

Productive, persistent perennial ryegrass



Perennial ryegrass seed head

Perennial ryegrass is a productive and persistent quality feed
Photo: Greener Pastures, DPI Victoria

Actions summary

- ▶ **Perennial ryegrass provides large quantities of high quality winter–spring feed**
- ▶ **Strategic grazing and seedling recruitment can improve perennial ryegrass persistence**
- ▶ **Cultivars bred from north west Spanish genetics show increased persistence and out-of-season growth compared with traditional cultivars**
- ▶ **Cultivars are available with endophytes that improve persistence without affecting livestock production**

Perennial ryegrass – the plant

Perennial ryegrass is valued in southern Australia for its high growth and quality feed in winter and spring. It is readily established across different production environments however it does not persist as well as deeper-rooted phalaris or cocksfoot under moisture stress.

Perennial ryegrass has three mechanisms to survive over summer:

- tillers that remain vegetative all through summer
- tillers that flower and produce buds that survive after the main tiller dies
- seeds produced in summer that germinate and grow into new plants after the autumn break.

Understanding these survival mechanisms is useful to tailor management strategies to improve the persistence and productivity of perennial ryegrass.

Allow ryegrass to flower

Perennial ryegrass survival from season to season (persistence) can be enhanced by allowing the plant to flower. Twenty-five times more new tillers are produced from tillers that have flowered compared with tillers that remain vegetative over summer and autumn. Also, new tillers produced from tillers that have flowered survive longer than those produced at any other time of year.

Allow ryegrass to set seed

The density of a perennial ryegrass stand can be increased by allowing ryegrass seed heads to mature over summer and drop seeds, which will germinate after autumn rains. Allowing ryegrass to develop seed heads provides dry standing feed for livestock over summer–autumn.



Well managed perennial ryegrass and sub clover pasture

The persistence and productivity of perennial ryegrass can be optimised with an integrated approach to soil management, cultivar and endophyte selection, and grazing and pasture management.

Improving persistence

Soil management

Perennial ryegrass is more productive and more competitive with weeds when grown on higher fertility soils. The optimum soil phosphorus level for perennial ryegrass is 12–15 mg/kg (Olsen P). Regular application of a phosphorus fertiliser is required to maintain productive pastures, and enhance persistence.

Perennial ryegrass is relatively tolerant of low soil pH compared with phalaris and lucerne. However, as soil pH decreases over time, the availability of aluminium increases. High soil aluminium can reduce pasture vigour and lead to a decline in perennial ryegrass. Application of lime may be required to enhance persistence.

Cultivar selection

There is a wide range of perennial ryegrass cultivars available and the challenge is to find the cultivars that suit your paddocks. Seek advice on the most appropriate cultivars from agronomists, resellers, researchers or consultants. Alternatively, look for results from local cultivar comparisons or try different cultivars on small areas of your farm.

Cultivars vary in persistence, overall pasture production, time of growth, time of flowering and ability to continue to grow after flowering. Traditionally, persistent cultivars were those that overcame hot, dry summer conditions by slowing their leaf production and shedding leaves as temperature and moisture stress increased, eg Victorian. Cultivars that respond rapidly to summer rain do not persist well in southern Australia.

Perennial ryegrass germplasm recently discovered in north west Spain has proven to be highly persistent and productive with superior summer growth if rainfall occurs. Several cultivars have been developed, eg Impact (diploid), and Bealey and Banquet II (tetraploid). These cultivars have demonstrated persistence under sheep grazing in marginal rainfall areas in central Victoria.

Endophyte selection

Endophyte is a microscopic fungus that lives inside ryegrass and can improve its persistence and production by producing toxins that protect the plant from its predators. However, the toxins produced by endophytes also can cause health problems in livestock such as ill-thrift, staggers and heat stress.

Ryegrass cultivars are now available with novel endophytes that cause little or no animal health problems. The table below lists some endophytes and their effects. Ask your reseller for further information.

Ryegrass endophytes and their effects on ryegrass persistence and livestock

	No endophyte	Wild endophyte	AR1	AR37	NEA2	Endo5
Persistence	Lacks persistence	Good	Good ^A	Good	Good	Good
Controls pests	No	Varies with wild type	Yes ^B	Yes	Yes	Yes
Causes staggers	No	Yes	No	Some has been observed	Very low risk	Very low risk
Causes ill-thrift, scours and flystrike	Very safe	Yes	Very safe	Very low risk	Very low risk	Very low risk
Number of available cultivars	Many, and seed stored for 2+ years.	About 30	8–10	2–3	1	1

^APersistence may be reduced by black beetle or root aphid when present.

^BNo control of black beetle and root aphid.



Pasture composition damaged by heavy set stocking

If the goal is to replace a problem ryegrass pasture with safe endophyte cultivars, the paddock needs to be totally clean of the old ryegrass before sowing the new cultivar. Small amounts of the old ryegrass containing harmful endophyte can continue to cause animal health problems.

'Short-term' can be perennial

Perennial ryegrass by definition has awnless seeds whereas short-term ryegrasses have seeds with awns (a fine spike at the end of the seed). Ryegrass with a perennial habit **and** awns (even if just a small percentage of seeds have awns) by definition will be called a short-term ryegrass even if trial results show it to be more persistent than most perennials. Examples include Impact and Banquet.

Grazing strategies

A strategic approach to grazing management in each season can help improve carrying capacity and perennial ryegrass persistence.

Spring – ideal grazing management aims to maintain pasture quality for as long as possible, and then allow seed head development which enhances ryegrass persistence. To increase ryegrass density, focus on one or two paddocks a year, allowing seed set and reducing grazing pressure after the opening rains to allow ryegrass seedlings to establish.

- Maintain pasture quality over September–October by grazing to 1500 kg DM/ha.
- For paddocks that cannot be maintained at 1500 kg DM/ha, consider cutting hay or silage.
- Allow pasture to increase to 3000 kg DM/ha by the end of November, to let ryegrass plants flower and provide dry standing feed for summer–autumn.
- In paddocks selected for seedling recruitment, remove stock from mid November to mid January, to allow seed heads to mature and seed to fall.

Summer–autumn – grazing management aims to reduce dry standing feed by the autumn break to maximise pasture nutritive quality following the break, optimise sub clover germination, maintain adequate ground cover to avoid soil erosion and protect perennial ryegrass bases from being overgrazed.

- Start the grazing rotation in January after stock has grazed the best quality dry standing feed. Aim to graze each paddock only once or twice over summer–autumn.
- Graze the pasture down to about 1000 kg DM/ha before the season breaks.
- Use a sacrifice paddock or stock containment area once paddocks have been grazed to 800–1000 DM kg/ha to avoid soil erosion and protect plants.

A long rotation is a good method to improve pasture utilisation and avoid overgrazing. For example, in an 8-paddock rotation, use a long rotation of 8–12 weeks before re-grazing a paddock, ie 1–2 weeks grazing for each paddock over summer–autumn. Spend less time grazing paddocks with little pasture mass, and more time in paddocks with high pasture mass.

It is important not to heavily graze new growth after summer rains as this can reduce tiller survival. Use rotational grazing after rainfall to allow plants to grow and replace buds before grazing.

Autumn break–winter – after the break has occurred, use a rotation to maximise pasture growth and persistence by preventing overgrazing of new ryegrass growth and newly recruited ryegrass plants.

Ideally, the ryegrass should be grazed at the 3-leaf stage. This can occur within 2 weeks of the opening rains, so do not delay grazing because the plants look small. These leaves will die and go to waste if not eaten.

- Start the rotation by stocking each paddock for a few days (3–5 days). Stretch the period out by a day or two with each new paddock to reach a target of approximately a 6-week rest period for each paddock during winter.



Rotational grazing, left, had more pasture and a higher stocking rate than set stocking, right. February 1999.

- For rotational grazing during winter, aim for a pre-grazing target of 1000–2000 kg DM/ha (depending on stock nutritional requirements and seasonal conditions). Remove stock at 600–800 kg DM/ha to maximise pasture growth rate and pasture quality.

A sacrifice paddock or containment area and full supplementary feeding of stock may be warranted to avoid overgrazing and/or severe pugging of good ryegrass pastures.

Benefits of strategic grazing

More feed – rotational grazing (1–2 week grazing period and 4–6 week spell) can increase pasture growth by 30% in winter compared with set stocking. This can sustain a 10% higher stocking rate.

Better pasture quality – rotational grazing increases grazing pressure, which can reduce weeds and rank areas of pasture.

Protected topsoil – rotational grazing over autumn–winter reduces the dominance of annual weeds that expose bare ground in summer–autumn. Rotational grazing over summer can be used to ensure adequate ground cover to avoid soil erosion.

More plants – resting a pasture from November to January allows ryegrass to set seed and establish new plants.

Other opportunities – rotational grazing can be used to ration pasture over summer, and to spell paddocks for nitrogen application, and hay or silage production.

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Further information

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