

Planting Guide

Native Warm season Grass for Seed Production in South Carolina

GENERAL USE

Native, perennial, warm season grass species are noted for their rapid growth in the mid to late summer when high temperatures retard the growth of cool season grasses. The primary use of native warm season grasses are for wildlife habitat, native grassland restoration, disturbed land reclamation, and livestock forage seeded in pure stands or mixtures. Different species have different unique characteristics for conservation: switchgrass for its stiff stems as a upright cover for upland bird cover and erosion control barriers, indiagrass for its bunchy habit as a waterfowl nesting cover, eastern gamagrass for its high digestibility and protein levels as a livestock and wildlife forage, little bluestem for its drought tolerance as a erosion control cover, and deertongue for its tolerance to low pH, and high levels of aluminum and manganese.

Seed production of native warm season grasses requires more intensive cultural techniques and wider spacing of rows than would be required for conservation use to assure optimum quantities and qualities of seed. High quality seed free of weed seed is absolutely necessary for effective restoration, reclamation, and habitat and forage plantings.

CHARACTERISTICS

Warm season grasses produce a deep, extensive, fibrous root system and short rhizomes. Growth begins in late April or early May, and increases rapidly with higher temperatures. They produce about seventy percent of its annual growth after June 15. Their average date of seed maturity is September 9. If undisturbed, most species attain a height of four to six feet (two to three feet for little bluestem), and establishes a very deep root system.

ADAPTABILITY

Warm season grasses are winter hardy, and will grow throughout South Carolina. Most are adapted to all soil textures and drainage classes except very poorly drained conditions. Switchgrass and eastern gamagrass are well-adapted to poorly drained soils. In the southern half of the state (plant hardiness zone 8), switchgrass and eastern gamagrass only grow well on poorly drained soils due to the high evapotranspiration rates. Deep, well-drained soils are preferred for optimum wildlife habitat value and seed and forage production.

ECOTYPES AND CULTIVARS

Stands established from seed of local stands will be well adapted to the area in the proximity of the collection site and will preserve the genetic integrity of the plant communities in the area. The adaptation of that seed beyond the immediate area will be unknown without testing. The seed production and quality, forage production and quality, and wildlife habitat value will also be unknown. Commercial seed producers will set their prices based on the risk of seed production and the potential market for seed with unknown adaptation.

Regionally adapted cultivars are the products of extensive collection and testing within a region. The plant material is tested extensively for its adaptation throughout the region and dependability of seed production, forage production, and wildlife habitat value. Commercial seed producers set their price with full knowledge of the cultivars' potential seed production and its market based on the area of adaptation.

The major native warm season grass species each have cultivars that have been released with specific areas of adaptation, including a few of each species that are adapted to South Carolina.

ESTABLISHMENT

For optimum germination and growth, freshly collected seed of native warm season grasses requires a cold, moist stratification before it will germinate at high temperatures. Ecotypes and cultivars from further south will germinate without stratification at a higher rate than cultivars from further north, but earlier seedings will germinate earlier and survive summer droughts better.

It should be drilled into prepared seedbeds or no-till. Prepared seedbeds must be fine, firm surfaces free of competition. The seeding must be packed after drilling to insure good seed to soil contact. Seedings into fields that have been pastures or hayfields must have good weed control of the live vegetation on the site before drilling. No-till seedings are recommended in fields that have been pastures or hayfields to minimize the exposure of weed seeds to ideal germination conditions.

Native grass and forb seed is bought, sold, and seeding rates are developed by pounds of pure live seed (PLS). Pure live seed (PLS) is the amount of actual seed that will germinate in an amount of seed. Because the germination of native seeds is not dependable year to year and many species have awns, hairs or other impurities attached to the seed, pure live seed (PLS) is the only dependable way of handling native seeds. Drills must be calibrated to sow the correct amount of bulk seed to deliver the specified pure live seed. For example, to deliver 5 pounds of pure live seed (PLS) with 50% germination and 50% purity, the drill must sow $5/0.5 \times 0.5 = 5/0.25 = 20$ pounds of bulk seed.

Seeding Dates – Optimum - Before the local date of last frost

Northwest South Carolina – May 1

Southeastern South Carolina – April 1

Last date to avoid extensive summer drought mortality – May 15

Seeding Rate – Rates are rates based on 30 pure live seeds (PLS) per square foot drilled for wildlife habitat and restoration, 50 pure live seeds (PLS) per square foot drilled for forage and erosion control. Eastern gamagrass has large seeds and is sown in wide rows like corn; the normal seeding rates are based on 1 or 5 seeds per square foot. Rates in mixtures should be reduced in proportion to the number of species in the mix and the desired representation of each species in the mix.

For pure stands or mixtures, the table below can be used to estimate seeding rates:

Pounds Of Seed Per Acre												
Species	Seeds Per Pound	Seeds Per Square Foot										
		1	5	10	20	30	40	50	60	70	80	90
Eastern Gamagrass	6,000	7	14	73								
Big Bluestem	165,000		1	3	5	8	11	13	16	18	21	24
Indiangrass	175,000		1	2	5	7	10	12	15	17	20	22
Sideoats Grama	191,000		1	2	5	7	9	11	14	16	18	21
Deertongue	225,000		1	2	4	6	8	10	12	14	15	17
Little Bluestem	260,000		1	2	3	5	7	8	10	12	13	15
Coastal Panicgrass	300,000			1	3	4	6	7	9	10	12	13
Switchgrass	390,000			1	2	3	4	6	7	8	9	10

For a pure stand of indiagrass sown for wildlife (30 seeds per square foot), the seeding rate is 7 pounds of pure live seed (PLS) per acre.

An evenly-balanced mixture of big bluestem, little bluestem, and indiagrass established for wildlife (30 seeds per square foot) without forbs would have 10 pure live seeds of each species per square foot. The seeding rate of each species would be:

- Big Bluestem – 3 pounds of pure live seed (PLS) per acre
- Little Bluestem – 2 pounds of pure live seed (PLS) per acre
- Indiagrass – 2 pounds of pure live seed (PLS) per acre

Seeds per Pound of Forb (Wildflower) Species												
Common Name	Seeds per Pound	1	5	10	20	30	40	50	60	70	80	90
Tickseed Sunflower	125,000	1	2	3	7	10	14	17	21	24	28	31
Partridge Pea	65,000	2	3	7	13	20	27	33	40	47	54	60
Lanceleaf Coreopsis	221,000		1	2	4	6	8	10	12	14	16	18
Plains Coreopsis	1,400,000				1	1	1	2	2	2	2	3
Illinois Bundleflower	85,000	1	3	5	10	15	20	25	31	36	41	46
Purple Coneflower	117,000	1	2	4	7	11	15	18	22	26	30	33
Indian Blanket	153,000		1	3	6	8	11	14	17	20	22	25
Maximilian Sunflower	225,000		1	2	4	5	8	10	11	13	15	17
Evening Primrose	1,500,000				1	1	1	1	2	2	2	3
Blackeyed Susan	1,710,000				1	1	1	1	2	2	2	2

An mixture of 2/3 grasses and 1/3 forbs (wildflowers) established for wildlife (30 seeds per square foot) would have 20 pure live seeds (PLS) of the grass species per square foot and 10 pure live seeds (PLS) per square foot of forbs. If the grass component of the mixture was an evenly balanced mixture of big bluestem and indiagrass, each species would have 10 pure live seeds (PLS) per square foot. If the forb component mixture was an evenly balanced mixture of partridge pea and Illinois bundleflower, each species would have 5 pure live seeds (PLS) per square foot. The seeding rate of each species would be:

- Big Bluestem – 3 pound of pure live seed (PLS) per acre
- Indiagrass – 2 pound of pure live seed (PLS) per acre
- Partridge Pea – 3 pounds of pure live seed (PLS) per acre
- Illinois Bundleflower – 3 pounds of pure live seed (PLS) per acre

Seeding Depth – Indiagrass, Big bluestem, Little Bluestem, Deertongue - ¼ to 1/2 inch
 Switchgrass – 1/8 to ¼ inch
 Eastern Gamagrass – 1 inch

Indiagrass, big bluestem, and little bluestem seed is chaffy, and must be debarbed mechanically, sown with drills with chaffy seed boxes capable of handling the seed, or mixed with an inert material (weight of the inert material equal to the weight of the seed). Mechanical debarbing will add one dollar per pound to the price of the seed, but will allow seeding with conventional drills.

The seedling vigor of all perennial native warm season grasses is poor. Weed control is critical for stand survival. The only residual herbicide approved for use with perennial native warm season grasses is Plateau, which may be applied at or after seeding. Plateau will harm switchgrass and eastern gamagrass so its use is not recommended. Seed mixtures on which Plateau will be used

should not include switchgrass or eastern gamagrass. Weed control may also be done with contact herbicides or mowing. Most contact broadleaf herbicides are approved for use on native warm season grasses. Annual weeds may be controlled by mowing over the top of the native warm season grasses to prevent the weeds from making seed. All cool season grasses may be controlled when the native warm season grasses are dormant with a contact herbicide; some are controlled by Plateau. Forbs (wildflowers) may have a lower tolerance to Plateau than the rate required to control certain weeds.

The stand should be fertilized to raise the levels of phosphorus and potassium to moderate levels for corn (100 bushes per acre yield) before seeding. Nitrogen should not be applied until mid-summer once the stand is established and competing well with any weeds. Nitrogen rates the first year should be thirty to forty pounds per acre. The pH should be maintained between 6.0 and 6.5 for optimum habitat value and forage and seed production.

MANAGEMENT

Stands managed for forage should be fertilized annually with eighty pounds of nitrogen per acre, split into applications in June and August. Nutrient contributions from manure of grazing livestock should be accounted for. Moderate soil test levels of phosphorus and potassium should be maintained.

Pastures should be grazed when the stands reach twelve to sixteen inches tall. Animals should be removed when the grass is six to eight inches tall. Hay should be cut when the grass is at boot stage, and a stubble height of six inches should be left. A height of twelve inches should be left at frost. After frost, the grass may be grazed to six inches.

Weed control may be accomplished by maintaining plant vigor. Broadleaf weeds may be controlled with contact herbicides applied during the growing season; some may be controlled by Plateau before or during the growing season. Annual weeds may be controlled by mowing over the top of the native warm season grasses to prevent the weeds from making seed. Cool season grasses may be controlled with contact herbicides applied when the native warm season grasses are dormant; some may be controlled by Plateau before or during the growing season. Plateau is not recommended for use on switchgrass or eastern gamagrass. Forbs (wildflowers) may have a lower tolerance to Plateau than the rate required to control certain weeds.

Stands managed for wildlife and not harvested for forage should be burned every three to five years to stimulate the stand and reduce excessive mulch accumulations that restrict the movement of new hatchlings and attract nest predators.

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