

Brachiaria brizantha

Scientific name

Brachiaria brizantha (Hochst. ex A. Rich.) Stapf.

Synonyms

Urochloa brizantha (Hochst. ex A. Rich.) R.D. Webster

Panicum brizanthum Hochst. ex A. Rich. [basionym]

Family/tribe

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

Common names

beard grass, palisade grass, palisade signal grass, Mauritius grass (Malaysia); signal grass, Palisadengras (German); brizantha, braquiaraõ, brizantão, capim braquiária, capim marandú, marandú, capim ocinde (Portuguese - Brazil); pasto alambre, pasto señal, zacate señal, zacate signal (Spanish).

Morphological description

Loosely tufted perennial with short rhizomes and erect or slightly decumbent stems 60–150 cm high (occasionally to 200 cm). Leaves flat, bright green up to 20 mm wide and up to 100 cm long. May be hairless or hairy. Inflorescence is a racemose panicle consisting of 2–16 racemes, 4–20 cm long and elliptical spikelets 4–6 mm long, with no hairs or a few hairs at the tip. Spikelets are normally a single row, with a purple, crescent-shaped rachis 1 mm wide. Glumes and lower lemma are cartilaginous in texture.

B. brizantha intergrades with *Brachiaria decumbens* and the species may be difficult to distinguish. The main difference is in growth habit with *B. brizantha* more tufted and *B. decumbens* more decumbent and forming a denser cover. The two are morphologically distinguished by the shape of the rachis and the arrangement and texture of spikelets.

Distribution

Native to:

Africa: Botswana, Cameroon, Côte D'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mozambique, Namibia, Nigeria, Sierra Leone, South Africa, Tanzania, Uganda, Zaire, Zambia, Zimbabwe.

Sub-Saharan Africa from 25°S to 12°N, from 100–2,300 m asl.

Widely naturalised throughout the humid and sub-humid tropics.

Uses/applications

Permanent pasture for grazing and cutting for fresh feed and for conservation. Multi-purpose pastures including fattening systems. Suitable for establishment with upland rice (*Oryza sativa*) in the Colombian savannas. It is also planted as a pasture under plantation crops and as a ground cover for erosion control.

Ecology

Soil requirements

Grows on a wide range of soils with pH 4–8, textures ranging from light to heavy (but free-draining) and fertility from high to low, including those of acidic soils with high soluble Al concentrations. Tolerance to Mn varies among accessions. Will show a minor response to lime on acid soils.

Generally needs medium to high soil fertility to be productive. More nutritionally demanding than other *Brachiaria* species.

Moisture

Best adapted to the humid and sub-humid tropics with 1,500–3,500 mm AAR, but will also grow in the more arid regions of the tropics with rainfall somewhat below 1,000 mm. Can withstand dry seasons of 3–6 months during which the leaf may remain green while other tropical species have browned off. Less adapted than either *B. humidicola* or *B. dictyoneura* to short dry periods (<3 months) or to wet soils.

Reports of tolerance to flooding are varied. 'Toledo' can stand short-term flooding (<1 month), 'Marandú' has little tolerance.

Temperature

B. brizantha is a warm-season grass for the lowlands, altitudes to 2,000 m in the tropics but only to 1,000 m in higher latitudes. Leaf is frost-sensitive, but the plant survives light frost.

Light

Shade tolerance is intermediate compared with other tropical grasses; productive under moderate light intensities of more open plantations of coconuts (>60% light transmission). Cv. Marandú was the most productive grass under mature (12-year) rubber. At low N inputs, DM yields have been higher in shade than in full sunlight.

Reproductive development

The species is predominantly polyploid and apomictic. Diploid sexual accessions are known, but have no commercial value.

Defoliation

Can tolerate frequent defoliation under grazing or cutting. Cvv. Marandú and Karanga are tall and so easier to cut by hand.

Fire

Burning is not recommended but will recover from an occasional, but not annual, fire.

Agronomy

Guidelines for the establishment and management of sown pastures.

Establishment

Large areas are established from seed. Fresh seed will not germinate due to physiological dormancy and must be stored for 6–9 months or acid-scarified before sowing. Seed should be broadcast at 2–4 kg/ha onto a well-prepared seedbed and then lightly harrowed and rolled to incorporate. Mixtures with legumes are commonly planted. In the wetlands of the Brazilian savannas, planting early in the rainy season results in the loss of seedlings through flooding, so late planting is more suitable.

Smallholders establish *B. brizantha* vegetatively from rooted tillers.

Fertiliser

Very responsive to fertiliser N, and may require repeated moderate applications. In cut-and-carry systems, fertiliser should be applied after each cut for maximum production.

Compatibility (with other species)

Lightly grazed *B. brizantha* provides good ground cover and weed control. Under light grazing, many twining legumes will persist in the sward (better than with other commercial species of *Brachiaria*). Creeping legumes such as *Arachis* spp. and *Desmodium heterocarpon* subsp. *ovalifolium* will combine well under more intense grazing. Very vigorous growth can inhibit development of young rubber trees in establishing plantations.

As an intercrop, competition from *B. brizantha* reduced yields of soybean (*Glycine max*) by 40–50% and of upland rice (*O. sativa*).

Companion species

Grasses: In Eastern Venezuela, used in mixtures with *B. humidicola* or *B. dictyoneura*.

Legumes: *Arachis* spp., *D. heterocarpon* subsp. *ovalifolium*, *Centrosema molle*, *Stylosanthes* spp., *Alysicarpus vaginalis*, *Leucaena leucocephala*, *Pueraria phaseoloides*, *Desmodium intortum*.

Pests and diseases

B. brizantha is the most resistant of the *Brachiaria* spp. to spittlebugs (Cercopidae), through an antibiotic mechanism. However, the level of resistance varies among accessions. 'Marandú' and other new selections are resistant. Resistance to the spittlebug *Deois flavopicta* is probably from antinexosis, antibiosis and tolerance. Resistant to leaf-cutting ants (*Atta* spp. and *Acromyrmex* spp.). In Eastern Venezuela, severe damage due to the brown bug *Scaptocoris* can be observed in commercial 'Marandú' pastures. Foliar leaf blight (*Rhizoctonia solani*) affects all accessions of *B. brizantha* except for CIAT 16320, which has low to moderate levels of resistance. Susceptible to rust (*Uromyces setariae-italicae*) in Colombia. Under poor drainage, susceptible to bacterial root rot (*Erwinia chrysanthemi* pv. *zeae*).

Ability to spread

Good spread from seed in sown pastures. However, 'Marandú' appears to have some form of allelopathic effect which even reduces seedling recruitment of its own seed.

Weed potential

Common weed of disturbed areas in the humid tropics and subtropics.

Feeding value

Nutritive value

Nutritive value is dependent on the basic fertility of the soil, fertiliser application and age of regrowth. In tropical America, CP ranges are 7–16% and digestibility 51–75%. IVDMD of regrowth declined from 75% at 2 weeks to 55% at 12 weeks.

Palatability/acceptability

Well accepted by grazing stock. Considered to be slightly more palatable than *B. decumbens*.

Toxicity

Can cause severe photosensitization in sheep, goats and young cattle.

Production potential

Dry matter

Very productive and can support high stocking rates with good persistence under continuous or rotational grazing. Good growth in the dry season. DM yields range from 8–20 t/ha/yr.

Animal production

On moderately fertile soils, will generally support cattle liveweight gains of 400–500 kg/ha/yr at stocking rates of 2.5 steers/ha in the wet season and 1.5 in the dry.

When associated with legumes and stocked at 3 animals/ha, 'Marandú' has recorded LWGs of 540–840 kg/ha. In Brazil, with 2.2–2.4 animals/ha, LWGs of 290–340 kg/ha/yr were recorded. In Costa Rica, 'Marandú' produced LWGs of 154 kg/head and 924 kg/ha with *Arachis pintoi*, and 110 kg/head and 714 kg/ha in a pure stand.

'Toledo' has produced 8–9 kg milk/head/day. LWGs of 600 g/head/day (307 kg/ha/yr) over 3 years in Paraná, Brazil have been reported, superior to *Setaria sphacelata*. Production was poorer than limpo grass (*Hemarthria altissima*) at Ponta Grossa, Brazil.

Genetics/breeding

B. brizantha is an apomictic tetraploid. Diploid sexual accessions are known, but have no commercial value.

Breeding objectives for *Brachiaria* species in Colombia are for increased resistance to spittlebugs, leaf-cutting ants, and other biotic constraints, better edaphic adaptation, especially to infertile soils and improved nutritive value.

Seed production

Direct heading or hand harvest for yields of 100–500 kg/ha with 50–150 kg/ha pure seed, and up to 1,000 kg/ha pure seed with mechanical recovery of fallen seed. Seed may be dormant for up to 6 months after harvest.

Herbicide effects

No information available.

Strengths

- Resistance to spittlebug attack.
- Good persistence under grazing.
- More compatible with legumes than some other *Brachiaria* spp.
- Tall types are well suited to cutting.
- High seed production potential.

Limitations

- Tends to monospecific sward.
- Needs moderate to high fertility soils.
- Poor adaptation to poorly drained soils.
- May cause photosensitization, particularly in sheep and goats.

Selected references

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Internet links

http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl?urochloa+brizantha

<http://www.fao.org/ag/AGP/AGPC/doc/Gbase/data/pf000187.htm>

Cultivars

Cultivars	Country/date released	Details
'Marandú' (CIAT 6294, BRA000591, CPI 81408, ILCA 16550)	Brazil (1984)	Kenyan accession. Good spittlebug resistance. Requires intermediate to high fertility soils. Relatively intolerant of water-logging. Widely planted in tropical America.

'Brizantha' 'Gigante' 'Insurgente' 'Diamantes 1' (CIAT 6780)	Cuba (1987) Venezuela (1989) Mexico (1989) Costa Rica (1991)	See 'Marandú'.
'La Libertad' (CIAT 26646)	Colombia (1987)	'La Libertad' is adapted to poorer soils than 'Marandú'. Accession is of unknown origin.
'Toledo' 'Victoria' 'Xaraés' (CIAT 26110, MG-5)	Costa Rica (2000) Colombia (2002) Brazil, EMBRAPA	Collected at 1,500 m asl in a 1,700 mm annual rainfall region of the Rift Valley in Burundi. Selected for soils of intermediate to high fertility and rainfall above 1,600 mm. High yield and drought tolerance for dry season production but susceptible to spittle bug. More resistant to foliar blight and <i>Fusarium</i> than 'Marandú', and recovers faster from defoliation . More prostrate than 'Marandú'. Used for erosion control on fragile hillsides in smallholder systems in Honduras and Nicaragua.
'Serengeti' (CIAT 6387)		Collected at 1,200 m asl in a 1,300 mm annual rainfall region of the Rift Valley in Kenya.
'Karanga' (CIAT 16835)		Collected at 1,200 m asl in an 800 mm annual rainfall region of Zimbabwe.

Promising accessions

Promising accessions	Country	Details
CIAT 16467		Collected at 1,600 m asl in a 1,000 mm annual rainfall region of Kenya. Good dry season production.
CIAT 16113, CIAT 16316, CIAT 16315, CIAT 16306		Ethiopian accessions from 1,600 m asl .
CIAT 6016, CIAT 6387	Brazil	Highest yielding in Brazilian savannas.
CIAT 6385, CIAT 26124, CIAT 26318, CIAT 26990	Colombia	Rift Valley accessions from Kenya, Burundi, Rwanda and Uganda.
CIAT 16300	Costa Rica	Ethiopian accession from 1,750 m asl with 1,600 mm annual rainfall .
CIAT 6021	Ecuador	Accession is of unknown origin.
BRA 004391	Brazil	Collected in Nukuru, Kenya at 1,900 m asl . Most tolerant of water-logging of several accessions.



Seedheads (racemose panicle) and seed.



Maturing seedheads.



Tussocks of cv. Toledo.



Young clumps of cv. Marandú.



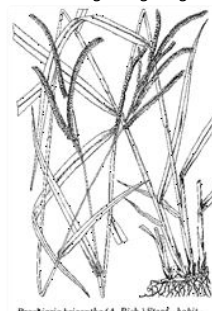
Mature stand formed from short rhizomes.



Seedcrop of cv. Toledo.



cv. Marandú and *Arachis pinto* cv. Amarillo recovering from grazing.



Brachiaria brizantha (A. Rich.) Stapf - habit.

From: t Mannetje, L. and Jones, R.M. (1992) *Plant Resources of South-East Asia No. 4. Forages*. (Pudoc Scientific Publishers, Wageningen, the Netherlands). © Prosea Foundation.

