Panicum trichocladum

Commonly known as "Creeping Guinea grass", a shortly rhizomatous, stoloniferous, fine stemmed perennial (cv. Embu)

cv. Aruana, Brazil

Under coconuts, Vanuatu (cv. Embu)

Scientific name

Panicum trichocladum Hack. ex K. Schum.

Synonyms

None listed in GRIN.

Family/tribe

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

Morphological description

Shortly rhizomatous, fine stemmed perennial, 0.2–1 m tall (rarely to 1.5 m) with scrambling, decumbent, much branched culms 0.2–3 m long, developing nodal roots when touching or close to the ground. Leaf blades almost horizontally spreading, light green to green, narrowly lanceolate to lanceolate, 5–20 (–30) cm long, (4–) 10–15 (–18) mm wide; rounded at the base, apex acuminate; ligule a ciliate membrane 2 mm long; leaf-blade surface pilose, margins scabrous. Panicle open, ovate, 6–20 cm long, moderately branched, usually sparsely long-ciliate on the distal branches and pedicels and densely hairy on the main axis around and immediately below the lowest branches, rarely glabrous; panicle branches pilose, rarely glabrous; spikelets (2.2–) 2.5–3 mm long.

Common names

Africa: ikoka, mkoko, nyasi, ukoka (Tanzania)

English: creeping guinea grass (Australia); donkey grass

Latin America: capim aruana (Brazil)

Distribution

Native:

Africa: Democratic Republic of the Congo; Ethiopia (s.); Kenya; Malawi; Mozambique; Sudan (s.); Tanzania; Uganda; Zambia; Zimbabwe

Uses/applications

Forage

Used for permanent pasture if fertility maintained. Provides good shade-tolerant ground cover, making it useful for agroforestry including pasture under coconuts.

Environment

Also useful for soil conservation and bench development in terraced contour cultivation systems.

Ecology

Soil requirements

Often found on sandy or gravely soils, but also on loams and clay loams. Adapted to most well-drained, friable, fertile soils.

Moisture

Occurs mostly in areas receiving >850 mm/yr, sometimes with a pronounced dry season of up to 7 months. Adapted to areas receiving >2,000 mm/yr.

Temperature

Occurs from sea level to 2,300 m. Good cool season growth in some genotypes.

Light

Occurs in light forests and forest edges, in bush and along stream banks. Some varieties recognized for ability to grow in shaded conditions, *e.g.* 'Embu'.

Reproductive development

Single record of flowering November to January in upland Uganda.

Defoliation

While tolerant of heavy grazing, it is less so than many other stoloniferous grasses such as *Digitaria eriantha* (Pangola grass).

Fire

No data, but probably similar to *M. maximus* and not adversely affected by fire in the long term.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Germination should be tested, since seed may not reach maximum germination until up to 18 months after harvest. Dormancy can be overcome by removal of glumes from fresh seed. Seed can be drilled or broadcast at 2–3 kg/ha. Being a small seed, it should be planted at no more than 1 cm deep. Rolling after sowing improves germination and establishment. This group can also be established from slips, stolon plantlets, or pieces of stolon with several nodes, planted on the contour every 0.5–0.6 m in rows 1.25–1.5 m apart.

Fertilizer

Establishment fertilizer is necessary on infertile soils, using 20–40 kg/ha P, and about 50 kg/ha N if limited cultivation prior to planting. Maintenance fertilizer is needed for pure grass swards especially in cut-and-carry systems. Inadequate N will lead to weakening of the stand and invasion by less desirable species. Maintenance dressings of 200–400 kg/ha/yr of N are required to promote healthy, productive stands on less fertile soils. Soils with pH <5 require addition of lime to bring pH up to 5.5–6.

Compatibility (with other species)

Combines well with twining legumes under light grazing, and more stoloniferous legumes under intensive management. Can be grown successfully under open forest or plantation due to shade tolerance.

Companion species

Grasses: *Chloris gayana*.
Legumes: *Centrosema molle*, *Macroptilium atropurpureum*, *Macrotyloma axillare*, *Neonotonia wighti*, *Neustanthus phaseoloides*, *Stylosanthes guianensis* var. *guianensis*, *S. capitata*, *S. macrocephala*, *Leucaena leucocephala, Vigna hosei*.

Pests and diseases

Ergot (*Claviceps* spp.), and other fungal diseases, *Conidiospormyces ayresii*, *Fusarium roseum*, and *Tilletia* sp. can reduce seed yields when conditions are favourable to the pathogen. Seed production has also been adversely affected by a smut (*Ustilago* sp.) in Colombia and bunt in the Rift Valley of Kenya. In Puerto Rico a leaf spot caused by *Cercospora fusimaculosus* has been recorded.
'Aruana' is moderately tolerant of spittlebug variously known as cigarrinha (Brazil), chicharrita (Argentina), salivazo and mión (Colombia) (*Notozulia entreriana*, *Deois flavopicta*, *D. incompleta*, *Mahanarva* spp., *Aeneolamia reducta*, *A. selecta* (Homoptera, Cercopidae) in tropical America. A "small-leaf virus", possibly a phytoplasma, has been recorded on 'Aruana'. Streak virus disease has killed populations of 'Embu'.

Ability to spread

Spreads by virtue of stoloniferous growth habit and significant seed set.

Weed potential

Troublesome weed in sisal and coffee plantations; common in wastelands. Causing some concern by virtue of spread in Sri Lanka.

Feeding value

Nutritive value

Young active growth has been measured to have 17.5% CP and 0.29% P, declining with age to 8.5% CP and 0.1% P in mature growth during the dry season. 'Aruana' is characterised as having 7.5–12% CP, 64% IVDMD.

Palatability/acceptability

Palatable to cattle and sheep. The young leaves regarded as especially suitable for calves, and it is still grown to a limited extent as a calf feed.

Toxicity

None reported.

Feedipedia link

April 2020: Page under construction

Production potential

Dry matter

Commonly 10–20 t/ha DM, depending on variety and growing conditions, particularly levels of N applied.

Animal production

Can achieve up to 0.8 kg/hd/day LWG and up to 1,200 kg/ha/yr LWG (commonly 300–500 kg/ha/yr LWG) depending primarily on stocking rate and N fertilizer rate.

Genetics/breeding

2*n* = 32. Facultative apomicts in which both apospory and pseudogamy occur.

P. trichocladum is one of three species in the agamic complex of the *Maximae* (Panicoideae), the others being *Megathyrsus maximus* and *M. infestus*. *P. trichocladum* was specifically not reassigned to *Megathyrsus* because its leaf anatomy and photosynthesis subtype are different from those found in the other two species. However, intermediate types between *M. maximus* and *P. trichocladum* have been identified.

Seed production

Best in environments with longer day lengths and distinct dry seasons. Seed ripens unevenly, and is shed as it matures. Highest seed yield (19% recovery) obtained when the panicle has shed 40–60% of its spikelets, which occurs about 12–14 days from panicle emergence. Direct heading is less efficient in terms of seed recovery than mowing, windrowing and sweating. Yields of 50–100 kg pure seed yield are common from machine harvest, and around 200 kg/ha from ground sweeping, although higher yields have been recorded.

Herbicide effects

No data for this group, but probably similar to *M. maximus*:
“Atrazine can be used for weed control in *M. maximus* at 4 L/ha. 'Gatton' can tolerate over 4.5 kg/ha a.i. whereas common weeds such as *Nicandra physaloides*, *Raphanus raphanistrum*, *Argemone ochraleuca*, *Ageratum conyzoides*, *Sida cordifolia* and *Eleusine indica* are killed at 0.9 kg/ha a.i..
M. maximus can be prevented using a pre-emergent spray (no wetting agent required) of 2,4-D sodium salt at 4.5 kg/ha of an 840 g/kg a.i. product using a minimum of 340 L/ha of water. It is susceptible to glyphosate and readily controlled by drizzle applications. Young plants are susceptible to selective grass-killers, and diuron at 2.5 kg/ha of an 800 g/kg a.i. in a minimum of 340 L of water per hectare. Mature plants can also be killed using 2,2-DPA at 2.3 kg of a 740 g/kg a.i. product plus paraquat at 85 ml of a 200 g/L a.i. product plus wetting agent at 250 mL per 200 L of water, spraying to point of runoff.”

Strengths

- Very leafy.
- Readily eaten by all stock.
- Suited to grazing and cutting.
- Moderately tolerant of heavy grazing.
- Moderately drought tolerant.
- Early season growth in some lines.

Limitations

- Requires fertile soils.
- Intolerant of waterlogging.

Selected references

Bogdan, A.V. (1977) Tropical Pasture and Fodder Plants. Longman Inc., New York, USA. p. 181–192.

Clayton, W.D. and Renvoize, S.A. (1982) Gramineae (Part 3). In: Polhill, R.M. (ed) Flora of tropical East Africa. Royal Botanic Gardens, Kew, UK.

Grof, B. and Harding, W.A.T. (1970) Dry matter yields and animal production of guinea grass (*Panicum maximum*) on the humid tropical coast of North Queensland. Tropical Grasslands 4:85–95. bit.ly/2ylKtFH

Harty, R.L., Hopkinson, J.M., English, B.H. and Alder, J. (1983) Germination, dormancy and longevity in stored seeds of *Panicum maximum*. Seed Science & Technology 11:341–351.

McCosker, T.H. and Teitzel, J.K. (1976) A review of guinea grass (*Panicum maximum*) for the wet tropics of Australia. Tropical Grasslands 9:177–190. bit.ly/2WX5TDg

Middleton, C.H. and McCosker, T.H. (1975) Makueni, a new guinea grass for North Queensland. Queensland Agricultural Journal 101:351–355.

Pernès, J. (1975) Organisation evolutive d'un groupe agamique: la section des *Maximae* du genre *Panicum* (Graminées). ORSTOM, Paris, France.

Savidan, Y.H., Jank, L. and Costa, J.C.G. (1990) Registro de 25 acessos selecionados de *Panicum maximum*. Embrapa Gado de Corte, Campo Grande, Brazil. bit.ly/3bDPMi1

Cultivars

'Aruana' (IZ 5) Released in Brazil (1989). Fine-stemmed, stoloniferous, usually <1 m tall; narrow leaves, long growing season, very good seed production, very aggressive, very palatable, high quality feed, suited to heavy grazing by all livestock, including sheep and goats. Adapted to areas with >1,000 mm rainfall. Yields of about 20 t/ha/yr DM with 30–40% in dry season (April–September). Drought resistant and moderately tolerant of frost and spittlebug. Considered to be *Megathyrsus maximus* in Brazil.

'Embu' (Q 8132, K6237, ORSTOM G24, BRA 004367) Released in Kenya and tested in Australia. Origin Embu, Kenya (0.50° S, 37.40° E, 1,500 m asl, rainfall 1,100 mm). Grows to 1–1.5 m tall. Leaf-blades 20–30 cm long and 12–17 mm wide; occasional short hairs on the leaf surface, and sparse short hairs on the lower outside of the sheath near the node junction; occasional hairs on the lower stem internodes. Panicle 15–20 cm long, 12–15 cm wide, green. A leafy, palatable variety, but intolerant of heavy grazing. Good winter growth, but low seed production. Good shade tolerance. Well adapted to very high rainfall environments (2,500–3,500 mm/yr).

Promising accessions

None reported.