

Lucerne

System planning

Powering farm production
through home grown high protein



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SOLUTIONS
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Lucerne

Used for centuries across the world as a high value animal feed. Today, modern genetics of the ancient alfalfa, lucerne, are powering farm productivity all over New Zealand.

Resilient, reliable and extremely productive. The signature long tap root grows deep, reaching groundwater where other species can't. Lucerne is a powerful producer, providing a level of certainty unsurpassed by other forage perennials, year after year.

High production and performance

Lucerne is suitable for many farming systems, not just dryland sheep and beef, and has flow-on benefits for the whole operation.

It can be used on its own or in a mix, on irrigated or non-irrigated land, as a grazed option, or for conserved feed.

Performance wise dryland lucerne gives a similar output of weaned lamb as irrigated pasture. The stocking rate is similar to irrigated pasture versus three to four times that of dryland pasture, with more consistent results year on year in stocking rate, liveweight gain and per hectare production.

This high protein high performer provides four to five times the lamb production per hectare than dryland grass, while using the same amount of water.

For dairy systems, its constant high protein available at times when other feed sources may be limited in quality or quantity. This home grown additional protein source can help reduce reliance on imported feeds or supplements and leads to increased animal performance.

LUCERNE'S HALLMARK TRAITS INCLUDE:

HIGH QUALITY LEAF
[ME. 12, Protein >24%]

AND STEM
[ME~8, Protein <14%]

HIGH WATER USE EFFICIENCY
Thanks to the deep tap root

CONSISTENTLY HIGH ANIMAL PRODUCTION

PREDICTABLE STOCKING RATES

A PERSISTENT STAND LIFE

Lucerne systems

Paddock preparation

For the best return on investment, it's important to get the groundwork right. Lucerne likes well drained soil and doesn't like competition from weeds. Root disease such as *Phytophthora* can cause seedling damage as well as reduce yields and persistency.

Lucerne systems

Prior to sowing :

- Identify suitable paddocks for soil type and end use
- Soil test early to ensure a pH > 6.0 (150mm probe)
- Test deep soil for aluminium if applicable (>1m)
- Spray out in autumn
- Correct nutrient deficiencies for P, K, S, Molybdenum and Boron (P 20, S 10+, K 6+)
- Use crop rotation to remove weeds from paddocks
- Ensure pests are under control

Lucerne systems

Paddock preparation :

Nutrients

A key consideration for stand health and performance is soil pH. This aids establishment and allows optimum nitrogen fixation by the plant, setting the stand up for a long and productive lifespan.

Soil pH should be tested well in advance (six to twelve months prior to planting). Every tonne of lime applied will generally increase the pH level by 0.1 units which takes a long time to become effective.

Optimum pH of the soil also helps ensure key nutrients required by the plant for production are available. These nutrients are important for a range of plant functions.

Potassium keeps plants healthy and productive. The plants demands increase as it grows.

Sulphur and Molybdenum enable protein formation and development. Molybdeneum is also important for Rhizobia function, while Boron is crucial for plant functions. Calcium and Magnesium are both important for plant nutrition.

Nitrogen fixation

Lucerne is a legume meaning its nitrogen requirements are met by beneficial bacteria, called Rhizobia, converting nitrogen from the atmosphere into a form the plant can utilise. In return the lucerne plant provides energy for the bacteria to survive, so it is a beneficial relationship.

This process can provide upwards of 25 kg N/ha for every tonne of dry matter that is produced, helping ensure maximum plant production and subsequent quality.

As such the plant does not require applications of artificial nitrogen. Establishing immature stands will rely on soil available nitrogen until the Rhizobia are effective. The only situation where application of nitrogen at establishment may be needed is continuously cropped paddocks where the available soil nitrogen is too low.

Nutrient removal

As lucerne is highly productive it requires regular nutrient inputs (other than nitrogen) for maximum performance.

Key nutrients should be replaced depending on the system and environment. Soil test annually to determine requirements. For every tonne of dry matter lucerne produces it removes the equivalent of ;

- Over 20 kg of Potassium (K)
- Almost 14 kg of Calcium (Ca)
- Almost 3 kg of Phosphorus (P), Sulphur (S) and Magnesium (Mg)

Lucerne systems

Dormancy scale

For lucerne growth there is an international dormancy scale of 1 - 10 ;
1 = highly winter dormant
10 = highly winter active
The climate and location will determine what type of lucerne to select.

Low winter activity cultivars have the longest persistence with little to no cool season growth. Semi dormant types are a good compromise in many locations, offering good persistence and production.

High winter activity types provide more cool season production in suitable environments (up to 20% of their production) but are less persistent due to their increased growth.

Areas with a proportion of low - mid activity cultivars may wish to include a higher activity in their rotation for seasonal management, e.g. potential earlier grazing post- winter.

Select cultivars that will produce the majority of their dry matter at a time of year when it can be utilised. RAGT has a range of high performance lucerne genetics suited to all systems and regions.

LOW - MID ACTIVITY RATING

Harsh winter locations

MID - RANGE ACTIVITY RATING

Cool winter locations

HIGHER ACTIVITY RATING

Mild winter locations

Lucerne systems

Paddock planting :

Paddock preparation

Where possible, spraying out and fallowing a paddock well in advance of sowing is an effective way to ensure maximum weed control.

If you suspect that perennial or hard to kill weeds are going to be a significant issue in the chosen paddock, consider one or two crop rotations of a brassica or cereal before looking to establish the lucerne.

Check the chemical history of the paddock as some chemistry can severely impact lucerne seedling establishment and survival, an example is sulfonylurea herbicides as these can remain present in the soil for up to two years after application.

When to sow

Typically spring sow from late September to early November, when soil temperatures are above 8 degrees celcius. Timing will be dictated by environment and in some areas late summer / early autumn sowings are viable if the soil temperature is 15 degrees celcius or above and there is six weeks or longer before cool conditions slow or stop growth.

Lucerne will also benefit from good soil moisture at sowing, as seeds absorb 25% of their weight in water before beginning the germination process.

Paddock planting

Before working the final surface in cultivated situations, incorporate pre-emergence herbicide and sow between 8 - 12 kg/ha of freshly inoculated seed, as lucerne requires specific Rhizobia for effective nodulation. The stand will self-thin over time to suit the environment.

Higher winter active lucerne typically requires a higher sowing rate.

Shallow sow at 5-15mm on better soil or up to 25mm on sandy soils in a fine firm seedbed, if your soil type is suitable you can direct drill.

In its first year ensure the stand has an opportunity to have 50% flowering in the spring. This will allow the plant to develop a sufficient root structure and build energy reserves before the summer, for established stands (older than one year) this flowering period will occur in the autumn.

Lucerne systems

Sheep systems :

Stocking rate

It is important to understand what stocking rate to use and when to start grazing. Research at Lincoln University suggests that as lucerne's growing points are at the top of the plant, it should be rotationally grazed.

- Set up a 5 - 6 paddock rotation
- Start spring grazing when lucerne is about 15cm tall
- The first paddock grazed and sprayed in the autumn is likely to be the first ready for grazing in the spring
- Put ewes with lambs onto lucerne as early as possible
- The exact number of animals to put on will vary across locations and seasons
- As a guide Lincoln recommend 12 - 14 ewes plus twins for 10 - 12 weeks
- Paddock 1 needs to be consumed in 3 - 4 days
- There will be little post grazing residuals because all of the herbage on offer is leafy rocket fuel

Round one

Once ewes and lambs start on lucerne, the next question is when to move them. Paddock 2 will be taller and contain more dry matter than when paddock 1 was started.

To get an idea of how much to leave behind after grazing, test the herbage as animals go in. Find where the woody part begins as this is low quality maintenance feed and not recommended for fast growing animals.

When entering paddock 4, look to see if recovery in paddock 1 is 10 - 15cm tall. How this grows over the next two weeks dictates paddock rotation. If regrowth is fast paddock 6 could be dropped out of the rotation for hay or silage. The other option is to increase mob size.

As a guide, the time of return to paddock 1 after leaving should be between 30 and 42 days or you will have grown too much stem, compromising quality.

Maximise lucerne production with these seasonal tips

Spring production (September / October / November)

- Set up a 7 - 10 day break
- 5 - 6 paddock rotation with 35 - 42 day recovery, less will limit root reserves
- Post weaning lambs only eat lucerne leaf, stock at about 70/ha, follow with ewes
- 2.5-4.0 kg DM/head allowance (increase later in season)
- Minimum of 6 - 8 weeks on lucerne to maximise liveweight gain
- Delayed harvest increases proportion of stem
- Start paddock 1 at 1,500 kgDM/ha, return when 3,300 kgDM/ha
- Paddock 2 start 2,200 kgDM/ha
- Paddock 3 start 2,600 kgDM/ha
- Paddocks 4-6 start 3,300 kgDM/ha

Summer (December / January)

- Shorter rotation, 30 - 35 day return
- Water stress can accelerate flowering but leaf is still high quality
- Conserve a true surplus throughout this time

Autumn recovery (February / March)

- Allow at least 50 % of lucerne stems to flower sometime from mid-summer to autumn
- This is to encourage root recharge
- Graze if drought stops plant growth, then allow recovery after rainfall until growth stops
- Long rotation of 42 days sometime between January and the end of May to build up root reserves for spring growth and support stand persistence

Winter (June / July)

- Hard graze with a large mob once frosts stop growth, if mild graze anyway to help the ability for early spray
- Apply weed control 14 days later
- Node accumulation on stems sets up the spring growth potential
- A late spray or an early 'green pick' drastically delays spring growth and reduces yield, impacting production potential /animal performance in spring and adds pressure on the system

Lucerne systems

Sheep systems :

Animal health

Animals grazing lush lucerne are most prone to health issues as the gut adjusts, but its important to start grazing lambs on lucerne as young as possible.

Ensure there is plenty of fibre available, like good quality meadow hay or ryegrass straw, and salt. Ewes that have previously been on lucerne are likely to take to it with little adjustment.

Lambs should be protected against clostridial diseases before going onto lucerne, particularly in spring.

A comprehensive pre-lamb vaccination programme should provide adequate cover in early spring. This may need to be followed up with a further vaccination post-weaning. Fast growing animals are more prone to clostridial disease from rapid bacterial growth in the rumen that can cause sudden death. This is often mis-reported as bloat.

Never put hungry stock onto lucerne.

Red gut is a common issue with fast growing lambs on lucerne. This is when the feed passes through the animal too quickly. Good quality fibre can help prevent this. To mitigate risk pre-mow the lucerne ahead of grazing to wilt it before running stock onto a new break. The mown, wilted lucerne is high in both fibre and sugar, making it a highly palatable source of fibre.

High levels of coumestans can lead to stock infertility due to oestrogens produced by fungi in the crop when grazing affected plants during mating. This can be a problem in wet, overcast conditions or if the plants are suffering from leaf disease and is more regularly seen in younger animals. New lucerne or clear and dry conditions are less susceptible.

A way to help alleviate any issue is to remove ewes three weeks prior to mating.

Common sheep grazing problems and treatments

- Clostridial bacteria : vaccinate
- Cobalt : vitamin B12 injection
- Avoid flushing if leaf spots or flowering lucerne (new regrowth or tops only are fine)
- Red gut problems on high quality feed : fibre
- Na deficiency (0.03%) : salt licks/fence-line weeds/pasture. Require 0.11% Na-sheep/beef/dairy

Lucerne systems

Dairy systems :

Future farming

One of the key benefits to feeding lucerne in a dairy system is its high protein content provided at a time of year when pasture quality can be limited. This is often in the summer when ryegrass based pastures come under climatic pressure and subsequently their quality is reduced. This can often be as low as 10% protein which is well below the requirements of a dairy cow in mid-late lactation (14-16%). This deficit is then filled by alternative crops or more commonly conserved feed or imported supplements.

High quality lucerne can help fill this deficit cost effectively.

In a dairy system grazed or conserved feed can be included in the diet, with the volume dictated by other dietary components and the daily requirements of the animal.

Grazing

Direct grazed lucerne is part of many dairy systems globally where they successfully integrate the species to help drive animal performance and production.

There are some key tips to help ensure maximum benefit and mitigate animal health risks such as bloat. Grazing entry height should be approx. 30cm, which is higher than a typical sheep system and provides more fibre. Grazing intervals are based on the rate of regrowth.

If paddocks get too long (40cm and above) these can be dropped from the grazing rotation and taken for silage. To help alleviate the risk of bloat consider pre-mowing the lucerne break prior to grazing. When grazing; back fence to ensure animals do not have access to any regrowth.

Animal health

- Provide salt licks ; require 0.11% Na
- Pre-mow to wilt lucerne before grazing to avoid bloat
- Utilise animal health preventatives for bloat such as capsules or oil
- Back fence breaks to avoid grazing regrowth

Cutting / harvesting systems

If you're using lucerne for hay or silage, be clear about your aim - quality versus quantity versus persistence - as this will determine the cut timings.

- As a good compromise, cut early for the first two cuts, with the first at bud stage or earlier, then 35 to 42 days later (delaying reduces quality)
- Then successive cuts at 10% flowering intervals
- As with grazing systems, allow a minimum 50% flower pre-autumn to build root reserves
- Time the last cut for when growth stops
- Always cut above grown / new buds
- Cutting regimes require regular nutrient inputs

The technical data mentioned in this document comes from tests carried out by RAGT. The results obtained may vary according to agronomic and climatic conditions, as well as specific cultivation techniques. In any event, the technical data provided is for information purposes only and does not bind RAGT contractually.

