

# Tropical Forages

## *Chamaecrista pilosa*

### Scientific name

*Chamaecrista pilosa* (L.) Greene

### Subordinate taxa:

*Chamaecrista pilosa* (L.) Greene var. *luxurians* (Benth.) H.S. Irwin & Barneby

*Chamaecrista pilosa* (L.) Greene var. *pilosa*

### Synonyms

var. *pilosa*: Basionym: *Cassia pilosa* L.

var. *luxurians*: Basionym: *Cassia trichopoda* var. *luxurians* Benth.

### Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily: *Caesalpinioideae* tribe: *Cassieae* subtribe: *Cassiinae*.

### Morphological description

Short-lived perennial or self-regenerating annual herb, with somewhat lignified mature stems; sparsely branched, erect to 65 cm, or procumbent. Heavily grazed plants adopt a low rosette growth habit. Stems densely pilose with spreading and appressed short white hairs. Leaves pinnate, with (3–) 4–5 (–6) leaflet pairs, petioles short (2–6 mm), rachises 2–3 cm long; leaflets oblong or oblong-obovate, 5–25 mm long, 3–7 mm wide, rounded at the apex and mucronate, ciliate, glabrous or sparsely pilose, with conspicuous elevated nerves,

asymmetric (midrib closer to the abaxial margin); stipules ovate-lanceolate, 6–13 mm long, long-acuminate, striate-nerved, ciliate, subcordate; petiole short (2–3 mm) with petiolar gland small, sometimes none. Flowers axillary, mostly borne singly on filiform pedicels, mostly longer than leaf rachises; sepals lanceolate, 4–5 mm long, sparsely pilose or glabrous; petals yellow, 5–7 mm long. Pods linear oblong, 2–4 cm long, 3–4 mm wide, rounded and apiculate at the apex, sparsely appressed-pubescent or glabrate, with numerous obliquely transverse seeds, elastically dehiscent; seeds rectangular, flattened, ±2 mm long, c. 400,000–450,000 seeds/kg.

### Common names

*English*: hairy sensitive pea

*Latin America*: palma-do-campo (general term for *Chamaecrista* spp. in the Caatinga, Brazil)

### Distribution

var. *luxurians*

#### Native:

*South America*: Brazil (Bahia, Ceará, Goiás, Maranhão)

var. *pilosa*

#### Native:

*Northern America*: Mexico (Chiapas); U.S.A. (Florida)

*Caribbean*: Cuba; Dominican Republic; Jamaica; Trinidad and Tobago (Trinidad)

*Central America*: El Salvador; Guatemala



Leaves pinnate with mostly 4 or 5 leaflet pairs (CPI 57503)



Erect or procumbent, short-lived perennial or self-regenerating annual herb (CPI 57503)



Flowers mostly borne singly on axillary filiform pedicels; stems densely pilose with white hairs (CPI 57503)



Pods black when mature, elastically dehiscent



Seeds

South America: Colombia; Venezuela

## Uses/applications

### Forage

Could be sown into native pastures to augment feed quality, or into pastures of improved grasses. Limited value for conservation or standing hay because of substantial leaf drop under dry conditions, leaving woody indigestible stem.

### Environment

Cultivated in Venezuela to stabilise sand dunes. Could be used as a ley or phase legume in crop-livestock systems to improve cereal production.

## Ecology

### Soil requirements

Best adapted to friable, well-drained light soils of low to moderate fertility, but will grow on moderately heavy clay soils. However, it does not regenerate effectively on hard-setting or surface-sealing soils. Has been grown successfully on soils with pH ranging from about 5 to 7, and may be calciphobic.

### Moisture

Found in dry or moist open places, sometimes on sandbars along streams. While average annual rainfall (AAR) at collection sites in the tropics have been as low as 500 mm, *C. pilosa* generally requires better moisture conditions than does *C. rotundifolia*. Other collection sites have AAR above 1,000 mm, and the species has been grown successfully in the subtropics in areas with up to 1,625 mm AAR. In cultivation, it is probably best sown in areas with AAR from 900 to 1,600 mm. As with *C. rotundifolia*, heavily-grazed, low stands are more drought tolerant than large plants.

### Temperature

This is a warm-season species, with a wide spectrum of temperature adaptation, having been collected from areas in the tropics with 24-hour average annual temperature (AAT<sub>24</sub>) of 27.4 °C (SD 0.7), and grown successfully in the subtropics with AAT<sub>24</sub> of 19.4 °C (SD 4.2). It is native to, became naturalized in, or has been grown successfully from about 28° N to 29° S, and to about 850 m asl (16° N, Mexico). Well-developed *C. pilosa* plants can survive light frost, but there tends to be significant leaf-shed after frost. Some smaller plants are killed by frost, but there is usually sufficient soil seed to ensure re-establishment.

### Light

Grows best in full light. CPI 57503 yields declined in trials in Bali and North Sulawesi, Indonesia, when grown under coconuts (light transmission 58% and 73%).

### Reproductive development

Flowering indeterminate. In S hemisphere subtropics, perennating plants commence flowering in early summer. However, if sown mid-January, the first flower may not appear until late February or early March.

### Defoliation

If cut or grazed early, plants adopt a decumbent growth or even prostrate habit. Low cutting of mature plants can result in plant death.

### Fire

Fire in associated mature grass can kill plants of *C. pilosa*, but stands recover from plentiful soil seed.

## Agronomy

Guidelines for establishment and management of sown forages.

### Establishment

Seed must not be hot water treated to break dormancy as it aggregates due to the mucilaginous layer on the seed surface. Seed germinates quickly after rainfall; seedlings grow rapidly and early-flowering types can flower within 6 weeks. It nodulates satisfactorily with native rhizobia or with broad spectrum strains such as CB 756 in Australia, which is also suited to species such as *Macroptilium atropurpureum*. Seed is best broadcast on the surface of a well-prepared seedbed, lightly covered and rolled.

### Fertilizer

Not demanding in terms of soil fertility, but may respond to additions of fertilizer, particular phosphorus, on low fertility soils.

### Compatibility with other species

As with most short-lived perennials, *C. pilosa* requires bare soil for recruitment of new plants as old plants die out. Thus it is not compatible with denser, sward-forming species such as *Cynodon dactylon*.

## Companion species

Grasses: *Bothriochloa bladhii*, *B. pertusa*, *Chloris gayana*, *Digitaria eriantha*, *Heteropogon contortus*, *Urochloa mosambicensis* and a range of other grasses.

Legumes: *Aeschynomene falcata*, *Listia bainesii*, *Stylosanthes guianensis* var. *intermedia*.

## Pests and diseases

No pests or diseases of any consequence have been recorded to date. However, laboratory tests have demonstrated susceptibility to *Alternaria cassiae* and *Sclerotium rolfsii*, but resistance to *Phomopsis*, *Colletotrichum dematium* f sp. *crotalariae*, *Macrophomina phaseolina* and *Pseudocercospora nigricans*.

Seed set can be markedly reduced through attack by pod-sucking species such as *Nezara viridula* and *Riptortus serripes*.

## Ability to spread

*C. pilosa* sets profuse quantities of seed, and has the potential to spread beyond the sown area. However, it appears to display less tendency to spread than many of the provenances of *C. rotundifolia* sown at the same sites. It spreads more readily on soils with a friable surface than on those with a hard-setting surface.

## Weed potential

It has certain weedy characteristics like prolific seeding, hard seed, relative ease of establishment, and adaptation to low fertility soil, but does not appear to have been declared a significant weed in any country, other than "In Jamaica, occasional as a weed of waste places on alluvial soils".

## Feeding value

### Nutritive value

In one experiment, nitrogen and neutral detergent fibre levels measured in the tops range from 1.07 - 2.54% and 70.1 - 43.5% respectively. In another measuring seasonal variation in nutrient levels in the tops, N levels varied from 1.4 - 3.4%, P from 0.04 - 0.26%, Ca from 0.4 - 0.9%, Mg from 0.23 - 0.43%, while Na was mostly about 0.01%.

### Palatability/acceptability

CPI 57503 is usually well-eaten by cattle, and may be somewhat more palatable than *C. rotundifolia*. It was also well eaten in feeding experiments with rats, suggesting it may have application in rabbit production.

### Toxicity

Feeding experiments with rats show CPI 57503 to be non-toxic. However, in view of the within-species variation in liveweight gain in other legume species tested, this assessment must be treated as unique to that accession.

**Note:** The agronomic and nutritional information above relates to experience with a single accession, CPI 57503 (see below).

## Production potential

### Dry matter

DM yields of up to 3.4 t/ha have been achieved in the subtropics in Australia.

### Animal production

No information.

## Genetics/breeding

No information

## Seed production

As with many tropical legumes, harvesting seed from ripe pods can be difficult, particularly in the heat of the day, when the slightest touch can trigger explosive dehiscence of pods. It is therefore usually best to harvest early in the morning, collecting yellowing pods that are already ripe as well as mature pods. Dry in the sun under fine mesh or in paper bags. With sequential, non-destructive harvesting, most seed can be collected, but with a single destructive harvest, losses may exceed 50% of the possible crop. Total seed production has been measured up to over 1 tonne/ha.

## Herbicide effects

Tolerant of pre-planting trifluralin. No further information, but may be similar to *C. rotundifolia*: "Susceptible to 2,4 -D and to acifluorfen, moderately tolerant of fluazifop-butyl and sethoxydim." Effective control once established is difficult due to high levels of seedling recruitment from soil seed.

## Strengths

- Adapted to low-fertility soil.
- Prolific seed production.
- Persistent under grazing.

## Limitations

- Needs well-drained soil.
- Not very drought-hardy.

## Selected references

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## Cultivars

None released.

## Promising accessions

**CPI 57503** Selected in subtropical Australia. From near Cumaná, Venezuela (10°29' N, 64°12' W, 2 m asl, c. 500 mm rainfall) collected on sandy soil 90 m from seashore. Persistent in low fertility, sandy soils under grazing.

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