PGG Wrightson Seeds

Lucerne Management Guide

2022

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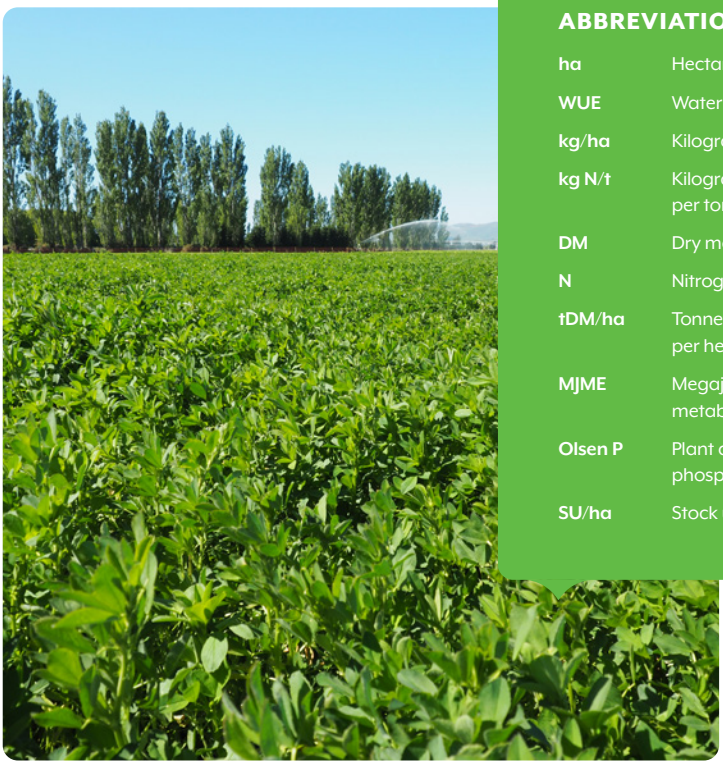


ABBREVIATIONS

ha	Hectares
WUE	Water use efficiency
kg/ha	Kilograms per hectare
kg N/t	Kilograms of nitrogen per tonne
DM	Dry matter
N	Nitrogen
tDM/ha	Tonnes of dry matter per hectare
MJME	Megajoules of metabolisable energy
Olsen P	Plant available phosphorous in the soil
SU/ha	Stock units per hectare

About lucerne

Lucerne is a perennial legume and a valuable crop worldwide, often being referred to as the 'King of Forages'. It has this reputation because of its high nutritional quality, high yield, persistence under dry conditions, ability to fix atmospheric nitrogen and flexibility of being a dual purpose crop for both grazing and conserved feed as hay and silage.

Lucerne has a deep taproot which can extract available water from the soil profile and also has high water use efficiency, making it a very drought tolerant species. It can fix its own nitrogen and this is proportional to the foliage grown (approximately 25kg N/t above ground dry matter).

Excellent animal production when grazing lucerne is achieved through high forage quality over the spring-autumn months. It offers high nutritional quality through these critical months when grass-based pasture quality declines significantly.

Persistence of a stand is affected by several factors which include dormancy group, grazing and/or hay management, soil fertility and type, drought and weed invasion. Choosing the right lucerne is about selecting the right characteristics for the environment and management system required, with the aim to ensure the stand produces well for as long as it is needed. To assist with increased stand persistence PGG Wrightson Seeds offer a grazing tolerant variety called Stamina™ 5 which has been bred and selected to persist and perform in both grazed and cut stands.

This guide provides a great starting point for information on the planning, establishment and management of lucerne stands. For more information on integrating lucerne into your farming system contact a member of the PGG Wrightson Seeds team; contact details can be found at the back of this guide.

WHO SHOULD GROW LUCERNE?

Growing lucerne is appropriate for farmers who have:

- Annual rainfall less than 1,000 mm per year
- Free draining soil
- Rotationally grazed stock
- Preference for nitrogen to be generated by a plant rather than nitrogenous fertilisers
- High fertility and free draining soils with a pH over 6.0

Benefits of lucerne

Lucerne is a perennial legume with a taproot that gives the plant access to water and nutrients deep in the soil profile. This gives the plant superior drought tolerance and preference over grasses in lower rainfall areas.

Lucerne is a multi-purpose plant that can be either grazed *in situ* or conserved as hay/silage to feed during times of the year when pasture quality or diet protein levels are low. Lucerne has excellent stock acceptance and produces impressive yields of high quality feed.

- Suitable for all stock classes (dairy, sheep, beef and deer)
- Suitable for ewes during lactation and mating*
- Provides high quality feed through dry periods when most other species will typically be losing quality
- Lucerne produces high yields in dryland environments, especially on deeper soils
- Lucerne can be sown as a pure sward or in combination with other pasture species to be grazed or conserved for hay/silage production
- Shows greater drought tolerance than most other pasture species and responds quickly to moisture after drought

Figure 1: Annual dry matter yield in dryland monoculture

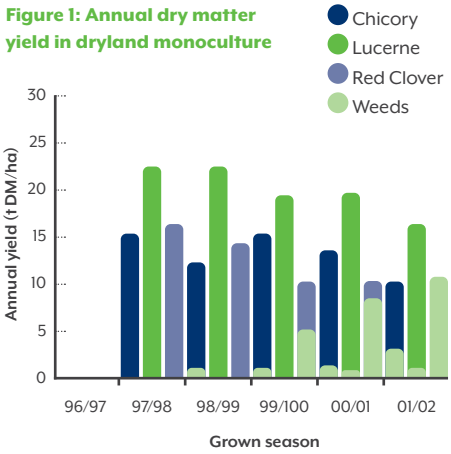
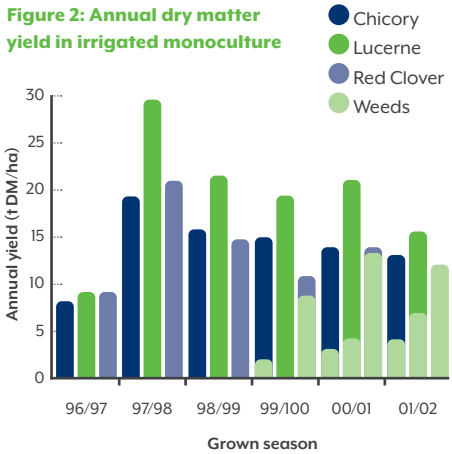


Figure 2: Annual dry matter yield in irrigated monoculture



TRIAL RESULTS *Source: Lincoln University*

Annual dry matter yield in dryland and irrigated monocultures of three forage types

A Canterbury trial investigated the effect of dryland (Figure 1) and irrigated (Figure 2) monocultures on annual dry matter yields in tonnes per hectare (tDM/ha) associated with three forage types: chicory, lucerne and red clover.

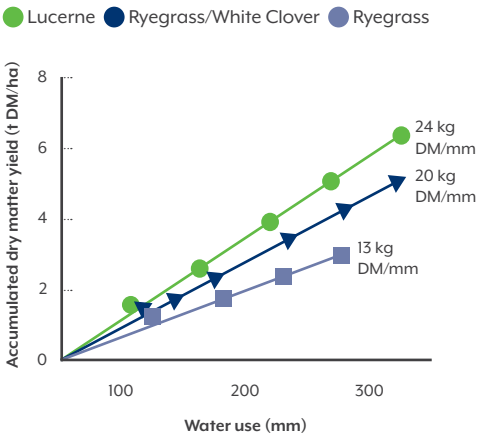
Forages were grown on a Wakanui silt loam at Lincoln University in Canterbury, New Zealand. The trials were sown on 1 November 1996. Bars represent one standard error of the mean for comparison of species means within and between irrigation treatments. Upper bars are for total production and lower bars are for weed production (Brown *et al.*, 2005)

**If foliar disease is present, mating of ewes on lucerne should not be undertaken.*

GOOD DROUGHT TOLERANCE

- Lucerne is drought tolerant due to its water use efficiency (WUE). WUE is the ratio of total dry matter (DM) accumulation to total water input (kgDM/ha/mm of water used)
- Drought tolerance is influenced by soil depth, soil texture, plant species and rooting depth
- Lucerne has a taproot which can extract more available water from the soil profile than ryegrass cultivars. Ryegrass has a fibrous root system which is efficient at extracting water but only within the top layers of the soil
- WUE is highest in spring
- Species with high herbage nitrogen content have high WUE. Lucerne has a higher herbage nitrogen content than most grass/clover pastures and therefore a higher WUE

Figure 3: Spring dry matter yield and water use



NITROGEN FIXATION

- Lucerne is a legume that can fix its own nitrogen, i.e. convert atmospheric nitrogen into plant available nitrogen reducing the requirement for application of nitrogen fertiliser
- Nitrogen fixation is directly proportional to herbage grown (lucerne produces approximately 25 kg N/t of above ground DM)
- Lucerne will fix more nitrogen annually than white clover pastures due to higher yield when soil moisture is limiting
- Lucerne does not require nitrogen application, as this may decrease nitrogen fixation and encourage growth of weeds within the stand

LONGEVITY

- Typically, lucerne persists for 4–8 years in a pastoral system (stands can persist for as long as 15 years in drier environments where pressure from weeds is low, and is well controlled)
- Persistence is dependent on grazing management and pest and disease pressure
- Modern cultivars, such as Kaituna and Stamina™ 5 tolerate diseases, Aphids, Sitona Weevil, fungi and viruses better than older cultivars such as Wairau
- Stand renewal is based on a decline in plant population and an invasion of taprooted and rhizomatous weeds, for example dandelion, yarrow and couch/twitch

TRIAL RESULTS

Spring dry matter yield and water use of three forage types

A Canterbury trial compared the spring dry matter yield in tonnes per hectare (tDM/ha) and water use (mm) associated with three forage types: lucerne, perennial ryegrass/white clover and perennial ryegrass pasture.

The trial was sown in silt loam soil in Templeton, 4 km northwest of Lincoln University, between 29 September to 9 December 1993 (Moot *et al.* 2008).

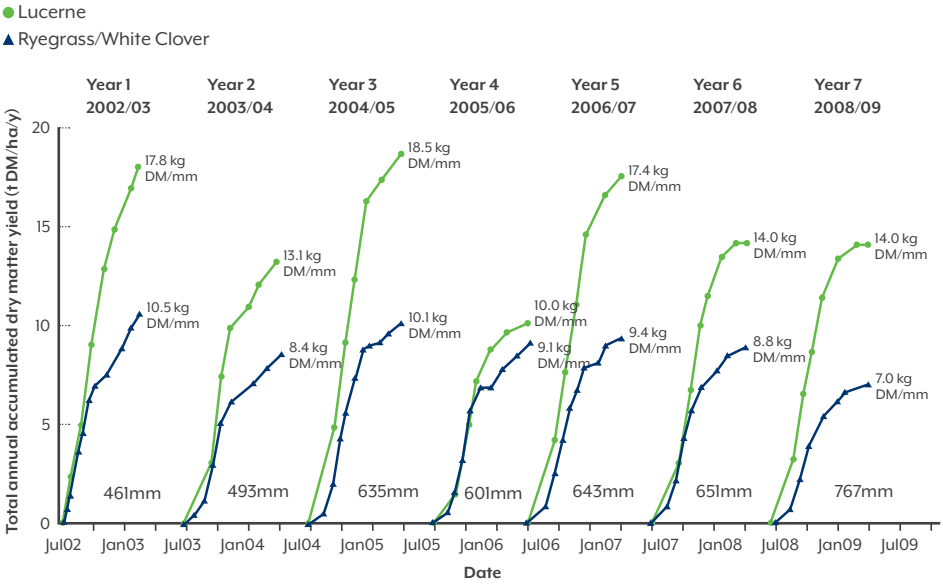
INCREASED DRY MATTER PRODUCTION

- In a dryland environment, lucerne can produce up to 40% more dry matter than other pasture
- Lucerne produced the highest annual yield compared with ryegrass/white clover pastures in a long term dryland experiment at Lincoln University, Canterbury, refer to Figure 4

ENVIRONMENTAL BENEFITS

- Lucerne has the ability to extract rather than leach nitrate i.e. "cleanup" nitrogen contaminated sites. This is due to its taproot extracting nitrogen at soil depths greater than other pasture species root systems
- This extraction can be used advantageously in areas near waterways where leaching is potentially an issue or in areas that receive high applications of nitrogen such as dairy effluent areas
- This benefit is not currently utilised well in New Zealand but is an option to incorporate into our farming systems

Figure 4: Total accumulated annual dry matter production over seven seasons



TRIAL RESULTS *Source: Lincoln University*

Total accumulated annual dry matter production of two forage types over seven seasons

A Lincoln University study investigated the total accumulated annual dry matter production per hectare (tDM/ha/y) of perennial ryegrass/white clover and lucerne pastures for seven growth seasons (2002-2009). Accumulation for year 1 began on 4 September 2002 (Mills *et al.* 2008; Mills and Moot, 2010).

Planning and establishment

PLANNING

- Identify an area to be planted in lucerne a minimum of 6 months prior to planting.
  - Select free draining soil
  - Soil test (150 mm) to ensure pH is greater than 6, Olsen P is 15-20, sulphur is 10+ and potassium QT is 5-8
    - > If pH is low, apply lime. It takes approximately 6 months for maximum lime to take effect but this depends on a number of factors including lime quality
    - > A high pH is required so that molybdenum is available to ensure the plant fixes nitrogen
- Identify problem weeds (break crops may be needed to remove these before lucerne can be planted)
- Cereals, Italian ryegrass or brassicas can be used prior to sowing lucerne to control weeds using short residual herbicides and allowing time for the fertility to build up
- Do not sow a new lucerne stand straight after an old lucerne stand, best practice is to allow two years between stands
- Chemical residue – take note of what products have been used historically in the paddock and when. Lucerne is sensitive to some chemical residues (speak to your local seed retailer if you have any concerns)
  - If the chemical history is uncertain, take an ice cream container of soil and plant radish seeds. Radishes are very sensitive to chemical residue; if they don't grow there may be residue

ESTABLISHMENT

- Lucerne is usually spring sown
- Direct drill into a sprayed out block or sow into a fine, firm, seedbed (5-15 mm or up to 25 mm when soil moisture stress is likely)
- Sow with a starter fertiliser when the average soil temperature is above 8°C in spring and 14°C in autumn
- Untreated seed requires inoculation with rhizobia to fix nitrogen before sowing, to ensure effective nodulation
- If sowing a pure lucerne stand for grazing and/or cutting, sow at 8-10 kg/ha of inoculated seed or 10-14 kg/ha pre-inoculated Superstrike® seed
- For lucerne stands that are for cutting only, higher sowing rates can be used at 15-18 kg/ha. In mixes with other grasses such as cocksfoot, lower rates of lucerne are typically sown at 8 kg/ha of Superstrike® seed
- Monitor for weed presence and apply post emergent herbicide at correct growth stage if required. Note establishing stands are less tolerant of some herbicides compared with a mature stand
- After sowing allow the lucerne to reach a minimum of 50% flowering (50% of the tallest stems have a flower) prior to the first grazing/cutting
  - If the stand is weedy at establishment it can be grazed/cut once if it is 15-20 cm tall and then left to flower a minimum of 50%
- If irrigation is available, apply water before sowing to ensure adequate soil moisture
- Note: For established stands delay irrigation until 10-14 days after grazing
  - Irrigation encourages weed seed germination
  - When lucerne has been grazed or cut (i.e. its leaves removed) the crop requires minimal water to regenerate leaf cover
  - Sitting water can cause roots to rot

Seed treatment

Superstrike® lucerne contains:

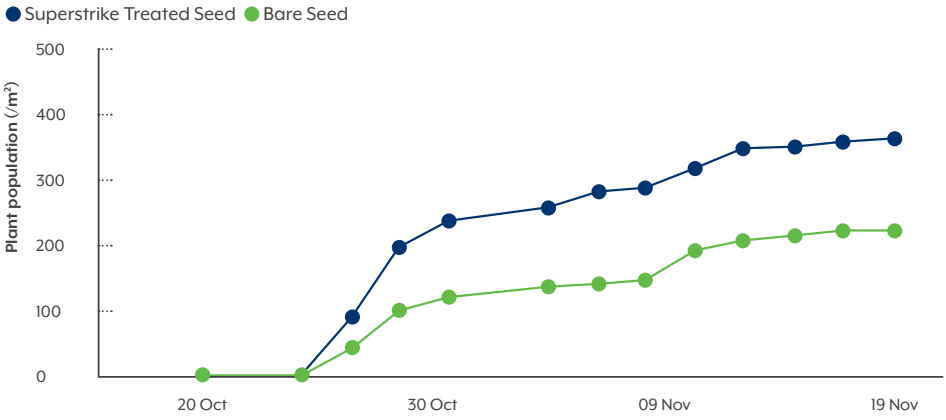
- A strain of nitrogen-fixing bacteria (rhizobia) specific to lucerne
- A contact fungicide to control 'damping-off' disease (*Pythium*)
- A fine lime base to assist root development and helps provide a localised pH correction around the seedling
- Molybdenum, an essential trace element for seedling establishment and root nodulation

Effect of Superstrike® Seed Treatment on Lucerne Establishment

In a Lincoln University trial Superstrike® seed treatment provided a significant increase in establishment population over bare seed. Superstrike® treated seed was adjusted to the same rate as bare seed to account for increased individual seed weight due to seed treatment.

At 28 days after sowing Superstrike® seed (16 kg/ha) had a population of 386 plants/m^2 versus bare seed (10.5 kg/ha) with 227 plants/m^2. See figure 5 below (Wigley *et al*, 2012).

Figure 5: Plant populations for October sown lucerne at Lincoln University



Established stand management

WEED CONTROL

- Identify weeds present
- The most common weed control occurs in winter on lucerne stands (i.e. when the lucerne is dormant)
  - Dryland lucerne stands should be sprayed every second year (at least)
  - Irrigated lucerne stands should be sprayed annually
- Consult your local seed retailer for chemical recommendations

INSECTS AND DISEASES

- Identify early and graze or cut the stand (removing the pest feed source)
- If pest infestations are high and are causing damage to yield then an insecticide is necessary
- Early winter graze to reduce over-wintering aphid populations

NUTRIENT REQUIREMENTS

Depending on grazing or cutting management lucerne can have different nutrient requirements. Grazed lucerne stands will require less fertiliser than cutting systems as nutrients are returned from dung and urine.

Annual soil testing is a good way to ensure fertility is maintained and appropriate fertiliser is used. Leaf analysis during the active spring growth phase can also be used in conjunction with soil tests to determine fertiliser requirements.

In a cut and carry system apply the recommended fertiliser after the first cut in establishing stands and every second cut thereafter. Nutrient removal per tonne dry matter harvested per hectare:

- Phosphorus – 2-3 kg/ha
- Potassium – 15-20 kg/ha
- Sulphur – 2-4 kg/ha
- Calcium – 13-17 kg/ha

TARGET SOIL TEST RANGES

- pH – maintain a soil pH of 6.0-6.2 to promote optimal rhizobium activity and N fixation.
- Phosphorus – Olsen P levels of 15-20 for sedimentary/ash soils and 20-25 for pumice soils should be maintained
- Potassium – large quantities of K are removed in hay or silage (15-20 kg K/ha/tonne DM), maintain soil Quick Test K levels in the 6-8 range with appropriate applications of potassium
- Sulphur – required for protein formation and nitrogen fixation in legumes, maintain sulphate-S levels of at least 6-10 with annual applications 20-40 kg S/ha depending on soil type

IRRIGATION

- If irrigation is available, this can help when moisture is low. Although lucerne is highly drought tolerant, irrigation increases the potential to more than double the lucerne yield in dry years
- **Note:** weed invasion can occur when lucerne is irrigated too frequently and immediately after cutting or grazing
- The optimum frequency and timing of irrigation is dependent on how much water the soil can hold. Speak to your local seed retailer about soil water holding capacity
- When demand for water is low, delay irrigation until new leaves are visible and are ready to expand and out-compete germinating weeds
- Roots grow at 1 cm/day. Growth above the ground stops while reserves are put into the roots

Grazing management

To practically manage lucerne grazing you need a five to six paddock rotation, such as the example provided below:

- 30 hectares of lucerne divided into 6 x 5 hectare paddocks
- Stocked at 300 ewes plus twins (i.e. 10–12 SU/ha)

Two to three weeks after lambing, stock are introduced to the first lucerne paddocks. Once the first paddock is grazed, they are then rotated around the other five paddocks. Stock are left on each paddock for five to seven days. During periods of rapid growth graze once paddocks reach target pre-grazing height (20-25 cm).

Lucerne leaves grow from the top of each stem, unlike grass species where the growing point is located at the base of the plant. When lucerne is cut or grazed new stems shoot from the base of the plant. These new stems need a chance to regrow, which is why rotational grazing rather than set-stocking is recommended.

In large paddocks break feeding will improve utilisation. As the leaves have the highest nutritive value, priority stock should have the first access to the stand, as stock preferentially graze the leaves first. Rough rule of thumb: for every 10 cm of lucerne that is above 20 cm height, yield is around 800-1000 kgDM/ha.

When grazing lucerne frequently there is a compromise between the amount of green leaf surface area left to photosynthesise and yield.

SPRING

Focus on stock performance

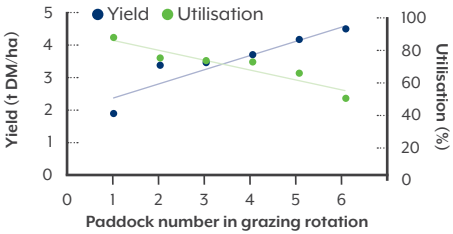
- Start to graze the first paddock when lucerne is approximately 15-20 cm high (1500 kgDM/ha)
- Graze for five to seven days until all green leaf and soft stem is gone
- Allow 35-42 days recovery (any shorter reduces root size and stem height)

As stock graze through individual paddocks in a rotation, yields will increase however, utilisation will generally decline as seen in the figure below.

At the end of the first rotation, if the last paddock is more than 40 cm utilisation will be lower and may require an increased stocking rate or true surpluses to be conserved as a supplement.

If the last paddock in the rotation is less than 15 cm tall, stocking rate may need to be reduced to match feed availability.

Figure 6: Yield and utilisation for the first spring grazing of a six paddock rotation



Sim, R.E. 2014. Water extraction and use of seedling and established dryland lucerne crops. PhD Thesis, Lincoln University, Canterbury, New Zealand.

Ideally ewes and lambs grazed on lucerne will stay on lucerne for at least eight weeks to maximise liveweight gain. For the first rotation, when lucerne is lush, ensure some fibre is available to stock, e.g. meadow hay.

- Have salt licks available for stock, as lucerne foliage is low in sodium
- Lucerne quality:
  - Lucerne leaf has approximately 12 megajoules of metabolisable energy per kilogram of dry matter (MJME/kgDM) and crude protein is greater than 24%
  - The stem has approximately 8 MJME/kgDM and protein is greater than 14%
    Note: delayed harvest increases the proportion of stem

SUMMER

Short rotation, 30-35 days recovery

- Water stress accelerates flowering but leaf is still high quality
- Conserve a true surplus (i.e. where there is more lucerne available than stock demand)

AUTUMN

Focus on the lucerne plant replenishing root reserves

- Extend the rotation to 42 days between grazings to allow root reserves to recharge. Ideally allow a minimum of 50% of the tallest stems to flower, note that under drought conditions crops may not flower but will still benefit from a longer rotation
- Graze if drought is 'terminal' i.e. plants stop growing to avoid loss of leaves, then allow recovery to at least 20 cm height after rain
- Aphids can be an issue. These can be cleaned up in late autumn/early winter by hard grazing once growth has stopped
- Shorter day length and decreasing temperatures signal the plant to start directing energy to root reserves for stand persistence and production next spring
- Ewes can be flushed on lucerne, however, if Leaf Spot is present then oestrogen levels and ewe fertility may be affected

WINTER

- Hard graze when growth stops, for example once frost stops growth
- Following hard winter grazing, allow 10-14 days for weeds to freshen before spraying. Aim to spray while lucerne is still dormant and before lucerne leaves grow back
- Resist the urge to graze regrowth after the first winter grazing, as this delays spring growth/first grazing and reduces yield
- The order in which paddocks are 'hard grazed' and then sprayed in winter dictates the order they will be ready for grazing in spring

Crop management

SPRING

Focus on above-the-ground production

- Cut when lucerne is around 40-45 cm high to maximise quantity and quality
  - The best time to cut the lucerne stand for hay or silage is late morning to mid-afternoon after the dew has lifted. This is when the concentration of sugars and starches is highest
- Allow 35-42 days recovery (any shorter reduces root reserves and lowers root size and stem height)
- Apply fertiliser after the first spring cut then after every second cut, providing it isn't too dry

In addition to phosporus and sulphur lucerne takes a high amount of potassium (K) when made into hay or silage, so it is necessary to apply potassic based fertiliser to replace what is removed. This should be done in spring after the first or second cut. K deficiency is exhibited by the plant as light green/white colouring around the edge of the leaf.

SUMMER

- Short rotation, 30-35 days recovery and earlier flowering so cut at 35-40 cm height

AUTUMN

The focus is below the ground allowing root reserves to replenish

- Extend the rotation to 42 days between cutting to allow root reserves to recharge. Ideally allow a minimum of 50% of the tallest stems to flower, note that under drought conditions crops may not flower but will still benefit from a longer rotation
- Apply lucerne fertiliser after every second cut providing it isn't too dry
- Avoid harvesting before the first winter frost

WINTER

- Cut when growth stops, for example once frost stops growth
- Remove any over-wintering aphids
- Spray weeds

Lucerne hay

To produce high quality hay focus on producing hay that fulfills the following criteria:

Clean stand

Weeds reduce the aesthetic appeal of the bales and/or may put stock at risk of toxicities. Talk to your local agronomist about how to keep your stand clean.

Control Aphids

Honey dew from Aphids sticks hay together and discolours bales. Talk to your local agronomist about an Aphid control programme.

More leaf, less stem

Protein and other valuable nutrients are concentrated in the leaf.

Leafy lucerne hay is more readily accepted by stock. Leaf yield can be maximised through shorter intervals between harvest, by harvesting with less flower and by not drying the crop down too far. Avoid excessive tedding (i.e. spreading or turning of the cut lucerne for drying) before baling.

Green colouration

Quality is improved by baling more leaf and less stem, by avoiding bleaching from rain or heavy dew and by shed-storing bales to prevent rain or sun bleaching damage. Avoid mould growth by reaching the target moisture content at harvest.

Keep dusty bales to a minimum

To avoid respiratory problems don't harvest the hay too dry or on dusty hot days when topsoil may end up in bales.

Target bale moisture percentage content

Targets differ with bale size. Reasonably dry implies more dust. Too damp increases the risk of spoilage, mould growth and overheating of stored bales.

Target dry matter percentage (%DM) for lucerne hay bales

Bale Size	Dry matter
Small squares	›80-82% DM
Round	›82-84% DM
Medium squares/ Freemans	›84-88% DM

Conditioning

Rolling and crimping stems improves the drydown speed of stems (so leaves don't become dry) and produces a softer hay that is more accepted by stock.

Animal nutrition and health

ALLOWANCES/INTAKE

When incorporating lucerne into the farm system you will need to consider how it will be utilised. For a grazing system, rotational grazing is recommended thus multiple paddocks maybe required, in contrast a silage or hay system can be one or more paddocks.

Sheep – lamb finishing

- Five to seven day break until all green leaf and soft stem is gone
- Post weaning lambs only eat lucerne leaf so stocking rates should be at about 70 lambs/ha
  - A daily feed allowance of 2.5-4 kgDM offered per lamb (increase as lambs grow)
  - Minimum of six to eight weeks on lucerne to maximise liveweight gain
  - Follow lambs with ewes to clean up

Ewes - Lambing on lucerne

- Set stock ewes onto lucerne 1-2 weeks before lambing. After tailing/docking, start rotational/block grazing of the lucerne
- Set stock in mobs of fewer than 100 ewes
- Set stock at a stand height of 15cm – providing sufficient feed for ewes, but short enough to prevent lost lambs and mismothering
- Provide extra dietary fibre either as grass oversown into lucerne or access by ewes to pasture areas amongst or adjacent to lucerne. Feeding out baleage or hay is useful but take care with mismothering
- Offer salt blocks to ewes

Before mating ewes on lucerne consider the quality on offer

Risks:

- Lucerne stressed by insect attack or foliar disease may produce coumestrol, an oestrogenic compound that reduces ovulation rates when fed to ewes before or during tupping

Preventative measures:

- Healthy, normal lucerne plants should not produce coumestrol. If in doubt, do not graze ewes on lucerne, and avoid feeding lucerne hay or silage before or during tupping

Dairy systems

Grazing of lucerne with dairy cows is not particularly common in New Zealand relative to other dairying systems such as those in North and South America. Conserved lucerne is a valuable and common supplementary feed eaten by New Zealand dairy cattle. Uses include feeding to milking cows, young stock rearing and for cutting and carrying to both milking and dry cows.

ANIMAL HEALTH MANAGEMENT

Occasionally we see lucerne-associated animal health challenges including:

Ruminal bloat

Causes:

- High quality leaf proteins fermenting rapidly in the rumen, forming a stable foam that prevents stock from belching gas

Preventative measures:

- Don't allow hungry stock sudden unrestricted access to lucerne
- Offer hay, straw or baleage to reduce appetite and to help break down rumen foam
- Shift stock later in the day when dew or frost is off the lucerne
- Slow the grazing rotation, allowing lucerne to become more fibrous
- Bloat oil – added to stock drinking water or as bloat blocks
- Rumensin (monensin sodium) as anti-bloat capsules, or as Rumensin Trough Treatment or monensin added to feed

- Mowing and wilting lucerne in front of cattle
- Consider sowing in a grass species to help dilute the lucerne in the diet and offer a form of roughage

Red gut in sheep

Causes:

- High quality lucerne leaving the rumen too quickly, passing to the intestines and continuing to ferment, forming gas and causing the intestines to twist

Preventative measures:

- Offer hay or dry baleage to slow the passage of feed from the rumen and to increase the volume of the rumen (less room for the intestines to twist)
- On-off grazing of lambs: graze on poorer quality pasture plus hay for two days, then lucerne for five days, repeating the grazing cycle

Thiamine deficiency (polioencephalomalacia) in young sheep and cattle

Causes:

- Sudden change in diet that changes the types of rumen microbes to those that break down thiamine

Preventative measures:

- Gradually adapt stock from poor quality forages to lucerne
- Provide extra fibre as hay, baleage or a pick of non-lucerne forage around the outside of the paddock
- Include a grass species in with the lucerne to provide a mixed grazing sward (talk to your local agronomist)
- Slow the grazing rotation, allowing lucerne to become more fibrous
- Thiamine injections or oral drenches for stock before they go onto lucerne may help (talk to your veterinarian)

Enterotoxaemia (pulpy kidney)

Causes:

- High quality lucerne passing to the intestines where it encourages rapid growth of *Clostridia* that produce toxins

Preventative measures:

- Vaccination of stock with a *Clostridial* vaccine, with the second (booster) shot administered 10 to 14 days before stock start grazing lucerne

Sodium deficiency

Causes:

- The lucerne plant is 'natrophobic', and does not accumulate sodium in the green part of the plant

Preventative measures:

- Supplementation of lucerne-fed stock with sodium as salt blocks or salt licks

Metabolic disease in dairy cattle before and after calving

Causes:

- Feeding lucerne hay or silage to springing dairy cows before calving. High concentrations of potassium and/or calcium in lucerne increases the risk of hypocalcaemia

Preventative measures:

- Don't feed lucerne hay or silage to springing dairy cows before calving unless advised to do so by your nutritionist or veterinarian

Technical lucerne information

AUTOTOXICITY

It is well known that lucerne plants can produce chemical(s) which suppress the germination and growth of lucerne seedlings. This phenomenon is called autotoxicity.

Autotoxicity is difficult to detect and predict. Older lucerne stands are more prone to it than young stands because it is a root derived product that builds up over time – in evolutionary terms the plant is trying to stop its seedlings growing where it already is.

For a thinning older stand, overdrill Italian ryegrass (or similar) in autumn to get use out of the accumulated nitrogen (N) and prolong the stand life. Alternatively, drill in a perennial grass and make it a pasture that might last another three to four years as your transition paddock.

MIXED SWARDS

If you have never grown lucerne before, plant a pure stand of lucerne and learn how to manage it.

After the ideal areas of your farm for lucerne monocultures are established, there may be an option to look at lucerne/grass mixes on more difficult soils or topography. These range from lucerne with some grass to minimise soil erosion on wind prone sites, through to a grass pasture where lucerne is providing the legume component where other legumes (e.g. white clover) have failed. The management of lucerne/grass mixes is more complex and extra caution should be taken. Lax grazing will allow preferential grazing within swards of lucerne and grass leading to reduced longevity of the lucerne.

Tall fescue

Tall fescue and lucerne can be sown together and is best suited where sub-division is sufficient to control the reproductive growth of tall fescue in early spring. When feeding tall fescue/lucerne stands consider the importance of maintaining plant numbers of lucerne when grazing.

Cocksfoot

Lucerne has been grown successfully as the legume component of cocksfoot pastures in low (less than 400 mm) rainfall environments. Stock should still be rotationally grazed. They tend to consume the lucerne on entry and then eat the cocksfoot. The higher N deposition in urine is used by the cocksfoot and improves its growth, water use efficiency and acceptance by stock.

Bromus species

Lucerne sown with 'Bromus' species is complementary. Lucerne with brome is ideally suited to dry regions and with hot summers. There are different Bromus species available so it is best to get advice of which one to use. In common to all Brome's is the need for soils to be free draining and pH 6.0 to maintain longevity. Sowing Brome can be difficult due to the large seed so care needs to be taken when drilling.

Stamina™ 5 LUCERNE

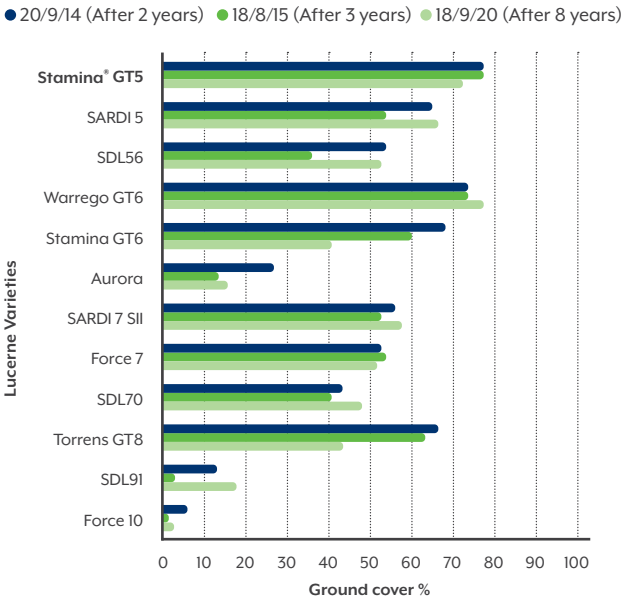
STAMINA TO GO THE DISTANCE

Stamina™ 5 is a grazing-tolerant, semi-dormant lucerne offering excellent yield and forage quality in dryland conditions. High grazing tolerance makes Stamina 5 an ideal choice for grazing systems, while offering flexibility in silage stands that are occasionally grazed.

The chart below illustrates that once established, Stamina™ 5 lucerne can tolerate continuous and close grazing better than other lucerne cultivars. Like all lucerne, Stamina™ 5 will persist and produce best when rotationally grazed.

- Grazing-tolerant lucerne that is semi winter dormant
- Highly productive in both grazing and hay/silage systems
- Strong persistence under grazing
- Tolerates periods of set stocking and close grazing
- Produces excellent quality hay
- Good overall resistance to most lucerne diseases

2012-2020 grazing tolerant lucerne trial: Leigh Creek, VIC



Cultivar: In order of low winter activity (top) to higher winter activity (bottom). LSD 5% - 2014 LSD 10.6, 2015 LSD 11.2, 2020 LSD 13.5.

Farm type

Sowing rate

BARE SEED
8-10 kg/ha

SUPERSTRIKE® TREATED SEED
10-14 kg/ha

Disease and pest resistance

HR = High Resistance

R = Resistant

MR = Moderate Resistance

Characteristic	Stamina™ 5
Phytophthora Root Rot	R
Stem Nematode	HR
Blue Green Aphid	R
Spotted Aphid	R
Bacterial Wilt	HR
Colletotrichium Crown Rot	MR

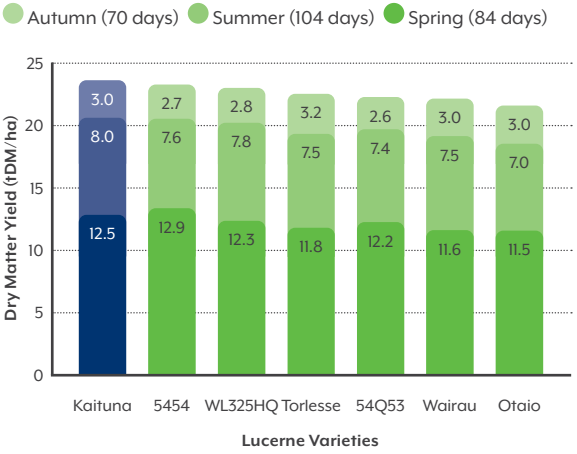
GRASSLANDS
Kaituna LUCERNE

VERSATILITY WHEN IT'S NEEDED

Grasslands Kaituna lucerne is a New Zealand developed lucerne selected for improved resistance to the range of insect pests and diseases. It is ideal for grazing and mixed regimes and is persistent under grazing and hay/silage production. Kaituna lucerne is highly productive in spring and summer, with later autumn and earlier spring growth than Wairau.

- Fine stemmed for better quality and palatability
- Semi-dormant in winter
- Versatile – persistent under grazing, hay/silage and mixed regimes
- High annual dry matter production
- Excellent pest and disease resistance

Three year average seasonal dry matter production of lucerne both grazed with sheep and cut for hay



Sown on 19th October 2000, the above trial conducted at Kimihia Research Centre in Canterbury measured the yield of various lucerne cultivars in spring, summer and autumn, over a period of three years.

Farm type

Sowing rate

BARE SEED
8-10 kg/ha

SUPERSTRIKE® TREATED SEED
10-14 kg/ha

Disease and pest resistance

HR = High Resistance

R = Resistant

MR = Moderate Resistance

Characteristic	Kaituna
Phytophthora Root Rot	R
Stem Nematode	R
Blue Green Aphid	R
Spotted Aphid	R
Bacterial Wilt	R
Pea Aphid	R
Crown Rust	R
Fusarium Wilt	HR
Verticillium Wilt	MR
Leaf Diseases	MR

Lucerne case study

KAITUNA LUCERNE CASE STUDY

Sandy Urquhart owns and manages Gladstone Farm along with his brother Andrew and their father Paul. The farm is located at Hawea Flat, Otago, where they have hot, dry summers and harsh, cold winters, along with high evapotranspiration rates. Given these conditions, lucerne is well-suited to their farm. The crop is healthy and vigorous with little weed burden. The Urquharts take heavy cuts of Kaituna to sell as baleage or hay, then in mid-March buy in 30 kg lambs and finish them by rotationally grazing the Kaituna to sell in May. "We have harvested over 15 tonne of dry matter each year through three cuts and a final autumn graze with lambs. Kaituna always continues to produce dry matter in the heat, especially in comparison to other cultivars as it doesn't go to flower as early," says Sandy. The Urquharts recognise that Kaituna is a versatile crop for their farming operation. They are able to make high quality conventional bales of hay for horses as well as five-foot bales for farmers. Kaituna also provides them with the ability to make high quality lucerne baleage along with lucerne chaff. Finally, they can buy in lambs to diversify their system even further. They are on track for a dry matter yield of at least 15 tonne per hectare again this year.

Property name

Gladstone Farm

Farm type

Cropping, sheep and beef

Hectares

300

Location

Hawea

Name

Sandy Urquhart

PGG Wrightson Seeds

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