

Tropical Forages

Grona heterocarpa subsp. *heterocarpa*

Scientific name

Grona heterocarpa (L.) H. Ohashi & K. Ohashi
subsp. *heterocarpa* var. *heterocarpa*



Perennial subshrub, cv. Florida (PI 217910)



More prostrate growth form (APG 62792)

Synonyms

Basionym: *Hedysarum heterocarpon* L.; *Desmodium heterocarpon* (L.) DC. subsp. *heterocarpon*; *Desmodium polycarpon* (Poir.) DC.; *Desmodium polycarpon* var. *polycarpon* (Poir.) DC.; *Hedysarum polycarpon* Poir.; *Meibomia heterocarpos* (L.) Kuntze



Inflorescence terminal and axillary racemes; pods 4-8 jointed



Pods change from green to dark brown at maturity

Family/tribe

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

Morphological description

A perennial (3–5 years) sub-shrub, sometimes a shrub or herb, ascending or often creeping with a woody rootstock. Stems and branches up to 1 m long, diffuse and ascending or erect, although prostrate under heavy grazing. Adventitious rooting sometimes occurs from stems lying on the soil surface. Stems range from nearly glabrous to densely covered with white or yellowish hairs. Leaves are generally trifoliolate, though unifoliolate leaves are common on seedlings and not unusual toward the base of mature stems. Leaflets mostly papery, smooth on the upper surface and hairy underneath, often with a light green to almost yellow watermark on the upper surface. Terminal leaflet normally broadly elliptic, ovate or often obovate, with tips generally retuse. Inflorescence terminal and axillary racemes, densely flowered; flower colour ranging from pink to violet or white. Pods erect or ascending, narrowly oblong, compressed and generally 4–8-jointed, turning from green to dark brown on maturity. Articles quadrangular to semi-elliptic, straight along the upper suture, somewhat rounded below, separating and then dehiscent. Seeds broadly elliptic, cream to orange in colour, 2 × 1.5 mm. 700,000–800,000 seeds per kg.



Line illustration



Prostrate native ecotype growing with *Axonopus fissifolius*, Manado, Indonesia

subsp. *heterocarpa*: Erect or ascending or prostrate herbs or subshrubs. Terminal leaflets usually obovate elliptic or oblong sparsely to subdensely hairy above. Inflorescence elongated. Flowers 3–4 mm long with pedicels 4–7 mm long. Pods sparsely to densely pubescent whit hooked and straight hairs (0.1–1.5 mm long).

subsp. *ovalifolia*: Prostrate stoloniferous herbs or subshrubs. Terminal leaflets ovate or elliptic to broadly ovate acute or obtuse glabrous or nearly glabrous above. Inflorescence short usually less than 5 cm long very densely flowered. Flowers more than 4 mm long with pedicels 2–3 mm long. Pods with densely long yellowish or whitish hooked-hairs (0.5–1.5 mm long).

Description based on Ohashi (1991).

Common names

Asia: baay dâm'naəp (Cambodia); □□□(□□□) jia di dou (yuan bian zhong) (China); buntut meyong sisir, kaci, akar entimor (Indonesia); shiba-hagi (Japan); rumput kerbau derapah, kacang kayu betina (Malaysia); mangkit-parang, mani-mani, huyo-huyop (Philippines); trâng quả dị quả (Vietnam)

English: carpon desmodium, Asian tick trefoil

Indian subcontinent: ■■■■■ ■■■■■■■■■■ kaadu moovile (Kannada); ■■■■■■■■■■ nilathuvara (Malayalam); ■■■■■■■■ jambhali dashami (Marathi); ■■■■■■■■■■ salaparni (Sanskrit); ■■■■■■■■■■ chepputatta (Telugu); ■■■■■■■■■■■■■■■■ kattumoojire (Tulu)

Pacific: piri piri, pua marino (Mangareva, French Polynesia); okula beluu (Palau); kaamalimal, kamelimele, kehmelmel en nansapw (Pohnpei); ea ea, piripiri 'aratita, piripiro, tia pipi, toharea (Tahiti); ngingie'uta (Tonga)

Distribution

Native:

Africa: Tanzania

Asia: Bangladesh, Bhutan, Cambodia, China (s.), India, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Taiwan, Thailand, Vietnam

Australasia/Papuasias: Australia, Papua New Guinea

Pacific: Fiji, Micronesia, New Caledonia

Naturalized:

Naturalized elsewhere.

Uses/applications

Forage

For grazing in long-term grass-legume pastures.

Other

The whole plant is used medicinally for reducing fever and for treating contusions and strains.

Ecology

Soil requirements

Range of well-drained soils of light texture, including the better-drained mineral soils of southern Florida. Needs moderate soil P levels. Can tolerate pH 4.3–5 and high Al saturation. Can suffer from trace element deficiency on neutral or alkaline soils.

Moisture

Average annual rainfall of 1,250–1,500 mm in Florida but up to 2,500 mm elsewhere. Mature plants have some drought tolerance but seedlings are very susceptible. The great drought of 2000/01 was responsible for the loss of much carpon desmodium in central and southern Florida. Carpon desmodium can survive up to a week of intermittent shallow flooding, but not extended periods.

Temperature

Carpon grows well in cooler conditions, as in Florida spring, but most growth (65%) is in summer. Tolerates repeated light frosts and can grow to 2,500 m asl in the tropics.

Light

No information available.

Reproductive development

No information available.

Defoliation

Tolerant of heavy grazing when it develops a prostrate growth habit with a very low-lying crown and protected meristems. When grown with aggressive grasses such as *Paspalum notatum*, heavy rotational (3–6 weeks) grazing is recommended to prevent grass dominance.

Fire

No information available.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

In southern Florida, USA seed can be planted any time from after the last frost until August, but little or no seed will set during the first year unless germination occurs before July. On clean seed beds, seeding rate is 3–5 kg/ha, but 5–10 kg/ha in established grass areas; nodulates with native cowpea rhizobium. Hard-seed levels of 50–65%. Seedling growth is slow, but once established, carpon can persist for more than 10 years without special grazing management.

Fertilizer

In southern Florida, recommendations are about 2.5 t lime/ha, 45–50 kg P and K/ha on virgin flatwood soils, with annual maintenance dressings of about 300 kg/ha of 0-10-20 (N:P:K).

Compatibility (with other species)

Once established carpon competes well with aggressive grasses provided they are grazed moderately heavily and not fertilised with nitrogen. In a trial with continuous grazing of a mixture of three tropical legumes with bahia grass (*Paspalum notatum*), the short-lived legumes joint vetch (*Aeschynomene americana*) and phasey bean (*Macroptilium lathyroides*) contributed to diets during the first summer, whereas the contribution of carpon was greater in the second summer.

Companion species

Grasses: *Axonopus fissifolius*, *Digitaria eriantha*, *Hemarthria altissima*, *Paspalum notatum* in Florida.

Legumes: Combines well with white clover (*Trifolium repens*) and short-lived species such as *Aeschynomene americana* and *Macroptilium lathyroides*.

Pests and diseases

Damage caused by several foliar diseases has been reported: leaf-spots (*Cercospora* sp., *Pestalotiopsis versicolor*) and anthracnose (*Colletotrichum gloeosporioides*) in southern USA and South America, also powdery mildew (*Oidium* sp.) and wilt (*Sclerotium rolfsii*). In Florida, carpon is susceptible to at least two species of root knot nematodes (*Meloidogyne incognita* and *M. arenaria*) and should not be planted in infested areas; cv. Florida is particularly susceptible. Little leaf mycoplasma has been recorded as moderate to severe in Central and South America. Web-worms and other insects can attack the foliage and seed pods in long ungrazed stands during flowering and seed maturation, but are best controlled by grazing.

Ability to spread

Carpon can be spread through the dung of stock grazing the seed heads. Resting a grass-legume pasture for the legume to seed and then introducing stock is recommended to maintain legume soil seed reserves for regeneration. A bahia grass (*Paspalum notatum*) pasture with a good stand of carpon desmodium had soil seed reserves of more than 300 seeds/m², equivalent to about 3 kg/ha.

Weed potential

Although generally considered a fairly benign species, it is classified as invasive in a number of Pacific islands.

Feeding value

Nutritive value

Less nutritious than legumes such as *Aeschynomene* and *Stylosanthes*. The foliage contains 9–20% CP, depending on growth stage, while grass/legume mixtures average 9–10% CP. 'Florida' carpon desmodium leaf CP averaged 17.6% (compared with 6.8% for bahia grass). Some 130 kg N/ha/yr has been measured in harvested forage, equivalent to 190–260 kg N/ha applied to pure pangola (*Digitaria eriantha*) and bahia grass (*Paspalum notatum*) pastures. IVOMD of mixtures with grasses ranged from 45 to 60%, depending on the grass and season of the year. IVOMD of 'Florida' carpon desmodium leaves was low in summer (47.0 vs 51.2% for bahia grass during the same period). Tannin percentages from two cuts were 2.3 and 3.1%.

Palatability/acceptability

In 5 years of commercial grazing in Florida, acceptability of 'Florida' carpon desmodium by cattle was reported to be satisfactory in spite of the tannin.

Toxicity

Probably none.

Production potential

Dry matter

In Florida, carpon desmodium contributed an estimated 40% to the total yield of 13.6 t DM/yr of a mixture with Coastcross 1 Bermuda grass (*Cynodon dactylon*).

Animal production

No data reported.

Genetics/breeding

$2n = 22$. Very polymorphic due to a high degree of cross-pollination; selfing is favoured by flowers being tripped.

Seed production

In Florida, flowering begins in early September and seed matures by November. Mature pods do not shatter readily; often a grass/legume mixture is mown when 85–90 percent of the legume pods are mature. The herbage is allowed to dry for at least one day, and preferably 2–3 days, before pick-up threshing. Pick-up threshing is preferable to direct heading because the vegetative material still has a high moisture content at this stage, and is likely to gum the threshing bars of the drum if direct headed. After seed harvest the stand is allowed to revert to a grazed pasture. Seed yields of 100 kg/ha have been reported.

Herbicide effects

No information available.

Strengths

- Resilient, easy to manage.
- Combines with aggressive grasses.
- Cool season growth.

Limitations

- Susceptible to root-knot nematodes.
- Medium to low quality.

Selected references

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Cultivars

'Florida' (PI 217910, IRFL 588, CPI 49729, CPI 83596, CPI 86277, CPI 100451) Released in Florida, USA in 1979. The original collection was obtained from the Forest Research Institute, Dehra Dun, Uttar Pradesh, India.

Promising accessions

None reported.

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