

How do I better utilise legumes in pastures in the mixed farming zone?

The issue:	Australia's feedbase is underproductive due to a sub-optimal mix of species in pastures and the lack of persistence of sub-clover and annual medics. Therefore, there is low nitrogen (N) fixation, particularly in mixed cropping and livestock enterprises.
The impact:	Low legume content reduces N supply to pastures and restricts response to applied phosphorus (P) and sulphur (S). Poor-performing pastures reduce livestock productivity.
The opportunity:	By growing pastures with a sufficient legume component, producers can improve persistence and productivity, grow free nitrogen and extend the growing season.

Legumes, which include clovers and medics, are a family of broadleaf plants which, in association with Rhizobium bacteria, are able to fix nitrogen from the atmosphere and make it available to other pasture species. The nitrogen fixed by legumes then boosts the performance of non-legume species in the pasture and produces higher quality dry matter, providing a nutritious feedbase.

Common legumes traditionally grown in the mixed farming zones are subterranean or sub-clover, annual medics and lucerne. However, with sub-clover and annual medics failing to persist and climate variability impacting production, hard-seeded annual legumes such as arrowleaf clover, biserrula, bladder clover, gland clover and serradella are providing increased value.

MLA-funded research has found hard-seeded legumes present an opportunity for mixed farming enterprises to grow a more resilient, flexible, highly productive feedbase and are a suitable replacement for sub-clover.

What are the benefits of growing pasture legumes?

A hard-seeded legume-based pasture can:

- offer free nitrogen which improves the productivity of other pasture species, the persistence of the pasture and the nutritional content of the whole pasture
- fix free nitrogen for the cropping phase of the rotation
- extend the production window
- improve pasture resilience to climatic conditions and seasonal variation due to their deep roots and/or capacity to produce sufficient seed for regeneration in subsequent years, even under adverse growing conditions
- provide more options for weed control in preparation for the cropping phase
- improve overall soil health
- regenerate after the cropping phase without re-sowing (species and variety-specific)
- produce hard seed which can be harvested using standard grain harvesting equipment, reducing costs
- be sown outside the crop sowing window with summer (unscarified or in-pod seed) and dry sowing options
- be sown within the cropping phase using low-cost techniques, such as twin seeding (unscarified or in-pod seed) with a cereal crop
- produce high quantities of nutritious winter feed
- provide similar and, in some cases, higher weight gain in ewes and lambs in winter and spring compared with lucerne, lucerne/phalaris and volunteer pastures
- be used for a high quality hay (particularly bladder clover) offering similar and, in some cases, higher weight gains than sub-clover or lucerne/oaten hay.

Four golden rules

1. Use the right species and cultivar: do the research on what is doing well in your area.
2. As for any new pasture sowing, make sure weed seed bank population has been reduced by preventing seed set of weeds for two and preferably three years prior to sowing the new pastures.
3. Minimise residual herbicide risk: avoid using residual herbicides in the previous crop or in summer spraying.
4. Choose the right soil type: match the soil type with the species.

How do I choose the right pasture legume?

Start by fully assessing your livestock needs, how the pasture will be utilised, the feed gaps in your system and where it fits in the paddock rotation. Look to local trial data, and support and advice from agronomists on variety performance in the area.

Other factors to consider are availability of seed, capacity to sow it and manage establishment, and paddock history and preparation.

More information

Download the [MLA Pasture Health Kit](#)

[Using French serradella to increase crop and livestock production](#)

[Using bladder clover to increase crop and livestock production](#)

[Using biserrula to increase crop and livestock production](#)

These publications contain advice on sowing techniques, weed management, fertiliser, variety selection and paddock management.

ASHEEP: asheep.org.au

Fitzgerald Biosphere Group Inc: fbg.org.au

Stirlings to Coast Farmers Inc: scfarmers.org.au

DPI&RD WA's: [Twin sowing and summer sowing: alternative techniques to introduce annual legumes into pastures](#)

YouTube videos:

Murdoch University's: [Successfully sowing legume pastures in summer, WA](#)

GRDC's: [Summer sown hard seeded Serradella](#)

[How to conduct a soil test and How to interpret a soil test fact sheet](#)

[Persistent pastures resource hub](#)

Murdoch University's: [Centre for Rhizobium Studies](#)

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How do I grow them and where do they fit?

There are various options for incorporating hard-seeded pasture legumes in your system. These include:

1. Sow them as a standalone pasture using scarified seed in mid to late autumn. Standalone sowing produces the highest seed yield and seed size, leading to improved persistence and production.
2. Summer sowing involves the sowing of unscarified or in-pod seed in mid to late summer. The high summer temperature breaks down some of the hard seed and seedlings emerge on opening autumn rain. Not all hard-seeded species and varieties are suitable for summer sowing. Ensure an appropriate, robust inoculant delivery system capable of surviving high summer temperatures is used to facilitate nodulation.
3. Twin sowing is a method where a crop and pasture are sown in a one-pass operation. Unscarified seed or in-pod seed is sown with the final crop. The sowing year is simply a seed softening year for the legume seed and therefore the crop can be sown at the normal rate. The legume will emerge in the following autumn. Hard-seeded French serradella and bladder clover are suitable for use in summer sowing.
4. Sow with a cereal crop for establishment the following year. This technique is called cover cropping and involves using a reduced rate of cereal seed. This offsets the cost of pasture establishment by using a single operation and having a crop to harvest at the end of the first year.
5. Sow into an existing grass-based pasture. For any legume, either traditional or new hard-seeded species, it can be difficult to achieve adequate establishment in existing pastures due to competition from established pasture species.



Meat & Livestock Australia
Level 1, 40 Mount Street
North Sydney NSW 2060
Ph: 02 9463 9333
mla.com.au