Sequel

Lucerne

Medicago sativa

DOMESTIC

KEY FEATURES

- Winter active dormancy FD 9
- Suited to hay making
- Produces high levels of forage during winter

SEQUEL is a highly winter active variety with a dormancy rating of 9. It has a tall growth habit and good resistance to aphids. SEQUEL provides high levels of forage over the winter period and is best suited to short to medium term rotations for hay making or silage.

Growing Conditions

Soil Type:
Suited to most soil types from sandy loams through to heavy clay soils

Sowing Rate:
Dryland hay or grazing: 4 - 8kg/ha
High rainfall/ Irrigation: 9 - 20 kg/ha
Irrigated hay production: 25 - 35kg/ha

pH:
($CaCl_2$) 5.0 - 7.5

Inoculant:
Group AL Rhizobium

Disease and Pest Resistance Trait

Pest can cause reduced forage yield, persistence and/or forage quality.

★★★ **Resistant**
Spotted Alfalfa Aphid

★★ **Moderately Resistant**
Blue-Green Aphid
Pea Aphid

★ **Low Resistance**
Stem Nematode
Bacterial Wilt
Phytophthora Root Rot
Colletotrichum Crown Rot

Agronomic and Botanical Characteristics

Developed in Australia.

Winter Dormancy:	9.0
Stand Persistence:	Good
Early Seedling Vigour:	Good
Growth Habit:	Upright from Crown
Recovery After Cutting:	Moderate - Fast
Fineness of Stem - Spring:	Moderately Fine
Fineness of Stem - Late Summer:	Fine
Leaf Retention:	Good

Lucerne Agronomic Information

Scientific name *Medicago sativa*

Strengths

- Perennial plant with year-round production
- Deep rooted, capable of extracting water and nutrients from deep in profile
- Has been utilised to restrict water table recharge and salinity reduction
- Moderate tolerance of soil salinity and sodicity
- Multi-purpose crop that can be used for grazing and hay operations
- Quick growth responses to spring and summer rainfall (or irrigation)
- Capable of producing high amounts of forage
- High nutritive value that is sought after in feedlot and intensive dairy systems

Limitations

- Short-term persistence in some regions (mainly due to disease susceptibility of older cultivars)
- Susceptible to waterlogging that can reduce plant numbers
- Requires strict rotational grazing to maintain plant stands
- Can cause bloat in cattle

Plant characteristics

Plant: Perennial legume, deep rooted, upright nature.

Stems: Erect from 40 - 80 cm high at 10% flower.

Leaves: Traditional lucerne cultivars comprise of three smooth, slightly toothed, oval, wedge shaped to pointed leaflets, sometimes with white crescent shaped markings.
New advancements with plant breeding exhibiting the Multifoliate leaf expression (many leaves or leaflets) are now becoming more common in the forage sector. Leaf veins strong, straight with little branching. Broadly triangular stipules with one or more small teeth occur at the point of leaf attachment to the stem.

Flowers: Pea flowers, mostly purple in colour, and about 8 mm across, borne in clusters up to 4 cm long at the tops of branches.

Pods: 4 - 5 coils in a spiral, spineless with a hard outer surface; produced in clusters; 1 - 5 seeds/pod.

Seeds: Small, green to yellow to light brown in colour; kidney shaped; 440,000 - 500,000 seeds/kg.

Pasture type and use

Medium term perennial (3 - 5 years); year-round production, predominantly in the spring/summer but with varying levels of winter production (winter activity). In many cases good grazing/ hay cutting management will lead to longer stand life 6+ years.

Where it grows

Rainfall

In rain grown stands, 250 - 800 mm/annual (Southern and Western Australia); 500 - 1200 mm/annual (subtropics).

Soil Types

Lucerne requires deep, well-drained soils (sands to moderately heavy clays) with a slightly acid to alkaline pH ($CaCl_2$) 5.0 - 7.5. It is intolerant of high levels of exchangeable aluminium and even short periods of waterlogging.

Temperature

Optimum temperatures for dry matter production range from 15 - 25°C in the day and 10 - 20°C during the night. However, this will vary with the winter activity level of the cultivar.

Establishment

Companion species

Lucerne is often sown as a pure stand. It is very competitive but if sown at a low rate it will grow with species such as early-flowering sub clover/annual medics, phalaris and Mediterranean types of tall fescue to boost winter production. It can be grown with chicory and a range of tropical grasses. The use of hard seeded legumes allows for natural regeneration each year to maintain winter production. Companion species such as grasses, arrowleaf clover and chicory will significantly reduce the impact of bloat in cattle.

Sowing rates

4 - 8kg/ha for dryland hay or grazing, depending on annual rainfall. 9 - 20kg/ha for high rainfall/ irrigation. 25 - 35 kg/ha for Irrigated hay production. Sow into a finely worked, moist, weed-free seedbed at 1-2 cm: cover with light harrows/weldmesh. On light soils rolling is desirable to improve seed-moisture contact. Direct drilling can work but failures occur, and caution is warranted. Use of cereal cover crops (Ryecorn/Barley) at low rates can be advantageous in lighter soil country.

Sowing time (Australian conditions)

Early autumn to early winter; late April is ideal.

In southern Australia, districts with an 8 month or more growing season, lucerne is best sown between late August and October, ideally on a winter fallow. Late spring sowings in dryland areas are dictated by wet years.
Spring sown lucerne under irrigation is a highly successful option. It allows for pre-watering and chemical knockdown to occur and enables seedlings to establish in warm soils.

Inoculation

Seed must be freshly inoculated with Group AL rhizobia and lime coated or pre-inoculated. Coated seed options have increased the flexibility for the farmer and now come with many beneficial additives as part of the coated product. Apron XL Fungicide for Damping off diseases and usage of insecticides allow for more successful plant establishment and reduce crop damage.

Nutrition

On marginal fertility soils, responses to magnesium, manganese, zinc, molybdenum, boron, and copper can occur. Establishment on acid soils is often made possible following the spreading/incorporating 1-5 t lime/ha. Aluminium toxicity can occur on soils with pH of lower than 5.5 (water) or 4.7 (calcium chloride). Based on soil tests, potassium (K), phosphorus (P) and sulphur (S) levels need to be maintained at the following levels:

K: 0.3 m. equiv/100g

P: 25 mg/kg

S: 10 mg/kg

Management

Maintenance fertiliser

Maintenance fertiliser needs to be applied regularly in irrigated lucerne where large quantities of nutrient are removed in hay. Based on soil tests, potassium, phosphorus and sulphur levels need to be maintained at the levels indicated above. Regular tissue testing will allow for more accuracy and correct timing application of macro and micro elements.

Grazing/Hay cutting

Timing of grazing or hay cutting should be matched to the build-up of carbohydrate reserves in the plant's roots. Levels in the roots are lowest about 2 weeks after grazing or cutting and reach their maximum at full bloom, somewhere between 4 - 8 weeks after the previous defoliation (dependent on time of year and winter activity level of the cultivar used).

Cutting for hay is best done at 10% flower or when the basal shoots are 3 - 5 cm in length.

It should be rotationally grazed for long-term persistence, whether grown as a pure stand or in mixed swards. It should be grazed off in 1-2 weeks followed by spelling for 4-8 week - depending on time of year and winter activity level of the cultivar used.

Allowing your lucerne stand to reach flowering stage at least once in the season will increase the resilience of the plant stand. The additional carbohydrate storage enables the plants to handle tougher climatic conditions e.g., drought or flood over the year.

Ability to spread

Low. Lucerne is usually cut or grazed before seed matures.

If lucerne seed is dropped or spread by livestock, it rarely establishes effectively owing to soil and soil water constraints. In lucerne producing environments, it may be found on road verges but not in adjacent paddocks subject to grazing.

Major pests

Red-legged earthmite, spotted lucerne aphid, blue-green aphid, pea aphid, lucerne flea, jassids or leafhopper, vegetable jassid, white fringed weevil, sitona weevil, small lucerne weevil, lucerne crown borers, lucerne leafroller, weed web moth or cotton web spinner, cutworms, wingless grasshoppers, thrips, lucerne seed web moth, native budworm, lucerne seed wasp, mirids, mites, snails.

Major diseases

Seedling disease: Damping off.

Leaf and stem diseases: lucerne mosaic virus, lucerne yellows, bacterial leaf and stem spot, witches broom, common leaf spot, Stemphylium leaf spot, Leptosphaerulina leaf spot or pepper spot, rust, downy mildew, Cercospora leaf spot, Phoma black stem, powdery mildew.

Root and crown diseases: Phytophthora root rot, Colletotrichum crown rot, Rhizoctonia canker (most significant,) violet root rot, Acrocalymma crown and root rot, Stagonospora crown and root rot (sometimes called common root rot), Fusarium wilt, bacterial wilt, Sclerotium blight and Sclerotinia rot.

Herbicide susceptibility

Herbicides can be used to take out grasses or broadleaved weeds selectively or can be used pre-planting or post-planting to tackle weeds at various stages of crop development.

It is always recommended to achieve one to two knockdowns on the paddock prior to sowing lucerne.

This will reduce the early seedling competition and allow for more uniform stand establishment. Lucerne growers have a wide range of herbicides that can be utilised in the establishment and growing phase. It is recommended to utilise these options early in the plant stand's life to set the crop up for long term production.

Mature lucerne is difficult to remove with herbicide. Follow agronomist recommendations and check labels for the herbicides that are registered for use in lucerne or to remove lucerne.

Animal production

Feed value

Lucerne is highly digestible (60 - 75 %), is a good source of crude protein (15 - 25 %) and has high levels of metabolizable energy (8 - 11 MJ/kg DM). In many feedlot or intensive systems, lucerne partners very well with maize silage as a low protein/ high ME partner.

Palatability

Very palatable.

Production potential

Daily live weight gains for beef cattle range between 0.7 kg/head/day from stemmy lucerne to 1.5 kg/head/day from young, leafy regrowth. Live weight gains of 300 - 400 g/head/day are achievable with lambs.

Livestock disorders/toxicity

There are few problems. To avoid cattle bloat, nitrate poisoning and red gut, do not graze immature/lush lucerne, especially with hungry stock (pre-feed with dry roughage). If there are concerns with managing lucerne stands for bloat then review companion species that can be sown with lucerne e.g., arrowleaf clover, chicory, grasses and cereals.

Cultivars

Cultivars are rated for 'winter activity' from 1 (winter dormant, negligible winter production) to 11 (highly winter active, 20 - 25% of annual production produced in the winter months). This indicates the ability of a cultivar to grow in cold temperatures and days of shorter length. Winter active cultivars (rated 7 - 11) are used for dryland farming systems in southern and Mediterranean Australia to best utilise the winter dominant rainfall, and in the subtropics to fill the winter production and protein gap. Winter active cultivars offer the ability to graze in the winter period but also the ability to cut hay from the early spring flush. This allows professional hay producers to meet early demand in such premium markets such as horse feed sectors.

Traditionally we see the usage of winter/semi winter dormant cultivars being utilised in premium end hay cutting systems due to their low crown height and high leaf carrying characteristics. The spring/summer dominant forage growth of the dormant material allows hay producers to capture a high proportion of value during the drier times of the year (Southern Australia).

Winter/semi winter-dormant cultivars are used more in the cooler regions as long lasting pasture.

Group	Winter Activity rating (WAR)	Information
Winter dormant	1-3	Little autumn-winter growth. 95% summer, 5% winter. Very low crowns, suitable for high quality hay stands looking for long term persistence.
Semi winter dormant	4-5	Suitable for long-term stands where persistence of the stand is the main priority. Have broad, low crowns. Used as a companion with annual legumes or grasses in long-term pastures. Low winter production. 90% summer, 10% winter.
Winter active	6-7	Suitable for long-term permanent pasture with long stand life. Growth slows during the winter months but does not cease. Low crown. 80% summer, 20% winter.
Highly winter active	8-9	Have high seedling vigour and first year production. Persistent under rotational grazing, but crown is commonly narrow and more exposed to grazing. 80% summer, 20% winter.
Very highly winter active	10-11	Well suited to short rotations of 2 - 4 years. Cut and Carry systems favour this group. Very productive but generally have poor persistence; require careful grazing and cutting to maximise persistence. When cultivars are compared over the long term, persistence associated with grazing tolerance generally declines with increasing WAR. Selection by breeders is helping overcome this limitation. 80% summer, 20% winter.

Source : Pastures Australia and Synergy Seeds

Australian Government Rural Industries Research and Development Corporation RIRDC www.rirdc.gov.au

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