

Stenotaphrum secundatum

Scientific name

Stenotaphrum secundatum (Walter) Kuntze

Most comments relate equally well to the closely related *Stenotaphrum dimidiatum* (L.) Brongn.

Synonyms

Ischaemum secundatum Walter

Family/tribe

Family: *Poaceae* (alt. *Gramineae*) subfamily: *Panicoideae* tribe: *Paniceae*.

Common names

buffalo grass (Australia); St. Augustine grass (USA); buffalo couch (Vanuatu); chiendent de boeuf, gros chiendent (French); pimento grass (Jamaica); manienie-haole, akiaki-haole (Hawai'i); pasto San Agustín, falso kikuyu, grama San Agustín, lastÓN, gramÓN, gramillÓN (Spanish); and confusingly as carpet grass, crabgrass, and wiregrass which are more commonly used for *Axonopus*, *Digitaria* and *Aristida* respectively.

Stenotaphrum dimidiatum is known as herbe bourrique (Madagascar); buffalo grass, and pemba grass .

Morphological description

Stoloniferous perennial, forming dense leafy mat to about 20 cm, with ascendant, much branched culms to 50 cm. Forms dense turf when regularly mowed or grazed. Stems flattened. Leaf-sheaths strongly compressed and keeled; leaves stiff, blue-grey in colour (some varieties more green), mostly glabrous except at base; blades 3-15 cm (rarely to 30 cm) long and 3-12 mm wide, folded in bud, usually rounded or obtuse at the tip when expanded, scabrous leaf margins, underside of midrib, and keel of sheath. Inflorescence a false (or, rarely, a true) one-sided spike, 4-15 cm long, comprising individual spikelets or short racemes inserted alternately into hollows either side of a wavy, flattened axis. Caryopsis dark brown, ovoid, plano-convex, ca. 1.5 mm long.

Distribution

Native to:

Africa: Cote D'Ivoire, Ghana, Liberia, Nigeria, Senegal, Sierra Leone, Cameroon.

North America: USA (Texas, Florida, Georgia, Louisiana, Mississippi, North and South Carolina), Mexico.

Central America & Caribbean: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, Antigua and Barbuda, Bahamas, Cuba, Dominica, Guadeloupe, Hispaniola, Jamaica, Martinique, Puerto Rico, St. Kitts and Nevis, St. Lucia.

South America: French Guiana, Guyana, Suriname, northern Venezuela, Colombia, eastern Brazil, northeastern Argentina, Uruguay.

In native habitats, *Stenotaphrum* spp. are predominantly seashore colonisers. Their inflorescences are adapted for short-range dispersal by ocean currents. *S. secundatum* is widely naturalised in Australia, the islands of the Pacific and Indian Oceans, and parts of southeast Asia to such an extent that the precise native range is obscure.

Stenotaphrum dimidiatum is native to Kenya, Tanzania, Mozambique, Zimbabwe, Madagascar, Mauritius, Reunion, Seychelles, India (Kerala) and Sri Lanka, but naturalised elsewhere in the tropics.

Uses/applications

Mostly occurs in natural swards or planted as turf. Has a role as pasture or soil conservation groundcover under trees, or near the sea where salt spray damages other grasses. Can be used for silage .

Ecology

Soil requirements

Although commonly found on siliceous and calcareous sands near the sea, it also grows on a wide range of well or poorly drained soils, from sandy loams to light clays. Found in infertile to moderately fertile soils with pH from 5.0-8.5 (calcareous sand). Has good tolerance of soil salinity (to 15 dS/cm) and of wind-borne salt from the sea.

Moisture

Commonly in areas with rainfall from 1,000->2,000mm in the humid tropics and subtropics, although will colonise moister situations in areas down to 750 mm. While moderately drought tolerant, it prefers good moisture, and can withstand temporary flooding and waterlogging .

Temperature

Grows best between about 20°C and 30°C, and a minimum of 10°C. Diploid types are more tolerant of cold and frost than many tropical grasses. Triploid types have poor cool season growth. Found from sea level to 1,300 m asl. Survival under frosted winter conditions varies with cultivar. In general, diploid types display better winter survival than polyploids.

Light

Among the more shade tolerant tropical grasses (grouped with *Brachiaria subquadriflora*, *Axonopus compressus* and *Paspalum conjugatum*). Maintains yields down to 40% sunlight.

Reproductive development

Flowers October to May in subtropics in southern hemisphere. Considerable variation in flowering time and intensity among bred lines. The Vanuatu type flowers throughout the year whereas cv. Floratam is late flowering. Diploids are fertile, triploid types produce little seed, and tetraploid types are completely sterile.

Defoliation

Extremely tolerant of regular grazing or mowing, one recommendation being that it should be grazed every second week down to 6 cm.

Fire

No data available. Generally growing in areas where fire is not an issue.

Agronomy

Guidelines for the establishment and management of sown pastures.

Establishment

Propagated vegetatively (since seed is not commercially available), using well-rooted sprigs or 7-10 cm plugs, planted 30 cm apart in rows 60-70 cm apart. Can also be established by broadcasting stolons or sprigs at 3.5-7 m³/ha and discing them into the soil and rolling. Can plant 10 ha from 1 ha of stolons. May take 5-6 months to form a complete cover, but less under light to moderate shade.

Fertiliser

Survives under low fertility, but responds well to N and P fertilization.

Compatibility (with other species)

Once established, is very competitive, suppressing weeds. Can grow with twining and stoloniferous legumes.

Companion species

Grasses: Rarely found with other grasses.

Legumes: *Macroptilium atropurpureum*. Found in association with *Desmodium heterophyllum*, *D. heterocarpon subsp. ovalifolium*, *D. incanum*, *D. triflorum*, *Desmanthus leptophyllus*, *D. pernambucanus*. Also planted with hedgerows of *Leucaena leucocephala* on coastal coralline plains.

Pests and diseases

Attacked by southern chinch bug (*Blissus insularis*) in Florida and the hairy chinch bug (*Blissus leucopterus*) in Hawai`i (overcome using resistant varieties). Webworm and armyworm are also a problem, encouraged by high levels of N fertilizer. Susceptible to a range of nematodes including root knot (*Meloidogyne* spp.), reniform nematode (*Rotylenchulus reniformis*) and cyst nematode (*Heterodera leuceiylma*). Fungal diseases include brown patch (*Rhizoctonia solani*), grey leaf spot (*Pyricularia grisea*), dollar spot (*Sclerotinia*-like fungi) and flower smut (*Ustilago cynodontis*), mostly favoured by excessive precipitation. These diseases tend to be more a problem in the turf industry than with grazed native or naturalised swards. St Augustine decline (SAD) is a mosaic disease caused by a *Panicum* mosaic virus.

Ability to spread

Most spread is through the vigorous stolons. However, dissemination from seed does take place, evidenced by adventive occurrences away from existing populations.

Weed potential

Poses no serious weed threat. Reported as a minor weed in coastal environments.

Feeding value

Nutritive value

Important to graze frequently. As with other tropical grasses, quality declines rapidly with age of regrowth, with N concentrations dropping from 2.7% to 1.0%, crude protein digestibility from 53% to 31%, and dry matter digestibility from 60% to 50%.

Palatability/acceptability

It is palatable when young, being eaten by small and large ruminants.

Toxicity

Levels of oxalate in the dry matter are about 1% and unlikely to cause problems. *Stenotaphrum secundatum* has been implicated in a calcosinosis (build-up of calcium deposits in the tissues) in cattle in Jamaica known as Manchester wasting disease, although livestock

throughout the tropics have grazed the grass without apparent adverse effects.

Production potential

Dry matter

Yields of the order of 5 t/ha/yr DM, although one estimate of >50 t green feed/ha/yr consumed by cattle.

Animal production

Long-term steer gains of 0.25-0.4 kg/hd/day are commonly reported in humid-tropical locations. Higher liveweight gains (0.61 kg/hd/day) have been reported over shorter grazing periods (6 months).

When N fertilised, can produce 1,000 kg liveweight gain/ha, although 400 kg/ha or less under poorer conditions. Stocking rates vary from 1 or 2 head/ha, up to 7 yearlings/ha, depending on inputs.

Genetics/breeding

The original *S. secundatum* evolved as a fertile diploid from *S. dimidiatum*. There are two distinct variants of *S. secundatum*; a sterile, triploid originating at the Cape of Good Hope, and a fertile diploid variant emanating from the Natal region of South Africa. Morphological mutation in the triploids is common, hence the considerable diversity that exists.

Stenotaphrum secundatum: $2n = 18, 20, 36, 54, 72$.

Stenotaphrum dimidiatum: $2n = 36$.

Seed production

Not applicable.

Herbicide effects

Susceptible to 2,4-D when young. Susceptible to MSMA and CMA moderately so to atrazine when the herbicide is applied to sandy soil. Tolerant to oxadiazon and clopyralid.

Strengths

- Extremely shade tolerant (excellent under coconuts).
- Good ground cover.
- Grows on poor soils.
- Salt tolerant.
- Stands heavy grazing.

Limitations

- Unpalatable when mature.
- Susceptible to nematodes.
- Triploid types must be planting from turf, cuttings or runners.

Other comments

Selected references

Chen, C.P. (1992) *Stenotaphrum secundatum* (Walter) O. Kuntze. In: 't Mannetje, L. and Jones, R.M. (eds) *Plant Resources of South-East Asia No. 4. Forages*. pp. 208-209. (Pudoc Scientific Publishers, Wageningen, the Netherlands).

Mullen, B.F. and Shelton, H.M. (1996) *Stenotaphrum secundatum*: a valuable forage species for shaded environments. *Tropical Grasslands*, **30**, 289-297.

Sauer, J.D. (1972) Revision of *Stenotaphrum* (*Gramineae: Paniceae*) with attention to its historical geography. *Brittonia*, **24**, 2002-2222.

Internet links

<http://www.fao.org/ag/AGP/AGPC/doc/Gbase/data/pf000329.htm>

<http://www.fao.org/ag/aga/agap/frg/afris/Data/163.htm>

Cultivars

Cultivars*	Country/date released	Details
'Texas Common' 'Florida Common'		Fertile diploid; somewhat cold tolerant but susceptible to SAD virus and chinch bug damage.
'Floratine'	USA (1959)	
'Roselawn'	USA (1944)	Selected from 'Florida Common' as a forage.
'Bitterblue'		Selected from 'Florida Common'; lower growing and more shade tolerant than 'Florida Common'.

'Floratam' (FA-110)	USA (1973)	Aneuploid ($2n = 32$), initially resistant to southern chinch bug invasion and SAD. By 1985, new biotypes of southern chinch bug were capable of seriously damaging both 'Floratam' and 'Floralawn'.
'Floralawn'	USA (1986)	Developed from 'Floratam'; initially resistant to southern chinch bug invasion.
'Seville' (S-6-68-516)	USA (1980)	Low growth habit, dark green colour. Highly salt tolerant.
'Jade' (S-6-72-182)		More shade tolerant and lower growing than 'Floratam'.
'Raleigh' (NCSA 21)	USA (1980)	Cold-tolerant, SAD-resistant.
'FX-2', 'FX-10', 'FX-33'		Resistant to the new biotypes of chinch bug.
'DelMar' (S-6-72-99)	USA (1986)	From controlled pollination of 'Seville' with a cold-tolerant selection. Cold tolerant, SAD resistant; more shade tolerant and lower growing than 'Floratam'.
'Variegatum'	USA	<i>S. secundatum</i> var. <i>variegatum</i> A.S. Hitchc. Leaves striped white. Cultivated as a basket plant.

* Most varieties developed as turfs in the southern states of USA.

Promising accessions

Promising accessions	Country	Details
Vanuatu type	Vanuatu and Indonesia	Strongly stoloniferous triploid type used extensively as a pasture /ground cover under coconuts throughout the Pacific Islands. Established more rapidly than 'Floratam' in agronomic trials in Indonesia.



A stoloniferous perennial forming a dense leafy mat.



Strong stoloniferous spread.



Stem tip and seedhead.



Growing under coconuts in Sulawesi, Indonesia.



With *Arachis pintoi* cv. Amarillo in Vanuatu.



With *Desmodium heterophyllum*.



With *Vigna hosei* in Vanuatu.



With *Desmodium heterocarpon* subsp. *ovalifolium*.



A grazed sward under coconuts in Vanuatu.



From: t Mannetje, L. and Jones, R.M. (1992)
*Plant Resources of South-East Asia No. 4.
 Forages.* (Pudoc Scientific Publishers,
 Wageningen, the Netherlands). © Prosea
 Foundation.



Grazed by cattle in Sulawesi, Indonesia.

