Stylosanthes viscosa

Scientific name

Stylosanthes viscosa (L.) Sw.

Synonyms

Basionym: *Hedysarum hamatum* var. *viscosum* L.; *Stylosanthes glutinosa* Kunth; *Stylosanthes prostrata* M.E. Jones

Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily: *Faboideae* tribe: *Dalbergieae* subtribe: *Stylosanthinae.*

Morphological description

Erect, ascending, spreading, much branched, perennial herb to subshrub, 15–50 (–100) cm tall. Stems woody at the base, upper branches herbaceous, with short, tuberculate bristles and densely pubescent with short viscid hairs, prostrate when cut or grazed in young stage. Leaves trifoliolate; stipules amplexicaul, viscid, densely pubescent and with tuberculate bristles; sheath 3.5–7.3 mm long; teeth needle-like, 1–5.7 mm long; petioles 2.5–5.0 mm long, hispidulous, viscid, rachis 1–2 mm long; leaflet blades ovate, obovate-elliptic to lanceolate, 6–14 (–25) mm long and 3–5 (–8) mm wide, both sides densely pubescent, short bristles, apex acute or obtuse. Inflorescence a small (6–11 mm long), terminal or axillary, crowded, viscid ovoid spike with 2–5 (–8) flowers; primary bracts unifoliolate or trifoliolate, with tuberculate bristles and silky pubescence. Flowers with suborbicular standard 4–7 mm long, yellow with a dark red striation forming an arch; wings 4–5 mm long, auriculate, keel 3–4 mm long, falcate. Pod (loment) comprising two fertile articles 1.5–2.5 mm long, 1.4–2 mm wide, shortly hairy, reticulately nerved; beak on terminal articulation 0.5–0.9 mm long, mostly coiled. Seed cream-coloured to light brown, smooth, 1.4–1.7 × 0.8–1 mm, similar size to that of *S. scabra.* 400,000–500,000 seeds-in-pod and 600,000–800,000 dehulled seeds per kg.

Three ecotypes are recognized in Brazil:

1) Prostrate, densely hairy type with small leaves and inflorescences from Rio de Janeiro, Espirito Santo, and very dry caatinga area of Bahia.

2) Erect leafy type with small spikes, and anthocyanin in leaves, from western Minas Gerais.

3) Prostrate type, with large leaflets (no anthocyanin), and thick stems from southern and south-western Minas Gerais - most susceptible to anthracnose.

Similar species

***S. viscosa*:** no axis rudiment

***S. scabra*:** axis rudiment present

Erect form growing with *Andropogon gayanus* cv Kent, Northern Territory Australia

Prostrate form (CPI 34904)

Leaves trifoliolate with ovate, obovate-elliptic to lanceolate leaflets; flower with suborbicular standard and dark red striation forming an arch

Viscid leaves and stems

Inflorescence a small terminal or axillary, crowded, viscid ovoid spike, mostly with 2-5 flowers; in native *Trachypogon* savanna on sand soil, E Venezuela

Pod segments and seed: upper segment with beak unusually strongly coiled (top); lower segment (below)

Habit.

Scale: between points = 1 cm. (Drawn from Segadas-Vianna 3591.)

A leaf and details of the vein system of the central leaflet; B bract; C bracteoles; D gynoecium; E keel; F wing; G standard; H androecium; I unfolded calyx; J pod; K seed. Scale: between points = 2 mm. (Drawn from Segadas-Vianna 3591.)

Shrubs of erect type, NW Queensland, Australia

Common names

Africa: moritaba (Bambara, West Africa); bala korama, bâda gotur (Senegal); damel, mbono muso, nbono (The Gambia)

English: sticky stylo (Australia); poor man's friend (Jamaica); viscid pencil-flower (USA); false lupine

Latin America: alfafa do nordeste, meladinha, meladinha-de-cavalo, melosa, vassourinha (Brazil), comino sabanero (Cuba); hierba del pujo (Mexico)

Note: Many of the African names may (also) refer to *Stylosanthes fruticosa* (Retz.) Alston

Distribution

Native:

Northern America: USA (Texas (s.)); Mexico (Baja Sur, Campeche, Chiapas, Colima, Guerrero, Jalisco, Nayarit, Oaxaca, Sinaloa, Sonora, Tabasco, Zacatecas (s.))

Central America: Belize; Costa Rica; Honduras; Nicaragua; Panama

Caribbean: Cuba; Dominican Republic; Jamaica

South America: Argentina (Chaco); Bolivia; Brazil (Bahia, Mato Grosso do Sul, Minas Gerais, São Paulo); Colombia; French Guiana; Guyana; Paraguay; Suriname; Venezuela (Bolívar, Mérida, Zulia, Anzoátegui, Barinas, Falcón, Monagas, Nueva Esparta, Sucre, Trujillo)

Naturalized:

Africa: Sierra Leone; Upper Guinea (possibly misidentified *S. fruticosa*)

Asia: India (Tamil Nadu)

Australasia: Australia (Western Australia, Northern Territory, northern Queensland)

Pacific: Hawaii

Uses/applications

Forage

S. viscosa has not been evaluated widely but may have a role in reducing tick populations (order Acarina) in grazing lands. Generally considered too unpalatable to be successful in evaluations, but there may be more palatable and anthracnose resistant types should the need arise.

Other

Larvae of the cattletick, *Boophilus microplus* are trapped in the sticky exudate on much of the *S. viscosa* plant. Flowers are a source of nectar for scavenging bees as evidenced by the Spanish common name, "melosa", meaning "honey". Decoctions prepared from various parts of the *S. viscosa* plant are used in Caribbean and African cultures for the treatment of diarrhoea, stomach ache, colds, and kidney complaints as well as in aphrodiasiac preparations.

Ecology

Soil requirement

Occurs on soils with pH from 4 to 7.5 (mostly acid), often on very sandy or sandy loam soils of sedimentary or granitic origin, but also on clays and clay loams. Soils are generally well drained. Tolerant of high soil Al^{+++} levels.

Moisture

Average rainfall at collection sites varies from 230 mm in Baja California, Mexico, to 3,200 mm in Cayenne, French Guiana, often with long dry seasons. Most accessions have been collected from sub-humid sites receiving 1,000–1,750 mm rain per year, with a 4–5 month dry season. High level of drought tolerance, comparable with that of *S. scabra*. Generally intolerant of waterlogging, particularly ecotypes from semi-arid tropics.

Temperature

Tropical to warm subtropical in distribution, from 29° S to 29° N, and from sea level to 2,000 m asl. Ecotypic differences in frost tolerance.

Light

Occurs mostly in open scrub, woodland or open, rocky savanna, usually in fully exposed positions, suggesting low tolerance of shading.

Reproductive development

At about 20º S, flowering commences from late February/early March to late May depending on ecotype.

Defoliation

Tolerant of heavy grazing, although grazing pressure often modified through low palatability of S. viscosa herbage.

Fire

Fire tolerance varies with ecotype (*e.g.* CPI 34904 susceptible, CPI 38611 tolerant).

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Embryo dormancy in fresh seed declines rapidly. The main restriction to germination is hard seededness, which is often high in freshly harvested seed. Natural breakdown of hard seededness is brought about by exposure to soil surface temperatures of 50–55 ºC. In the seasonally dry tropics, dry season soil surface temperatures are sufficient to soften seed in readiness for the first rains. When rapid germination and establishment of a proportion of the seed is desirable, various scarification treatments have been developed, often involving dry heat. Recommendations vary from 1–2 hours at 85 ºC in a heated oven, to 15–30 seconds on a hot surface at 140–150 ºC, in each case cooling to ambient temperature. Since heat treatments can damage seed, the safest and most practical way of scarifying seed is to use a hammer mill, which de-hulls and scarifies about 50% of the seed. Seed is sown at 1–2 kg/ha. Seedlings tend to be weak and slow growing during the first season. Inoculation is not essential since *S. viscosa* nodulates readily with a wide spectrum of rhizobium strains, but use of CB 82 or CB 756, strains proven effective on this species, provides a measure of insurance.

Fertilizer

While able to establish and persist on low phosphate soils, *S. viscosa* responds to applications of 10–20 kg/ha P on such soils. This is of benefit to both plant and animal.

Compatibility (with other species)

Once established, *S. viscosa* can persist with many of the grasses that grow in the same environment. Also competes with many lower-growing weed species, but not with taller-growing, unpalatable species.

Companion species

Grasses: *Cenchrus ciliaris*, *Digitaria milanjiana*, *Heteropogon contortus*, *Urochloa mosambicensis*.
Legumes: *Aeschynomene americana*, *Chamaecrista rotundifolia*, *Stylosanthes hamata*, *S. guianensis* var. *intermedia*, *S. scabra*.

Pests and diseases

Susceptibility to anthracnose caused by *Colletotrichum gloeosporioides* varies from highly susceptible to resistant, depending on genotype. Fifty-six per cent of accessions tested were resistant to a mixture of races 1 and 2 of Type A of the organism. Susceptible to blight caused by *Sclerotium rolfsii* as are many plant species. Slightly affected by legume little leaf phytoplasma, but possibly not as severely as is *S. scabra*. Some resistance to root knot nematode (*Meloidogyne javanica*), *e.g.* CPI 38611.

Ability to spread

Capable of spreading from plots.

Weed potential

S. viscosa appears in weed lists of several countries, but at this stage (2018) it is not considered a major weed. The ability to set seed and the low palatability of herbage, combined with the ability to survive dry conditions in poor soils confer weed potential on some accessions.

Feeding value

Nutritive value

CP and P levels of mature herbage range from 6 to 2%, and 0.05 to 0.13% P, respectively.

Palatability/acceptability

Generally considered unpalatable. Low palatability compared with *Centrosema acutifolium*, *Desmodium velutinum* and *Zornia glabra*.

Toxicity

No record of toxicity.

Production potential

Dry matter

Generally not as productive as *S. scabra*. Yields of 4.9 t/ha DM have been recorded in the first year and 12.5 t/ha DM in the second

year.

Animal production

Appears to have little benefit to animal production.

Genetics/breeding

2*n* = 20. Sporadic inter-specific crosses occur. Evidence suggests that *S. viscosa* is the maternal parent of the allotetraploid, *S. scabra*, with *S. seabrana* the pollen parent.

Seed production

Seed production is difficult with this species due to the sticky nature of the inflorescence, leaves and stems. The viscid substance, which is soluble in organic solvents but not water, is difficult to remove from equipment used in the harvesting process.

Herbicide effects

Probably similar to *S. scabra.*

Strengths

- Drought tolerant.
- Grows on poor soils.
- Persistent.
- Some resistance to anthracnose.
- Acaricidal properties.

Limitations

- Sticky/viscous.
- Unpalatable.
- Susceptible to waterlogging.
- Little benefit to animal production.

Selected references

Keller-Grein, G. and Schultze-Kraft, R. (1992) Preliminary agronomic evaluation of a *Stylosanthes viscosa* Sw. collection. Genetic Resources Communication No. 15. CSIRO Tropical Agriculture, St Lucia, Australia.

Stace, H.M. and Edye, L.A. (eds) (1984) The biology and agronomy of *Stylosanthes*. Academic Press, Sydney, Australia. doi.org/10.1016/B978-0-12-661680-4.X5001-X

Cultivars

None released to date.

Promising accessions

JCU-Vs1 Selected in Queensland, Australia. Accepted for PBR protection 22 May, 2018.

Note: Only a small fraction of the variation available has been tested to date and, with its wide range of adaptation, it should be much more closely examined, especially if the reasons for erratic palatability can be determined. The majority of accessions conserved ex situ are of Brazilian and Venezuelan origin. Areas in Central America and Mexico have been identified as possible sources of novel genetic variation and for conservation activities.