

Barrel medic

Scientific name(s)

Medicago truncatula

Strengths

- Palatable at all growth stages, including dead leaves and stems, and seedpods over summer.
- High nutritive value with high protein content.
- Fixes atmospheric nitrogen, benefiting cereal crops grown in rotation.
- As a grass-free pasture in rotation with cereals it is a disease break for various cereal pathogens including cereal cyst nematode, root lesion nematode, take-all and crown rot.
- Provides non-selective weed control options for reducing risk of herbicide resistant weeds in cropping phases (eg grazing, green manuring, hay production, spray-topping).
- Hardseeded and once established will maintain a soil bank of seed reserves and will self-regenerate from that seed bank.
- More productive and persistent in low rainfall areas than subclover.
- Outstanding complementary legume component for summer growing grass pastures in the subtropics.

Limitations

- Must not be sown too deeply.
- Winter production can be slow if autumn rains are late.
- Not well adapted to soils with pH(water) < 6.5, deep sands, waterlogged or moderately saline areas.
- Herbicide options for broadleaf weed control are limited.
- Seed harvest requires specialist vacuum harvesting machinery.
- Lush and/or pure stands can cause animal health problems.

Plant description

Plant: semi-prostrate annual legume, 15 - 30 cm high, with m side branches from near the base.

Stems: prostrate to ascending, green and hairy.

Leaves: made up of three wedge-shaped leaflets, matt green, hairy on both sides and toothed on the end margin. The central leaflet stalk is longer than the other two, while in most clovers (*Trifolium* spp.) they are all of similar length.

Leaflet markings: may vary from none, to slight purple flecking, pale green "watermarks" edged in brown or large dark blotches.

Flowers: yellow, pea-like and in small clusters of 2 - 4.

Pods: barrel shaped, 6 - 12mm long, hardening when ripe, 3-8 coils, spines of variable length and 6-12 seeds per pod.

Seeds: pale yellow to light brown, kidney shaped, 200,000 - 320,000/kg.

Pasture type and use

Used as a self-regenerating autumn-to-spring growing annual legume in dryland cereal/livestock zones in southern Australia, in rotation with winter cereals, grain legumes and canola, and in association with grass in permanent pastures in the subtropical grain and pastoral zone. Once established its hardseededness allows it to regenerate from a seed bank

after short cropping phases of typically 1 - 3 years.

Where it grows

Rainfall

Barrel medic requires an annual rainfall of 250 - 700 mm, with a growing season rainfall of 150-300mm. Early flowering varieties are suited to lower rainfall zones.

Soils

Barrel medic is adapted to a wide range of at least moderately fertile soils, from sandy loams to clays. It prefers neutral to alkaline soils (pH(water) > 6.5), not prone to waterlogging or salinity.

Temperature

It is an autumn-to-spring growing annual, best-suited to areas with mild growing seasons (15 - 25oC). However, it will tolerate higher and lower temperatures.

Establishment

Companion species

Grasses: annual ryegrass, volunteer cereals or sown cereals for grass/legume hay production, and with a range of summer growing grasses in the subtropics

Legumes: other annual medics (Medicago spp.), sub clover, lucerne

Sowing/planting rates as single species

- 6-10 kg/ha in southern Australia.
- 4-6 kg/ha in the subtropics.

Sowing/planting rates in mixtures

- 3-5 kg/ha in southern Australia
- 2-3 kg/ha in the subtropics (3-4 kg/ha if undersown with crops).

Undersowing with cereal grain or forage crops is an excellent management option for establishing barrel medic as a component of grass/legume pastures in the subtropics where the grass is sown after the medic sets seed. Low sowing rates of the cereal grain crop (e.g. 15 kg/ha) are essential for success with undersowing.

Sowing time

Sown April-June. Typically dry sown into the previous year's cereal stubble before the opening rains or into a moist, weed-free seedbed soon after the break. Shallow sowing (1-2 cm) is essential with press wheels, harrows or prickle chains to improve soil-seed contact and establishment.

Inoculation

Commercial Group AM.

Fertiliser

Phosphorous is generally the single most limiting macronutrient for barrel medics; sulphur may be required on some soils in the subtropics. Some soils, particularly infertile sands, may also be deficient in important trace elements (eg Cu, Zn, Mo and Co), some of which are directly involved in nitrogen fixation.

Management

Maintenance fertiliser

Generally barrel medics are grown in fairly close rotation with other crops which, if adequately fertilised, provide enough residual nutrients to maintain general soil fertility and medic growth. However, when sown in extended pasture phases on infertile soils in both southern Australia and the subtropics are likely to require topdressing with superphosphate at least. Soil testing is required to determine the need, timing and appropriate application rates. The trend towards high analysis fertilisers (eg DAP, MAP) in broadacre farming has also resulted in zinc deficiencies becoming more common on some soil types. Plant tissue testing is a more sensitive test for micronutrient deficiencies, some of which can be addressed in the short term with foliar sprays.

Grazing/cutting

Establishment - defer grazing in the first year until plants are well established and then only graze lightly until flowering. Remove stock until medic has finished flowering and producing pods, to maximise seed-set for subsequent regeneration. Paddocks should not be "crash" grazed or cut for hay in the first year if the stand is expected to regenerate.

Regeneration - in crop/medic rotation systems, it is best to defer grazing at the break of the season until the ground is covered and/or medics are well established (approx. 6 leaves, 2-3cm height, >1000 kg/ha dry matter). Set stock to control upright grasses, weeds and to encourage prostrate growth, increasing grazing pressure as necessary to prevent overly 'bulky' pastures in early spring. Reduce grazing pressure if possible whilst medic are flowering to maximise pod and seed-set. In grass/medic pastures in the subtropics, moderate to heavy grazing in the late summer is needed to utilise the grass and minimise the competition for light by the establishing medic. This grazing management should be applied sequentially year by year as it will not be possible or desirable to graze all paddocks in this way each year.

Summer grazing (southern Australia) - carefully monitor grazing of dried residues over summer, as over-grazing of pods, especially in the first year and on hard setting soils, will reduce future pasture regeneration.

Seed production

Barrel medic germinates after autumn rains, flowers in spring, and sets seed in late spring. It can produce over 800 kg/ha of seed under dryland conditions, with average commercial dryland seed yields being about 375 kg/ha. Requires specialised vacuum harvesting machinery.

Ability to spread

Colonises well from seed reserves. Some spread by seed in livestock faeces, pods adhering to sheep/wool or by movement of hay.

Weed potential

Low environmental weed potential due to its preference for moderately fertile soils, and because of its specific rhizobial requirements, high palatability and readily grazing preference. As a self-regenerating plant it can be a weed of crops in crop/pasture rotations but easily controlled in cereals with a range of inexpensive broadleaf weed herbicides. Fewer options in grain legumes crops.

Major pests

Redlegged earth mite, lucerne flea, bluegreen aphid, spotted alfalfa aphid, cowpea aphid, sitona weevil.

Major diseases

Phoma black-stem, rhizoctonia bare-patch, root lesion nematode and powdery mildew.

Herbicide susceptibility

Tolerant of grass-selective herbicides. Some herbicides available for selective control of certain broadleaf weeds. Spray-grazing and spray-topping techniques using less selective herbicides also available. Intolerant of some herbicide residues from cropping phase, particularly sulfonylurea herbicide residues in low rainfall areas with alkaline soils.

Animal production

Feeding value

High levels of crude protein (17-23%), energy (8-10 MJ/kg ME) and digestibility (55-75% DMD), with higher levels in young growth.

Palatability

Readily consumed by livestock, either as green or dry feed, including mature seed pods.

Production potential

Excellent feed for growing and finishing livestock when in growing phase. Dry residues and seed pods provide useful adjunct for maintenance of sheep grazing crop stubbles. In general animals can be expected to make better live weight gain and wool production on legumes than grasses, as a result of higher intake and more efficient utilisation of high protein, high energy feed.

Livestock disorders/toxicity

Barrel medic can cause photosensitisation in horses, occasionally red gut in sheep, and bloat in cattle. While phytoestrogens in barrel medic potentially could have negative effects on the reproduction of grazing livestock, this is rarely reported.

Cultivars

Group	Cultivar	Seed source/Information
Early	Parabinga	Australian Herbage Plant Cultivars
	Caliph 	SARDI Australian Herbage Plant Cultivars
Mid Season	Mogul 	SARDI Australian Herbage Plant Cultivars
	Sephi	Australian Herbage Plant Cultivars
	Jester 	SARDI Seedmark/PlantTech
	Paraggio	Australian Herbage Plant Cultivars

Note:

In the subtropics, the minimum winter rainfall requirement is >190 mm for all cultivars. All are adapted to loamy to clay soils with Paraggio showing a broader adaptation than the other cultivars Note: All barrel medics are susceptible to cowpea aphid

 Denotes that this variety is protected by Plant Breeder's Rights Australia

Further information

Queensland Department of Primary Industries - Annual medics

Acknowledgements

Information has been adapted from:

"Pasture Legumes for Temperate Farming Systems - The Ute Guide", Principal Author Michael Wurst, Rural Solutions SA, Primary Industries and Resources South Australia.

"Pasture Legumes for Subtropical Grain and Pastoral Systems - The Ute Guide", Principal Authors David Lloyd, Sue O'Brien, Brian Johnson (DPI&F Qld), Bruce Pengelly (CSIRO Sustainable Ecosystems), Michael Wurst (Rural Solutions SA).

SARDI factsheets (various)

DPI&F website Annual Medics

<http://www2.dpi.qld.gov.au/pastures/3625.html>

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