

How do I make my pastures more productive?

The issue:	Australia's feedbase is not reaching full productivity.
The impact:	Livestock production is failing to reach its full potential from the existing feedbase, and livestock production is largely underpinned by supplementary feeding.
The opportunity:	By lifting feedbase productivity, the red meat industry can lift live weight gain, increase carrying capacity, reduce the cost of production, maximise genetic gain and improve turn-off times.

While it is recognised that pasture persistence is an issue for Australian livestock producers, research has also revealed the feedbase is failing to operate at full productivity, effectively undermining gains made in other on-farm changes.

How to lift pasture productivity

With a combination of interventions and implementing paddock and grazing management changes, most producers have an opportunity to significantly lift feedbase productivity and reduce supplementary feeding costs. A feedbase operating at optimum capacity can also help increase business resilience to assist with climate variation and meeting market specifications amid increasingly complex, but growing, global demand for protein.

Pastures which achieve high productivity and maintain productivity for longer periods reduce the reliance on supplementary feed, such as grain and fodder. They also improve meeting market compliance, which lifts Australia's competitiveness on the global market.

Techniques to lift pasture productivity include:

- growing the right species for your environment and production system
- managing soil health by addressing nutrient deficiencies
- growing legumes to supply free nitrogen to the pasture
- managing weeds and pests
- encouraging regeneration by managing the seed bank and grazing regime
- selecting drought-tolerant and resilient species
- sowing additional species into existing pastures.

How do I know if my pastures are not reaching full productivity?

Start with an honest and realistic assessment. Conduct a pasture assessment, including a visual species review, a dry matter assessment and pasture quality testing. This will help understand how much pasture is being produced and what its nutritional value is by supplying measures such as digestibility. Producers can also upskill in this area with MLA's Grazing EDGE management training.

Compare the results with trial data on that species and seek advice from advisors on interpreting your results.

Then assess gaps in your production system by looking at:

- current carrying capacity
- weight gain rates
- ability to achieve market compliance
- reproductive efficiency
- animal health.

Are these above or below the local average? If you are unsure, ask around.

If your pastures are not performing to their potential, undertake research, talk to neighbours and advisors, and plan ahead for a better-performing system.

Pasture productivity checklist

Before writing off a pasture, carry out a simple assessment which might offer solutions to lift production without costly investment in new pastures:

1. Do other pastures in my district seem to perform better?
2. When did I last assess my soil nutrition status?
3. How targeted is my weed control regime?
4. Do I check legume nodulation?
5. Could I improve nitrogen cycling through my soils?
6. How am I going with seed production and plant regeneration?

Techniques for improving pasture productivity

The right plant

Use guides such as EverGraze and state department trial information to ensure you are growing the most productive species for your environment and your system.

From the beginning

Management during pasture establishment phase is crucial to the growth of a long-lasting, productive pasture. Understand the impact of early weed and pest control, initial grazing periods and encouraging seed set.

Monitor your pastures

By measuring your pasture production on a regular basis you can understand the impact of climate and grazing on growth. This can help you determine if you have a productivity issue. Are your neighbours growing more and how do your pastures compare?

Get to know your soil

Regular soil testing helps identify nutritional deficiencies which impact growth.

Manage weeds and pests

Controlling weeds, starting at the pasture establishment phase, allows the pasture species to become dominant and productive. Red legged earth mite and other pests, such as slugs, can have a large impact on production. If weeds are dominating pastures and impacting productivity, management techniques include:

- selective spraying for broadleaf or grass weeds
- spray grazing where broadleaf weeds are removed with hormone herbicides
- heavy grazing or spray topping, where herbicide is applied after head emergence on annual grass weeds.

Supply good nutrition

Legume pasture species set up for good nitrogen fixation via strong root nodulation support the productivity of other species. If this is not present producers need to supply nitrogen in the form of fertiliser. Phosphorus, sulphur and molybdenum are commonly deficient in poor-performing pastures. Low soil fertility encourages weed species to dominate.

Seed bank management

Pasture species need to set seed to regenerate. Once established, hard-seeded legumes need to be locked up during seed set every three to four years to generate a quality seed bank.

Grazing control

Over and under-grazing the pasture available impacts your productivity and, in the longer term, affects pasture persistence, increases weeds in the pasture and reduces the seed bank. Do you understand the optimum grazing periods for the species you grow, particularly during the establishment phase?

A new species boost

Did you know research has shown that oversowing existing low-productivity pastures with another species, particularly hard-seeded legumes, can improve production?



Fully assess the entire paddock. Sometimes only a section needs renovation or attention.

Pasture productivity checklist

Grazing periods need to be managed to meet the current season and coincide with the growth of the pasture. Techniques include:

- rotational grazing at high stocking rates to reduce the level of livestock pasture selectivity and maximise the array of feed utilised to maintain a healthy and diverse plant community
- heavy grazing applied to annual grass and broadleaf weeds at flowering time to reduce seed set of these weed species
- heavy grazing of native pastures in late spring to reduce shading and competition from annuals
- heavy grazing to reduce bulky dry matter over summer in preparation for an autumn break
- spelling or light grazing in late spring to allow seed set of desirable plants.

The nitrogen fix: are my pastures getting it?

Plants require large amounts of nitrogen (N) for growth. Along with other elements, it is a part of every living cell and is a major component in protein.

Unlike phosphorus, most of which is bound to soil minerals, nitrogen is found mainly in the soil organic matter fraction and as protein in plants and soil organisms.

Nitrogen is present in the soil in two major forms:

- organic nitrogen in soil organic matter and soil organisms (organic nitrogen is not available to plants)
- mineral nitrogen in soil as either ammonium (NH_4^+) or nitrate (NO_3^-) (mineral nitrogen is available to plants).

Rhizobia are one of the most important bacterial groups in agricultural soils because of their symbiotic (win–win) relationship with legumes.

Legumes can fix nitrogen in the soil only when the strain of rhizobium in the soil is compatible with that legume.

In Australia, the most common causes of reduced nitrogen fixation in pastures are soil acidity and phosphorus deficiencies, reducing rhizobia activity.

Highly productive, perennial grass-based pastures can exploit the added nitrogen in the system and reduce any sustainability problems associated with nitrogen loss.

Nitrogen deficiencies can be addressed by doing the following:

1. Ensuring effective strains of rhizobia are present in the soil, leading to efficient nodulation on legume roots and nitrogen cycling. This is supported by:
 - undertaking effective inoculation of legume pasture seed at planting
 - testing if the right strains of rhizobia exist in your soil
 - adding legumes to the pasture mix to supply the free nitrogen to grasses and other compatible species
2. Applying lime to acid soils
3. Applying nitrogen-based fertilisers.



A perennial improvement

An MLA-funded Producer Research Site was run by the Fitzgerald Biosphere Group in WA examining extending feed periods and better filling the winter feed gap. It tested a multitude of species mixes and sowing practices. Key findings included:

- barley is a successful cover crop to help establish Gatton panic grass and the mix created high quality and quantity production compared with the annual pasture
- the most successful establishment of oats and serradella into an eight-year-old kikuyu pasture came from sowing with knife points with double disc openers and press wheels (serradella established better than the oats)
- bladder clover performed slightly better than serradella when sown into a 10-year-old kikuyu stand, however straight kikuyu produced the highest feed quality.

A phosphorus challenge

To reach maximum productivity, some pastures – particularly lucerne – require phosphorus (P), but P-based fertilisers are costly. Below are some tips to get a beneficial response from P:

- Correct all nutrient deficiencies where economic responses are indicated. If phosphorus (P), sulphur (S) and potassium (K) are all identified to be below critical levels, then a fertiliser blend containing all three nutrients should be applied. Correcting only one nutrient will limit the response in pasture growth.
- Apply fertiliser when the pasture is most actively growing and you will get the best response, e.g. autumn for annual or sub-clover/perennial grass pastures, or split autumn and spring applications for highly productive perennial pastures (e.g. white clover/perennial ryegrass) or spring for summer active perennial pastures (e.g. lucerne).
- Do not apply P to waterlogged soils or at the coldest time of the year, as most of it will be rapidly converted into a form that is not available to plants.
- Avoid applying fertiliser near waterways, on waterlogged soils and on steep slopes to reduce nutrient contamination of streams. Do not apply fertilisers when storm events are likely to increase risk of nutrient run-off.
- Applying fertiliser in low ground cover situations should also be avoided.

More information

Sign up for your own personal livestock production portal at MyMLA and have information on pasture, training and the latest species trials and research sent directly to your inbox.

Making More from Sheep's: *Grow More Pasture tool*
makingmorefromsheep.com.au/grow-more-pasture/index.htm

Feed quality testing is conducted by various laboratories around Australia. Ask a reseller or advisor for advice on this.

EverGraze: On-farm options – Feedbase Pasture Species: *Regional pasture growth rates* and in tools the Pasture Improvement Calculator evergraze.com.au

NSW Department of Primary Industries [Rejuvenating perennial pastures](#) guide

Making More from Sheep's *Healthy Soils* module:
makingmorefromsheep.com.au/healthy-soils/index.htm module

ASRIS CSIRO's Nutrient Management:
[Farm Nutrient Loss Index](#)

EverGraze: On-farm options [Grazing Management](#)

MLA's: [Five Easy Steps phosphorus tool](#)

[Link here to nodulation fact sheet?](#)

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