

Tropical Forages

Setaria incrassata

Scientific name

Setaria incrassata (Hochst.) Hack.



Synonyms

Basionym: *Panicum incrassatum* Hochst.; *Setaria gerrardii* Stapf; *Setaria holstii* R.A.W. Herrm.; *Setaria perberbis* Stapf ex de Wit; *Setaria phanerococca* Stapf; *Setaria phragmitoides* Stapf; *Setaria polyphylla* Stapf; *Setaria woodii* Hack.

Family/tribe

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

Morphological description

A shortly rhizomatous (praemorse rhizome), tufted perennial, with geniculately ascending culms 30–200 cm high; nodes pubescent though the hairs sometimes fugacious, rarely glabrous. Leaf blades flat or convolute, linear, 10–60 cm long and 3–15 mm wide, tapering to a long fine point; ligule with a membranous base c. 1 mm long topped by hairs to 4 mm long. Inflorescence a dense, continuous false spike (spiciform panicle) 3–30 cm long, 8 mm wide (excluding the bristles); spikelets and bristles typically pallid green often with purple tips and sometimes wholly purple, the rachis tomentellous to sparsely pilose; bristles 2–15 mm long, in bundles of about 4; spikelets broadly ovate, 2.5–3 (–3.7) mm long. 345,000–560,000 seeds per kg.

Common names

Africa: vleimannagras (Afrikaans); cununo (also *S. sphacelata*), mossungu, msungu, muezuz, nampimpi, senze (Mozambique)

English: purple pigeon grass (Australia); vle bristle grass (South Africa); canary millet (Zimbabwe); black soil bristle grass, black soil timothy

Distribution

Native:

Africa: Angola; Botswana; Cameroon; Eritrea; Ethiopia; Lesotho; Malawi; Mozambique; Namibia; Nigeria; South Africa (KwaZulu-Natal, Free State, Eastern Cape, Northern Cape, Gauteng, Limpopo, Mpumalanga, North West); Somalia; Swaziland; Tanzania; Uganda; Zambia; Zimbabwe

Cultivated:

Australasia: Australia

Uses/applications

Forage

Sown as a medium to long-term pasture. Speed and reliability of establishment make it ideal for short-term leys.

Environment



A shortly rhizomatous, tufted perennial, with geniculately ascending culms, Eritrea (cv. Inverell)



Becomes very stemmy at maturity (cv. Inverell)



Inflorescence a dense, continuous false spike (spiciform panicle)(ILRI 15418)



Seed units



Seed crop (cv. Inverell)



Seed yields reduced by seed-eating birds



Not grazed readily when mature (cv. Inverell)



Underutilized pasture (cv. Inverell)

It is also used for erosion control on black earths where other perennials are difficult to establish.

Ecology

Soil requirements

Mostly found on black clay soils, but has also on clay loams, sandy loams and sands. pH at collection sites varies from 6.2 to 8.2. The main limitation appears to be the need for high soil fertility. In cultivation, established stands decline as fertility falls.

Moisture

S. incrassata is normally found in moist situations such as marshes and riverbanks, sometimes extending to adjacent stony hillsides, in areas receiving annual rainfall from about 500 to >1,200 mm. It has similar drought tolerance to that of *Panicum coloratum* var. *makarikiense*, but less than that of *Cenchrus ciliaris*. It establishes more readily without irrigation than most other introduced warm season perennial grasses, even under conditions of fairly severe moisture stress. It can tolerate short periods of waterlogging, but is inferior to *P. coloratum* var. *makarikiense* in this respect.

Temperature

Occurs from 34° S to 5° N, and from near sea level to 2,400 m asl. Annual average temperature in the coolest part of this range is about 16 °C, often with heavy frosts. It has been successfully cultivated from about 24 to 33° S in Australia, producing well in mid-summer. Spring, autumn, and total growth is slightly inferior to that of *P. coloratum* var. *makarikiense*. 'Inverell' is very susceptible to frost damage but mostly recovers with the onset of warmer conditions.

Light

Grows best in full sunlight.

Reproductive development

Flowers throughout the growing season given adequate moisture.

Defoliation

Has reasonable palatability and feed quality. It should be grazed frequently to maintain quality, but does not survive continuous heavy grazing.

Fire

Recovers following fire, from both tussocks and seed.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Freshly harvested seed can remain dormant for 7–18 months and should be tested before sowing. Summer sowings are usually more successful, although more dormant seed can be sown with winter cereals allowing it to establish the following spring. In general it should be sown at 2–3 kg seed/ha into a well-prepared seedbed, to a depth of 1–2 cm or slightly deeper (3–4 cm) in self-mulching soils. If there is moisture at depth, seedlings can emerge from as deep as 5 cm, but planting at this depth is generally not recommended. Subsequent rolling is usually beneficial, but not on crusting soils or if increased erosion risk is evident. On heavy clay soils or seed production plots, a sowing rate of 4 kg/ha of seed can be used to hasten results. It is a large, free-flowing seed which can be sown through crop or pasture planters. 'Inverell' establishes readily on black clay soils, even under moisture stress conditions where other species fail completely.

Fertilizer

Application of 100–200 kg/ha of superphosphate at planting can be beneficial in soils of low to moderate phosphorus fertility. There is usually adequate nitrogen released during cultivation to satisfy initial demands, but nitrogenous fertilizer may be essential subsequently if legume nitrogen is insufficient to maintain stand.

Compatibility (with other species)

Grows well with legumes and other grasses, but can initially suppress more slowly establishing companions if seeding rate of *S. incrassata* is too high.

Companion species

Grasses: *Chloris gayana*, *Megathyrsus maximus*, *Panicum coloratum*.

Legumes: *Clitoria ternatea*, *Desmanthus leptophyllus*, *D. virgatus*, *Medicago sativa*, *M. truncatula*, *M. scutellata*, *Trifolium subterraneum*.

Other: *Cichorium intybus*.

Pests and diseases

No problems encountered.

Ability to spread

Seedling recruitment is common within a stand.

Weed potential

Spread beyond the planted area has so far given little cause for concern.

Feeding value

Nutritive value

P levels range from 0.12 to 0.41%, and Ca levels from 0.14 to 0.29%. It should be grazed frequently and fertilized as is necessary to maintain quality.

Palatability/acceptability

Has reasonable palatability and feed quality if maintained below about 40 cm, but quickly runs to head and is then avoided by stock. It is not as palatable as other grasses sown on black clay soils and is more so preferred by cattle than by sheep. It is readily eaten when fed as hay.

Toxicity

Total oxalate levels vary from 0.67 to 1.9% of the dry matter, with Ca : total oxalate ratio ranges of 0.09–0.24.

Note: Ca : total oxalate levels <0.5 are considered to be potentially capable of causing bighead (nutritional secondary hyperparathyroidism) disease in horses unless Ca supplements are provided).

Production potential

Dry matter

Productivity in the first and second years of establishment is superior to that of most other perennial grasses in the same environment.

Animal production

Comparable liveweight gains to those achieved from other grasses. Mostly used for cattle production, but is also grazed by sheep.

Genetics/breeding

$n = 9$; $2n = 18, 36, 54$. Little has been done by way of genetic improvement of this species.

Seed production

The crop can be started at any time during the growing season when soil moisture is likely to be adequate for the 60–90 days it takes for the crop to develop, and before the likelihood of frost damage to the developing crop. Early management of a stand intended for a seed crop might involve gradually reducing stubble by grazing and then cutting remaining material to about 10 cm. Best crops are achieved using irrigation and an initial application of 100 kg/ha N, although lower rates of N (30–50 kg/ha) can be used if moisture is likely to be limiting. Seed is ready to harvest when it feels gritty and the colour changes from purplish green to light green. Seed reaches a peak of ripeness over a period of 4–10 days, after which it readily falls. Timing of harvest is therefore crucial. With good summer rainfall, yields in the order of 200–300 kg/ha/year can be expected from two harvests in a season, and up to 390 kg/ha have been obtained.

Presentation yields of about 600 kg/ha/crop have been measured, with potential (total) yields of over double this figure. Direct heading is most common although swathing and pick-up with a draper front header has been used to great effect by specialist seed producers.

Herbicide effects

No information available.

Strengths

- Easy to establish on heavy black soils.
- Drought tolerant.
- Tolerant of temporary waterlogging.

Limitations

- Needs moderate to high fertility.
- Unpalatable when mature.
- Oxalate levels that could harm horses.
- Intolerant of heavy grazing.

Selected references

Boschma, S.P. and McCormack, L.H. (2008) Towards a tropical grass package for northern New South Wales. In: Boschma, S.P., Serafin, L.M. and Ayres, J.F. (eds) Proceedings of the 23rd Annual Conference of the Grassland Society of NSW. Orange, NSW, Australia. p. 51–57.

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.

Gibbs Russell, G.E., Watson, L., Koekemoer, M., Smook, L., Barker, N.P., Anderson, H.M. and Dallwitz, M.J. (1990) Grasses of Southern Africa: An identification manual. Memoirs of the Botanical Survey of South Africa No. 58. Botanical Research Institute, Pretoria, South Africa.

McKenzie, R.A. (1988) Purple pigeon grass (*Setaria incrassata*): A potential cause of nutritional secondary hyperparathyroidism of grazing horses. Australian Veterinary Journal 65:329–330. doi.org/10.1111/j.1751-0813.1988.tb14520.x

Watt, L.A. (1976) Evaluation of pasture species for soil conservation on cracking black clays, Gwydir district, northwestern New South Wales. Journal of Soil Conservation New South Wales 32:86–97. nla.gov.au/nla.obj-750431280

Cultivars

'Inverell' (CPI 24582) Released in Australia (1977). Origin unknown. Institutional collection from Matopos Research Centre, Zimbabwe. Leafy variety 0.6–1.5 m high, leaves glaucous. Released as a forage for permanent and ley systems in sub-humid, subtropical eastern Australia.

Promising accessions

None reported.

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