pastures australia

A collaboration between AWI, GRDC, MLA, RIRDC and Dairy Australia

Gland clover

Scientific name(s)

Trifolium glanduliferum

Strengths

- Adaptable to a wide range of soil types
- Suited to low rainfall environments
- Resistant to red-legged earth mites and blue green aphids.
- Moderate tolerance of waterlogging.
- Excellent regeneration
- Easy to harvest for conservation.
- Ease of seed production
- High level of hard seed for protection against false breaks (premature germination).
- Compatible with other annual legumes in mixtures.
- Low courmarin levels in the plant.

Limitations

- Susceptible to competition from more vigorous species during establishment
- Need to restrict grazing during flowering
- Not as productive as serradella and biserrula

Plant description

Plant: Gland clover is an erect or semi-erect, extensively branched, self-regenerating annual pasture legume, forming dense swards to about 40 or 50cm tall.

Stems: Smooth and green (some reddening on the upper surface).

Leaves: Comprise 3 finely toothed, smooth, hairless leaflets, 1 - 2 cm long, rounded becoming more elongated in mature plants. Leaflet margins contain glands giving the plant its common name.

Flowers: Borne in many-flowered globular heads, the individual flowers are pinkish-white in colour when first formed, and develop a deeper pinkish-mauve colour with maturity.

Pods: 2 - 3 seeds/pod, with each bunch of pods producing 130-140 seeds.

Seeds: Yellow in colour, very small, oval. Approximately 1,430,000 seeds/kg (similar in size to balansa clover seed).

Pasture type and use

It is used in rotation with crops for grazing and hay and plays an important role in pasture mixtures for a number of soil types and rotational systems. Used in rotation with crops for grazing and hay.

Where it grows

Rainfall

Gland clover is best suited to regions with 350 - 600 mm annual rainfall with a predominantly autumn-winter-spring distribution and relatively little summer rain. It has been successfully grown in northern NSW in areas with a significant summer rainfall component, receiving a minimum average annual rainfall of 475 mm.

Soils

Gland clover is adapted to well drained to mildly waterlogged soils with a wide range of soil textures, and soil conditions from pH 4.5 to 8.0 ($CaCl_2$). However, it is not suited to poor infertile sands.

Temperature

Tolerant of light frosts to -4 or -5^{o} C.

Establishment

Companion species

Grasses: Italian ryegrass, African lovegrass (consol) and Premier digit grass

Legumes: sub clover and biserrula, serradella, rose clover

Sowing/planting rates as single species

Sowing rate for pure gland clover stands, either seed production or pasture, is 5 - 7 kg/ha. The small seed should be sown no more than 0.5 cm deep. Rolling after sowing is an advantage.

Sowing/planting rates in mixtures

Sow at 1 to 2 Kg/ha in mixtures with other pasture legumes.

Sowing time

Sow gland clover as close to the break of season in autumn as possible.

Inoculation

Seed of gland clover must be inoculated with group C inoculum, the same strain as is used for sub-clover.

Fertiliser

Sow with 100 to 150 kg/ha superphosphate, or super/potash if on sandy soils

Management

Maintenance fertliser

Not applicable

Grazing/cutting

Gland clover can be heavily grazed in winter. However, stocking rate should be reduced at flowering time, particularly in the first year. This will allow the clover to set large amounts of seed building up a soil seed bank, which is necessary for regeneration in subsequent years.

Seed production

Gland clover flowers spring to summer, and being an aerial seeding legume, can be harvested using a conventional header. Seed should be harvested when 75% of the stem is dry. Header settings are not critical, although the fan speed should be adjusted to 50% - 60% of that used for wheat, as gland clover seed is very small. Seed harvested on-farm should be scarified prior to sowing, to improve first year germination. Commercial seed yields of gland clover range from 200 - 700 kg/ha

Ability to spread

Many seeds of gland clover survive passage through sheep and are spread in the dung.

Weed potential

There are no reported cases of gland clover spreading into native vegetation.

Major pests

Resistant to red-legged earth mites, bluegreen aphids and cowpea aphids. Moderately susceptible to spotted alfalfa aphid and lucerne flea.

Major diseases

No major diseases have been observed. Not susceptible to clover scorch disease that affects sub-clover.

Herbicide susceptibility

There are no herbicides currently registered for gland clover. No adverse reaction to any of the common selective grass herbicides has been observed. In trials, post-emergence application of Broadstrike® (Flumetsulam) appeared safe while mild damage has been observed with Spinnaker® (Imazethapyr).

Animal production

Feeding value

Gland clover produces high quality forage in terms of crude protein, dry matter digestibility, and metabolisable energy, although all decline with age as is generally the case with annual pasture legumes. Crude protein levels at 50% flowering may be over 20% and digestibility about 75%. Within 4 weeks, these values may drop to about 14% and 65% respectively. In the same period, metabolisable energy may drop from around 10.5 to 9 MJ/kg DM.

Palatability

Moderately palatable

Production potential

The performance of gland clover in terms of dry matter and seed yield, over a range of soil types, is similar to other clovers (97% of spring dry matter and 103% of seed yield of Dalkeith averaged over a number of sites and seasons).

Livestock disorders/toxicity

No livestock disorders have been reported but, as with many temperate legumes, could be expected to cause bloat in cattle.
Gland clover contains low levels of coumarins (lower than those in lucerne) which can be converted to dicoumarol in mouldy hay. Since dicoumarol can affect animal health, care should be taken not to feed mouldy hay to livestock.

Cultivars

Cultivar	Seed source/Information
Prima	Western Australia - Deprtment of Agriculture and Food Seedmark

Further information

Dr Angelo Loi, WA Department of Agriculture Ph.: 08 9368 3907
Mr Brad Nutt, WA Department of Agriculture Ph.: 08 9368 3870
Dr Brian Dear, NSW Department Primary Industries Ph.: 02 6938 1856

NSW Department of Primary Industries - Gland clover Primefact 634

Acknowledgements

Prima gland clover was field tested by the National Annual Pasture Legume Improvement Program supported by GRDC and AWI.
I would also like to acknowledge the contribution by Belinda Hackney, Brian Dear, and Graeme Sandral, of the Pasture Genetics and Improvement Unit, Wagga Wagga, Primefact 634 (August 2007).

Author and date

Angelo Loi, Western Australian Department of Agriculture

May 2007