Centrosema macrocarpum

Scientific name

Centrosema macrocarpum Benth.

Subordinate taxa:

Centrosema macrocarpum Benth. var. *macrocarpum*

Centrosema macrocarpum Benth. var. *andinum* Schultze-Kraft & Belalc.

Synonyms

GRIN: *Centrosema seymourianum* Fantz

ILDIS: *Bradburya macrocarpa* (Benth.) Kuntze; *Centrosema lisboae* Ducke; *Centrosema magnificum* Malme

Family/tribe

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

Morphological description

Tap-rooted, trailing and twining perennial herb with slender stems, rooting at the nodes in some genotypes. Stems pilose with greyish hairs when young, glabrescent, lignified at base. Leaves trifoliolate; stipules triangular, petioles and petiolules pubescent; leaflets broadly to narrowly ovate, acute to acuminate at the apex, rounded or slightly wedge-shaped at the base; central leaflet larger and with longer petioles than the laterals, mostly 8–13 cm long, 3–8 cm wide, papyraceous to subcoriaceous, almost glabrous to pubescent on lower or both surfaces; frequently with a light-green marking along midrib. Inflorescence an axillary raceme with up to 30 flowers inserted in pairs along rachis; flowers papilionate, subtended by a pair of ovate-lanceolate-falcate bracteoles; calyx campanulate, 5-teethed with carinal tooth considerably longer than others; petals showy and cream-coloured with purple centre; standard orbicular-emarginate, 3–6 cm in diameter, pubescent outside; wings and keel much smaller than standard, directed upwards. Pod linear, compressed, up to 30 cm long, 1 cm wide, straight to slightly bent and beaked, subglabrous, containing up to 25 seeds, dehiscent. Seeds transversely oblong to rectangular, on average 5 mm × 3 mm, yellowish-brownish or black, plain, mottled or marbled. 15,000–25,000 seeds/kg.

var. *macrocarpum*: young shoots mostly green; corolla 3–3.5 cm long, white fading dull yellowish, maroon medially and along veins; pod 100–190 mm long, 6–8 mm wide, beak 12–18 mm long; seeds 5 mm × 3 mm, yellowish-brownish or black, plain, mottled or marbled.

Standard white fading dull yellowish, maroon medially and along veins

Trailing and twining perennial with acute to acuminate leaflets (cv. Ucayali)

Flower, dehiscent pod (CIAT 15318)

Immature pods with prominent beak

var. *macrocarpum* seed showing variation due to cross pollination

var. *andinum* seed yellow with irregular purple lines

Line illustration

Pole-trellised plants to facilitate manual seed harvest

Experimental grazing plots

With *Urochloa humidicola*, Quilichao, Colombia

var. *andinum*: young shoots reddish in colour; corolla 3–4 cm long, purple-violet with yellow-greenish vertex; pod 160–355 mm long, beak 17–40 mm long; seeds 9–11 mm long, 5–6 mm wide, yellow with irregular purple lines.

Common names

None reported

Distribution

var. macrocarpum

Native:

Northern America: Mexico (Chiapas, Guerrero, Jalisco, Nayarit, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz)

Caribbean: T rinidad and Tobago

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

South America: Bolivia, Brazil (Bahia, Federal District, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Pernambuco, Piauí, Roraima); Colombia; Ecuador (Los Rios, Napo); Guyana, Peru (San Martin); Venezuela

var. andinum

Native:

South America: Colombia (Antioquia, Caldas, Magdalena, Risaralda, Valle del Cauca)

Uses/applications

Forage

Grazed pastures in mixture with grasses, as legume-only protein banks, cut-and-carry.

Environment

Soil cover in orchards and plantations.

Ecology

Soil requirements

Adapted to low- to medium-fertility, well drained soils of various textures, particularly loams. Tolerates very acid conditions, with high soluble Al and Mn.

Moisture

Humid to sub-humid climate with annual rainfall >1,000 mm, 3–6 dry months. Once established, *C. macrocarpum* is very drought tolerant.

Temperature

Occurs naturally from 22º N in Mexico to 18º S in Bolivia, and from near sea level over much of the latitudinal range to 1,650 m asl in Colombia. Average annual temperatures at collection sites are mostly in the range 24–26 ºC, and down to 22 ºC. Warm season growth only.

Light

Moderately shade tolerant.

Reproductive development

Very photoperiod-sensitive: flowering triggered by short days even close to the equator, and stimulated by removal of accumulated biomass. Tripping of flowers by large insects required for pod set.

Defoliation

Tolerant of grazing and cutting once well established, but in mixtures with grasses tends to decline under intensive grazing.

Fire

Well-established plants recover after fire.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Seed should be inoculated with Rrhizobium strain CIAT 3101 (= CB 3125 in Australia) prior to sowing. A sowing rate of 3–5 kg/ha of scarified seed is usually adequate.

Fertilizer

Responds well to fertilisation on low fertility soils, mainly P and K.

Compatibility (with other species)

Combines well with bunch grasses and other species that produce a more open stand.

Companion species

Grasses: *Andropogon gayanus*, *Urochloa brizantha*, *U. humidicola*, Megathyrsus *maximus*.
Legumes: *Stylosanthes capitata*, *S. guianensis*.

Pests and diseases

Not seriously affected by the major *Centrosema* diseases, *Rhizoctonia* foliar blight, anthracnose, *Cercospora* leaf-spot and bacterial wilt. Soybean mosaic virus infection by aphids has been reported. Insects may eat leaves, especially during dry periods.

Ability to spread

Spread is localised by stolon development, extensive spread being limited by low amounts of seed produced under grazing.

Weed potential

None.

Feeding value

Nutritive value

In 8–12 week old foliage: CP 20–30%, IVDMD 45–70%, P 0.20–0.25%; Ca 0.65–0.98%.

Palatability/acceptability

Very palatable.

Toxicity

None reported.

Production potential

Dry matter

On low-fertility soils: <1–5 t DM/ha/12 weeks, and up to 15 t/ha/yr.

Animal production

In association with *Andropogon gayanus*, 170–200 kg LWG/steer/yr (400–600 kg/ha/yr) possible. In association with *Andropogon gayanus* or *Urochloa humidicola*, milk yields of Holstein cows 15–20% higher than on grass alone.

Genetics/breeding

2*n* = 22; self-fertile, but considerable outcrossing associated with dependence on tripping by insects (bumble bees).

Seed production

Handpicked seed yields of 50–500 kg/ha have been obtained from a potential yield of 800 kg/ha.

Herbicide effects

Tolerant of alachlor, metolachlor and pendimethalin, but not oxyfluorfen, pre-emergent herbicides; and of bentazone and fluazifop-butyl, but not 2,4-D amine and dalapon as post-emergent applications.

Strengths

- Adaptation to very acid, low-fertility soils.
- Good drought tolerance.
- High nutritive value.
- Tolerant of main *Centrosema* diseases.

Limitations

- Selectively grazed.
- Lack of persistence in mixture with grasses.
- Low seed production without proper managerial skills.

Internet links

https://uses.plantnet-project.org/en/Centrosema_macrocarpum_(PROSEA)

Selected references

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Cultivars

'Ucayali' (CIAT 25522) Released in Peru, south-east Asia (1990s). Composite of 12 accessions from Brazil, Colombia and Venezuela, informal releases.

Promising accessions

CIAT 5713 (CPI 119183) Selected in Colombia, Venezuela. Origin Venezuela (8º45' N, 280 m asl, 1,100 mm/yr).