

St. Augustine Grass

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Origin and Distribution. St. Augustine grass is a widely used lawn grass along the Gulf Coast in the U.S., in Southern Mexico, throughout the Caribbean region, South America, South Africa, Western Africa, Australia and the South Pacific and Hawaiian Islands. The species is primarily of tropical origin and is native to sandy beach ridges, fringes of swamps and lagoons, salty and fresh water marshes and limestone shorelines. St. Augustine grass gradually moved inland to naturally open sites such as streambanks, lakeshores and other moist sites. It tolerates a wide range in soil types, but does not withstand waterlogged or droughty sites.

In the U.S., St. Augustine grass is found from the Carolinas to Florida and westward along the Gulf Coast to Texas and in Southern and Central California. Because of its lack of winter hardiness, St. Augustine grass is restricted to areas with mild winter temperatures. Like bermudagrass, St. Augustine thrives in high temperatures, but the growth of St. Augustine is better than that of bermudagrass in cool, coastal climates.

St. Augustine grass is native to the Gulf of Mexico region, the West Indies and Western Africa. For as long as there have been records, St. Augustine grass has been reported as a seashore pioneer along the Atlantic coasts of Africa and the Americas. Prior to 1800, the species was reported in Uruguay, Brazil, Nigeria, Sierra Leone, the West Indies, Bermuda and South Carolina. In the Pacific, records are not nearly as old, but it was reported in Kauai prior to 1800. By 1840, St. Augustine grass had also been collected from Australia and New Zealand.

Several variants or strains of St. Augustine grass have been reported. The normal strain in early records has a white stigma color and was found to be a fertile diploid with 18 chromosomes. A sterile triploid variant with purple-colored stigmas was first collected around the Cape of Good Hope in 1791. By 1900 it was being used for lawns in Natal and has since been planted in Rhodesia, the Congo, Senegal, Australia and Southern California. In Florida it has been planted for lawns since the 1890's.

St. Augustine grass was moved inland from coastal regions by man for use in pastures and lawns. Its requirements, other than mild winter temperatures, include moist and somewhat fertile soils. St. Augustine grass will not survive in dry inland areas without supplemental irrigation. It is not as drought tolerant or cold tolerant as bermudagrass;

consequently, its inland movement has been restricted to states and countries bordering coastal zones.

This species is called "St. Augustine grass" and sometimes "carpetgrass" in the Southeastern United States and in California, "crabgrass" in Bermuda and the West Indies, "gramillon" in Argentina, "wiregrass" in St. Helena and "buffalograss" in Australia and the South Pacific.



Description. St. Augustine grass, *Stenotaphrum secundatum* (Walt.) Kuntze, is a perennial robust grass widely used for pastures and lawns. In the warmer climates of the tropics and subtropics it rivals bermudagrass in importance.

St. Augustine grass is a coarse textured, stoloniferous species that roots at the nodes. Unlike bermudagrass, St. Augustine grass does not have rhizomes. Its stems (stolons) and overlapping leaf sheaths are generally compressed; leaf blades generally folded, abruptly contracted at the base, rounded at the tip, and smooth; ligule is reduced to a short fringe of hairs; collar is petioled and the sheath greatly compressed and ciliate along the margins. Inflorescences mostly terminal, some also axillary, spike like (corky) racemes and spikelets imbedded in main axis; each raceme bearing 1-3 spikelets; spikelets lanceolate or ovate, awnless and sessile; glumes membranous, the lower glume less than half as long as spikelet; lower floret staminate, upper floret complete and caryopsis ovate to oblong, 2.0-3.0 mm long, often failing to mature.

Adaptation and Use. St. Augustine grass is adapted to moist, coastal areas with mild winter temperatures. It is known to be tolerant of high summer temperatures, and St. Augustine grass retains its color at temperatures as much as 10° lower than those which discolor bermudagrass.

St. Augustine grass tolerates moderate shade, being as good or better than other warm season grasses for shaded sites. However, under densely shaded conditions, St. Augustine grass develops thin, spindly turf.

So long as fertility and drainage are adequate, St. Augustine grass tolerates a wide range of soil types. St. Augustine grass grows satisfactorily at a pH range from 5.0 to 8.5, but develops a chlorotic appearance in highly alkaline soils (above pH 7.5). It does not tolerate compacted or waterlogged soil conditions. St. Augustine grass is highly tolerant of soil salinity, producing satisfactory growth at salt levels as high as 16 mmhos. Bermudagrass will tolerate only slightly higher salt levels.

St. Augustine grass is used primarily for lawns as it does not tolerate traffic as well as some other warm season species. It produces satisfactory turf at moderate levels of maintenance, effectively competes with weeds and other grasses and has only a few serious pests.

In moist, warm climates St. Augustine grass maintains a satisfactory turf cover with only occasional mowing. In drier climates (below 30 inches annual rainfall) it survives with supplemental irrigation. At higher maintenance levels, St. Augustine grass produces a thick, lush, dark green turf that is highly preferred by homeowners.

Varieties. Since St. Augustine grass has been propagated vegetatively for 200 years, only a few strains or varieties have evolved and none have been developed through grass breeding programs. The common strain, a fertile diploid with a white stigma color, is native to the Gulf-Caribbean-W. African region. This species may have crossed with another species of *Stenotaphrum* to produce the sterile triploid strain originally reported in S. Africa. This strain, distinguished from the common strain by its purple stigma color, has been found in Australia, New Zealand and in the Pacific Islands. It has been planted in Florida since the 1890's and in California since 1920.

Several selections from Florida were made available prior to 1960. Floratine, a purple stigma type, was released by the Florida Agricultural Experiment Station in 1959. Floratine was released for its somewhat finer texture and darker green color than the typical purple stigma type strain found in Florida prior to that time. It also retains its dark green color long into the fall and was reported to tolerate closer mowing than other St. Augustine grass selections.

Prior to Floratine, Bitter Blue was selected as an improvement over coarser textured types of St. Augustine grass used in Florida for lawns. Both of these selections, Floratine and Bitter Blue, are similar to the coarse textured triploid types reported in Florida prior to 1900.

Floritam St. Augustine grass was released by the Florida and Texas Agricultural Experiment Stations in 1972 as a SAD virus and chinch bug resistant selection. Like other Florida types, Floritam is a vigorous, coarse textured St. Augustine grass variety. Floritam has a purple stigma color and is sterile. Stolons of Floritam are large, purplish-red in color with internodes averaging 3 inches in length. Leaf blades are wider and longer than common St. Augustine grass. The morphological characteristics of Floritam are similar to those of Roselawn St. Augustine grass which is used as a pasture grass on muck soils in south Florida.

Floritam is not as cold tolerant as the common type found in Texas. Its use should be restricted to south Florida and the coastal zones of other southern states. Floritam also lacks the degree of shade tolerance that other St. Augustine grass varieties possess.

Seville St. Augustine grass was released by the O. M. Scott and Sons Company in 1980 as a SAD resistant and chinch bug tolerant variety. Seville is much finer textured than Floritam, but it too lacks the necessary cold tolerance to extend its area of adaptation beyond the southern boundaries of the Gulf Coast.

Raleigh St. Augustine grass was released by the North Carolina Experiment Station in 1980 as a cold tolerant, SAD resistant strain. Raleigh is finer textured than Floritam and develops a dense turf much like the Texas Common strain of St. Augustine grass. Raleigh is also more shade tolerant than Floritam. But, unlike Floritam, Raleigh is not resistant to lawn chinch bugs.

A strain of St. Augustine grass grown and produced commercially in Texas since 1920 is called Texas Common. Texas Common is typical of the white stigma type reported to be native to the Gulf-Caribbean-West African region. Texas Common was found to be a fertile diploid with 18 chromosomes. Seedling progeny from this white stigma type show wide variations in morphological characters. However, since the strain has been propagated vegetatively for over 100 years, only a few variations in the grass have been produced. Natural variants of the common strain are found throughout the state. It is assumed that these variants developed from seed produced by the common strains of St. Augustine grass.

Dwarf and variegated types of St. Augustine grass have also been selected from seed produced by Texas Common. However, these strains are more ornamental and novelty grasses than turfgrasses. One of the dwarf types (patented in the U.S. as Garretts 141) has been evaluated for its seed production potential. However, Garrets 141 and its progeny lacks the cold tolerance necessary to extend its area of adaptation beyond Southern Florida and South Texas in the United States.

Propagation. As long as St. Augustine grass has been cultivated, it has been propagated by vegetative means -- stolons, plugs or sod. Only recently has the seed production potential of St. Augustine grass been realized; but, as yet, significant use has not been made of that potential.

As reported by Long and Bashaw at Texas A&M in 1961 only a few strains of St. Augustine grass are fertile. The common strain of St. Augustine grass found in Texas is generally fertile; whereas, the strains used in Florida since before 1900 were found to be sterile.

St. Augustine grass is readily established from sod since the species is vigorous and spreads rapidly by creeping stolons. Sod plugs or stolons planted on 1 to 2 foot spacings can be expected to cover in one growing season. In commercial St. Augustine grass production 300 to 500 square yards (bushels) of sod are planted per acre. In small lawn plantings, 2 to 4 square inch sod plugs are planted on 1 to 2 foot spacings. St. Augustine grass can be successfully established from plugs anytime during the growing season if water is available.

Unlike bermudagrass, St. Augustine grass is not effectively propagated from stolons. St. Augustine grass stolons are much more prone to desiccation than bermudagrass. Also, bermudagrass roots much faster and has a faster growth rate than St. Augustine grass. As a result, St. Augustine grass is not successfully established by hydromulching or broadcasting stolons.

Some St. Augustine grass strains can be established from seed by planting at 1/3 to 1/2 pound of PLS per 1,000 square feet. The rate of establishment from seed planted at that rate would be about the same as for 2 inch sod plugs planted on 1 foot spacings. A seeded St. Augustine grass lawn should be kept moist for several weeks after planting to obtain a satisfactory stand of grass. Only after the seedlings have begun to spread can the grass tolerate dry conditions. St. Augustine grass should be seeded in late spring to early summer.

Fertilization during the establishment period (first three months after planting) is critical to developing a complete cover of St. Augustine grass. A starter fertilizer (one high in phosphorous) or a balanced, complete fertilizer should be applied at planting time. Subsequent applications of nitrogen at monthly intervals at a rate of 1 pound per 1,000 square feet will promote rapid spread of St. Augustine grass plugs. Weeds can be controlled preemerge with atrazine or post emerge with asulam (Asulox) and hormone-type herbicides (2,4-D, MCPP, dicamba).

Management. After establishment the success of St. Augustine grass as a lawn grass depends largely on management. Mowing, fertilization and supplemental watering are required to maintain a dense, green, weed-free turf of St. Augustine grass. In coastal areas where rainfall is adequate, St. Augustine grass will survive with little care. In inland areas, where rainfall is less dependable, close management of water is required to maintain a satisfactory lawn with St. Augustine grass.

The growth rate of St. Augustine grass is dependent on temperature, moisture availability and nutrient availability. Any one of these factors can limit the rate of growth of this species. In the spring with mild daytime temperatures and cool night

temperatures, St. Augustine grass greens up, but makes little growth. As day and night temperatures increase during late spring and summer, the growth rate increases. Thus, an established turf of St. Augustine grass may require mowing every 2 weeks in early spring and as often as every five days by late spring if nitrogen fertilizer is applied.

During the fall, as temperatures cool, St. Augustine grass maintains its dark green color, but its growth rate declines sharply. Mowing frequency may be reduced to twice monthly during late fall and early winter.

Mowing heights may range from 1 to 3 inches depending on the frequency of mowing and the degree of shade present. At mowing heights below two inches, St. Augustine grass should be mowed every five days during late spring and summer. At a 2 1/2 inch mowing height, a 7-10 mowing schedule is adequate. Above 2 1/2 inches, St. Augustine grass should be mowed at 10 to 14 day intervals. In moderate to dense shade, St. Augustine grass should be mowed at about 3 inches at 10 day intervals.

During the fall, mowing height should be raised about 1/2 inch to increase total leaf area of the turf. The increased leaf area will help the grass accumulate energy reserves to get through the winter. The greater leaf area will also help prevent weed invasion during the dormant season.

St. Augustine grass is responsive to nitrogen fertilizer in terms of color and growth rate. On sandy soils St. Augustine grass requires about 1 pound of nitrogen per 1,000 square feet per month during the growing season to maintain satisfactory color and density. At rates above 1 pound per 1,000 square feet, St. Augustine grass produces lush growth that is highly susceptible to insects and diseases. On heavier textured soils 1/2 pound of nitrogen every month is adequate to maintain good color and growth. Thatch accumulation is also a problem when nitrogen fertilization exceeds the required rate.

Late fall fertilization of St. Augustine grass helps maintain color and density of the lawn into the winter and promotes early recovery of the grass in the spring. Thus, to extend the length of time a St. Augustine lawn is attractive, the lawn should receive about 1 pound of nitrogen every 30 to 60 days from early spring through late fall.

St. Augustine grass is sensitive to iron deficiency and readily develops chlorotic symptoms in alkaline or iron deficient soils. This deficiency can be corrected with foliar applications or iron sulfate or iron chelate. Soil applications of iron sources are less effective than foliar application in alkaline soils.

Potassium requirements for St. Augustine grass are about the same as for other grasses. About half as much potassium as nitrogen is required to maintain growth. Potassium has

been shown to increase root growth, cold tolerance and drought tolerance in St. Augustine grass.

Phosphorous requirements for established St. Augustine grass are very low and generally met from the soil. Occasional applications of a phosphorous fertilizer material may be required. Newly planted St. Augustine grass will respond to phosphorous fertilizers in terms of an increased rate of spread.

Insects. Several insect pests cause serious damage to St. Augustine grass lawns. The Southern lawn chinch bug is the most serious pest on St. Augustine grass in Florida where the insect is active most of the year. In other states it ranks among the most serious pests along with SAD, brownpatch and white grub.

The chinch bug damages St. Augustine grass by feeding on the stems at the base of the leaf sheath. Populations of chinch bugs may reach several hundred per square foot with damage usually apparent at 20 to 30 chinch bugs per square foot. Initial injury symptoms from chinch bugs resembles drought stress -- stunted, chlorotic spots in open (full sun) areas of the lawn. As feeding continues, irregular areas of dead grass develop in the lawn.

Timely applications of insecticides will control chinch bugs. Two or more treatments are required during the growing season in most areas, and as many as 5 or 6 may be required in some areas of Florida. Floratam St. Augustine grass is resistant to the Southern lawn chinch bug and is widely used in South Texas where the grass is adapted. In Florida severe damage to Floratam has been observed in lawns infested with chinch bugs.

White grub are also a serious pest on St. Augustine grass lawns. The grubs are the larvae of the May beetle or June bug that develop in the summer and fall just below the soil surface. The grubs feed on roots of St. Augustine grass and cause significant losses of turf during some years. Damage usually appears the following year as dead areas of grass that can be easily lifted from the lawn.

Grub control is difficult since the larvae are often quite large when detected and feed below the soil surface. Also, for them to be effective, insecticides must be drenched into the soil where the insects feed. Since some insecticides are tightly bound to the thatch layer of St. Augustine grass, drenching the material into the soil is difficult.

Timely and proper application of insecticides is the only method of controlling white grubs. Since they are only an occasional problem, inspection of the turf in midsummer is required for effective control. Biological control with milky spore disease has not been effective against this species of white grub.

Sod webworms, armyworms and cutworms can also feed on St. Augustine grass leaves and can cause damage when infestations are heavy. Evidence of heavy feeding by these insects includes a skeletonized appearance of leaf blade, silk-like webs visible in early morning (webs cover earthen tunnel in the thatch layer of turf) or defoliation of lawn in irregular patches. All of the leaf-feeding insects can be easily controlled by insecticides or biological worm control. (*Bacillus* sp.)

Ground pearls, subterranean scale insects that feed on roots of grasses, can also cause damage to St. Augustine grass lawns. The scale insects attach themselves to grass roots and secrete a waxlike shell around their bodies that resembles a pearl. At the immature scale inside the pearl grows larger, the pearl also increases in size. The pearl may reach 1/8 inch in diameter, and can be found attached to grass roots in the top several inches of soil.

Ground pearl damage becomes evident in spring and summer, particularly during dry periods, as small irregular areas of unthrifty or dead grass. Insecticide treatment should be made in May or early June when the insect is in the crawler stage. Consecutive treatments for 2 or more years may be required for effective control.

Diseases. St. Augustine grass is susceptible to a number of turfgrass diseases including brownpatch, SAD, gray leaf spot, *Helminthosporium*, *Pythium*, rust, downy mildew and others. All of these diseases, except SAD, are caused by fungi and can be controlled by good management and fungicides. SAD is a virus disease for which there is no chemical control. Only resistant varieties of St. Augustine grass are effective against this disease. Floratam, Seville, Raleigh and several experimental varieties have shown good resistance to the SAD virus.

Brownpatch and gray leaf spot are the most serious diseases caused by fungi attacking St. Augustine grass. Although these diseases rarely kill St. Augustine, they severely weaken and thin the grass to the degree that the lawn is unsightly. Preventive applications of fungicides are most effective against these diseases.

Weeds. A healthy St. Augustine grass lawn effectively crowds out most weeds. But St. Augustine grass that is not properly maintained or is weakened by insects or disease can be invaded by grassy and broadleaved weeds. Cool season weeds such as henbit, chickweed and clover are a serious problem in dormant St. Augustine grass. These weeds can be controlled by hormone-type herbicides in early spring.

Annual grassy weeds such as fescue, annual bluegrass and crabgrass are best controlled by timely applications of preemergence herbicides. Perennial grasses such as dallisgrass

and bermudagrass are difficult to control in St. Augustine grass turf. Nonselective products can be applied as directed sprays to these weeds to obtain control.