

# SHORE LITTLE BLUESTEM

*Schizachyrium littorale* (Nash)  
E.P. Bicknell

Plant Symbol = SCLI11

## Alternative Names

*Common Names:* coast beard grass; coastal little bluestem; dune bluestem; dune false bluestem; maritime bluestem; seacoast bluestem; seacoast little bluestem; seaside beard grass; seaside bluestem; seaside little bluestem; shore bluestem; shore little bluestem

*Scientific Names:* *Andropogon littoralis* Nash;

*Andropogon scoparius* Michaux var. *ducis* Fernald & Griscom; *Andropogon scoparius* Michaux var. *littoralis* (Nash) A.S. Hitchc.; *Schizachyrium littorale* (Nash) Bicknell; *Schizachyrium scoparium* subsp. *littorale* (Nash) K.N. Gandhi & F.E. Smeins; *Schizachyrium scoparium* (Michaux) Nash var. *littorale* (Nash) Gould; *Schizachyrium scoparium* var. *littoralis*

## Description

*General:* Shore little bluestem is a perennial, native, warm season bunch grass that is typically of shorter stature. Although shore little bluestem most commonly ranges in heights from 1-2 feet, it can approach heights of up to 5 feet in some regions under appropriate conditions (Skaradek & Miller, 2007; Graetz, 1973; NPIN, n.d.). It breaks dormancy and begins its active growth period in late spring, continuing growth and seed production until the season's initial hard frost (Skaradek & Miller, 2007). The chalky blue-green stems may display tinges of purple. They are flattened near the base and frequently form roots at the lower nodes giving them a bent or curved appearance which may give the plant a more prostrate growth form (Lonard & Judd, 2010). Leaves are similarly colored to the stems, but after the first frost and as the plant approaches dormancy, it turns a reddish-brown leaving tan stems through the winter (Skaradek & Miller, 2007). Individual leaves range from 5.9-11.8 inches long and 0.12-0.25 inches wide (Lonard & Judd, 2010; Hosier, 2018). Leaves are primarily hairless but may display tufts of hair at their base near the leaf sheath (Skaradek & Miller, 2007; Hosier, 2018). Leaves have parallel veins emerging flat, but often become folded as they mature (Lonard & Judd, 2010; Skaradek & Miller, 2007). The flowering period begins in August and mature seed is developed in October (Duncan & Duncan, 1987). Mature seedheads produce abundant fluffy, silver hairs giving the plant a frosted appearance (Graetz, 1973). The flowers are racemelike forming clusters of seedheads about 3 inches long along roughly a 1-foot length of the seed-bearing stem (Hosier, 2018).



Figure 2: A spikelet surrounded by the abundant fluffy, silver hairs of the seedhead that give shore little bluestem its frosted appearance.



Figure 1: A bunch of shore little bluestem grass in the fall after its leaves and stems have turned rusty orange displaying its distinctive fluffy, silvery white seedheads.

Shore little bluestem was formerly considered a variety or subspecies of little bluestem (*Schizachyrium scoparium*) (Lonard & Judd, 2010). Shore little bluestem can be differentiated from the morphologically similar little bluestem by its well-developed rhizomes and the greater distances between nodes. Internodes of

shore little bluestem rhizomes are 0.2-1.6 inches while those of little bluestem are 0.04-0.12 inches (Duncan & Duncan, 1987; Lonard & Judd, 2010). Straightness of stems is an additional dissimilar morphological characteristic between the two species. Shore little bluestem stems are often bent at the base due to rooting at the nodes while little bluestem stems tend to stay straight and erect (Skaradek & Miller, 2007). This can impact the apparent growth form distinguishing the two species with shore little bluestem appearing more prostrate than little bluestem.

*Distribution:* Within the US, shore little bluestem occurs primarily along the coastal region from Texas to southern New England as far north as Massachusetts (Hosier, 2018; Skaradek & Miller, 2007). Although less common, it occurs further inland on the coastal plain grasslands, pine barrens, and maritime forests of the Mid-Atlantic region and in wooded openings and the sandy soils of the Coastal Sand Plain and Coastal Prairie region of south Texas (Westervelt et al., 2006; Diamond & Fulbright, 1990). Shore little bluestem is also reported to occur in Illinois, Indiana, Ohio, Pennsylvania, and Ontario, Canada on the coastal sand dunes around Lake Erie and Lake Michigan (Hitchcock, 1951; Gleason & Cronquist, 1963; Pennsylvania Natural Heritage Program, 2012; Ganger, Zimmerman, Grund, & Bissell, 2016; USDA-NRCS, 2021; NPIN, n.d.). However, Ghandi (1989) questioned the accuracy of those reports as his research concluded that the Great Lakes populations were morphologically more similar to little bluestem than shore little bluestem. The southernmost reported occurrence of shore little bluestem is along the coast of the Gulf of Mexico from Veracruz to Tabasco, Mexico (Moreno-Casasola, 1988).

For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

*Habitat:* Shore little bluestem commonly occurs from the leeward side of the primary dune to the scrub zone of coastal dune environments. In the pioneer zone of coastal dune environments, it occurs in association with American beachgrass (*Ammophila breviligulata*), sea oats (*Uniola paniculata*), coastal panicgrass (*Panicum amarulum*), bitter panicgrass (*Panicum amarum*), seacoast marsh elder (*Iva imbricata*), gulf croton (*Croton punctatus*), seaside goldenrod (*Solidago sempervirens*), and largeleaf pennywort (*Hydrocotyle bonariensis*) (Graetz, 1973). Further from the coast, shore little bluestem continues to occur in the scrub zone of the dune system growing in association with yaupon holly (*Ilex vomitoria*), wax myrtle (*Morella cerifera*), northern bayberry (*Morella pensylvanica*), eastern baccharis (*Baccharis halimifolia*), winged sumac (*Rhus copallinum*), peppervine (*Nekemias arborea*), Virginia creeper (*Parthenocissus quinquefolia*), muscadine (*Vitis rotundifolia*), devilwood (*Osmanthus americanus*), beach plum (*Prunus maritima*), eastern red cedar (*Juniperus virginiana*), and live oak (*Quercus virginiana*) (Graetz, 1973; Lonard & Judd, 2010). In coastal plain grassland habitats, shore little bluestem may be associated with species such as big bluestem (*Andropogon gerardii*), broomsedge bluestem (*Andropogon virginicus*), seashore dropseed (*Sporobolus virginicus*), gulfdune paspalum (*Paspalum monostachyum*), saltmeadow cordgrass (*Spartina patens*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*) (Dahl, Fall, Lohse, & Appan, 1975; Facella et al., 2020).

### **Adaptation**

Shore little bluestem is well adapted to the sandy, infertile, well drained soils of coastal dunes. It has some degree of drought tolerance, however not to the same extent as other coastal dune species (Skaradek & Miller, 2007; Oosting & Billings, 1942). It primarily occurs in sandy substrates with a pH ranging from 6.1–8.8 (Diamond & Fulbright, 1990; Skaradek & Miller, 2007; Moreno-Casasola & Espejel, 1986). Shore little bluestem prefers full sun and is well adapted to the scorching soil surface temperatures (up to 53°C) of the dunes (Hosier, 2018; Oosting & Billings, 1942). It is reported to be somewhat salt adapted and able to withstand some salt spray (Hosier, 2018). However, Oosting & Billings (1942) demonstrated in a containerized study that after a month of daily seawater spray treatments, shore little bluestem plants displayed a steady decline in health and vigor. A month of daily watering with seawater had greater detrimental effects resulting in nearly 100% mortality at the conclusion of the experiment (Oosting & Billings, 1942). Although it can withstand some degree of sand accretion, Martínez, Gabriela, and Salvador (2001) reported that the frequency and coverage of shore little bluestem increased in response to decreased sand movement (Martínez & Moreno-Casasola, 1996). These relationships with shifting sands and salt spray may partially explain why shore little bluestem more frequently inhabits stable secondary dunes rather than the windward side of the primary dune where it would be subjected to detrimental salt spray and frequently shifting sands. Shore little bluestem is also fire adapted. Following burning, shore little bluestem naturally revegetated burned areas of Padre Island National Seashore, Texas and reestablished as the dominant species 106 days after the fire occurred (Lonard, Judd, Smith, & Yang, 2004). The pubescent appendages of shore little bluestem seedheads make it well adapted for wind assisted seed dispersal (Lonard & Judd, 1980).

### **Uses**

*Conservation Practices:* The coastal dune adaptations of shore little bluestem make it an ideal candidate for the NRCS Critical Area (342) standard for dune stabilization plantings, especially in areas with a high likelihood of blowouts (Moreno-Casasola & Espejel, 1986; USDA-NRCS, 2014). Including shore little bluestem in dune vegetation planting mixes increases plant diversity and assists with the natural coastal sand dune successional process (Wootton et al., 2016).

Shore little bluestem may also be useful to the application of NRCS Conservation Practice Standards Conservation Cover (327), Wildlife Habitat Planting (420), and Upland Wildlife Habitat Management (645) if site conditions and objectives for applying the practice(s) are appropriate. The inclusion of native, bunch forming grasses provides pollinator habitat benefits in the form of larval host plants for butterflies and nesting/overwintering sites for native insects including bumble bees (Lee-Mäder, Borders, & Minnerath, 2013). Bunch forming grasses are preferred over sod forming grasses for pollinator habitat applications because the small patches of bare soil between clumping grasses provide valuable nesting area for ground nesting bees (Hopwood et al., 2015).

*Wildlife:* Shore little bluestem is a host plant for a variety of butterfly species including the cobweb skipper, common wood nymph, crossline skipper, Dakota skipper, dusted skipper, Leonard's skipper, ottoe skipper, and the swarthy skipper (Facella et al., 2020). Additionally, shore little bluestem serves as an apparent specialized host plant for the larvae of the rare crystal skipper butterfly. The crystal skipper's population numbers are directly impacted by the plant's population numbers where it occurs along the central coast of North Carolina from Fort Macon State Park to Hammocks Beach State Park (Taggart, 2008; Hosier, 2018; NCBG, 2020). Shore little bluestem also provides cover for shorebirds, migratory birds, and small mammals that inhabit the coastal dune environment (Wootton et al., 2016). The primary dune area of Padre Island National Seashore, Texas is dominated by grasses such as shore little bluestem which provide ideal habitat for rodents including the Gulf Coast kangaroo rat and the spotted ground squirrel (Jones & Frey, 2013). Rose & Sweitzer (2013) reported that shore little bluestem was the dominant grass species at a Chesapeake Bay dune study site that displayed the greatest population numbers of white footed mice leading them to conclude that well vegetated dunes are the preferred habitat for that species. In turn, these small mammals provide a food source for predatory avian species such as White-tailed Hawk, Harris's Hawk, Crested Caracara, and Black-shouldered Kite. Terrestrial predators such as bobcats and coyotes also prey on these small mammals (Fulbright, Diamond, Rappole, & Norwine, 1990). Shore little bluestem may also provide benefits to some species of crustaceans. Ehrenfeld (1990) reported that ghost crabs collect and cache shore little bluestem seedheads in their burrows on the dunes. Whether the benefit to the ghost crabs is strictly for burrow construction purposes or for dietary needs is unclear, but the practice is symbiotic as it provides a clear benefit to shore little bluestem by assisting with seed dispersal and establishing seedlings at favorable sites (Ehrenfeld, 1990).

*Ornamental/landscaping:* The bluish green leaves turn an attractive rusty orange as the season progresses culminating to an appearance of a "frosty fairyland", as described by Graetz (1973) when the fluffy seed matures, making shore little bluestem an attractive plant for ornamental landscaping applications. Its tolerance for harsh landscapes and infertile soils makes it an excellent option for difficult landscape sites (Skaradek & Miller, 2007). Additionally, its primarily lateral root system makes it an ideal choice for green roof plantings (Facella et al., 2020).

*Forage:* Shore little bluestem is readily grazed by cattle; however, the nutritive value has not been examined. Extensive cattle grazing was conducted on North Padre Island, Texas from the early 1800's until 1972 supported by the native plant community on the island which included shore little bluestem as one of several dominant grass species (Dahl et al., 1975).

#### **Status**

*Threatened or Endangered:* Shore little bluestem is listed as "critically imperiled" (S1) in OH, "imperiled" (S2) in NC, "vulnerable" (S3) in PA and NY, and "apparently secure" (S4) in NJ (NatureServe, 2021).

*Wetland Indicator:* FACW for Eastern Mountains and Piedmont, Great Plains, Midwest, and Northcentral and Northeast regions; FAC for Atlantic and Gulf Coastal Plain region; FACU for the Arid West regions (USACE, 2020).

*Weedy or Invasive:* Shore little bluestem is not currently listed as an invasive plant or as a noxious weed anywhere in the United States (USDA-NRCS, 2021).

Please consult the PLANTS Web site (<http://plants.usda.gov/>) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

#### **Planting Guidelines**

For dune stabilization and revegetation applications, establishment via vegetative plugs from March to May is recommended as the most dependable method (Skaradek & Miller, 2007; Wootton et al., 2016). Plugs should be planted with the root ball 2 inches below nursery grown depth on 2-5 foot centers with other dune appropriate species (Wootton et al., 2016). Planting stock stems should be 1-2 feet tall (USDA-NRCS, 2014). Direct seeding standards for the coastal dune environment have not been studied extensively, but Wolff (1951) reported that if mature shore little bluestem seed hay is incorporated into sand dunes it will result in some establishment. New Jersey Plant Materials Center (NJPMC) staff conducted preliminary direct seeding trials of dune adapted species in Avalon, NJ. Staff direct seeded shore little bluestem in replicated plots at two rates (5.6 and 2.8 PLS /ft) and two depths (1.0 and 0.6 inches) in late April 2015. The greatest rate of seedling emergence (1.5



seedlings/ft) resulted from the higher seeding rate and deeper planting depth while the highest seedling emergence rate from the lower seeding rate never surpassed 0.2 seedlings/ft. In a demonstration planting on a newly constructed dune adjacent to the Delaware Bay in Town Bank, NJ, NJPMC staff successfully established shore little bluestem via direct seeding (7.9 PLS /ft at 1.0-inch depth) using a single row garden push seeder in mid-April 2018.

Shore little bluestem can be successfully established via broadcast applications when included in wildlife habitat or insectary cocktail seed mixes. In a replicated seeding trial, NJPMC staff included shore little bluestem in a pollinator habitat direct seeding mix at a rate of 1.98 lb PLS/ac. The entire seeding area was cultipacked immediately before and after the seed mix was broadcast to improve seed to soil contact. Based on preliminary data (2020), this planting rate and seeding method resulted in an average establishment rate of 0.3 seedlings/ft<sup>2</sup>.



*Figure 3: A row of direct seeded shore little bluestem adjacent to rows of vegetatively established American beachgrass. Photo was taken after two growing seasons.*

Establish seed production fields following the same rates and guidelines for dune stabilization and revegetation plantings. The site should receive full sun and have soils that are well-drained. If necessary, amend the soil pH until neutral or slightly alkaline (Skaradek & Miller, 2007).

Shore little bluestem averages 321,000 seeds/lb (Wolff, 1951). NJPMC staff conducted pure caryopsis counts of Dune Crest Germplasm shore little bluestem after seed was cleaned of glumes, lemma, palea, and other chaff resulting in an average of 477,465 seeds/lb.

### **Management**

Minimal maintenance is required for coastal dune habitat plantings. Fertilization is recommended for the establishment year and the following year. Wootton et al. (2016) recommends a general dune vegetation initial fertilization rate of 20-30 lb nitrogen per acre broadcast applied but cautions that fertilizer applications should be site appropriate and not degrade water quality due to leaching of excess nutrients from overfertilization. Alternative nutrient sources such as a slow-release fertilizer (14-14-14) applied direct to the planting hole (0.05 oz per plant) and organic options provide fertilization choices other than standard synthetic fertilizers for coastal dune sites (Wootton et al., 2016).

For seed production, nursery, and ornamental applications, base fertilizer rates on soil test results of the planting site. Contact your local agricultural extension for soil test analysis and fertilizer application recommendations prior to implementing a fertilization plan. If the soils lab does not maintain recommendations specifically for shore little bluestem, they may use guidelines for similar species or other native warm season grasses (Skaradek & Miller, 2007; USDA-NRCS, 2014).

### **Pests and Potential Problems**

There are no known pests or problems associated with shore little bluestem (Skaradek & Miller, 2007).

### **Environmental Concerns**

There are no known environmental concerns associated with shore little bluestem in the US (USDA-NRCS, 2014). Shore little bluestem has been listed as a potentially weedy grass in Mexico (Sanchez-Ken, 2012).

### **Seeds and Plant Production**

Harvest seed between mid-November to mid-December with hand tools (hand sickles) or on a greater scale with mechanical agricultural equipment (Wolff, 1951). Using a flail-vac sweeper stripper style harvester allows for mature seed to be harvested while leaving immature seed on the plant to further develop. This method of harvesting has proven effective and efficient as it does not damage the plant and allows for multiple harvest passes minimizing seed loss to wind distribution and premature harvest. Wolff (1951) reported that seed can be harvested by combine but will result in extremely low purity levels. Dry harvested material to preserve seed viability and reduce the possibility of fungal growth and decomposition. Depending on harvest conditions, drying method/equipment, and environmental conditions, drying time could be several days to several weeks (Houseal, 2007). A small seed production field (0.183 ac) at the NJPMC produced an average 57 lb/ac of clean shore little bluestem seed per year from 2008-2020 when harvested with multiple passes using a flail-vac harvester (Woodward Flail-Vac Seed Stripper, Ag-Renewal Inc., Weatherford, Oklahoma) from mid-September to mid-December.

Best practice seed cleaning methods depend upon the harvest method. If harvested with hand tools, thresh seed before attempting to separate the chaff from the seed. Thresh seed with mechanized seed cleaning equipment or use a manual rubbing board. Small harvest amounts can be mechanically threshed using a slightly modified kitchen blender (Scianna, 2004). NJPMC staff have used a brush machine (Westrup [Slagelse, Denmark]) to further detach seed from glumes and fluffy appendages. Several passes of the plant material through a brush machine with square wire mantles (#7-12) have proven effective. Air and screen seed cleaning equipment separates chaff from seed with multiple passes using a range of 0.31 - 0.094 inch round hole or  $\frac{1}{16}$  by  $\frac{1}{4}$  -  $\frac{3}{64}$  by  $\frac{5}{16}$  inch slotted screens for the top and/or middle screens and “blank” (solid) or 0.04 inch round holes for the bottom screen.

Laboratory purity tests of seed harvested with a flail-vac harvester at the NJPMC from 2006-2016 and cleaned using the mechanized seed cleaning equipment, methods, and settings described above showed an average purity of 89.75%.

Containerized nursery stock can be produced from seed in a greenhouse setting. Greenhouse experiments conducted by Martinez & Moreno-Casasola (1996) demonstrated successful germination and seedling production using native dune habitat sand as the growing medium held at an average temperature of 25 °C. Seedlings were watered every 2-3 days when the sand surface was dry. This watering regime concurs with Oosting and Billings' (1942) findings where container grown shore little bluestem responded more positively to an alternate day watering treatment than to daily and no watering treatments. NJPMC staff produced quart sized container stock from seed using a planting medium mixture of sand (15-60% by volume) and a peat based general purpose growing mix medium.

### **Cultivars, Improved, and Selected Materials (and area of origin)**

These plant materials are somewhat available from commercial sources.

Dune Crest Germplasm shore little bluestem is a source identified composite germplasm released by the New Jersey Plant Materials Center in 2007 intended for use in Mid-Atlantic coastal areas from Massachusetts to North Carolina. The germplasms that constitute Dune Crest Germplasm were sourced from five New Jersey locations (Sea Bright, Barnegat Light, Brigantine, Avalon, and Cape May) and a site near Dewey Beach in Delaware State Park, DE (USDA-NRCS, 2014).

Cultivars should be selected based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension, or local USDA NRCS office for recommendations on adapted cultivars for use in your area.

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