Teramnus labialis

Scientific name

Teramnus labialis (L. f.) Spreng.

Subordinate taxa:

Teramnus labialis (L. f.) Spreng. subsp. *arabicus* Verdc.

Teramnus labialis (L. f.) Spreng. subsp. *labialis* var. *abyssinicus* (Hochst. ex A. Rich.) Verdc.

Teramnus labialis (L. f.) Spreng. subsp. *labialis* var. *labialis*

Synonyms

Basionym: *Glycine labialis* L. f.

Family/tribe

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

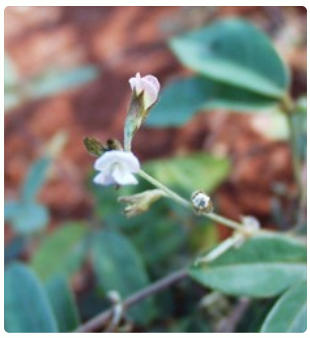
Morphological description

Extremely variable perennial, twining or prostrate, trailing, some forms stoloniferous, sometimes woody at the base. Stems 0.3–4.0 m long, angular, slender, often covered with adpressed to spreading white to ferruginous hairs, sometimes glabrescent. Leaflets rounded, elliptic, ovate, obovate, narrowly oblong or lanceolate, (1–) 3–6 (–8) cm long, (0.5–) 2–3.5 (–5) cm wide, emarginate to acuminate at the apex, mostly rounded at the base, glabrous to densely covered with white or ferruginous hairs on both surfaces; petioles 0.9–4 cm long; rachis 1–9 mm long; petiolules (2 mm long; stipules narrowly lanceolate, 2–3 mm long. Inflorescence a slender axillary raceme, with few to many flowers along the 0.3–10 (–15) cm long rachis; peduncle 0.8–3 cm long. Calyx tube glabrescent or hairy, ribbed, 1–3 mm long, lobes lanceolate, 0.8–3 mm long, acute, usually densely hairy; standard white, cream, pink, pale salmon, mauve or magenta, sometimes with deeper coloured splash, obovate, 5 mm long, 3.5 mm wide. Pods linear or slightly falcate, 2.5–6 cm long, 2–4 mm wide, glabrescent to densely covered with adpressed or spreading hairs; upturned stylar beak 2–3 mm long; 7–12 seeds/pod. Seeds yellow-brown to dark purplish-brown, oblong or almost cylindrical, smooth or covered with a granular encrustation, 2–3 mm long, 1.2–2 mm across; hilum minute, aril slightly developed, white with a small scale-like extension. 110,000–370,000 seeds per kg.

Strongly twining form

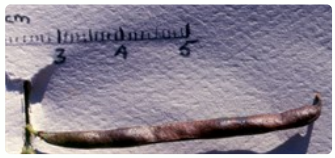
Leaflet ovate, apex obtuse (CPI 60377)

Habit, foliage and immature pods; leaflets lanceolate, apex acute (CPI 60371)



Inflorescence an axillary raceme with few to many flowers; flower colour varies with ecotype (ILRI 8114)

Leaves and hairy pods



Mature glabrescent pod (Note distinctive upturned beak of *Teramnus*)

Seeds

With *Cynodon nlemfuensis* in Cuba

subsp. *labialis* var. *abyssinicus*: seeds smooth; leaflets often smaller; upper surface of leaflets glabrous.

subsp. *labialis* var. *labialis*: seeds smooth; leaflets often smaller; upper surface of leaflets hairy.

subsp. *arabicus*: seeds with granular surface; leaflets elliptic up to 7.5 cm long; pods usually with appressed hairs, but if spreading then leaflets longer and narrower.

Similar genera

***Teramnus*:** distinctly upward-curved beak on the pod

Glycine and ***Neonotonia*****:** pod acuminate to weakly uncinate

Common names

Africa: adagbudu (Yoruba, Nigeria)

Asia: □□□ ruan jia dou (China); cantingan, kakacangan sapi, kacang sapi, koselan, ron kaka (Java); kacang tikus (the Moluccas); mangkit-bagin (Tagalog, Philippines), balagun (Cebuano, Philippines), bagon-bagon (Samal, Philippines); voë romiet (Cambodia); mon sran gre-u-i-dab ma, mon sran gro-u-i-dab ma (Tibet)

English: blue wiss (USA); rabbit vine, horse vine (Barbados); green gram, Vogel-tephrosis (India)

Indian Ocean: pistache marronne (Madagascar, Réunion); teloravina, vahilandy (Madagascar); uviji matra, uvigi mtoumama, muvunge muche, mjividza, famaki angotu (Bushi, Mayotte)

Latin America: curvicán de jutía, teramnus, tripa de jutía (Cuba); frijolillo (Puerto Rico, Virgin Islands)

South Asia: mashani (Bengali); [redacted] kalyan, [redacted] lomashparnini, [redacted] mashani, [redacted] mashaparni, [redacted] pandu-loma, masban, mashoni, van(a) udad (Hindi); [redacted] adavi uddu, mooshaparni, moosha parna (Kannada); [redacted] ran-udid (Konkani); cherukattuzhunnu, kattualandu, kattulunnu (Malayalam); [redacted] ran-udid, kudu-udid, ran-udida (Marathi); ban-kultha (Oriya); [redacted] hayahapuchchi, [redacted] kalyani, [redacted] mashaparni, [redacted] visarini (Sanskrit); [redacted] wal-kollu (Sinhala, Sri Lanka);[redacted] mashaparuni (Tamil); [redacted] karu minumullu, adavi mahasaha (Telugu); kattuzhunninveru

Distribution

Native:

Africa: Angola; Benin; Burundi; Cameroon; Central African Republic; Chad (south); Côte d'Ivoire; Democratic Republic of the Congo; Ethiopia; Ghana; Guinea-Bissau; Kenya; Liberia; Mali; Mozambique; Nigeria (s.); Rwanda; São Tomé & Príncipe; Senegal; Sierra Leone; Somalia; South Africa; Sudan; Swaziland; Tanzania; Togo; Uganda; Zambia; Zimbabwe

Western Indian Ocean: Comoros; Madagascar; Mauritius; Réunion; Seychelles

Asia: Bangladesh; Cambodia; India; Indonesia; Laos; Malaysia; Myanmar; Philippines; Saudi Arabia; Sri Lanka; Taiwan (s.); Thailand; Vietnam; Yemen

Pacific: Guam; Papua New Guinea

Caribbean: Antigua and Barbuda; Barbados; British Virgin Is; Cuba; Grenada; Guadeloupe; Haiti; Hispaniola; Jamaica; Martinique; Montserrat; Puerto Rico; St. Lucia; St. Vincent and The Grenadines.

Central America: Guatemala; Nicaragua; Panama

South America: Guyana

Cultivated:

Caribbean: Cuba

Uses/applications

Forage

Component of permanent pastures, with potential for agroforestry applications due to moderate shade tolerance. It can be grazed fairly intensively or cut for green chop. It is used commercially as a forage in Cuba, but does not appear to be sown elsewhere for this purpose.

Environment

Has grown well as a ground cover and soil improver under citrus (*Citrus sinensis*), banana (*Musa* sp.) and coconut (*Cocos nucifera*).

Other

Tribal people use seeds as food, and various parts of the plant are used in natural medicines in India. It is well-recognized as a medicinal plant for its antiinflammatory activity in the Ayurvedic system of medicine, and has been reported to be useful in treating rheumatism, tuberculosis, nerve disorders, paralysis and catarrh.

Ecology

Soil requirements

Found in well- (rarely poorly-) drained sands to clays with pH (5.5–) 6.0–8.0 (–9.0). Although originating from mostly near neutral to alkaline soils, some ecotypes have performed well on soils with pH 5.0–5.5. 'Semilla Clara' is not as well adapted to acid soils as other warm-season species such as *Macroptilium atropurpureum* (Siratro) and *Stylosanthes guianensis*. While a few accessions have been collected in sodic areas, *T. labialis* is generally considered to have low salt tolerance.

Moisture

Mostly collected in run-on or moister areas, in regions with average annual rainfall (500–) 750–1,500 (–2,500) mm. Probably best sown in areas with rainfall >1,000 mm. In some areas, it grows with sour-grass (*Paspalum conjugatum*), a species common in shaded situations, often on acid, poorly drained soils. At least some ecotypes shed their leaves during dry periods and are killed off by the prolonged dry periods.

Temperature

Occurs between about 25º N and 29º S, and from sea level to 3,000 m asl, representing a range in average annual temperatures of about 14–27 ºC, sometimes with frost. There is some variation in frost tolerance within the species, although all accessions that have been tested have shown some measure of susceptibility. Most have the tops killed by light to moderate frost, but recover with the onset of warmer conditions.

Light

Has grown well under citrus (*Citrus sinensis*), banana (*Musa* sp.) and coconut (*Cocos nucifera*). Exhibits shade tolerance greater than that of *Vigna hosei*, but less than that of the very shade tolerant *Grona heterophylla* and *Arachis pintoi* .

Reproductive development

The majority appear to flower in response to shortening daylength. Flowering time varies markedly among provenances, some flowering in about 70 days from a spring planting and others 200 days.

Defoliation

Tolerance of defoliation varies according to growth habit, lower growing, stoloniferous varieties normally being more tolerant than more upright types.

Fire

No information available, but not normally grown in fire-prone situations.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Generally, seed does not require scarification. However, levels of hard seed can be high in some samples, and scarification may be necessary to achieve at least 50% germination. Although *T. labialis* appears somewhat promiscuous in relation to rhizobial requirements, inoculation with CB 756 (Australia) or an equivalent strain may be beneficial. Seed can be broadcast or sown at 2–3 kg/ha in rows 50–75 cm apart, and no more than 3 cm deep. Seed is small and seedling development relatively slow, so seed should be sown into a well-prepared seedbed, with the area rolled after sowing. Stands take 6–8 months to become established.

Fertilizer

T. labialis requires moderately fertile soil. Application of 20 kg/ha P and 40 kg/ha K is recommended on deficient soils. In view of the high demand for Mo by the closely related *Neonotonia wightii*, and in the absence of information specific to *T. labialis*, it may be advisable to apply 100–200 g/ha Mo every 3 years on more acid soils.

Compatibility (with other species)

T. labialis grows well in mixed pastures, persisting and producing considerable bulk without smothering the grasses. It is probably not sufficiently aggressive to combine with more competitive grasses such as *Paspalum notatum*, nor does it twine to a sufficient height to combine with unmanaged tall grasses such as *Megathyrsus maximus*. However, it can combine with these larger species if they are maintained at about 50–80 cm high.

Companion species

Grasses: *Axonopus fissifolius*, *Bothriochloa pertusa*, *Dichanthium aristatum*, *Digitaria eriantha* (not pangola), *Stenotaphrum secundatum*.
Legumes: *Macroptilium atropurpureum*, *Neonotonia wightii*, *Vigna parkeri*.

Pests and diseases

It is not affected by pests and diseases to any great extent, although leaf damage caused by *Fusarium* and *Alternaria* has been recorded, particularly in the wet season. It is less affected by *Alternaria* than are *Macroptilium atropurpureum* and *Neonotonia wightii* . Some leaf damage has also been caused by the banded cucumber beetle, *Diabrotica balteata* (Coleoptera: Chrysomelidae).

Ability to spread

T. labialis has become naturalized outside its native range.

Weed potential

There is no evidence of its being considered a serious weed in any of the areas to which it has been introduced. It is often found in disturbed situations.

Feeding value

Nutritive value

Maintains a high leaf to stem ratio, with crude protein levels of leaf and stem being measured at 21 and 10% respectively, compared with 18 and 11% in *Neonotonia wightii*. At the same time, Ca levels in leaf and stem of *T. labialis* were 1.2 and 1%, and P levels 0.3 and 0.2%.

Palatability/acceptability

Cattle select *T. labialis* in preference to *N. wightii*. Although it is well eaten by cattle, one report suggests less so by sheep.

Toxicity

No record of toxicity.

Production potential

Dry matter

T. labialis types range from low-growing, soft herbs to vigorous plants that can twine to over 1 m high. While more productive types can produce 10–16 t/ha DM, many produce much lower annual yields.

Animal production

No data available.

Genetics/breeding

2*n* = 20, 24, 28. There appears to be no variation within accessions grown from nursery-produced seed, suggesting this is a closely selfed species.

Seed production

Pod-set often occurs beneath the foliar canopy, and close to ground level, making mechanical harvesting difficult. In 'Semilla Clara', which flowers in October at 22º49' N, pods ripen in late January. The general recommendation is to harvest 3–4 weeks after commencement of ripening, when 90–95% of pods are ripe. While seed yields of >1 t/ha have been recorded, 0.2–0.5 t/ha are more common.

Herbicide effects

Set back by the selective grass herbicide, sethoxydim, but recovers with time. In view of its close relationship to *Neonotonia wightii*, and in the absence of specific information, caution should be exercised using those chemicals that adversely affect that species: "*N. wightii* is tolerant of pre-emergence applications of trifluralin and benfluralin. Seedlings are susceptible to acifluorfen, bentazone, 2,4-D and 2,4-DB. Tolerance to 2,4-D and 2,4-DB improves with age. The former should only be used at 0.8 kg/ha a.e. or less once the stand is three to four months old, but still checks growth of the legume. 2,4-DB can be used at five weeks of age at 1.1 kg/ha a.e., and at 2.2 kg/ha a.e. at three to four months. Tolerant of diquat at 140 g/ha cation from 5 to 8 weeks as long as seedlings are healthy, and at 280 g/ha once established."

Strengths

- Productive.
- Palatable.
- Associates well with grasses.
- Few insect or disease problems.
- Moderately drought tolerant.
- Good seed production.
- Persistent under suitable management.

Limitations

- Not tolerant of heavy grazing.
- Best on fertile, near-neutral soils.
- Frost tender.

- Difficult to harvest seed.

Selected references

Eagles, D.A. and Pengelly, B.C. (1996) Morphological and agronomic attributes of a collection of the genus *Teramnus*. Genetic Resources Communication No. 24. CSIRO Tropical Agriculture, St Lucia, Australia. bit.ly/2X0RnKM

Febles, G. and Funes, F. (1978) Legume development in Cuba. Cuban Journal of Agricultural Science 12:111–124.

Funes, F. and Pérez, C. (1976) Agronomical studies on perennial soybean. I. Comparison between *Glycine wightii* and *Teramnus labialis* under cutting and grazing conditions. Cuban Journal of Agricultural Science 10:199–209.

Funes, F. and Yepes, S. (1974) Pasture introduction in Cuba. Proceedings of the XII International Grassland Congress, Moscow, Russia, June 11–20, 1974. p. 89–104.

Gillett, J.B., Polhill, R.M. and Verdcourt, B. (1971) Leguminosae (Part 4) Subfamily Papilionoideae. In: Milne-Redhead, E. and Polhill, R.M. (eds) Flora of Tropical East Africa. Crown Agents for Overseas Governments and Administrations, London, UK. p. 535–538.

González, Y. and Mendoza, F. (1991) Comportamiento de la germinación de *Teramnus labialis* cv. Semilla clara. II. Tratamientos antes de almacenar. Pastos y Forrajes 14:227–234. bit.ly/2xEJPCO

Gutiérrez, I.R., Pérez, G., Benega, R. and Gómez, L. (2002) Coberturas vivas de leguminosas en el plátano (*Musa* sp.) 'FHIA-03'. Cultivos Tropicales 23(3):11–17. bit.ly/2xLf7I1

Kaligis, D.A. and Sumolang, C. (1991) Forages species for coconut plantations in North Sulawesi. In: Shelton, H.M. and Stür, W.W. (eds) Forages for Plantation Crops. Proceedings of a workshop, Sanur Beach, Bali, Indonesia. 27–29 June 1990. ACIAR Proceedings No. 32. Australian Centre for International Agricultural Research (ACIAR), Canberra, Australia. p. 45–48. aciar.gov.au/node/8081

Mazorra, C., Borges, G, Blanco, M., Marrero, P. and Martínez, G. (2002) Aceptabilidad relativa de las principales especies de plantas que componen las coberturas citrícolas de la CPA "José Martí". Zootecnia Tropical 20:341–355. bit.ly/2wXM3wX

Menéndez, J. (1982) *Teramnus* Swartz. Pastos y Forrajes 5:251–263. bit.ly/346rA5p

Pengelly, B.C. and Eagles, D.A. (1996) Diversity in the tropical legume genus *Teramnus*. Tropical Grasslands 30:298–307. bit.ly/2JxQjGb

Pérez, A. and Ralo, R. (1997) Efecto de las dosis de fósforo y potasio sobre la producción de semillas de leguminosas. I. *Teramnus labialis* cv. Semilla Clara. Pastos y Forrajes 20:133–141. bit.ly/3aGpuf8

Verdcourt, B. 1979. A Manual of New Guinea Legumes. Office of Forests, Lae, Papua New Guinea.

Williams, M.J. (1988) Potential of some tropical forage legumes for Florida's sand ridge. Soil and Crop Science Society of Florida Proceedings 47:184–189. ufdc.ufl.edu/AA00067243/00032/192j

Cultivars

'Semilla Clara' Released in Cuba (pre-1974). Selected from native/naturalized populations in Cuba. The most commonly used cultivar. Terminal leaflet to 5.5 × 2.5 cm, glabrate on the upper surface, hairy underneath; pods pubescent, 3.5–5 cm long, 2–3 mm wide, beak 4 mm long; seeds light brown in colour, 7–10/pod. Flowering early October, and producing pods through to May in the northern hemisphere. Well grazed by cattle.

'Semilla Oscura' Cuba (pre-1974). Selected from native/naturalized populations in Cuba. Shorter internodes than 'Semilla Clara'; terminal leaflet 4 × 2.1 cm, with short hairs on both surfaces; pods slightly hairy, 3.5–4 cm long, 3 mm wide, beak 2 mm; seeds dark brown or black, 6–9/pod. Flowers earlier than 'Semilla Clara'.

Promising accessions

The folllowing accessions showed merit at 26º S in SE Queensland, Australia on an acid soil, in an area receiving 1,100 mm rainfall. They were evaluated under grazing for persistence and rated for productivity, growing in association with *Axonopus fissifolius* and *Paspalum dilatatum*.

CPI 52793 Origin Madagascar (23.08º S, 44.1º E, 300 m asl, rainfall 550 mm).

CPI 52794 Origin Gauteng, South Africa (25.45º S, 28.12º E, 1,300 m asl, rainfall 650 mm).

CPI 52797 Origin Morogoro, Tanzania (7º S, 500 m asl, rainfall 800 mm).

CPI 52799 Origin Arusha, Tanzania (3º S, 1,380 m asl, rainfall 900 mm) - collected from sodic area.

CPI 60371 Origin Krugerspos, South Africa (25º S, 1,120 m asl, rainfall 500 mm).

CPI 60377 Origin Arusha, Tanzania (3º S, 1,390 m asl, rainfall 1,000 mm).

CPI 70292 Selected line from Malkerns Research Station, Swaziland (26º31' S, 780 m asl, rainfall 993 mm).

CPI 82319 Origin Santiago de Cuba (20º N, 50 m asl, rainfall 1,100 mm).

CPI 114122 Origin Ethiopia (11.5º N, 2,900 m asl, rainfall 1,000 mm).

CPI 114123 Origin Ethiopia (11.3º N, 2,960 m asl, rainfall 1,200 mm).