

Tropical Forages

Canavalia brasiliensis

Scientific name



Canavalia brasiliensis Mart. ex Benth.

Synonyms

Canavalia prolifica Piper ex Ricker

Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily:
Faboideae tribe: *Phaseoleae*.

Morphological description

Annual or weakly perennial, prostrate to twining herbaceous legume. Leaves trifoliolate, leaflets almost glabrous, ovate, 12–15 cm long and 8–11 cm wide, apex acute. Inflorescences axillary racemes, 12–26 cm long, with white, mostly violet, violet-blue or purple flowers, 2–2.5 cm long. Pods glabrous, 12–20 cm long and approx. 1 cm wide, of brown to dark-brown colour, dehiscent with an average of 12 seeds. Seeds light brown to brown, approx. 11 mm long and 8 mm wide, with a black hilum, 6 mm long. There are 1,000–2,500 seeds/kg with a high level of hardseededness.

Common names

English: Brazilian jackbean, Barbicou-bean

Latin America: feijão bravo do Ceará (Brazil); calibolati, frejolón, frijol espada, haba de playa, mata de playa (Spanish)

Distribution

Native:

Northern America: Mexico (Campeche, Chiapas, Colima, Guerrero, Jalisco, Mexico, Michoacán, Nayarit, Oaxaca, Quintana Roo, Sinaloa, Sonora, Tamaulipas, Veracruz, Yucatán), USA (Florida (s.))

Caribbean: Antigua and Barbuda, Barbados, Cuba, Haiti, Martinique, St. Vincent and Grenadines (St. Vincent), Trinidad and Tobago, US Virgin Islands

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

South America: Argentina (n.e.), Brazil, Colombia, Ecuador, Paraguay, Venezuela (n.)

Uses/applications

Forage

C. brasiliensis is used to improve the value of stubble grazing during the dry season.

Environment



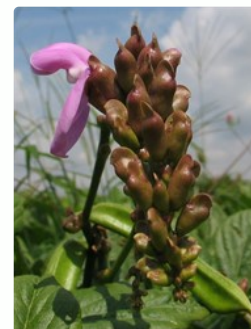
Twining growth habit



Twining or prostrate annual or weak perennial



Leaflets glabrescent, inflorescence an axillary raceme



Inflorescence and seed pod



Inflorescence and immature pod



Fully developed pod



Mature pod



Seeds



Seed showing black hilum

Mainly for green manure, fallow improvement and erosion control but also for fresh or conserved forage. In view of its ample and deep root system, the species can contribute to amelioration of soil structure, to stabilization of erosion prone sites and to nutrient cycling. Because of the intermediate decomposition and N mineralization rates of the biomass, nutrient release synchronises well with the nutrient demand of annual crops such as maize and rice, when the green manure biomass is incorporated before sowing of the succeeding crop. As a result, N recovery is higher than for most other green manure plants and can reach N recovery rates of mineral N fertilizer.

Other

In poor regions of northeast Brazil, seed is used as human food in times of low food availability.

Ecology

Soil requirements

Grows well on a wide range of soils, from very acid (pH 4.3) to alkaline (pH 8.0) and is adapted to low fertility. Root growth and biomass production are best in well-drained soils. The species is affected by soil compaction, though less than *C. ensiformis*. There are indications of salinity tolerance; however, the information available is not conclusive.

Moisture

Adapted to 900–1,800 mm annual rainfall; survives and can stay green during 5–6 months of dry period. Regrows quickly at the onset of the rains.

Temperature

Grows in an altitudinal range of 0–1,800 m asl.

Light

No shade tolerance known.

Reproductive development

Life cycle is 8 months.

Defoliation

First cut can be made 3–4 months after sowing; 4 months thereafter, a second cut is possible.

Fire

Probably no fire tolerance.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Scarification of seeds before sowing is necessary to break hardseededness, e.g. via 30 minutes hot water (80 °C) treatment, and improve germination. *C. brasiliensis* is broadcast or sown in rows 40–50 cm apart and with 20 cm distance between plants in the row, equivalent to 50 kg seed/ha. For seed production, seeds are sown in rows 1 m apart and 20 cm between-plant distance, equivalent to 20–30 kg/ha of seed. Seed is sown at a depth of 1–3 cm. Vigorous initial growth.

Fertilizer

Though *C. brasiliensis* is adapted to low fertility soils, superphosphate fertilization will enhance establishment and growth.

Compatibility (with other species)

Vigorous growth can suppress weeds.

Companion species

No information available.

Pests and diseases

No information available.

Ability to spread

No information available; probably low.

Weed potential

No information available; probably low.

Feeding value

Nutritive value

There is little information on herbage quality of *C. brasiliensis* and no feeding trials are reported. According to one study, the biomass contains 23% CP; 33.5% ADF; 44.1% NDF; 10.6% hemicellulose; 6.52% lignin; 8.42% polyphenols; IVDMD is 69.6%. C/N ratio is 12–16. Seeds contain 31.9–41.6% CP, 52.3% carbohydrates, 12.3% crude fibre, 2.8% ash and 1.2% oil. In an evaluation of 47 accessions, CP values in 8-week-old fresh forage ranged between 19 and 25%, and IVDMD between 76 and 85%. Limiting amino acids are methionin, cystein and tryptophan. *C. brasiliensis* has high lysine content and could be used as a component in concentrates for poultry and swine.

Palatability/acceptability

In Central America, cattle readily use crop residues improved with *C. brasiliensis* in the dry season. There is a report from Nicaragua that herbage is well accepted by sheep and goats.

Toxicity

Seeds of *C. brasiliensis* contain several antinutritive factors, the toxic amino acid, canavanin, contributing the major part. Other antinutritive components include trypsin inhibitors, concanavalin Br and canatoxin. In Brazil, toxicity of *C. brasiliensis* herbage to ruminants was reported; however, in Central America under crop residue grazing enriched with *C. brasiliensis* contributing with less than 20% to the diet, no negative effects on cattle were observed.

Production potential

Dry matter

Highly productive under favourable conditions: 3–8 t/ha/cut; more than one cut per year is possible.

Animal production

Grazing maize stover improved with associated *C. brasiliensis* can increase dry-season milk production by c. 16% (1 L/cow/day).

Genetics/breeding

$2n = 22$.

Seed production

Accession CIAT 17009 yields 570–680 kg seed/ha.

Herbicide effects

No information available.

Strengths

- Drought tolerance.
- Adaptation to a wide range of soils, including acid, low fertility soils.
- High potential for green manure and soil conservation.

Limitations

- Antinutritive and toxic compounds.

Internet links

<http://floradobrasil.jbrj.gov.br/jabot/FichaPublicaTaxonUC/FichaPublicaTaxonUC.do?id=FB22855>

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Cultivars

None released to date.

Promising accessions

CIAT 17009 (BRA-000515) Selected in Nicaragua, Colombia, Honduras. Origin Minas Gerais, Brazil (17°47' S; 240 m asl; 1,170 mm/yr).

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