

Tropical Forages

Melinis minutiflora

Scientific name

Melinis minutiflora P. Beauv.



Synonyms

Melinis tenuinervis Stapf; *Panicum melinis* Trin.

Family/tribe

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

Morphological description

Tufted perennial reaching 0.5–0.8 (–1.5) m in the vegetative state, and slender, loose, straggling or trailing stems (sometimes rooting from lower nodes) to 2 m long; leaves crowded towards ends of sterile shoots; fertile culms erect or geniculate ascending, to 1.5 m tall. Leaf sheaths and blades minutely to densely covered with glandular hairs exuding drops of viscid oil, with characteristic molasses or cumin odour; leaf blades flat, linear, 4–20 cm long, 0.5–1.5 cm wide, usually flushed purple or red-brown, tapering to a fine point. Inflorescence a panicle 10–30 cm long, with racemes initially appressed, spreading to present a pale pink to purple plume effect at anthesis, and becoming appressed again towards maturity; spikelets glabrous, sometimes shortly hairy, purplish, 1.5–2.5 mm long, comprising 2 florets (only the upper one fertile); upper glume often with awn to 9 mm long, and the lower lemma with or without awn 5–15 mm long; caryopsis 1.2–1.4 mm long, spindle-shaped or elliptical; 6–15 million spikelets ("seeds") per kg. Wide variation in growth habit, hairiness, leafiness, and vigour.



Racemes spreading to present a pale pink to purple plume effect at anthesis, becoming appressed again towards maturity



Hillside covered in molasses grass, humid tropics, Qld, Australia



Flowers in response to shortening days, N Qld, Australia



Leaf sheaths and blades minutely to densely covered with glandular hairs



Inflorescence a panicle with racemes initially appressed



Seed units



With *Calopogonium mucunoides*, humid tropics, N Qld, Australia



Common roadside weed in the humid tropics and subtropics of Queensland, Australia

Common names

Africa: heuninggras, melassegras, stinkgras (Afrikaans); evantonkala, lekamboma (Angola); ikivutavuta (Burundi); cimvurabo (Democratic Republic of Congo); aketibua, akutuakuru (Ghana); futaute (Shambaa, Tanzania); ikinyamavuta (Tanzania); ori (Yoruba); fokole, minan sa bine (Sierra Leone)

Asia: □□□ tang mi cao (China); หญ้าขี้เหล็ก ya yang (Thailand)

English: Brazilian stinkgrass, dordura grass, efwatakala grass, gordura grass, honey grass, molasses grass, stink grass, Wynne grass; Venezuela grass (India)

Europe: herbe à miel, herbe à molasse, herbe molasse, mélinis (French); melinide (Italian)

Latin America: capim gordura (Brazil); chopín, gordura, pasto de gordura, yaraguá Uribe (Colombia); calinguero (Costa Rica); melado (Cuba); yerba agua (Dominican Republic); candiguero, catingueiro, zacate gordura (Mexico); yerba melao (Puerto Rico); capín melao, capín meñao, sebo de Flandes, yaraguá melado (Venezuela); pasto hediondo, pasto miel (Spanish)

Pacific: puakatau (Hawaii, Tonga); mauku piro (Rapa Nui)

Distribution

Native:

Africa: Angola; Burundi; Cameroon; Congo; Côte d'Ivoire; Democratic Republic of the Congo; Equatorial Guinea; Ethiopia; Ghana; Guinea; Kenya; Liberia; Malawi; Mozambique; Nigeria; Rwanda; Sierra Leone; Somalia; South Africa (KwaZulu-Natal, Transvaal); Sudan; Swaziland; Tanzania; Togo; Uganda; Zambia; Zimbabwe

Atlantic Ocean: Cape Verde

Indian Ocean: Comoros; Madagascar

Naturalized:

Indian Ocean: Réunion

Asia: China; India; Indochina; Taiwan

Australasia: Australia; Papua New Guinea

Northern America: Mexico; USA (Florida)

Pacific: French Polynesia; Hawaii; Galápagos Islands (Ecuador); New Caledonia; Niue; Palau; Tonga; Wallis and Futuna Islands

Caribbean: West Indies

Central America: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama

South America: Argentina; Bolivia; Brazil; Chile; Colombia; Guyana; Paraguay; Peru; Suriname; Uruguay; Venezuela

Uses/applications

Forage

A vigorous pasture grass, for grazing, hay (loses odour with drying), and silage. Not favoured for cut-and-carry due to low, dense growth, stickiness, and strong aroma.

Environment

Used as a fast-establishing pioneer to cover disturbed soil and suppress weeds.

Other

Value for intercropping to reduce insects and ticks. Populations of the African or brown ear tick (*Rhipicephalus appendiculatus*) and the cattle tick (*Boophilus microplus*) are reduced by the presence of *M. minutiflora*. When inter-cropped with maize, *M. minutiflora* repels the lepidopterous cereal stemborer (*Busseola fusca* Noctuidae, and *Chilo partellus* Pyralidae: Crambidae) females from ovipositing on the maize. Intercropping with the non-host molasses grass, *M. minutiflora*, significantly decreases levels of infestation by stem-borers in the main crop and also increases larval parasitism of stem-borers by *Cotesia sesamiae* (Hymenoptera: Braconidae) by attracting the wasp female.

Ecology

Soil requirements

Grows on a variety of well-drained soils, with surface textures ranging from sands to medium clays. Tends to grow most vigorously on steep hillsides and road cuttings. Tolerant of low fertility, pH from 4.5 to 8.4, and high aluminium. Responds to improved fertility. Intolerant of salinity.

Moisture

Native or naturalized in areas with annual rainfall of (750–) 1,000–2,000 (–2,500) mm. Relatively drought-hardy over a dry season of four to five months. Does not tolerate waterlogging or flooding.

Temperature

Largely found between 800 and 2,200 m asl in the tropics and subtropics, in areas with average annual temperatures from 18–21 (–25) °C and mean temperature of the coldest month between 6 and 15 °C. Higher growth rate at 30 °C than at 20 °C. In the tropics, it is mostly found in cooler higher altitudes, or at lower elevation where nights are cool. Foliage is "burnt" by frost, and repeated heavy frost kills the plant.

Light

Found in grassland and shady places, sometimes forming pure stands.

Reproductive development

A short-day plant, flowering between April and June in the southern hemisphere subtropics. In the northern hemisphere (China), it flowers and seeds from July to October. Varies with provenance.

Defoliation

Does not withstand grazing below 15–20 cm because crowns are well above ground level. Should be well established before grazing and then grazed sparingly. Stands decline under heavy grazing. Develops quickly and may be harvested 50 days after planting seed.

Fire

Adapted to moderate fire, in which the dense mats are generally only partly consumed, allowing rapid regeneration from remaining portions. Plants are killed by fierce fires, which develop when burning mature growth, the fire intensity enhanced by the oil from the glandular hairs.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Land preparation with fire or rough cultivation is usually adequate. Fresh seed has little dormancy but can be hammer-milled to improve germination and seed handling. Seed can contain 2–3 million caryopses/kg. This very fine seed is sown at 0.5–1 kg/ha, either broadcast onto the surface or placed very shallowly, no more than 2.5 cm, sometimes under-sown with cereal crops. It establishes quickly. Also propagated from cuttings, which strike readily, and cover the ground quickly.

Fertilizer

Establishes and performs well on soils of low to moderate fertility, but responds to additions of nutrients, especially N and P, on very infertile soils.

Compatibility (with other species)

Melinis minutiflora establishes quickly from seed, developing into a competitive mat, and dominating other grasses initially. Combines well with legumes under appropriate management. Can be transient, and should not be the only species sown. Strong ability to suppress annual weeds. Once established, if unmanaged, it forms monospecific stands.

Companion species

Grasses: *Chloris gayana*, *Setaria sphacelata*

Legumes: *Centrosema molle*, *Desmodium intortum*, *D. uncinatum*, *Macroptilium atropurpureum*, *Neonotonia wightii*, *Neustanthus phaseoloides*, *Stylosanthes guianensis* var. *guianensis*, *Vigna parkeri*

Pests and diseases

Generally little affected by insects or disease. However, the following fungi have been reported: *Claviceps* sp., *Corticium solani*, *Fusarium graminearum*, *F. sambucinum*, *Phyllachora graminis*, *P. melinicola*, *Uredo melinidis*, *Uromyces setariae-italicae*. Nematodes include: *Helicotylenchus dihystera*, *Hemicriconemoides cocophilus*, *Meloidogyne javanica*, *Peltamigratus nigeriensis*, and *Scutellonema clathraudaatum*. Molasses grass dwarf disease, a small leaf or stunting virus disease carried by *Malaxodes farinosus*, affects some varieties more than others in Kenya.

Ability to spread

Spreads quickly under favourable conditions, by virtue of stolons and wind-dispersed seed.

Weed potential

Listed as a weed in many countries. Develops considerable fuel load that leads to forest reduction from severe understorey fires and can result in negative impacts on populations of tree and shrub species.

Feeding value

Nutritive value

CP values range from about 18% in young material, to as low as 4% in mature grass, mostly in the range of 6–10%; also 3.6–4.8% Ca, 1.9–4.4% P, 0.6–1.2% S, 3.9–9.20% Mg, 2.5–3.4% Na. Exudate with characteristic odour from glandular leaf hairs contains fatty acids, esters, and probably a phenolic substance.

Palatability/acceptability

Generally not relished on first exposure. Livestock must become accustomed to the grass before they eat it readily.

Toxicity

Calcium oxalate levels in the leaves of 1.1–1.7% have not caused problems.

Feedipedia link

<https://www.feedipedia.org/node/414>

Production potential

Dry matter

Annual dry matter yields are mostly of the order of 5–10 t/ha, but vary from as low as 2 to nearly 20 t/ha, depending largely on moisture availability and N fertility.

Animal production

Can carry 1 beast/ 0.5–2 ha, gaining 0.4–0.5 kg/day LW.

Genetics/breeding

$2n = 4x = 36$. Thought to be a facultative apomict, self pollinated when sexual.

Seed production

Mechanical harvesting is difficult due to the bulk of viscous foliage. This problem is reduced if the crop is mowed and sweated prior to threshing. The best crops have been harvested low when the seed crop has been over-ripe and seed has been retained in the mat. However such crops are difficult to clean. Cleaning problems are exacerbated by the seed's small size and the fact that several asteraceous weeds of similar seed size (e.g. *Ageratum*) are common in the country where it grows. Hammer milling has been used to remove the awns, a job that produced vast amounts of irritating dust. De-awning is now achieved by blowing seed out of a fan and through a rotary (Hannaford) screen before putting the fragmented material over a conventional cleaner. Seed yields mostly range from 100 to 200 kg/ha, but may be as low as 12 and up to 280 kg/ha depending on conditions, harvest method and provenance.

Herbicide effects

Glyphosate and fluzifop-P herbicides are suggested for chemical control.

Strengths

- Adapted to infertile soils.
- Tolerant of aluminium.
- Pioneer species (rapid establishment and ground cover).
- Weed suppression.

Limitations

- Susceptible to severe fire.
- Invasive.
- Intolerant of heavy grazing.

Selected references

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Cultivars

'**Branco**' Released in Brazil. Light green leaves, poorer quality than 'Roxo'.

'**Cabelo de Negro**' Released in Brazil. Smaller than 'Roxo', more grazing tolerant.

'**Chania**' Released in Kenya. Originating from Chania River, Kenya (0°, 36° E, 2,000 m asl). More prostrate growth habit and lower seed production than 'Kitale Commercial', but higher field tolerance to molasses grass dwarf disease.

'**Comum**' Released in Brazil. Similar to 'Kitale Commercial' and 'Roxo'. Probably the type introduced to Australia from South America in the early 1900s.

'**Francano**' Released in Brazil. Similar to 'Roxo', but more vigorous.

'**Kitale Commercial**' Released in Kenya. Probably the variety naturalized throughout the tropics and subtropics. Very susceptible to molasses grass dwarf disease.

'**Mbooni Hills**' Origin Kenya (1°40' S, 37°28' E, 2,000 m asl). Creeping stoloniferous variety, forming close sward. Lower seed production than 'Kitale Commercial', but higher field tolerance to molasses grass dwarf disease.

'**Roxo**' Released in Brazil. Similar to 'Kitale Commercial'.

Promising accessions

None reported.

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