**Tropical Forages**

*Panicum trichocladium*

**Scientific name**

*Panicum trichocladium* Hack. ex K. Schum.

**Synonyms**

None listed in GRIN.

**Family/tribe**

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

**Common names**

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

English: creeping guinea grass (Australia); donkey grass

Portuguese: capim aruana (Brazil)

**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.

**Distribution**

Native:

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

**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.

**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.

Other

Agronomy
Guidelines for the establishment and management of sown pastures.

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, Pueraria phaseoloides, Macroptilium atropurpureum, Macrotyloma axillare, Neonotonia wighti, Stylosanthes guianensis, S. capitata, S. macrocephala, Leucaena leucocephala.

Pests and diseases
Ergot (Claviceps spp.), and other fungal diseases, Conidiobolus, 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 fusimaculosa has been recorded.

'Aruana' is moderately tolerant of spittlebug variously known as cigarrinha (Brazil), chicharrita (Argentine), salivazo (Colombia) (Notozulia enteririana, Deois flavopicta, D. incompleta, Mahananara spp., Aeneolamia reducta, A. selecta (Homoptera, Cercopidae) in tropical America. A "small-leaf virus", possibly a phytoplasma, has been recorded on Áruana'. 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
https://www.feedipedia.org/node/12056
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\textsubscript{n} = 32. Facultative apomicts in which both apospory and pseudogamy occur.

\textit{P. trichocladum} is one of three species in the agamic complex of the \textit{Maximae} (Panicoideae), the others being \textit{Megathyrsus maximus} and \textit{M. infestus}. \textit{P. trichocladum} was specifically not reassigned to \textit{Megathyrsus} because its leaf anatomy and photosynthesis subtype are different from those found in the other two species. However, intermediate types between \textit{M. maximus} and \textit{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 \textit{M. maximus}:
‘Atrazine can be used for weed control in \textit{M. maximus} at 4 L/ha. ‘Gatton’ can tolerate over 4.5 kg/ha AI 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 AI.
\textit{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 AI product using a minimum of 340 litres of water per hectare. Mature plants can also be killed using 2,2-DPA at 2.3 kg of a 740 g/kg AI product plus paraquat at 85 ml of a 200 g/litre AI product plus wetting agent at 250 ml per 200 litres 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


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’ (Q8 132, 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 is 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.

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