

# Tropical Forages

## *Centrosema molle*

### Scientific name

*Centrosema molle* Mart. ex Benth.



### Synonyms

*Centrosema pubescens* auct. pl.\*

**Note:** \* *autorum plurimorum* (Latin: of most authors) is used to represent the most common incorrect usage of a name that has been widely used for a taxon different from the one intended by the original author.

### Family/tribe

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

### Morphological description

Perennial, trailing-climbing-twining herb with strong taproot system; under appropriate soil moisture conditions able to root at nodes of trailing stems. Stems slightly hairy, becoming woody when old. Leaves trifoliate, leaflets elliptical, ovate-oblong or ovate-lanceolate, 1–7 cm long, 0.5–4.5 cm wide, rounded at the base and mostly acuminate at the apex, slightly hairy, especially on the lower surface; petiole up to 5.5 cm long, stipules 2–4 mm long, persistent. Inflorescence an axillary raceme with 3–5 papilionate flowers, light to dark lilac in colour, sometimes white; each flower subtended by two striate bracteoles; calyx campanulate with five unequal teeth; standard orbicular, up to 3 cm in diameter, hairy on the outside, bright or pale lilac on either side of a median greenish-yellow band with numerous dark violet stripes or blotches; wings and keel much smaller than the standard, directed upwards. Pod linear, compressed, 4–17 cm long and 6–7 mm broad, straight to slightly bent and beaked, with prominent margins, dark brown when ripe and containing up to 20 seeds. Seeds transversely oblong to squarish with rounded corners, 4–5 mm × 3–4 mm × 2 mm in size, brownish-black, mostly with dark mottles; approx. 40,000 seeds/kg.

### Similar species

***C. molle***: bracts 4–6 × 1–2 mm, puberulous; pedicels 6–9 mm at anthesis; bracteoles 6–9 × 4–6 mm; seeds brownish black.

***C. pubescens***: bracts 6–9 × 3–6 mm, sericeous; pedicels 3–6 mm at anthesis; bracteoles 10–16 × 6–9 mm; seeds yellowish green.

### Common names

**Africa**: akidi (Igbo), ewa-ahun (Nigeria)

**Asia**: □□□ ju ban dou (China); sentro (Indonesia); dilang-butiki, lesu-kesu, pukingan (Philippines); ถั่วลาย thua lai



Pale lilac flowered form



Trailing, climbing and twining perennial



Dark lilac flowered form



Pink flowered form



White flowered, stoloniferous form (cv. Cardillo)



Leaves and flowers of *C. molle* (L.), *C. pubescens* (R)



Immature pods



Pods at different degrees of maturity; twisted valves following shattering



*Centrosema pubescens* Benth. - 1, flowering branch; 2, fruits; 3, seed.

Line illustration



Mottled seeds

(Bangkok), ถั่วสะแอด tua sa daet (Prachin Buri), thua-sentro (Thailand); day trung châu lông (Vietnam)

*English:* centro, butterfly-pea, centro pea, soft butterfly pea, spurred butterfly pea

*French:* fleur-langouette, pois bâtard

*Latin America:* centrosema, jequirana, jetirana, jitiranu, patinho, roxinha (Brazil); bejuco chino, bejuco de chino, bejuco do chieve, bejuco do chivo, bejuco de juventud, bejuquillo, caracucha, centro, centrosema, centrosema peluda, chancho, choncho, conchita, conchitas, flor de conchitas, flor de pito, flor de pito blanco, frijol cuchillo, frijolito, gallinita, hierba jabonera, jequirirana, patillo

## Distribution

### Native:

*Northern America:* Mexico (Campeche, Chiapas, Colima, Guerrero, Jalisco, Mexico, Michoacán, Nayarit, Tabasco, Veracruz)

*Caribbean:* Antigua and Barbuda; Cuba; Dominican Republic; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; Puerto Rico; St. Lucia; St. Vincent and Grenadines; Trinidad and Tobago

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

*South America:* Bolivia; Brazil (Acre, Alagoas, Amazonas, Bahia, Ceará, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Piauí, Rio de Janeiro, Rondônia, São Paulo); Colombia; Ecuador (El Oro, Esmeraldas, Guayas, Loja, Los Ríos); French Guiana; Guyana; Peru (Amazonas, Cajamarca, Lima, San Martín, Ucayali); Suriname; Venezuela

### Cultivated/naturalized:

*Africa:* Angola; Kenya; Cameroon; Cote d'Ivoire; Equatorial Guinea; Gabon; DRC; Ghana; Guinea; Guinea-Bissau; Liberia; Mozambique; Nigeria; São Tomé and Príncipe; Sierra Leone; Tanzania; Togo; Uganda; Zambia; Zimbabwe

*Indian Ocean:* Mauritius; Réunion

*Asia:* Brunei; Christmas Island; India; Indonesia; Malaysia; Singapore; Sri Lanka; Taiwan

*Papuasias:* Papua New Guinea; Solomon Islands

*Australasia:* Australia (Queensland, Northern Territory)

*Pacific:* Fiji; Guam; Micronesia

## Uses/applications

### Forage

In grazed pastures in mixture with grasses or as legume-only protein bank; also as cut-and-carry forage, mainly for fresh consumption.

### Environment

In SE Asian tree plantations, often in a ground cover mixture with other legume species. Soil improvement when used as ground cover and green manure. Reduction of herbicide use when used as cover crop for weed control.

### Other

Folk medicinal application for treatment of wounds.

## Ecology

### Soil requirements



Heavy seed set (CPI 58575)



Seed crop, North Qld Australia (cv. Cardillo)



*C.molle* in stable mixture with Napier grass after 5 years of cutting. Northern Vietnam



With guinea grass, Vanuatu



cv. Cardillo, a strongly stoloniferous variety (cv. Cardillo)

In general, well-drained soils of medium to high fertility but some germplasm is also adapted to acid soils of lower fertility; some tolerance of water-logging.

## Moisture

Most productive under high rainfall conditions (>1,500 mm/year), but because of its taproot system, able to persist also under dry-subhumid conditions with 3–5 dry months.

## Temperature

Grows from sea level to 1,600 m asl between 22° N and 22° S. Warm season growth only.

## Light

Shade-tolerant, can persist under 80% shade.

## Reproductive development

An indeterminate legume. Flowering is induced mainly by photoperiod (short days), but is also favoured by water stress.

## Defoliation

Persists under proper grazing and fertilizer management, but is sensitive to overstocking.

## Fire

Tolerates lenient fire when established; plant population can also regenerate from soil seed bank.

## Agronomy

Guidelines for establishment and management of sown forages.

### Establishment

In spite of being promiscuous, inoculation of seed with an effective *Bradyrhizobium* strain is recommended in Australia to optimize establishment. Seeding rate: 3–5 kg scarified seed/ha or more, e.g., when broadcast; full seedbed preparation recommended, sod-seeding also possible. Slow to establish but on good soils, under appropriate moisture conditions and in pure stands, forming a 40–50 cm thick ground cover 4–8 months after sowing.

### Fertilizer

With effective *Bradyrhizobium* strains (e.g. CB 1923 and 2947), nitrogen fixation estimates 70–280 kg/ha/year in grazed mixtures with grasses; sensitive to P, K, Ca, Mo deficiency.

### Compatibility (with other species)

Quite compatible depending on management (i.e., proper fertilization and stocking); e.g., persisted in the humid tropics of Australia for more than 11 years in mixture with [Megathyrsus maximus](#).

### Companion species

Grasses: The most suitable grass partner is [Megathyrsus maximus](#); other suitable tussock grasses are reported to be [Andropogon gayanus](#), [Cenchrus purpureus](#), [Chloris gayana](#), [Hyparrhenia rufa](#), [Melinis minutiflora](#), [Paspalum dilatatum](#).

Legumes: As ground cover in southeast Asian plantation agriculture, often in a species mixture with [Neustanthus phaseoloides](#), [Calopogonium mucunoides](#) and [C. caeruleum](#), also [Grona heterocarpa](#) ssp. [ovalifolia](#).

### Pests and diseases

Relatively insensitive, but can be affected by *Cercospora* leaf spot, anthracnose, *Rhizoctonia* foliar blight, red-spider mites.

### Ability to spread

Fairly good, by seed.

### Weed potential

In some areas of West Africa considered a weed.

## Feeding value

### Nutritive value

High CP contents (17–26%), medium IVDMD (45–65%); in common centro 3-month old leaf, means of 7 cuts: 26% CP, 52% IVDMD, 0.24% P, 0.86% Ca.

### Palatability/acceptability

High to medium.

## Toxicity

None detected so far.

## Feedipedia link

<https://www.feedipedia.org/node/321>

## Production potential

### Dry matter

In pure stands, up to 12 t DM/ha/year possible; in mixed pastures, 1–3 t/ha/year (humid tropics, Australia).

### Animal production

260–600 kg/ha/year LWG reported for mixtures with a grass (e.g., *Megathyrsus maximus*; humid tropics in Australia, SE Asia); with daily LWG of 400–600 g/animal under proper grazing management; carrying capacity in the humid tropics can be 900–1,000 kg LW/ha.

## Genetics/breeding

$2n = 22$ ; considered to be self pollinated (even cleistogamy has been reported) but flower colour segregation can frequently be observed. There have been attempts of both intra- and interspecific breeding in Australia and South America, the most widely tested *C. molle* hybrid accession being CIAT 438.

## Seed production

High seed production potential when grown on trellises (200 to >1,000 kg/ha possible, depending on harvesting method); hardseededness (up to >60%) is common.

## Herbicide effects

There is some tolerance to low doses of 2,4-D.

## Strengths

- High quality.
- High seed production potential.

## Limitations

- High soil requirements.
- Slow establishment.
- Management-dependent lack of persistence because of high palatability.

## Internet links

[https://uses.plantnet-project.org/en/Centrosema\\_pubescens\\_\(PROSEA\)](https://uses.plantnet-project.org/en/Centrosema_pubescens_(PROSEA))

<https://keys.lucidcentral.org/keys/v3/pastures/Html/Centro.htm>

## Selected references

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## Cultivars

'Common centro' Used in Australia. No formal release; origin unknown.

'**Centrosema Comum**' Used in Brazil. No formal release; origin unknown.

'**El Porvenir**' Released in Honduras (1990). Origin: Colombia.

'**Villanueva**' Released in Cuba (1993). Origin not reported.

'**Cardillo**' (Q 25261) Released in Australia (1995). Selected for white flower colour from CPI 43197, a vigorous accession with strong stolon development. Origin Santa Cruz de la Sierra, Bolivia (17°49' S, 425 m asl, rainfall 1,250 mm; combines well with *Urochloa decumbens*.

'**Barinas**' (CIAT 15160) Released in Southeast Asia (second half of 1990s). No formal release; origin Barinas, Venezuela (8°20' N, 69°33' W; 180 m asl; rainfall 1,560 mm/yr); selected for good acid soil adaptation; shows wide adaptability and vigour across different soils and climates.

## Promising accessions

**CIAT 5169, CIAT 5172, CIAT 5634, CIAT 15150, CIAT 15160, CIAT 15470, CIAT 15872** Selected in several countries in tropical America. Good acid-soil adaptation, wide adaptability and vigour across different soils and climates; some with stoloniferous growth habit.

Large, quite variable germplasm collection is available at CIAT (Cali, Colombia) for screening for adaptation to particular environments/niches.

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