jensen 2013) because plants invest in root growth before shoot growth. Thus, full establishment may require more than 2 years (Mischkolz et al. 2013, Miller et al. 2013). When a 4 and 7 year old restoration planting was sampled, Yurkonis et al. 2010 observed little bluestem to be one of the dominant species that had established from seed mixes.



Ease of maintenance: Little bluestem is a moderately low-stature plant and can grow successfully in low maintenance conditions. Miller et al. (2013) selected little bluestem as the dominant species (53%) in a native seed mix and found that it performed well in Minnesota in the second and third year especially under no-mow conditions.



Erosion control: Little bluestem is generally non-rhizomatous but has a sod-forming habit with deep and fibrous roots (Steinberg 2002, Tober and Jensen 2013). Little bluestem developed a mean root length between 46 to 76 cm in Rhode Island rooting column experiments (Brown et al. 2010). Steinberg (2002) reports a rooting depth between 1.3 and 1.75 m (4.5-5.5 feet). The good combination of deep rooting, even root distribution and short stature highlights little bluestem as an excellent species for anchoring roadside slopes in low-maintenance conditions such as roadsides (Brown et al. (2010).



Ecosystem benefits: Little bluestem is a valuable forage species for livestock (Leithead et al. 1971) and is considered to be one of the best grasses for nesting and roosting habitat (Tober and Jensen 2013). It provides food and cover for many upland bird species such as the Baltimore Oriole (Steinberg 2002), and chipping, field, and tree sparrows (Tober and Jensen 2013). Butterfly caterpillars may overwinter above the base of little bluestem clumps (Tober and Jensen 2013). Little bluestem is used for reclamation of mine spoils and is most successful when soils are amended with organic matter (Steinberg 2002). It is also used extensively in native landscaping (Tober and Jensen 2013). Native American tribes used little bluestem in ceremonial sweat lodges and as lining and insulation for moccasins (Tober and Jensen 2013).



Resilience:



Drought: Little bluestem can withstand prolonged drought periods (Leithead et al. 1971) due to its long roots that can access water resources and its association with arbuscular mycorrhizae, which increase in abundance with declining water levels (Steinberg 2002). During the severe drought in the 1930's in Kansas, however, little bluestem was replaced by more drought resistant sideoats grama. (Albertson 1937). During the seedling stage, little bluestem is less tolerant to drought than grama grasses but more tolerant than big bluestem, switchgrass, indiagrass, prairie junegrass, basin wildrye and western wheatgrass (Mueller and Weaver 1942). Little bluestem was able to survive a drought in a backslope trial when planted along a roadside in Rhode Island whereas 8 out of 14 species planted did not survive (Brown et al. 2010). In a frontslope trial, however, little bluestem and most other species with exception of prairie junegrass had poor survival as a result of nutrient deficiency and drought stress (Brown et al. 2010).



Low fertility: Little bluestem thrives on low fertility soils and will be competitively excluded from communities when resources are more abundant.



Freezing: Little bluestem has excellent tolerance to cold environments and can thrive in the northern United States as well as Canada.



Salinity: Little bluestem is tolerant of salinity concentrations commonly encountered along roadsides (Biesboer and Jacobson 1994, Gibson and Carrington 2009). Biesboer and Jacobson (1994) seeded little bluestem into experimental plots in Minnesota and subjected soils to salt treatments ranging from 0 to 20,000 ppm salt. Percent germination was 50% when no salt was added and decreased to 12% in 2,500 ppm, 10% under 5,000 ppm, 6% under 10,000 ppm and no germination at higher concentrations. In another experiment, they observed 15% germination by day 15 but none of the seedlings survived past day 25. In Minnesota, roadside soils rarely approached 2,500 ppm, suggesting that little bluestem would be able to germinate although at a reduced rate. In a similar experiment in Illinois, Gibson and Carrington (2008) observed 9-14% germination in seeded plots subjected to a range of salinity treatments. Percent germination was not affected by salinity and even increased slightly.



Acidity: Little bluestem prefers neutral to alkaline soils (Leithead et al. 1971) of pH 7 and higher (USDA plant fact sheet). pH of 5.5 or higher is sufficient for establishment (USDA plant fact sheet) and Thorne and Cardina (2011) report a pH range from 4.8 to 8.



Wear tolerance: Little bluestem is adapted to grazing but is negatively affected by intense grazing. Little bluestem is not tolerant of low mowing heights (Johnson 2008).



Competition: Little bluestem is competitive when resources are limited but will decline in cover and be excluded in more productive habitats.

Mixes: Brown et al. (2010) recommends mixing little bluestem (which is dormant in the winter months) with cool season grasses that have minimal winter dormancy. Little bluestem was used in a native grass mixture to test which of eight mixtures performed better in low maintenance trials in Minnesota (Miller et al. 2013). The mixture containing little bluestem (53%) also included 32% side-oats grama, 10% blue grama, 3% prairie junegrass, 1% poverty oat grass, and 1% kalm's brome. The mixture was the slowest among the eight mixtures to establish with 47% cover 56 days after seeding as opposed to 95% cover for the best performing mixtures (tall fescue blend and fine fescue mixture). However, after underperforming in the first year of establishment, the native mixture received very good turf quality ratings in the second and especially the third year of growth under minimal mowing conditions. Percent weeds in the third year was moderate (12%) and significantly lower than a Kentucky bluegrass blend. Under no-mow conditions, the mixture obtained the best quality ratings by the third year and supported few weeds (7%). Fine fescues also performed well but were affected by diseases (leaf spot and melting out) even though these did not affect quality ratings. Miller et al. (2013) conclude that native warm season grass mixtures are well suited for no mow conditions owing to their interesting foliage and seed heads. Selecting seed mixtures is important to allow for species to self-organize into communities that are adapted to the local environment.

Cultivars: Little bluestem exhibits a broad range of ecotypic variation due to its broad distribution (Tober and Jensen 2013). Cultivar 'Carousel' is a compact plant developed by Chicagoland Grows. Cultivars 'The Blues' and 'Standing ovation' have ornamental utility. Cultivar 'Pastura' originates from New Mexico and is a prolific seed producer (Steinberg 2002). Local ecotypes may be available from local seed vendors (USDA plant fact sheet).