

Tropical Forages

Grona heterophylla

Scientific name



Grona heterophylla (Willd.) H. Ohashi & K. Ohashi

Synonyms

Basionym: *Hedysarum heterophyllum* Willd.;

Desmodium heterophyllum (Willd.) DC.; *Meibomia heterophylla* (Willd.) Kuntze

Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily:

Faboideae tribe: *Desmodieae*.

Morphological description

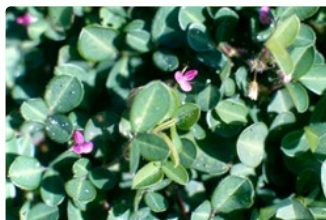
Prostrate perennial, 10–70 cm tall, multi-branching, strongly stoloniferous, rooting freely from stolons and lower nodes of aerial stems. Stems up to 1.5 m long, angular, reddish-brown, tomentose, with spreading brown hairs 1.5–2.0 mm long. Stolons become woody with age and almost glabrous. Leaves trifoliolate, often intermixed with unifoliolate leaves on lower part, petioles angular, 5–15 mm long. Terminal leaflet 10–30 mm long and 8–15 mm wide, larger than lateral leaflets (12–15 mm long and 8–10 mm wide). Leaflets obovate or elliptical, margins entire, apex slightly emarginate, reticulate venation, densely pubescent (hairs whitish coloured) on both dorsal and ventral surfaces. Petiole of the terminal leaflet 4–5 times longer than those of lateral leaflets. Inflorescence a few-flowered axillary or terminal raceme to 6 cm long, and/or leaf-opposed clusters of 1–3 flowers; pedicel 10–25 mm long. Flowers small (3–5 mm long), pink, purple or white, giving rise to a 3–6 jointed, undulate (on dorsal edge) pod, which fractures at the joints on maturity. Pods 12–25 mm long, 4–5 mm wide, finely pubescent. Segments oblong or quadrate, densely covered with minute hooked hairs; when segments break, they stick to hair or clothing when ripe (hence name of tick trefoil). Seeds kidney shaped, 2.25–2.50 mm long and 1.50–1.75 mm wide, yellowish brown turning dark brown with age; seed coat glabrous. About 325,000 seeds per kg.

Similar species

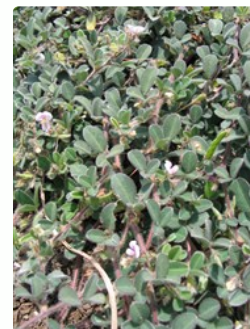
Grona heterophylla: terminal leaflet broadly elliptic or broadly elliptic-obovate, 10–30 mm long and 8–15 mm wide, base obtuse, apex rounded or nearly truncate, often emarginate; silver blaze on midrib common.

Grona triflora: terminal leaflet obcordate, obtriangular, or obovate, 2.5–10 mm long and 2.5–10 mm wide, base cuneate, apex truncate, slightly emarginate; silver blaze absent.

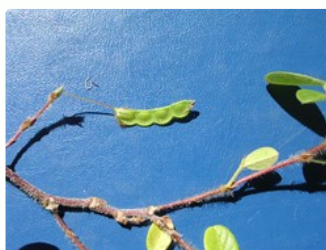
Common names



Inflorescence a few-flowered axillary or terminal raceme; leaves with silver blaze along midrib (cv. Johnstone/CPI 73651)



Stems angular, reddish-brown, tomentose; leaves densely pubescent on both surfaces



Pods covered with minute hooked hairs (cv. Johnstone)



Leaflet apex can be slightly emarginate; flowers, pods 3-6 jointed



Seeds



Desmodium heterophyllum (Willd.) DC. - 1, flowering and fruiting branch; 2, fruit; 3, seeds.

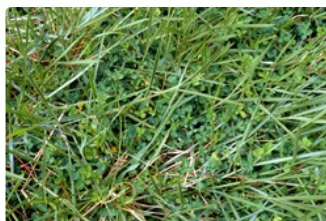
Line illustration



With *Ischaemum ciliare*, Samoa



With *Stenotaphrum secundatum*, Vanuatu



With *Urochloa humidicola*, Santo, Vanuatu



With *Urochloa decumbens*, N Qld, Australia

Asia: Smau 'âm'bôk, trôm' préi (Cambodia); 苜蓿草 yi ye shan ma huang (China); sisik betook, heuheulangan, sukut jareman (Indonesia); kawariba-makie-hagi (Japan); padông môd liinz (Laos); akar sisik naga, akar telinga tikus, kekara, omba-omba, peparu bendang, rumput sisik naga, rumput sisek betok, rumput sisek naga, rumput telinga tikus (Malaysia); kabot (Sarawak); ya maengmi (Thailand); hàn the, thóc lép khác lá, trâng quả dị diệp (Vietnam)

English: hetero, greater clover-leafed desmodium, Guinea clover, Japanese tick-clover, Spanish clover; variable-leaf tick trefoil (USA)

Indian subcontinent: tellausiri (India); මහා ඉන්දුපියාලියා maha undupiyaliya (Sinhala); perumpulladi (Tamil)

Latin America: desmodium hetero, trébol japonés

Pacific: senivakacegu, wakutu (Fiji)

Distribution

Native:

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

Papuasía: Papua New Guinea

Naturalized:

Australasia/Papuasía: Australia (Queensland), Solomon Islands

Pacific: Fiji, Hawaii, Micronesia, Northern Mariana Islands

Uses/applications

Forage

Valuable component of grazed native pastures and of sown pastures dominated by creeping grasses. Tolerance to spread under heavy grazing allows it to persist under conditions of management that result in the loss of most other legumes.

Environment

It has been used as ground cover in pepper gardens in Sarawak (Malaysia).

Other

Roots, twigs and leaves are used in Cambodian and Indian folk medicine to treat various conditions.

Ecology

Soil requirements

Grows on a wide range of soils from sands to clays with pH 4.5–7.5. Very efficient at extracting phosphorus from infertile soils. Will tolerate low pH and high Al; little salt tolerance.

Moisture

Requires high rainfall (at least 1,500 mm/year). Little tolerance of drought but will persist through moderate dry seasons of up to 5 months length. Tolerates waterlogged soils and short-term flooding.

Temperature

Warm-season tropical legume with no frost tolerance.

Light

Very shade tolerant and is often found under the canopy of shrubs in grassland. It persists in well-grazed pastures under mature coconut plantations and yield is less affected under 50% light than many other tropical legumes.

Reproductive development

Flowers and produces seed over a long period. As each segment of the pod dehisces at maturity, seed production is difficult.

Defoliation

Extremely tolerant of heavy grazing due to multi-branching stems that root at the nodes, and will spread under these conditions. Difficult to harvest in cut-and-carry systems due to its prostrate growth habit.

Fire

Hetero will recover after fire from plant or seed, but hetero-rich pastures with creeping grasses are rarely burnt.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Can be sown from seed, but this is rarely available commercially due to difficulty of harvest. Seed should be inoculated with an appropriate rhizobium (QA 982 or CB 2085 in Australia). Almost invariably planted from cuttings of rooted stolons and stems into moist soil where it will spread rapidly due to its free branching habit and free seeding. If sown from seed, seeding rates can be as low as 0.25–0.5 kg/ha. Grazing animals spread seed through dung and from yet-to-dehisce seedpod segments adhering to hair.

Fertilizer

Hetero will grow well in infertile soils but will respond vigorously to added P (and S). Nitrogen fixation by hetero was 64 kg N and 110 kg/ha/year N with tall guinea grass (*Megathrysus maximus*) and *Urochloa miliiformis*, respectively.

Compatibility (with other species)

Depending on grazing management, hetero is incompatible with tall tussock grasses but competes well with creeping or low-growing vegetation.

Companion species

Grasses: *Axonopus* spp., *Dichanthium caricosum*, *Digitaria eriantha* (pangola), *Paspalum notatum*, *Urochloa decumbens*, *U. humidicola*.

Legumes: *Alysicarpus vaginalis*, *Grona triflora*.

Pests and diseases

Susceptible to root knot nematodes (*Meloidogyne* spp.) on lighter soils; also affected by little leaf (mycoplasma-like organisms) and some leaf fungi, but these are rarely important under grazing. Both foliar blight (*Rhizoctonia solani*) and cercospora leaf-spot are observed on the species in the humid regions of Central and South America.

High tolerance of insect pests.

Ability to spread

Will spread by stolons and seed and naturalise under suitable conditions as evidenced by its spread and persistence in the Pacific region.

Weed potential

Only well adapted to heavily grazed situations, usually in association with low-growing grasses, especially with fertilizer applications, so weed potential is limited.

Feeding value

Nutritive value

17–18% CP; base levels are increased by P (and S) application.

Palatability/acceptability

Moderate levels of tannins reported but palatability is good, except for early growth.

Toxicity

No toxicity reported.

Feedipedia link

April 2020: Page under construction

Production potential

Dry matter

Yields of about 2 t/ha/yr have been obtained from grass-legume pastures and about 3–5 t/ha/yr under plantation crops when grown in pure stands.

Animal production

In Fiji, LWGs of over 500 kg/ha/yr recorded on fertilised hetero in native pastures. naturalized hetero invaded pastures previously fertilised and sown with Siratro (*Macroptilium atropurpureum*), which declined at stocking rate of 3.5 head/ha. In northern Australia, LWGs of over 700 kg/ha/yr have been obtained off signal grass (*Urochloa decumbens*)/hetero and pangola (*Digitaria eriantha*)/hetero pastures. In Samoa, LW production from a grazed (steers) *Ischaemum indicum*/hetero pasture was 370 kg/ha/yr vs. 220 kg/ha/yr on *I. indicum* alone.

Genetics/breeding

2n = 22 and self-compatible, although normally cross-pollinated. At CIAT, there is a collection of about 100 germplasm accessions available, which has yet to be evaluated.

Seed production

Hetero is free-seeding but harvesting is difficult because of: (1) the flowering period being much extended; (2) prostrate growth habit; and (3) seeds dehiscing from the individual pod segments soon after maturity. Consequently seed must be hand-harvested from plants over a long period of time or vacuum-harvested from the soil surface. Seed yields of 35 kg/ha have been achieved.

Herbicide effects

No information available.

Strengths

- Well adapted to heavy grazing.
- Compatible with creeping grasses.
- Natural spread under grazing.
- Can be planted vegetatively.
- Good shade tolerance.

Limitations

- Adapted to high rainfall regions only.
- Heavy grazing necessary to prevent suppression by grasses in the growing season.
- Low DM production.
- Difficult seed production; no commercial seed available.

Internet links

<https://research.csiro.au/cultivars/wp-content/uploads/sites/162/2017/03/johnstone.pdf>

Selected references

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Cultivars

'Johnstone' Released in Australia (1973). Vegetative material was first introduced from New Guinea to Queensland in 1945. Persistent and productive cultivar released for use with sward-forming grasses such as pangola and signal grass on acid soils in the high rainfall zone of tropical north Queensland, Australia.

Promising accessions

CPI 100851 From Hayfield, Papua New Guinea (3°40' S, 150 m asl, rainfall 1,950 mm). Dominant legume in heavily grazed pastures on acid soils (pH 4.5) in Papua New Guinea.

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