

### Chicory is a champion in WA



*Chicory and subterranean clover*

#### Actions summary

- ▶ **Chicory is a summer-active perennial that provides quality forage for livestock in summer and autumn**
- ▶ **Chicory is deep-rooted and will use soil water to help reduce soil salinity**
- ▶ **Productive chicory grows best on deep well-drained fertile soils**
- ▶ **Chicory requires rotational grazing to persist for 3–5 years**
- ▶ **Managed re-seeding can extend stand life to 6–8 years**

#### Chicory – the plant

Chicory is a summer-active perennial herb that responds quickly to summer rainfall and provides high quality feed from October to April. Once soil temperatures fall below 9°C in winter, chicory becomes dormant.

Chicory provides a good balance of crude protein, energy and minerals that when combined with rapid passage through the animal results in high feed intake and liveweight gain. High animal growth rates, eg 290 g/day (lambs) and 900 g/day (calves), have been measured on chicory.

Chicory requires annual rainfall of 500 mm or more for inland areas, and 400 mm or more for coastal areas where summer rainfall is reasonable. It has a tap root that can access moisture from 2–3 m but is only slightly salt tolerant and has low waterlogging tolerance.

#### Does chicory suit my farm?

Successful chicory production requires deep well-drained fertile soils with a pH(CaCl<sub>2</sub>) of 4.3 or greater, and rotational grazing. An investment in chicory is most rewarding when it is the focus of production in spring and summer (when summer rain falls), and it grows with a productive annual legume as a companion species for winter feed.

The best financial returns are gained when chicory is used to finish stock, especially prime lambs. Chicory enhances weaner sheep production as problem grasses can be removed with grass selective herbicides. It is ideal for increasing ewe liveweight over summer and providing an energy boost immediately before joining. Chicory is unsuitable for hay making as it becomes very brittle upon drying.



Three year old chicory growing in deep sand near Albany WA

## Chicory on farms

### Special purpose summer pasture

Chicory is established to provide high quality forage from October to April. It can be sown as a pure stand or with other summer-active species such as lucerne. Subterranean clover should be included to provide nitrogen.

### Component of a general purpose pasture

Chicory in pasture mixes, eg with perennial ryegrass and sub clover, provides higher quality forage during summer. However, grazing for good pasture utilisation in winter will compromise its persistence. Chicory in a mix will not last as long as special purpose pasture, and it will limit the range of herbicides that can be used.

## Cultivars

The cultivars of chicory currently available have been selected for New Zealand conditions but the following cultivars have performed well in WA.

**Grasslands Puna (public variety)** – the first forage cultivar of chicory. It was selected for its densely leaved habit and vigour. It appears to be the hardiest of current varieties and has the best persistence and lowest rainfall requirement.

**Puna II** – a selection from Puna for more upright growth habit, greater winter activity and improved uniformity. It requires a longer growing season to persist.

**Choice** – also a selection from Puna and similar to Puna II but specifically selected for dairy pastures as it has a low content of lactucin, which can taint milk.

**Grouse and Forager (public varieties)** – both are erect short-term cultivars (1–2 years) developed as summer cropping options.

New cultivars of chicory are being released regularly and the Pasture Species Database maintained by the Grassland Society of Southern Australia lists current cultivars. Visit the database at <http://www.grasslands.org.au/pasturespecies.htm>.

## Establishment

Chicory is best sown in early spring although successful establishment can be achieved in autumn. The seeding rate is 3–4 kg/ha if sown alone or 0.5–1.0 kg/ha in a mix. Seeding depth should be 10 mm or less. A target plant density range is 45–60 plants/m<sup>2</sup> at the start of the first summer. Chicory should not be sown after brassica crops as both species are susceptible to the same diseases.

In the year before sowing, control weeds particularly broadleaf weeds as there are few post-emergent broadleaf herbicides for use in chicory. Red-legged earth mite (RLEM) must also be controlled.

Before sowing, heavily graze the paddock to remove excess plant matter. Apply a knockdown herbicide to control remaining plants, 2–3 weeks before sowing. Spray if RLEM are present or treat seed with insecticide. Fertiliser is not commonly applied with spring sowing as there is a release of mineralised nitrogen following the use of knockdown herbicide.

Seed germinates over 2–8 weeks so initial germination may look poor.

## Companion species

Chicory is best grown with a temperate legume to provide nitrogen and winter growth. The most common companion species in WA is sub clover. If the paddock has a good sub clover history, then regeneration following chicory establishment should be sufficient; if not add seed the following autumn. Lucerne is another option, with or without sub clover. A winter-active grass such as tall fescue is a good companion, as they have a complementary growth pattern.

## Fertiliser

Chicory responds to high soil fertility so soil testing is recommended. Provide adequate phosphorus and potassium for sub clover. Chicory is responsive to nitrogen. Apply 40–50 kg N/ha as either 100 kg of urea or 200 kg of ammonium sulphate in spring and



*Chicory seedlings three months after spring sowing - Hamilton Proof Site*

summer (ideally just prior to a rainfall event) to increase dry matter production. Defer grazing for several weeks after nitrogen application. If sub clover content is significant extra nitrogen fertiliser applications may not be needed.

## Grazing management

New chicory should be grazed when plants are 15–20 cm high and stock removed when plants are no lower than 2.5 cm. Grazing is best in short periods at high stocking rates, eg 3–5 days, 100 DSE/ha. Subsequent grazings can be to 2.5 cm also provided there is a recovery period of 3–6 weeks.

Rotational grazing ensures the best results from chicory as it reduces selective grazing of the chicory, allows plants to build reserves and increases persistence compared with set stocking. Intensive grazing in spring, keeping dry matter levels below 3000 kg/ha, with rest periods will improve the performance of annual legumes and productivity of livestock.

**Spring** – spell for 3 weeks between grazing. If flower stalks appear increase grazing pressure to keep the plant in a vegetative state for as long as possible. In pastures with good legume content, cease grazing towards the end of spring to allow the paddock to be set up for weaning lambs.

**Summer–autumn** – spell for 5–6 weeks between grazing, until chicory has 3 new leaves and is 15–20 cm high. If any flower heads appear, mechanical slashing may be required in late summer.

**Winter** – only graze when the paddock is dry, ie no soil pugging. Long spells of 6–10 weeks are required to allow recovery. Chicory can be grazed to ground level in winter. It will successfully regenerate new shoots from reserves in its large tap root provided a sufficient spell is allowed between grazing.

When first introduced to chicory, livestock may take several days to accept the different looking and tasting herbage. During this time, they may selectively graze grass or weeds but once they become accustomed to chicory, they will readily consume it.

## Encouraging reseeding of chicory

Chicory stands thin out with 20–30% of plants dying off per year. Allowing seed set and encouraging recruitment of new seedlings can thicken stands. Spring sown chicory will not normally set seed in the first year, as it needs a cold period to stimulate seed set in late spring.

The following steps will encourage reseeding.

- Rotationally graze through spring, using high stocking rates to remove weeds.
- Spell the paddock November–January to allow seed heads to develop and seed to ripen – control all weeds first as the spell from grazing will increase remaining weeds.
- Graze chicory once the majority of seed has matured - chicory flowers from late spring right through summer, from the bottom of the flower head to the top.
- Graze off any green chicory leaf in autumn and then slash the paddock to spread seeds and remove coarse stems to encourage new growth from the base of the plant.
- Leave some bare ground to allow seeds to germinate in autumn. Experience at Hamilton, Victoria has shown that new seedlings continue to establish up to 18 months after reseeding.
- Control RLEM as new seedlings are very susceptible at germination.

## Diseases

Charcoal rot is the only recorded disease affecting chicory. The lower stem and tap root darken until they appear charcoal coloured. Small black fungal bodies (sclerotia) may be seen when the stem is split lengthwise. Sclerotia may survive in trash or dry soil for long periods and spread into new plants via damage to the plant crown. Spread of the disease can be reduced by avoiding damage to crowns, grazing when wet, pugging and over-sowing with tine implements. There is no chemical control for charcoal rot.



Sheep in a chicory based pasture

## Animal health

It is commonly reported that sheep grazing chicory have lower worm burdens than if grazing normal pastures. It is unclear if this reduced worm burden is due to condensed tannins, higher soluble carbohydrates, some other compound in the chicory or just the taller growth habit of the chicory so that animals do not ingest worm larvae. There are no known bloat problems associated with chicory.

Stock grazing chicory especially in spring should have current vaccination against clostridial disease. Sheep commonly, and sometimes cattle, scour when grazing chicory, a possible reaction to chemicals in the plant. Scouring does not lower animal performance but may increase fly problems in sheep. If scouring occurs, provide roughage as hay or a companion grass.

## Grower experience

Rob West planted chicory on the heavier soils on his Dalyup River property near Esperance over a number of years. It has persisted exceptionally well, providing very high quality feed suitable for finishing lambs. The pasture includes an excellent stand of sub clover which Rob encourages by removing the annual grass component with a grass selective herbicide every few years.

The chicory and sub clover complement each other with the sub clover providing quality winter and spring feed while fixing valuable nitrogen which the chicory taps into when actively growing in spring to autumn.

Rob has only lightly grazed the chicory in an attempt to maintain stand density. He believes this is why its year-round stocking rate is under the farm average. The 'up side' is that it's a great paddock for lambs with quality feed and no grass seeds.

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### Further information

Perennial pastures for Western Australia. Western Australian Department of Agriculture and Food, Bulletin 4690

Chicory. NSW Agriculture AgFact P2.5.40. Information available from <<http://www.agric.nsw.gov.au/reader/past-varieties/chicory-part-a.htm>>.

*Grower testimonials and photos on pages 1 and 4 sourced from Evergreen Farming*

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