Desmodium uncinatum

Scientific name

Desmodium uncinatum (Jacq.) DC.

Synonyms

Basionym: *Hedysarum uncinatum* Jacq.; *Meibomia uncinata* (Jacq.) Kuntze

Family/tribe

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

Morphological description

Robust perennial herb or subshrub with trailing, non-twining stems to several metres long, radiating from a stout rootstock and ascending to about 1 m at flowering. Stems cylindrical-angular, 2.5 - 4.0 mm diameter, densely covered with short hooked (uncinate) viscid hairs, rooting down if in prolonged contact with moist soil grow, scrambling over surrounding vegetation. Leaves trifoliolate, petiole 2 - 6 cm long, densely uncinate-pubescent; stipules 3–6 (-)8 × 2–4 mm, ovate, long-acuminate at apex, slightly auriculate at the base; rhachis 0.5-1.5 cm long. Leaflets ovate to elliptic, entire, apex ± acute, both surfaces appressed-hairy, upper surface with a longitudinal, generally pyriform, silver blaze about the midrib; terminal lamina 5-10 cm long, 2.5-6.0 cm wide; lateral laminae 4-8 cm long by 2-4 cm wide; petiolules 2 - 3 mm long; stipels filiform to 4 mm long. Inflorescence a fairly open terminal or axillary raceme (10 -) 20 - 40 (-50) cm long, sometimes branching at lower floral nodes; flowers borne singly or in groups of 2 (- 4); pedicels 4–10 mm long. Flowers 7–12 mm long, pink to mauve turning blue or white on fading. Peduncle, rachis and pedicels all covered with viscid hairs. Pods falcate 10 -50 mm long, lower suture deeply constricted, upper suture smooth, thickened; comprising 3 - 8 (-12) segments, 3-7 × 3-4 mm, covered with viscid, uncinate hairs; dehiscent between segments on maturity. Seeds mainly light brown with mixture of olive-green to cream, 200,000–220,000/kg in cv. Silverleaf.

Inflorescence an open terminal or axillary raceme (cv. Silverleaf)

Robust perennial herb or subshrub with trailing, non-twining stems ascending to about 1 m at flowering; image with *Setaria sphacelata*, S. Qld, Australia (cv. Silverleaf)

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Desmodium uncinatum (Jacq.) DC. – 1, flowering and fruiting branch; 2, flower; 3, fruit.

Line illustration

Seeds

Common names

Africa: silwerblaardesmodium (Afrikaans)

Asia: semanggi (Indonesia); pega-pega (Tagalog), koer (Bagobo) (Philippines); enieo (Thailand)

English: Hawai'i ticktrefoil, silverleaf desmodium, Spanish tick-clover, velcro plant, velcro vine, velcro weed

Europe: spanischer Klee (German)

Latin America: amor-de-velho-comum, amor-de-velha-da-folha-grauda, comum, amores, amoroso, carrapicho, carrapicho-beiço-de-boi, pega-pega, trevino do campo (Brazil); amor seco, desmodio plateado; desmodio de hoja plateada, desmodium español, pega pega, platero, trébol español, trébol español hojas plateadas (Spanish)

Distribution

Native:

South America: Argentina; Bolivia; Brazil; Paraguay; Peru; Uruguay; Venezuela

Naturalized:

Naturalized throughout the highland tropics and humid subtropics in areas where *D. uncinatum* previously sown

Uses/applications

Forage

Sown as the legume component in permanent mixed pastures for grazing. Value for cut-and-carry is restricted by the discomfort caused by the generally sticky plant parts. It can be made into hay or incorporated into silage to improve the protein content.

Environment

Forms an effective ground cover with abundant leaf fall and slow decomposition resulting in a deep mulch layer under the plants.

Other

Along with other *Desmodium* spp., *D. uncinatum* has been shown to be produce the volatile chemicals that underpin the "push-pull" control strategy for witchweed, *Striga hermonthica*, and cereal stemborers in crops of maize and sorghum, when grown as an intercrop.

Ecology

Soil requirements

Generally grows best on lighter and more friable soils of moderate fertility with pH >5.5, but not on heavy clays. 'Silverleaf' is more tolerant of low pH, high Al and Mn than 'Greenleaf' (*D. intortum*) but is intolerant of salinity. It has commonly become naturalized in Australia around the margins of rainforest remnants in fertile, well-drained, friable red clay-loams (krasnozems).

Moisture

D. uncinatum has been collected in areas with annual rainfall ranging from 800 mm to 2,000 mm. While 'Silverleaf' is most commonly sown in areas with well-distributed rainfall exceeding 900 mm, it has been successfully sown in subtropical lowland areas receiving as little as 700 mm. Although not productive during the dry season, it can persist in regions with dry seasons less than 5 months, particularly at higher latitudes if these are the cooler months. With its stronger taproot, *D. uncinatum* is more drought-tolerant than *D. intortum*, but less tolerant of poor drainage. It can tolerate short term flooding.

Temperature

D. uncinatum has been collected in the upland tropics of Colombia (6° N) at 1,900 m asl to the elevated subtropics of Argentina (31° S) at almost 900 m asl. Although a warm season plant, it has better cool season growth than many other tropical legumes. Peaks of growth occur in spring and autumn with a slight depression in mid-summer when insolation and temperature are high and moisture supply sometimes limited. Generally grown at moderate altitudes (to 2,000 m) in the tropics and lower altitudes in the subtropics. Leaves are damaged or killed by frost, but crowns usually survive.

Light

It is moderately shade-tolerant as would be expected in view of the vegetation types where it is found: "high altitude grassland, grassland, highland rocky field, cerrado (lato sensu), riverine forest and/or gallery forest, seasonally deciduous forest, seasonally semideciduous forest, ombrophyllous forest (tropical rain forest), mixed ombrophyllous forest".

Reproductive development

'Silverleaf' flowers in response to shortening days. In the subtropics and elevated tropics, it flowers at the end of the wet season (mid-April in S hemisphere), about 1 month earlier than *Desmodium intortum* (Mill.) Urban. It is self-fertile, but flowers may require tripping.

Defoliation

'Silverleaf' requires fairly lenient grazing; it regresses to a small plant or dies out under constant heavy defoliation below 10 cm. 'Silverleaf' pastures tend to decline even under good management.

Fire

Pastures containing *D. uncinatum* are not normally burned, but the plants mostly recover after a fire.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

D. uncinatum is usually planted from seed into a well-prepared seed bed, but has been sod-seeded into herbicide-treated pasture. Seed should be inoculated with specific 'Desmodium' group rhizobium (CB 627 in Australia), and Mo may be beneficial, particularly in more acid soils. Seedling establishment is initially slow, but the established legume starts to grow soon after the cool season.

Fertilizer

High levels of fertility are needed for satisfactory growth and P, S, K may need to be applied before sowing and as maintenance.

Compatibility (with other species)

'Silverleaf' is usually grown with grasses that are also cold-tolerant, for example *Setaria sphacelata*, although it can combine with other tussock species. It has be grown with creeping grasses but does not persist under heavy grazing.

Companion species

Grasses: *Cenchrus clandestinus, Chloris gayana*, *Megathyrsus maximus, Setaria sphacelata*.
Legumes: *Desmodium intortum*, *Macroptilium atropurpureum, Neonotonia wightii*.

Pests and diseases

'Silverleaf' in Australia suffers from the root-chewing larvae of the weevils *Amenmus quadrituberculatus* and *Leptopius* spp. (Coleoptera: Curculionidae). It is susceptible to 'legume little-leaf disease' caused by phtoplasma infection by leafhopper (Hemiptera: Cicadellidae)

Ability to spread

Seed is readily spread by the sticky, uncinately pubescent pod segments adhering to animal coats and human clothing. The legume can also spread through its trailing stems that root in moist soils at the nodes; however, it will only spread into suitably fertile soils.

Weed potential

D. uncinatum has become a serious weed of creekbanks (*i.e.* riparian areas), roadsides, fencelines, forest margins, disturbed sites, waste areas and plantation crops (*e.g.* sugarcane) in subtropical Australia, being ranked among the top 100 invasive plant species in Queensland and regarded as an environmental weed in the New South Wales North Coast region. Its trailing stems do not pose the same problem posed by vigorous twiners such as *Macrotyloma axillare*, but the sticky stems are thought to have an adverse effect on small native fauna.

Feeding value

Nutritive value

Crude protein levels in whole top growth range from 12 to 23%, those in the leaves being approximately double those of the stems. Partitioning of N concentrations in leaf and stem varies with stages of flowering, N being more concentrated in the leaves post-anthesis than pre-anthesis. High condensed tannin levels have been measured in the leaves. While tannin levels can adversely influence palatability, they can also help reduce protein losses in the rumen by bonding to the protein facilitating passage through to the lower digestive tract where the protein can be absorbed.

Palatability/acceptability

Stock do not readily graze *D. uncinatum* on first exposure, possibly due to high tannin levels, but following a short period of accustomisation, there is little or no reluctance.

Toxicity

No toxicity has been recorded.

Feedipedia link

https://www.feedipedia.org/node/299

Production potential

Dry matter

Legume yields of 4–7 t/ha and legume/grass yields of 15 t/ha DM have been recorded.

Animal production

Early work in coastal SE Queensland found annual liveweight gain from grazed *D. uncinatum* - grass pastures averaged some 340 kg/ha. The presence of *D. uncinatum* in a mixed sward with *Chloris gayana* resulted in similar or slightly greater liveweight gain to that obtained from animals grazing only nitrogen-fertilized *Chloris gayana*.

Genetics/breeding

D. uncinatum is primarily a self-fertile diploid. Taxonomically, it belongs to a weakly separated complex of species, including the closely related *D. intortum*, with which hybrids can be produced.

Seed production

Flowering occurs in response to short days in mid-April when vegetative growth ceases. Selfing of the flowers can take place, but cross-pollination is important for satisfactory seed set. Seed matures about mid-June when the branches die back. The seed crop is mowed when 50 percent of the seed is ripe, allowed to dry in a swath for 10–14 days before threshing. Slow drum speed (200 rpm) are necessary to reduce seed cracking. While seed yields of 330 kg/ha are achievable, commercial yields are usually of the order of 220–275 kg/ha.

Herbicide effects

Seedlings are show good tolerance to 2, 4-D at 500 g/ha but are moderately sensitive to this herbicide at 1,600 g/ha; they are sensitive to acifluorfen at 450 g/ha, but tolerant of bentazone at 1,440 g/ha, fluazifop-butyl at 210 g/ha and sethoxydim at 370 g/ha.

Strengths

- For cooler regions.
- Long growing season.
- By-pass dietary protein due to condensed tannins.

Limitations

- Intolerant of heavy grazing.
- Needs fertile soils.
- Weed problem in non-pasture land.

Selected references

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Dzowela, B.H. (1986) Value of a forage legume component in summer beef fattening systems in Malawi. In: Haque, I., Jutzi, S. and Neate, P.J.H. (eds) Potentials of forage legumes in farming systems of sub-Saharan Africa. Proceedings of a workshop held at ILCA, Addis Ababa, Ethiopia, 16–19 September 1985. p. 540–546. hdl.handle.net/10568/49939

Hacker, J.B. (1992) *Desmodium uncinatum* (Jacq.) DC. In: Mannetje, L.'t and Jones, R.M. (eds) Plant Resources of South-East Asia No. 4. Forages. Pudoc Scientific Publishers, Wageningen, the Netherlands. p. 116–118. edepot.wur.nl/327785

Sweeney, F.C. and Hopkinson, J.M. (1975) Vegetative growth of nineteen tropical and sub-tropical pasture grasses and legumes in relation to temperature. Tropical Grasslands 9:209–217. bit.ly/3dC91dy

Cultivars

'Silverleaf' (CPI 8990) Released in Australia (1962). Origin unknown. Seed obtained from Division of Agrostology, Institute of Animal Biology, Deodoro, Brazil.

Promising accessions

None reported.