Alysicarpus vaginalis

Scientific name
Alysicarpus vaginalis (L.) DC.

Synonyms
Alysicarpus rupicola Edgew.
Alysicarpus nummularifolius (L.) DC.
Alysicarpus nummularifolius sensu auct.
Alysicarpus nummularifolius (L.) DC. var. angustatus Ohwi
Alysicarpus vaginalis (L.) DC. var. diversifolius Chun
Hedysarum cylindricum Poiret
Hedysarum vaginale L.

Family/tribe

Common names
Alyce clover; buffalo clover; one-leaf clover; trebol Alicia.

Morphological description
Low growing annual or short-lived perennial, extremely variable in habit, leaf shape and flower colour. Stems numerous, 10–100 cm long, emanating from the rootstock; variable in hairiness, moderately branched and leafy; with single simple oval-shaped leaves on a short petiole 10 mm long with prominent pointed stipules. Leaves 5–65 x 3–25 mm, but generally 10 x 20 mm. Flowers, 6 mm long, reddish yellow or pale purple, borne in racemes up to 13 cm long and comprised of 6–12 flowers each. The seeds, dark red, oval or oblong, 1–1.5 mm long. Seed weight is approximately 625 seeds/g for cultivar ‘FL5’ and higher for cultivar ‘FL3’.

Ungrazed plants can be more erect, growing to 1 m in height in dense swards.

Distribution
Native to:
Africa: Angola, Gabon, Ghana, Kenya, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Sierra Leone, Sudan, South Africa (Natal), Swaziland, Tanzania, Togo, Transvaal, Uganda, Yemen (Socotra), Zaire, Zambia, Zimbabwe.
Western Indian Ocean: Mauritius, Reunion.
Arabian Peninsula: Oman, Yemen.
Eastern Asia: Japan - Ryukyu Islands, Taiwan.
Indian Subcontinent: India, Pakistan, Sri Lanka.
Indo-China: Cambodia, Laos, Thailand, Vietnam.
Malesia: Indonesia, Malaysia, Papua New Guinea, Philippines.
Australia: Northern Territory, Queensland.
Widely naturalised in the neo-tropics.

Uses/applications
A. vaginalis is a useful component of native pastures, especially under heavier grazing. It is cultivated for pasture, hay (in the United States), and forage. It is also used for soil improvement and conservation, and provides effective erosion control on newly established terraces.

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 will respond to P and K fertilisers when growing on infertile soils. Its susceptibility to nematodes can limit productive growth to heavier soils, including black clays. Low salinity tolerance.

Moisture
It will grow in the humid, sub-humid tropical and subtropical lowlands, under rainfall from 900–2,000 mm. Under wetter conditions, it behaves as a perennial. It can stand dry seasons of up to 6 months but may behave as an annual in more arid regions. It does not like 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. A. vaginalis is killed by heavy frosts but generally regenerates 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 *Desmodium heterocarpon* subsp. *ovalifolium* 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 small, flattened rosette. It is likely that tall erect growth cut at a low level will not recover quickly due to the absence of growing points.

Fire

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

Agronomy

Guidelines for the establishment and management of sown pastures.

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. No longer commonly planted as an improved pasture or hay crop.

Fertiliser

Alyce clover responds well to P, K and S on deficient soils in both native pastures and sown stands.

Compatibility (with other species)

Alyce clover 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 grazing and frequent cutting as in lawns.

Companion species

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

Legumes: *Desmodium heterophyllum*, *Atylosia scarabaeoides* (as a useful component of naturalised pastures on basaltic slopes at Sigatoka, Fiji).

Pests and diseases

*Alysicarpus vaginalis* is very susceptible to root-knot nematodes (*Meloidogyne* spp.). As these are more severe on light soils, the legume often grows best on heavier soils. Leaves are often severely affected by leaf-mining caterpillars.

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.

Feeding value

Nutritive value

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

Palatability/acceptability

Well eaten by cattle and horses. Similar palatability to lucerne (*Medicago sativa*) and *Aechynomene americana* under grazing by sheep in a cafeteria trial.

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 naturalised 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 (*M. 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.

Seed production

*Alysicarpus* seeds freely and yields of up to 300 kg/ha have been recorded when harvested by combine harvester, or mown and threshed.

Herbicide effects

Severely damaged by acifluorofen, 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

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

Limitations

- Susceptible to root-knot nematodes.
- Susceptible to waterlogging.
- Low DM yield in mixed pastures.

Selected references


Internet links

http://ecocrop.fao.org/

Cultivars

<table>
<thead>
<tr>
<th>Cultivars</th>
<th>Country/date released</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL3’</td>
<td>Florida, USA 1989</td>
<td>Developed from PI 538829 for summer hay production in south-eastern USA. More tolerant or resistant to root-knot nematodes, with the exception of <em>Meloidogyne incognita</em> Race 3. Seedling vigour and nematode resistance greater than FL5’. Later maturing than FL5'.</td>
</tr>
<tr>
<td>FL5’</td>
<td>Florida, USA</td>
<td>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 <em>A. vaginalis</em>.</td>
</tr>
</tbody>
</table>

Promising accessions
<table>
<thead>
<tr>
<th>Promising accessions</th>
<th>Country</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI 60169</td>
<td>Queensland, Australia</td>
<td>Origin Uganda. Perennial with moderate yield and persistence in experimental plantings in central Queensland, Australia.</td>
</tr>
<tr>
<td>CIAT 17360</td>
<td>South America</td>
<td>Accession increased in grazed pangola (<em>D. eriantha</em>) pasture that was occasionally cut for hay in Paraguay.</td>
</tr>
</tbody>
</table>