

Tropical Forages

Bothriochloa insculpta

Scientific name



Bothriochloa insculpta (Hochst. ex A. Rich.) A. Camus

Synonyms

Basionym: *Andropogon insculptus* Hochst. ex A. Rich.;
Andropogon pertusus (L.) Willd. var. *insculptus* (Hochst. ex A. Rich.) Hack.; *Dichanthium insculptum* (Hochst. ex A. Rich.) Clayton

Family/tribe

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

Morphological description

A perennial tussock, 30–80 cm tall (–1.5 m at maturity); often strongly or weakly stoloniferous; stolons 1.5–2.5 mm diameter, reddish pink to mauve. Leaves glaucous; leaf blades linear, tapering, to 30 cm long and 8 mm wide, mostly glabrous except for spreading hairs at the base; ligule a fringed membrane, hairs shorter than the membrane. Culm internodes yellow, nodes with annulus of spreading white hairs, to 4 mm long. Inflorescence subdigitate or with a central axis seldom over 3 cm long; 3 to >20 racemes per panicle, 2–9 cm long, olive green to purplish in colour, lower racemes often branched. Spikelets in pairs, sessile spikelet with single deep pit, and geniculate and twisted awn 15–25 mm long in the lower glume; pedicellate spikelet glabrous, unawned, usually neuter, with 1–3 pits in the lower glume. Inflorescence, seed and leaves emit an aromatic odour when crushed. 650,000–1.2 million seed units/kg (1 seed unit = sessile spikelet + pedicellate spikelet + awn).

Similar species

Bothriochloa insculpta: spreading hairs on the nodes; strongly aromatic inflorescence; pit(s) on the lower glume.

Dichanthium annulatum: spreading hairs on the nodes; little or no aroma in inflorescence; no pit(s) on the lower glume.

Common names

Africa: klosgras, lidjesgras, stinkgras, stippelgras, terpentyn gras, turfklosgras, turfgras (Afrikaans); uhathsi (Ndebele); aus gudun, aus ma'an, domar, gurguro, haldaf, magalhed (Somalia); motsamabudi (Sotho); umKunena (Zimbabwe); imbutane (Zulu)

English: creeping bluegrass, pinhole grass, stippel grass, sweet-pit grass, sweet pitted grass, tassel grass, turf grass

India: hennu ganjalub garikai hullu



A perennial tussock, often strongly or weakly stoloniferous (cv. Bisset)



Strongly stoloniferous cv. Bisset (L); weakly stoloniferous cv. Hatch (R)



Pink to mauve stolons (cv. Bisset)



Dense flowering in seed crop (cv. Bisset)



Inflorescence subdigitate or with a central axis seldom over 3 cm long; 3 to >20 racemes per panicle.



Seed units with pits in the lower glume.



Maturing seed crop (cv. Bisset)



Harvesting seed with brush harvester



Hay bales made after seed harvest (cv. Bisset)



Pasture (cv. Hatch with *Macropitium atropurpureum* cv. Siratro)

Latin America: pasto dulce picado (Spanish)

Distribution

Native:

Africa: Botswana; Democratic Republic of Congo; Eritrea; Ethiopia; Kenya; Lesotho; Malawi; Morocco; Mozambique; Namibia; Somalia; South Africa (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, North West, Northern Cape, Western Cape); Swaziland; Tanzania; Zambia; Zimbabwe

Asia: India; Yemen

Europe: Italy (Sicily)

Cultivated/naturalized:

Widely used as a cultivated species, especially in Australia, and naturalized globally in tropics and subtropics.

Uses/applications

Forage

Permanent pasture on moderately fertile soils in sub-humid environments. Makes good hay provided stems are leafy and succulent and not coarse and woody when cut.

Environment

Strongly stoloniferous varieties provide stable ground cover on exposed or overgrazed slopes.

Ecology

Soil requirements

Found mainly on near neutral to alkaline, fertile soils, with textures ranging from stony and sandy to clay. Adapted to well-structured, well-drained, red and black clays, loams and clay loams, of at least moderate fertility. Generally not suited to sandy soils. Can colonise certain eroded clays, scalded areas and puggy soils. One of the few grasses suited to sowing in black self-mulching clays but establishment difficult. Not adapted to very heavy black clays. Some varieties collected from sodic soils.

Moisture

Usually found in moister situations in areas with rainfall from 450 mm to 1,500 mm. Best sown in areas with rainfall from 700 to 1,000 mm. Tolerant of dry conditions and short periods of waterlogging, but not of prolonged drought or permanently wet conditions. Poor growth during dry periods, but responds quickly to rain or irrigation.

Temperature

Found from sea level to 2,000 m asl, and from 37° latitude to near the equator, representing an average annual temperature range of about 17–27 °C. Grows through the warm season and into the cool season until cut by frost. Regrowth after the cool season is slow in comparison with *Chloris gayana* and *Megathyrsus maximus*. Stands burnt by frost recover from crowns established along the stolons.

Light

Found in open bush and grassland and does not grow well in shade.

Reproductive development

Short day flowering response in cultivars, varying with provenance.

Defoliation

Often found naturally in heavily-grazed areas. Although, ideally, grazing should be withheld until seedlings develop a strong root system, stands have been effectively established under quite heavy grazing. Should be managed to maintain fairly low, leafy stand. Stolon rooting in weakly stoloniferous types is favoured by stock trampling.

Fire

Very tolerant of fire. Annual burning may be necessary to remove uneaten material at the beginning of the growing season.

Agronomy

Guidelines for establishment and management of sown forages.



Charolais cattle grazing Bisset pasture, SE Qld, Australia



Used for water way stabilisation (cv. Hatch)

Establishment

Established from seed or stolons. High level of dormancy in freshly harvested seed, which breaks down after 4–9 months' storage. Seed is best sown on or near the surface (not deeper than 1 cm) of a fine, clean seedbed, at 1–3 kg/ha (for soil conservation sow at higher rates). To avoid erosion resulting from cultivation, it can also be sown into the ashes following a fire, although this results in lower and slower establishment. Germinates quickly and establishes reliably. Difficult to achieve flow of fluffy seed through some mechanical planters unless seed is pelleted. Good establishment can be achieved on friable-surfaced soils, by broadcasting seed into standing winter cereal stubble and relying on trampling by grazing animals to cover the seed. Seed must maintain close contact with wet soil for about 3 days for seedlings to establish.

Fertilizer

Responds to nitrogen, although survives in infertile soils through non-symbiotic nitrogen fixation in the rhizosphere. Usually uneconomic to apply nitrogen fertilizer to large areas of dryland pasture, but good legume can provide sufficient nitrogen to stimulate grass. Severe renovation of declining mature pasture releases sufficient nitrogen to rejuvenate the stand in the short term.

Compatibility (with other species)

Competes well with weeds due to creeping nature, but may also suppress associated legume.

Companion species

Grasses: Not normally sown with other grasses but could be mixed with *Chloris gayana*. May be beneficial to plant mixture of cultivars of *B. insculpta* to benefit from individual relative strengths.

Legumes: *Aeschynomene villosa*, *Leucaena leucocephala*, *Medicago sativa*, *Stylosanthes hamata*, *S. humilis*, *S. scabra*, *S. seabrana*, *Trifolium repens*.

Pests and diseases

Main diseases are ergot caused by *Claviceps pusilla* and rust caused by *Puccinia duthiae*, some varieties being more susceptible than others. It is also attacked by another rust, *Puccinia nakanishikii*, a leaf spot, *Mycloptodiscus lateralis*, and a smut, *Sporisorium doidgeae*. Attack by nematodes (unconfirmed) may have caused loss of stand in seed crops in sandy soil.

Ability to spread

B. insculpta is a successful coloniser due to its tolerance of low fertility soils and regular defoliation, its ability to produce significant yields of seed, and the sometimes-strong stolon development. Fluffy seeds are spread by wind and adhesion to animal fur.

Weed potential

Probably poses less of a weed threat than does the closely related *B. pertusa*.

Feeding value

Nutritive value

Quality declines with age, and more rapidly with the onset of flowering. CP levels in young leaf may be of the order of 10%, declining to about 5% in standing hay at the end of the season. Calcium level of 0.32% and phosphorus level of 0.12% have been measured.

Palatability/acceptability

Readily eaten by stock, and can tolerate heavy grazing. The strongly scented herbage does not taint milk or meat. The hay also is aromatic. Some varieties are more readily eaten than others.

Toxicity

Low in oxalate, so will not cause big head in horses. No problems recorded.

Feedipedia link

<https://www.feedipedia.org/node/494>

Production potential

Dry matter

Paddock yields of the order of 10 t/ha DM, and 15–20 t/ha DM in seed crops, where nitrogen fertilizer and possibly irrigation are used.

Animal production

Over a 335 day period, cattle have gained an average of 0.5 kg/hd/day, with a peak of 1.25 kg/day in autumn, and a low of -0.4 kg/day in winter.

Genetics/breeding

$2n = 40, 50, 60, 120$; apomictic.

Seed production

In the southern hemisphere subtropics, 'Bisset' commences flowering in early May and 'Hatch' in late April, leading to main seed crops in late June/early July and mid to late May, respectively. Low temperatures delay seed ripening, and frosts may destroy immature seed crops. In the upland tropics, 'Bisset' seed crops have been harvested between mid May and mid June and 'Hatch' between late April and mid May, about 4 weeks after head emergence. In this environment, and in the absence of frosts, a follow-up crop of various cultivars has proven possible in August/September. Without nitrogen, seed yields may be as low as 20 kg/ha, but normally range from 100 to 150 kg/ha, and up to 200 kg/ha under ideal conditions. As with most grasses, an application of 100 kg/ha N following a clearing cut about 2 months before flowering helps to ensure a high density of well-filled heads. Crops can be direct headed or brush harvested. Harvest timing is important as seed dislodges readily when ripe.

Herbicide effects

Killed by glyphosate, tolerant of atrazine.

Strengths

- Palatable.
- Drought tolerant.
- Tolerant of heavy grazing.
- Grows on less fertile soils.
- Effective ground cover to combat erosion.

Limitations

- Low palatability in some varieties.
- Slow regrowth after dry/cool season.

Selected references

Bisset, W.J. (1978) The origin of *Bothriochloa insculpta* cv. Hatch in Queensland. *Tropical Grasslands* 12:208–209. [bit.ly/2QDSw75](https://doi.org/10.1071/2QDSw75)

Bisset, W.J. and Graham, T.G. (1978) Creeping bluegrass finds favour [pasture grass, *Bothriochloa insculpta*, Queensland]. *Queensland Agricultural Journal* 104:245–253.

Cultivars

'Bisset' (composite of CPI 59584 and CPI 59585) Released in Australia in 1989. Origin: CPI 59584 from Nairobi, Kenya (1° S, 1,667 m asl, rainfall 850 mm) and CPI 59585 from Namanga, Tanzania (3° S, 1,273 m asl, rainfall 625 mm). Commences flowering in early May in subtropics. Finer, better developed and better rooted stolons, and more palatable forage than 'Hatch'. Little rust.

'Cedo' (composite of CPI 69517 and CPI 125652B) Released in Australia in 2004. Both accessions originate from Bulawayo, Zimbabwe (19.31° S, 1,200 m asl, rainfall 600 mm). CPI 69517 commences flowering in subtropics early to mid April, and CPI 125652B 2 weeks earlier. Former morphologically and agronomically similar to 'Bisset'; the latter with finer, darker red, more profuse stolons. Both earlier flowering than 'Bisset' and 'Hatch'. Rust-prone in humid environment.

'Hatch' (CPI 2695) Released in Australia in 1978. Originating from Zimbabwe, and naturalized near Rockhampton in Central Queensland. Robust appearance, low tendency to develop nodal roots on prostrate culms (stolons). Commences flowering in late April in subtropics. Not as well eaten as 'Bisset'. Rust-prone in humid environment.

Promising accessions

CPI 59587 Selected in southern Queensland, Australia. Origin near Bulawayo, Zimbabwe (19.85° S, 29.08° E, 1,364 m asl, rainfall 650 mm). Similar to CPI 69517 (see cv. Cedo).

CPI 52193 Selected in Australia. Origin near Choma, Zambia (16.85° S, 26.9° E, 1,250 m asl, rainfall 750 mm). Similar to CPI 69517 (see cv. Cedo).

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