



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

Red clover

Scientific name(s)

Trifolium pratense L

Synonymyns:

Trifolium pratense L. var. *frigidum* auct. non Gaudin

Trifolium pratense L. var. *sativum* (Mill.) Schreb

Strengths

- Highly productive and suitable for grazing, silage or hay
- Can be grown in a short-term pasture mix
- Stoloniferous varieties have moderate drought tolerance and can maintain populations through the production of daughter plants
- Provides a valuable source of nitrogen for companion grasses or subsequent crops

Limitations

- Susceptible to a range of fungal diseases.
- Stock infertility can occur due to oestrogenic compounds present in most cultivars
- May cause bloat in grazing animals if dominant
- Relatively poor winter growth.

Plant description

Plant: a herbaceous perennial or biennial legume, 50-75 cm tall with a strong, deep, extensively branched taproot

Stem: erect, hollow, hairy, leafy stems with 4-6 branches originate from a dense crown. Stoloniferous types are more persistent and tolerant of close grazing by sheep

Leaves: trifoliolate on a slender stalk, oblong or oval shaped and hairy, with branched veins. Tetraploid types tend to have larger leaves than diploid types.

Flowerhead: large spere-shape, many small rose-coloured flowers clustered; brown and papery after seed set.. Egg-shaped pods contain one seed.

Seeds: kidney-shaped, can be yellow, brown or purple with a moderate level of hard seed present. ~600,000 seed/kg

Pasture type and use

Red clover is a most productive, summer-active, forage legume for temperate areas. It is a most nutritious for hay or silage production and well suited to cattle grazing. Associated with high levels of N fixation

Where it grows

Rainfall

To be persistent and productive red clover requires an annual rainfall of at least 700 mm. Hardier stoloniferous varieties will persist and be productive in areas down to 600 mm annual average rainfall.

Soils

Performs best on well-drained fertile loamy soils of moderate to heavy texture. Tolerant of acid

soils, however it performs best in a pH (water) range of 5.5–7.0. Moderate tolerance to soil aluminium. Does not thrive on poorly drained soils. Low tolerance to saline soils.

Temperature

Red clover is can be found growing naturally between latitudes 30°N and 65°N. Tolerance to high or low temperatures reflects origin of parental material

Optimum growth occurs in the range 20-25°C

Establishment

Companion species

Compatible with other temperate species, especially short and long rotation ryegrass, chicory. Potential to increase feed quality when sown with summer crops (eg maize)

Sowing/planting rates as single species

5 - 8 kg/ha.

Sowing/planting rates in mixtures

2 - 5 kg/ha.

Sowing time

Can be sown in autumn (early) or spring. There is a risk of frost damage to young plants if sown in autumn.

Inoculation

Should be inoculated and lime pelleted using Group B (TA1) inoculant.

Fertiliser

Requires high levels of fertility for best performance. Major nutrient requirements are phosphorous, potassium, sulphur and molybdenum. Soil test results and local knowledge of soil type and fertiliser history should determine rates to be applied at sowing.

Management

Maintenance fertiliser

Adequate levels of phosphorous, potassium, sulphur and molybdenum should be maintained for optimum growth.

Grazing/cutting

When grown for hay, cutting red clover at the early flowering stage ($\frac{1}{4}$ to $\frac{1}{2}$ in bloom) maximises the yield and feed value. Generally three cuts (subsequent cuts at $\frac{1}{4}$ bloom) of hay can be expected per year provided there is adequate fertility and moisture.

Lenient grazing in the first year will enhance production and persistence (leave at least 5 cm of growth). Rotational grazing will improve persistence. Red clover is sensitive to set stocking for long periods. Avoid overgrazing in winter, as this will hasten the thinning of stands.

Seed production

Red clover is an out-crossing, insect-pollinated species; isolation is required for seed production areas. Seed yields of up to 800 kg/ha have been achieved, but are more commonly between 250 – 600 kg/ha in specialist seed production paddocks.

Ability to spread

Red clover can spread through the actions of stock passing the hard seed.

Weed potential

Low. Some potential to invade disturbed native vegetation.

Major pests

Red-legged earthmite, Pea aphid, blue oat mite and cut worms. Native bud worms (Heliothis), mirids and thrips can damage seed crops

Major diseases

Red clover can be susceptible to a number of fungal diseases including root rot (*Phytophthora* spp.), clover rot (*Sclerotinia* spp.) and crown rot (*Fusarium* spp.).

Rust.

Powdery mildew may be a problem in areas with high humidity and rainfall.

Herbicide susceptibility

Red clover is sensitive to commonly used hormone type herbicides such as MCPA and 2,4-D. Herbicides containing 2,4-DB can be used.

Animal production

Feeding value

High. Intake can still be quite high when digestibility is relatively low at advanced stage of growth

Tetraploids generally have higher digestibility and protein levels than diploids

High nutritive value: silage has a high crude protein content of 16-20% and a ME content of 10-12 MJ/kg DM, depending on the growth stage at harvest

Palatability

Highly acceptable forage to livestock either as hay, silage or grazed at a young leafy growth stage

Red clover silage has a higher level of palatability compared to grass silage, allowing for greater animal intake and animal production.

Production potential






Under optimum growing conditions red clover peaks at 70-90 kg dry matter/ha/day in spring and summer, dropping to 5–10 kg dry matter/ha/day in winter.

Livestock disorders/toxicity

High oestrogen levels in some varieties can lead to a reduction in the fertility of stock grazing red clover at mating time.

Bloat can be a risk particularly in cattle if grazing pure stands and may cause an increase in urinary calculi (clover stones) in sheep. Occasionally causes problems with red gut in sheep.

Cultivars

Group	Cultivar	Seed source/Information
Early	Grasslands Hamua	Stephen Pasture Seeds
	Grasslands Sensation 	PGG Seeds
	Grasslands Colenso 	PGG Seeds
	Double Cut	Seed Distributors
	PAC19 ⁴ⁿ	AusWest Seeds
Early stoloniferous	Astred  (low oestrogen)	Wrightson Seeds
	Grasslands Broadway 	AusWest Seeds
	Grasslands Crossway 	Plant Breeders Rights database Enquire Grasslandz Technology Ltd
Mid	Redquin (low oestrogen)	AusWest Seeds
	Renegade	Stephen Pasture Seeds

	Ceres Claret	Stephen Pasture Seeds
Late	Grasslands Turoa	AusWest Seeds
	G27 ^{4N}	Enquire Grasslandz Technology Ltd
	Grasslands Pawera ^{4N}	AusWest Seeds
?	Red 812	Upper Murray Seeds
	USA	AusWest Seeds

Ⓢ Denotes that this variety is protected by Plant Breeder's Rights Australia as at the 17th April 2009

^{4N} Tetraploid

Further information

VicDPI - Oestrogens in pasture, hay and silage AG0737

FAO - Red clover

Australian Herbage Plant Cultivars

Charlton, D and Stewart, A 2000, Pasture and Forage Plants for New Zealand, NZ Grasslands Association

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Author and date

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