

Tropical Forages

Alysicarpus vaginalis

Scientific name

Alysicarpus vaginalis (L.) DC.



Synonyms

Basionym: *Hedysarum vaginale* L.; *Alysicarpus nummularifolius* auct.; *Alysicarpus rupicola* Edgew.; *Hedysarum cylindricum* Poir.

Family/tribe

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

Morphological description

Erect or spreading, procumbent annual or short-lived perennial herb, 10–60 (–100) cm tall, often woody at the base; prostrate under heavy grazing. Stems glabrous or slightly pubescent, numerous, 10–100 cm long, emanating from the rootstock; rooting at the nodes under sustained moist conditions; variable pubescence, moderately branched and leafy. Leaves unifoliolate, ovate to oblong elliptic, subcordate at the base, finely hairy with longer hairs above, 5–20 (–65) mm long and 3–10 (–25) mm wide, reticulate venation conspicuous on both surfaces; petiole 4–10 (–15) mm long; stipules lanceolate, 7–24 mm long. Racemes axillary or terminal, 1.5–7 (–13) cm long, binate at each node, comprising 6–12 (–16) flowers. Standard orange, pinkish-buff or pale purple 4–6 mm long, often paler than wings and keel; calyx lobes lanceolate, pubescent. Pods pubescent, 12–25 mm long and 2–2.5 mm across, comprising 4–7 loments, not constricted between the loments; loments 2.5–3 mm long and 1.5–3 mm across; surface with raised reticulation. Seeds oval or oblong, slightly compressed, 1–2 mm long, yellow, light brown or dark red, often speckled; 400,000–650,000 seeds/kg.

Common names

Africa: gádágíí, lussak, senkello (Nigeria); sòkàma àna (Mali); tolubele (Sierra Leone); bundiya, buyaayi, gadaji (Upper Volta)

Asia: □□□ lian jia dou (Chinese); brobos, gudé oyod, tebalan (Indonesia); akar seleguri (Malaysia); than-ma-naing-kyauk-ma-naing (Myanmar); banig-usa, mani-manian (Philippines); thua lisongna (Thailand); cây me dât, cây the the, đậu vảy ốc, đậu mũi mác, me đất (Vietnam)

English: alyce clover, buffalo clover, one-leaf clover, white moneywort (USA); pannata (Hawaii, USA); false moneywort (Bahamas)

India: chauli, sauri, pan-nata (Hindi); naamada soppu (Kannada); baramtal-chettu (Telugu)

Italian: trifoglio d'alice



Prostrate growth habit of naturalized form in NE Australia



Erect growth habit of naturalized form, NT Australia



Taproot on very sandy soil, E Venezuela



Inflorescence an axillary (image) or terminal raceme



Little or no constriction between pod articles (CPI 104852)



Seeds



Alysicarpus vaginalis (L.) DC. - 1, flowering and fruiting branch; 2, flower; 3, fruit; 4, seed.
Line illustration



Foliage and flowering - erect habit (CPI 52359)



Interrow crop Katherine Australia



Grazed mixture with *Digitaria eriantha*, E Paraguay

Latin America: trébol alicia, maní cimarrón (Cuba); yerba de contrabando (Puerto Rico)

Distribution

Native:

Africa: Angola; Democratic Republic of Congo, Gabon; Ghana; Kenya; Mozambique; Niger; Nigeria; Rwanda; Sao Tome and Principe; Sierra Leone; South Africa (KwaZulu-Natal, Limpopo, Mpumalanga); Sudan; Swaziland; Tanzania; Togo; Uganda; Yemen (Socotra); Zambia; Zimbabwe

Western Indian Ocean: Mauritius; Réunion

Arabian Peninsula: Oman; Yemen

Asia: Japan (Ryukyu Islands); Taiwan; India; Pakistan; Sri Lanka; Cambodia; Laos; Thailand; Vietnam; Indonesia; Malaysia; Philippines

Oceania: Papua New Guinea

Naturalized:

Australasia: Australia (Queensland, Northern Territory)

Northern America: USA

Central America: Panama

Cultivated:

Papuasias: Papua New Guinea

Northern America: USA



Native pasture with *Themeda triandra*, NQ Australia

Uses/applications

Forage

Useful component of native pastures, especially under heavier grazing. It is cultivated for pasture, hay, and forage.

Environment

Grown for green manure (soil improvement) and soil conservation, providing effective erosion control on newly established terraces.

Other

The whole plant is used medicinally for treating wounds and bone fractures in China.

Ecology

Soil requirements

A. vaginalis grows on a wide range of soil types from coralline sands to moderately acid clays. It has moderate fertility requirements and responds to P and K fertilizers when growing on less fertile soils. Its susceptibility to nematodes can limit productive growth to heavier soils, including black clays. Low tolerance to salinity.

Moisture

While it usually occurs in seasonally dry climates with total annual rainfall between 700 and 1,700 mm, it will grow in the humid, sub-humid tropical and subtropical lowlands, under rainfall to 2,000 mm. It can stand dry seasons of up to 6 months but may behave as an annual in more arid regions. It behaves as a perennial under good moisture conditions. It does not tolerate waterlogged conditions but can tolerate short-term flooding.

Temperature

Broad adaptation to temperature, from warm temperate regions to the tropics, and from sea level to 1,400 m asl in many tropical areas. Leaves killed by light to moderate frosts. Plants killed by heavy frosts but can regenerate strongly from seed in the following spring/summer.

Light

Alyce clover grows well under moderate shade and is more vigorous under the canopy of shrubs rather than in the open. Similar shade tolerance to *Grona heterocarpa* subsp. *ovalifolia* in a greenhouse study in Malaysia.

Reproductive development

A short-day plant producing relatively high seed yields in the first season of growth. Seed requires an after-ripening period of approximately 16 weeks to overcome physiological dormancy. Physical dormancy must also be overcome by abrasive scarification to break the seed coat.

Defoliation

Alyce clover is very tolerant of continuous, heavy grazing and regular mowing. Under grazing conditions, single plants change from an erect form of growth to a prostrate habit. Tall erect plants cut at or near ground level may not recover quickly.

Fire

Fire is uncommon in the heavily grazed swards that favour Alyce clover. A perennial accession (IRFL 3240) persisted and spread following burning in Florida due to its deep, well-developed crown. Very hot fires may kill the plant but stands will regenerate from seed.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Commercial seed of *Alysicarpus vaginalis* is seldom available. It has been planted as a hay crop in Mississippi and Florida with seed rates of 10–15 kg/ha, sown into disced strips. Seed for immediate germination should be scarified but does not require specific inoculant.

Fertilizer

Responds well to P, K and S on deficient soils in native pastures and sown stands.

Compatibility (with other species)

Declines under intense competition from vigorous tussock grasses, but combines well with native grasses controlled by heavy grazing. It can combine well with creeping, sward-forming grasses under heavy grazing and frequent cutting as in lawns.

Companion species

Grasses: *Stenotaphrum secundatum*, *Bothriochloa pertusa*, *Dichanthium caricosum*.

Legumes: *Grona heterophylla*, *Atylosia scarabaeoides* (as a useful component of naturalized pastures on basaltic slopes at Sigatoka, Fiji).

Pests and diseases

A main disadvantage of the crop is its susceptibility to [root-knot nematodes](#). Prevention measures include growing the plant on heavier soils, which reduce the severity of infestation, and to use certain [cultivars](#) that may be more resistant to nematodes. Other pests of the plant include [leaf-mining caterpillars](#). It is host to the [plume moth](#) *Exelastis crepuscularis*. A number of [seed beetles](#) of the genus [Bruchidius](#) complete their larval development in the seeds of *A. vaginalis*, including two recently described from the plant.

Ability to spread

Alyce clover spreads naturally under grazing probably aided by spread of seed in dung. It becomes more prevalent under grazing.

Weed potential

Common weed of lawns and golf fairways where *A. vaginalis* persists under regular mowing. It is a weed of roadsides and other disturbed habitat in [Guam](#), [Hawaii](#), and [Fiji](#). It is considered an [invasive species](#) on many [Pacific Islands](#).

Feeding value

Nutritive value

Crude protein content 16–18%, and IVDMD 67–73%.

Palatability/acceptability

Well eaten by cattle and horses. Similar palatability to *Medicago sativa* and *Aechynomene americana* under grazing by sheep.

Toxicity

Reported not to cause bloat in cows, presumably due to the presence of condensed tannins in the forage.

Production potential

Dry matter

Yields of hay in southern USA have been 4–6 t/ha. As a naturalized component of perennial grazed pastures, contributions to total DM yields are low.

Animal production

Steers fed *A. vaginalis* hay with 0.45 kg/head/day of cottonseed meal gained 0.97 kg/head/day over a 74-day period, in comparison to those fed lucerne (*Medicago sativa*), and bermuda grass (*Cynodon dactylon*) hay and cottonseed meal, which gained 1.27 and 0.76 kg/head/day respectively. Steers grazing *A. vaginalis* pastures during late summer gained an average 0.6 kg/head/day over a 4-year period.

Genetics/breeding

Evaluation of germplasm collections in Florida and Australia has identified both annual and perennial types. $2n = (14) 16$

Seed production

Seeds freely, yielding up to 300 kg/ha when harvested by combine harvester, or mown and threshed.

Herbicide effects

Severely damaged by acifluorfen, chloramben, paraquat and MSMA. Tolerant of dinoseb (1.1–3.3 kg/ha), 2,4-DB (0.5 kg/ha), naptalam (0.5 kg/ha) and bentazone (0.8–2.2 kg/ha). Repeat applications of bentazone at the highest rate caused severe damage.

Strengths

- Naturalized in native pastures pan-tropically.
- Increases under heavy grazing.
- Dries rapidly as hay and can be baled one day after cutting.
- Good seed yield.
- Readily eaten by cattle and horses.
- Makes good hay.

Limitations

- Susceptible to root-knot nematodes.
- Susceptible to waterlogging.
- Low DM yield in mixed pastures.
- Pod segmentation makes seed harvesting difficult.

Selected references

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Cultivars

'**FL3**' released in Florida, USA 1989 Developed from PI 538329 for summer hay production in south-eastern USA. More tolerant or resistant to root-knot nematodes, with the exception of *Meloidogyne incognita* Race 3. Seedling vigour and nematode resistance greater than 'FL5'. Later maturing than 'FL5'.

'**FL5**' released in Florida, USA 1989 An early maturing accession developed from PI 217904 for summer hay production in south-eastern USA. Slightly less susceptible to root-knot nematodes than common *A. vaginalis*.

Promising accessions

CPI 60169 Selected in central Queensland, Australia. Origin Paraa, Uganda (2°19' N, 31°37' E, 545 m asl, rainfall 1,000 mm). Perennial with moderate yield and persistence in experimental plantings.

CPI 97094 Selected in central Queensland, Australia. Origin near Lae, Papua New Guinea (6°43' S, 147°00' E, 50 m asl, rainfall 5,000 mm). Annual accession with highest yields of all *Alysicarpus* evaluated in experimental sowings. Potential in leys.

CIAT 17360 Selected in central Queensland, Australia. Origin near Butterworth, Malaysia (4°58' N, 100°44' E, 30 m asl) . Accession increased in grazed pangola (*D. eriantha*) pasture occasionally cut for hay in Paraguay.

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