Seed Guide

Edition 6

International

Grow with
Confidence

BARENBRUG

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Inoculant
Inoculant (rhizobia) group recommended to inoculate the cultivar in order to achieve successful nodulation and nitrogen fixation.

Minimum annual average rainfall (mm)

pH range
pH range that can be used as an indicator for the suitability of a cultivar. The pH referred to is for a suspension of 1:5 soil: 0.01mol calcium chloride ($CaCl_2$).

Preferred soil type

- **Pasture grasses**
- **Pasture legumes**
- **Alfalfa**
- **Forage brassicas and herbs**
- **Vetch**
- **Forage cereals**
- **Summer crops**
- **Tropical grasses and legumes**
- **Turf**
- **Traded varieties**
- **Seed technology**

Contents

Barenbrug, leader in research and development

Barenbrug is a leading Australian seed company, and part of the worldwide Royal Barenbrug Group, specialising in research and development, marketing, extension and distribution of proprietary pasture and forage seeds, cropping, turf and seed enhancement technology.

Our extensive range of products contains more than 100 seed varieties to meet the needs of our customers within Australia and internationally.

Significant investment is made each year, both internally and with our research and development partners in order to develop and commercialise new varieties. To ensure our products are fit for purpose, they are rigorously tested at our research sites at Howlong, New South Wales and Gatton, Queensland and across many satellite locations throughout the country.

High quality seed is critical to Barenbrug in providing farmers with reliable, high performance products to improve productivity and maximise profitability.

Pasture selection

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Pasture renovation and forage production

No matter what type of stock you are running, you need pastures that will deliver. With the right pasture for your situation, you can achieve quality feed with rapid establishment. This will enable you to keep your options open and concentrate on making every stock unit count and maximise your profits. Whether you are growing lambs, dairy cows, prime beef or perhaps all three, you will get more out of every stock unit and grow profits with new pastures.

The simplest way to identify paddocks for renovation is to compare the production of all paddocks on your farm using your grazing records. If all the paddocks are the same size, simply add up the number of grazings per year for each paddock. If the paddocks are different sizes, you need to calculate grazings per hectare. Don't forget to include hay or silage crops. By recording the stock type, number and duration of the grazing, you will be able to gauge the effectiveness of various paddocks in general or for specific times or purposes.

In many rotational systems pastures are grazed 10–12 times a year. Poor paddocks might give two less grazings than average, and four less than top performing new grass paddocks. A gain of two grazings from pasture renovation equates to 3–4t DM/ha and is highly economical. If the difference is larger, even bigger returns can be made.

In other systems there may be a requirement for set-stocking at certain times. The correct selection of pasture species to persist under high grazing pressure at key times and under seasonal stresses may be more critical than outright yield potential.

There is also scope to reflect on the age of pastures, even if they appear to be going fairly well. Plant breeders have been developing varieties with increasing yield potential as well as improved features including insect tolerance, growth at key times, tolerance of hostile soil conditions as well as increased overall annual pasture quality. Estimates have the rate of genetic gain by plant breeders in some species at around 1.0–1.2% per year. This could mean that your 20-year-old pasture is performing at only 20–24% of its potential and may be under-delivering to the farm's income potential.

The success of a pasture or forage will depend on a number of factors including:

- Soil type
- Soil fertility/nutrient levels including pH
- Aspect and slope
- Moisture – rainfall, timing, irrigation, dry periods
- Heat and cold
- Latitude/photoperiod
- Insect and other invertebrate pests
- Vertebrate pests
- Weed control strategies
- Stock type
- Paddock size, orientation, shape
- Water points, stock movements and similar
- Budget
- Species selection
- Cultivar selection
- Approach to pasture establishment
- Grazing management
- Fertility maintenance
- Maintaining weeds and pests below problematic thresholds
- The outcome being sought by the farming operation
- How the pasture fits in with other farming operations such as annual cropping or seasonality of animal enterprises
- Extreme environmental events.

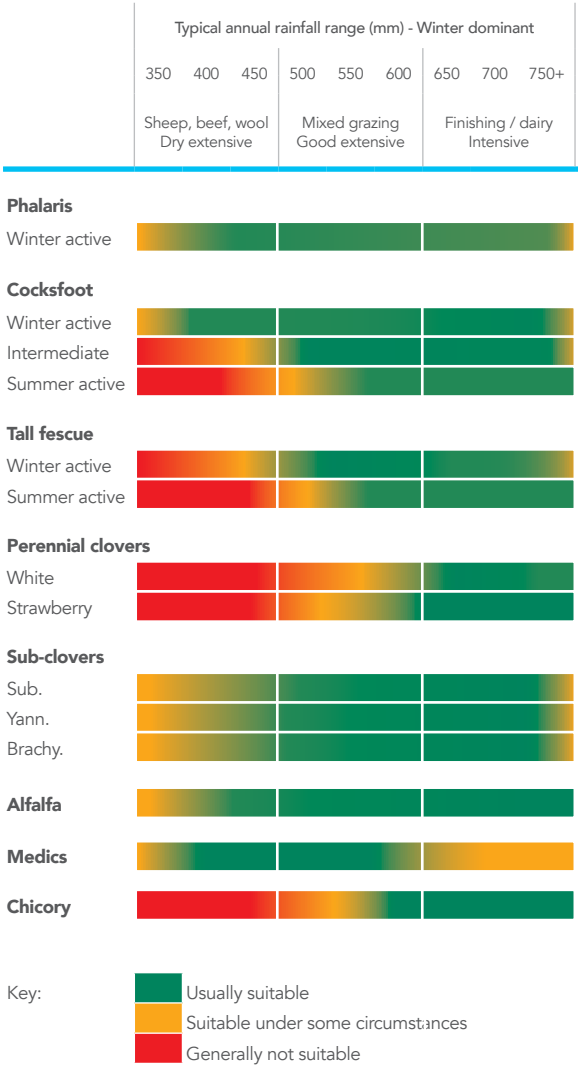
Many of these factors can be addressed through appreciating the environmental potential and constraints, adopting good farming practices, understanding the levels of risk for reward, and by properly considering the need for inputs to enable a good pasture or forage to work properly and be maintained.

It is useful to categorise various pastures and forage types into annual, short-term and perennial. In some cases a series of annual forages may be the best option for the long-term, or to play a role in a cropping or renovation program. Similarly there are excellent annual and short term options for specialty forages and fodder as well as providing good stepping-stones towards a longer-term goal.

Pasture type	Typical features	Purposes e.g.
Annual / seasonal 6–12 mths	Feed at key times	Cover a feed gap
	Rapid growth	Pasture renovation
	High yield	Silage/hay crops
	Good quality	Cropping break
	Single variety or simple mixes	Weed/pest control
Short term 2–5 years	High performance	Cropping break
	Responsive to inputs	Mixed farming
	Yield at key times	High intensity operations/finishing
	Rapid paddock turn-over anticipated	Specialised seasonal production
Perennial 5 years +	Perennial grasses	Backbone of grazing operations
	Perennial or self-regenerating legumes	Long pasture phase / cropping break
	Resilient and reliable	Fodder production
	Often multiple varieties/species	Best use for the site

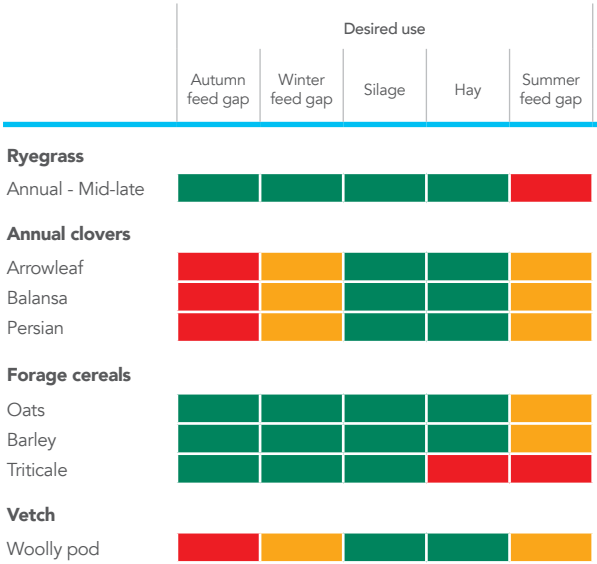
This booklet will give you a guide as to particular species, possibly sub-types within species and appropriate cultivars that will meet those requirements in most circumstances.

Long-term pastures for temperate areas

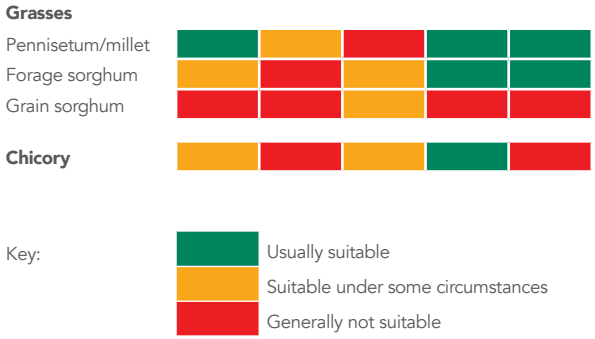


Irrigation	Hot, dry summers, days often >32˚C	Suitable varieties	Page
		Holdfast GT, Horizon, Advanced AT	TBA
		Summadorm	TBA
		Howlong	TBA
		Safin	TBA
		Prosper	TBA
		Fortune	TBA
		Storm	TBA
		Palestine	TBA
		Losa, Campeda + others	TBA
		Monti + others	TBA
		Antas + others	TBA
		Dormancy 6 - 11	TBA
		Jester SU, Sultan-SU, Scimitar	TBA
		Commander	TBA

Annuals/short-term autumn planting



Annuals/short-term for spring/summer planting



Cold winters, Soil temp <8° C for winter	Varieties	Page
	Vortex	35
	Zulu II	66
	Vista	63
	Laser, Lightning, Nitro, Strathwood	65
	Express, Wizard	119
	Dictator 2	122
	Crackerjack 2	121
	RM4, Capello, Haymaker	112

	Hybrid Pennisetum	126
	Nudan, Lush, Hunnigreen, Revolution BMR	124
	Cracka, Liberty	124
	Commander	105

Pasture grasses

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Temperate pasture grasses

The broad family of grasses contains around 10,000 species and examples are found in almost all climates. Included are wheat, barley, rice, millet, maize, bamboo, sorghum and sugar cane which all play important roles in food production, energy, manufacturing and structural materials. By far the most dominant sub-group in terms of land area are the pasture grasses which provide food for animals, resulting in outputs such as meat, milk, cheese, wool, hides, other animal products as well as leisure and amenity.

The main pasture grass species for temperate regions are described in this chapter: ryegrasses which are versatile and productive over a range of climates and production systems, particularly in areas with cooler/milder summers; and hardy perennial species such as phalaris, cocksfoot and tall fescue which will often be better or complementary choices in areas with tougher climates or other challenges.

In the main, grasses provide the bulk of animal feed in pasture systems, offering energy, protein, fibre and other vital nutrients. Usually some sort of pasture legume base is included with grass species in order to provide nitrogen for the pasture system as well as a feed source and diversity.

Ryegrasses

There are four main groups of ryegrass:

Perennials
For typically 5 – 8 years plus, but may only last a few years under some conditions. These work best in areas with a more distributed rainfall pattern or irrigation and milder summers where they form the basis of a long-term pasture feed-base.

Hybrids
Life-span 2 – 5 years depending on the variety and the circumstances. Work well where multiple years are required with very good autumn and winter growth, and the persistence of true perennial ryegrass may be unreliable. Also excellent for oversowing.

Italians
Life-span 18 months – 2 years under favourable conditions although typically one year under most systems. A popular option in areas where late spring growth is reliable, or where summers are mild and a second year may be required. Very useful for oversowing into existing pastures as a boost for a year or two.

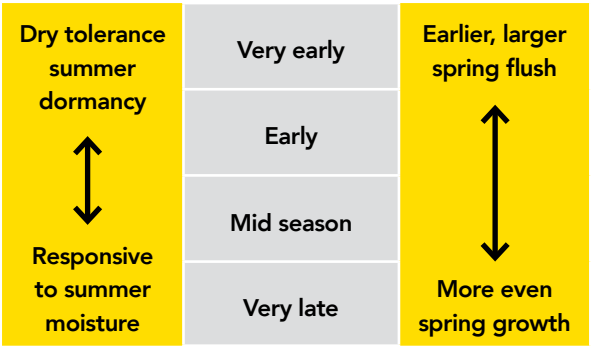
Annuals
Life-span 8 – 11 months when autumn sown. Annuals are popular in areas with winter dominant rainfall and dry, hot summers, or for a quick winter feed prior to spring cropping.

All ryegrass will propagate from seed, however the more perennial characteristics the variety has, the greater its ability to self-regenerate from vegetative daughter tillers.

True annual ryegrass does not have this ability, whereas true perennials have a large capacity to reproduce through tillering. Therefore as the capacity for vegetative tillering increases, the potentially longer-lived the plant. Italian ryegrass and hybrids are intermediate types in this respect. In summer hot and dry situations, vegetative tillering will be reduced or non-existent, hence perennial ryegrass may not persist well enough to be an option.

Ryegrass heading dates

This term refers to the relative maturity of a variety when the grass becomes reproductive and sends up flowering tillers. As a rule, the earlier the heading date, the more late winter growth potential and the more pronounced the spike in spring growth.



Early heading types are more suited to areas where the spring conditions may become hot and dry early. Once they have run to head they will typically stop producing unless there is follow up moisture. This is a useful survival strategy for ryegrass in drier extensive grazing areas. Once a grass starts to become reproductive and runas to head, the relative pasture quality is reduced as the plant accumulates more cellulose and lignin. Stalky pastures with lower proportion of leaf have reduced quality and animal performance can be reduced.

Conversely, it is typical for late-heading date varieties to exhibit relatively less winter growth, although this is now changing with some of the newer late varieties offering very good winter yields. Later varieties have a longer but steadier spring flush thus, allowing for greater flexibility and extended pasture quality into early summer.

It is often beneficial to have a range of heading dates on farm.

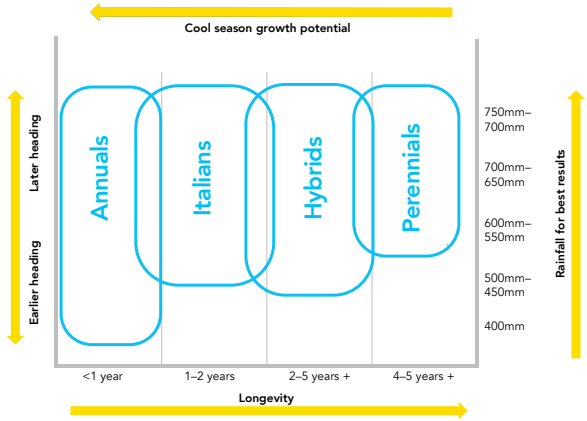
Early varieties

- Suit paddocks or locations that typically finish earlier e.g. lighter soils, north facing
- Maximise the potential from rain-fed (dryland) production with an early spring flush
- Likely to complement later paddocks by providing comparatively more feed in late winter/early spring
- Allow for allocation of paddocks for fodder conservation, with later paddocks being grazed
- Often can be considered for sites with shorter growing seasons or where lower input costs are justified

Later varieties

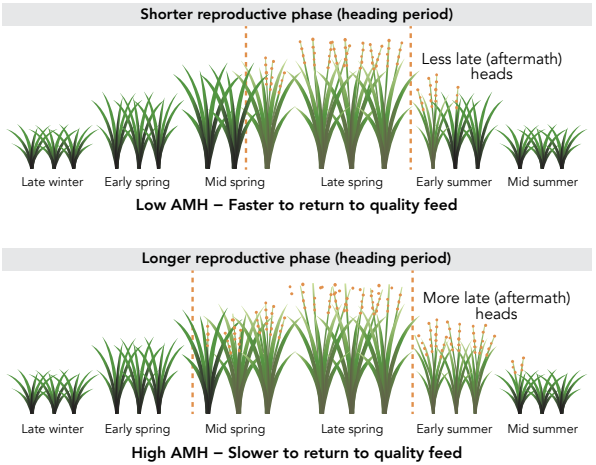
- Suit sites where the spring season holds on longer
- Offer higher feed quality and animal performance, over an extended period
- Maximise the potential value from summer irrigation or moist summer conditions
- Potentially spreads the silage/hay season risk and workload
- More usually suited to sites where higher outputs are being targeted
- Often considered more easily managed to maintain spring and summer quality

Ryegrass use pattern and fit chart



Aftermath heading

Increasingly, ryegrasses are selected to have as narrow a heading period as possible. For example, they are selected to run to head all at once, and then stop. This is termed 'low aftermath heading' (AMH). If a variety has an extended flowering period, then the quality of the pasture is reduced for an extended period due to the stalk content.



This explains part of the persistence of older type ryegrasses in some more mature pastures: it is not the original plant that survives, but the capacity for the stand to re-seed over a long flowering period, with lax grazing or through hay cutting. Nowadays, grass is more often conserved as silage, less frequently taken for hay and varieties are generally selected for low AMH. This means that to obtain true long-term perenniality, the grass must be managed to reproduce from its tillers. This can be encouraged by selecting the right variety for the conditions. This includes good grazing management, particularly in spring, appropriate fertility, and not grazing when the paddocks are going through stress such as drought or waterlogging.

Ryegrass ploidy: Diploid and Tetraploids

Ryegrass is naturally a diploid, meaning it has two sets of chromosomes. Some varieties are tetraploids: artificially developed by plant breeders to have four sets of chromosomes. This practice was first developed in Holland in the 1960s and has since become common in plant breeding. The practice does not involve gene modification. Tetraploids have larger seeds (nearly double the size of standard diploid types), and because of this a higher sowing rate is required. Plants of tetraploid varieties are also larger with wider, darker leaves, lower number of tillers, and fewer, but thicker roots. Tetraploiding in perennial ryegrass has been found to increase palatability and can increase feed value.

	Diploids	Tetraploids
Features	Smaller seed size	Larger seed size
	Finer leaves and stems	Broader leaves and thicker stems
	Often paler green colour	Usually bright, dark green
	Finer root system	Fewer, thicker individual roots
	Greater number of tillers per plant	Fewer tillers per plant
Benefits	Generally higher drought tolerance	Often have greater stock acceptance
	Greater pugging tolerance in wet environments	Usually grazed low, allowing higher clover percentage
	Lower sowing rates, lower cost per hectare	Generally lower fibre, higher ME
Disadvantages	Often slightly higher fibre, lower ME, although with new plant breeding this is no longer necessarily the case	Higher sowing rates required
		Less tolerant of lengthy dry periods
		Less tolerant of pugging and traffic
	Growth habit of some cultivars so dense as to be poor companions for clover	Will often offer less than ideal levels of fibre at key times e.g. early spring
		More readily over-grazed

Phalaris

Phalaris 2–6 kg/ha

Phalaris aquatica

Phalaris is a deep-rooted, vigorous perennial that is best suited to heavier soils, but will produce well on a range of soil types. Early released varieties were most suited to neutral and alkaline soils, although newer varieties have been developed to produce well in more acidic conditions. Phalaris has some tolerance to salinity and is very tolerant of periods of waterlogging. It is relatively resistant to cockchafers and corbie grubs.

Establishing a perennial pasture based on phalaris will improve farm productivity compared to systems relying on annual grasses. Nitrogen produced by pasture legumes, usually grown with annual grasses, leaches down though the soil profile, taking nutrients with it, leaving acidic elements behind. The deep-rooted perennial nature of phalaris draws these nutrients back up to help prevent or slow down the onset of acidification. Another major benefit of the deep-root system of phalaris is it improves persistence and productivity under drought conditions.

There are two main groups:

Winter active: summer dormant (to varying levels), more erect, more acid tolerant, suited to dryland and cattle.

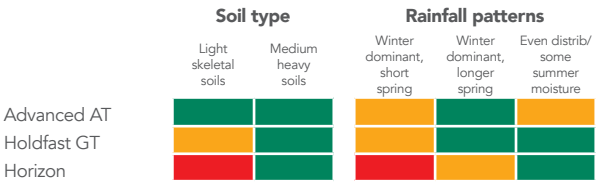
Winter dormant: more prostrate, often denser crown, neutral pH, suited to sheep, summer rainfall.

Phalaris has a small seed, reflected in the low sowing rate:

3–5 kg/ha (as only/main grass)
1–3 kg/ha (mixes with other grasses).

Typical companion species:

Sub-clover, white clover, strawberry clover, cocksfoot, fescue (and ryegrass if well executed).



Grazing tolerant

Holdfast GT

Phalaris

500+ mm 4.5 – 8.5 Most soil types

- Grazing tolerant winter active phalaris bred by the CSIRO
- Exhibits excellent seedling vigour to aid successful establishment
- Selected for long term persistence under grazing (both set stocking and rotational grazing)
- Increased productivity over the life of the stand
- Lower levels of stagger causing alkaloids
- Its ability to grow in moderately acidic conditions increases its area of adaptation
- Grazing tolerant replacement for Holdfast. Bred from Holdfast and other winter active varieties. Once established, Holdfast GT can be set-stocked and will provide a productive long-term stand.

Drought tolerant

Horizon

Phalaris

400-700 mm 4.8 – 7.5 Most soil types

- New CSIRO-bred winter-active phalaris
- Strong summer dormancy
- Improved persistence in medium rainfall regions
- Exceptionally high winter growth and fast establishment (for phalaris)
- Replacement for Atlas PG
- Lower total alkaloids than Australian.

Acid tolerant

Advanced AT

Phalaris

450+ mm 3.9 – 8.5 Most soil types

- Winter active phalaris with superior establishment and root penetration on acid soils, especially in tougher seasons
- Will tolerate pH $CaCl_2$ 3.8 and Al^{3+}% of 20–30%, providing better production and persistence on these soils than other phalaris varieties, cocksfoots and perennial ryegrass, (CSIRO, 2007)
- Higher second year dry matter yield than Holdfast on acid soils (40–80% across all CSIRO trial sites) and higher than closest acid tolerant variety, Landmaster (36%)
- Suited to rotational grazing and improved fertility, regardless of soil acidity
- Best managed by rotational grazing
- Gives producers with high acidity soils a productive and persistent pasture option that has not been previously available
- Will increase productivity on highly acidic soils with aluminium content and due to its broad breeding background, will also produce well in soils of a pH above 4.0.

	Grazing management		Soil pH		
	Rotational	Lax / set-stocked	Very acidic <4.5	Acidic 4.5 - 5.5	Neutral - alkaline 5.5 - 8.5
Advanced AT					
Holdfast GT					
Horizon					

Key:

- Good option
- Often suitable
- Not recommended

Phalaris establishment and management

Grazing of a newly sown pasture should be avoided until plants have become established. Grazing prior to effective establishment can cause plants to be pulled out reducing the population and pasture performance. Once established, phalaris will tolerate periods of set-stocking, although more erect varieties will benefit from good rotational grazing systems. Many older phalaris varieties have high levels of alkaloids which can cause phalaris toxicity (phalaris staggers). New varieties contain lower alkaloid levels in the leaves and therefore provide a safer grazing alternative. However, in areas prone to phalaris toxicity plants should be grazed cautiously in the autumn and early winter.

Phalaris can be grown with other legume or grass species to help reduce the risk of illness in livestock. Phalaris toxicity can affect sheep that are grazing on fresh growth after breaking rains. Stock are at the greatest risk when grazing on short, frosted plants, which mainly occurs during the autumn or the early winter period. To counter the potential problem, Cobalt bullets can be orally administered or by ensuring stock are not hungry when introduced to lush, green feed. The greatest risk to animals is when they are able to ingest a high level of herbage in a short period of time. Toxicity levels in the plant increases if plants are subject to stresses such as drought and frost.

Once stands are established it is recommended that the following be observed to maximise the benefits and persistence:

- Lime acid surface soils if needed/plausible, or use Advanced AT
- Apply superphosphate if Olsen P is 15–18ppm or less. Phalaris will respond well to higher P levels
- Graze winter active cultivars rotationally with 4–6 week spells in autumn-winter
- Do not graze too hard or too often after stem growth starts in spring, especially in a dry year
- Allow to produce seed heads in the first year, and at intervals in future years
- Flowering allows basal buds to be set for future growth.
- Clean up stem residues in summer to increase clover germination and growth
- Set stock after late spring to utilise feed and open the sward for clover growth
- Do not heavily graze new shoots from summer regrowth.

Cocksfoot

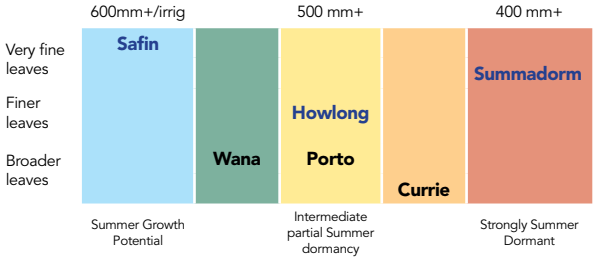
Cocksfoot 2–4 kg/ha in a mix,
Dactylis glomerata 6–8 kg/ha as dominant species

Cocksfoot is a tussocky, true perennial grass that suits lighter, well drained soils. It is generally the most acid-soil tolerant grass species and will produce well where many other grasses struggle to produce. Cocksfoot will also suit higher rainfall areas with free-draining, low pH soils e.g. granites and deep sands. It will perform best where reasonable fertility can be maintained and rotational grazing adopted, although cocksfoot pastures may be set-stocked for reasonable periods through spring if required. Cocksfoot does not contain any substances harmful to grazing animals.

Cocksfoot is slow to establish as the seed is small and light-weight. Cocksfoot is generally used in a wide range of rainfall areas from very low to very high, as a component in a pasture mix with clovers and other grasses. Higher sowing rates will result in the cocksfoot becoming dominant over time. It is generally used in extensive sheep and beef production, although there is scope for use within dairy systems and for all other stock classes.

Maintaining higher levels of soil fertility will help to increase production, persistence and feed quality. There are many varieties available, with some more noted for having a dense crown, and tolerant of drought and close grazing; others being less dense, more upright and better companions for clover. Cocksfoots are now available over a spectrum of seasonal growth activity, with new cultivar Summadorm at one end and summer active Safin at the other, with intermediate Howlong in between.

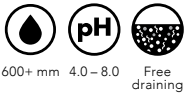
Cocksfoot can be very persistent and become the dominant pasture if not carefully managed. Levels of cocksfoot in the pasture mix should be monitored as animal performance may decline if it becomes rank the dominating species. It is suggested that cocksfoots are used in mixtures with other grasses such as ryegrass, phalaris or tall fescue. Other companion species include lucerne, white clover, red clover, strawberry clover and sub-clovers.



Summer active

Safin

Cocksfoot

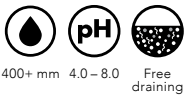


- Super fine leaved cocksfoot
- 40–50% higher tiller density than most other cocksfoots
- Increased early spring production with high total DM
- Suits lambing and calving patterns in medium rainfall dryland systems
- Reliable, palatable feed where summer rainfall is anticipated.

Intermediate

Howlong

Cocksfoot

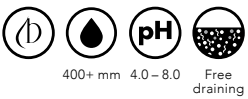


- Bred from Porto specifically for dry conditions and acid soils
- Improved autumn/winter growth
- Fine leaves and tillers
- Less likely to form clumps
- High total yield and good autumn winter growth
- More compatible with other species
- Versatile, hardy all-rounder.

Summer dormant

Summadorm

Cocksfoot



- Hardy, deep-rooted perennial grass that is well suited to dry conditions and acid soils
- Good seedling vigour and early growth
- Strongly Mediterranean type (summer dormant),
- Maximum herbage production is during the autumn, winter and early spring
- Excellent summer dormancy compared to other Mediterranean types
- New reselection from Kasbah.

Cocksfoot grazing management

Plants will benefit from light grazing during the first 6–8 months after an autumn sowing, provided the root system has developed adequately.

Light rotational grazing will encourage root development and allows it to compete with any legume which may have been sown as a companion species. If sowing with ryegrass, reduce the ryegrass sowing rate, and manage new pastures to ensure the cocksfoot can establish effectively. This may involve one or two initial on-off grazings with good monitoring.

In summer dry areas, avoid over-grazing during the spring/summer period. If grazing with sheep, extra care must be taken through dry periods as they can damage young and established crowns due to cocksfoot's erect growth habit. Poor management will lead to reduced plant numbers and persistence.

Cocksfoot pastures grazed with sheep should be rotated frequently so as not to allow the sheep to continually graze close to the crown. Over grazing during this period, in combination with moisture stress, can cause the stand to thin out significantly and allow weed invasion. This is particularly the case for summer-dormant (Mediterranean) types such as Summadorm.

Intermediate types such as Howlong and Porto, due to moderate capacity for summer growth, will require some level of summer grazing pressure to be applied. If this is not done, plants may become tall and rank as the autumn period approaches, thus reducing the quality of the overall pasture.

Summer active types such as Safin are now being introduced to offer productivity in lower fertility areas subject to summer rain or complemented by irrigation. Safin may be readily grazed as part of a mixed pasture in a summer active sward.

Tall fescue

Tall fescue 10 – 15 kg/ha
Festuca arundinacea

Tall fescue is a very deep rooted, true perennial that is adapted to a wide range of conditions and soil types. It will cope well with waterlogging and has a degree of salt tolerance. Generally a pH of 5.2 or higher is needed for best long-term results, and it will respond to improved fertility. It will do best under medium to high rainfall or irrigation, although Mediterranean types will persist in summer dry areas. Tall fescue is very slow to establish, and care must be taken not to have it selectively grazed out of mixed stands in the first year. It is a good species to use as a pasture base to companion cocksfoot, phalaris and clovers. Stock acceptance may be slow initially when introduced from ryegrass pastures. Suits all stock classes. There are two fairly distinct sub-groups:

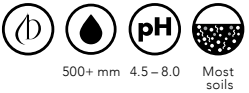
Mediterranean: Mediterranean cool season (winter) active, tall fescue is summer semi-dormant to dormant, giving improved persistence in summer dry regions. It is faster establishing than summer active tall fescue and has strong winter and spring production and fine leaves, maintaining better feed quality. It suits dryland, lighter soils and slopes.

Continental: Continental summer active tall fescue is a perennial grass more tolerant of hot summer, poorly drained and saline conditions than perennial ryegrass. These types are often sown under irrigation where higher summer temperatures limit ryegrass growth or where summer rainfall is expected. It performs best on heavier soils, where its deeper rooting ability can utilise more soil moisture than ryegrass.

Summer active

Fortune

Tall fescue

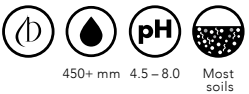


- Bred for improved survival under hot and dry conditions
- Superior persistence and yield compared to alternative leading tall fescue varieties
- Strong seedling vigour leading to successful establishment.
- Densely tillered, fine leafy growth with good stock acceptance
- Later heading offering improved feed quality
- Excellent yield in the shoulder seasons of early spring and autumn, and exceptional winter yields for a summer active type
- Suitable for all classes of livestock: nil endophyte.

Winter active

Prosper

Tall fescue



- Winter active forage tall fescue
- Fast establishing
- Truly summer dormant, excellent cool season growth
- Erect growth habit, with fine, soft leaves
- Rust resistant and is suited to summer dry environments
- Persistent and good legume companion
- Nil endophyte safe for all stock classes.

Pasture legumes

Grow with Confidence

Pasture legumes

Pasture legumes are a cornerstone of most pasture systems and many cropping programs. This group of species includes perennial plants such as white, red and strawberry clover, and annual or short-lived species such as sub-clovers, aerial-seeded annual clovers, vetches and lucerne. Other species such as lotus, serradella and biserrula are also important in some temperate regions. Many temperate species transfer well into the sub-tropics although there are particular species that are developed for the warm-wet north including burgundy bean, cow pea and stylo.

Legumes are typically used in combination with grass and other species as part of a long-term pasture or a specialty forage, to provide nitrogen fixation, improved pasture feed quality and diversity of species for resilience. In some cases clovers, vetches, lucerne and tropical legumes may be used as a specialty stand-alone crop for specific outcomes such as high quality fodder, a break crop or simply as the best way to utilise a particular site.

Species and variety selection are important, and sowing rates will vary depending on the situation. Sowing legumes with the correct grasses is a further vital consideration. Often a mixture of two or three pasture legumes will offer the best outcome.

For sowing a pure stand, typically multiply suggested sowing rates by 2–3 times.

White clover

White clover 2 – 5 kg/ha (in a mix)
Trifolium repens

White clover is productive and persistent under a wide range of management systems and has a high feed value. Its ability to fix atmospheric nitrogen makes a substantial contribution to the growth of companion grasses. White clover will grow over a wide range of soil and fertility conditions although a pH of 5.4 or higher with reasonable phosphorus levels is required for good results. It has poor tolerance of drought conditions and is best suited to medium-high rainfall or irrigation, where it will respond well to spring and summer moisture.

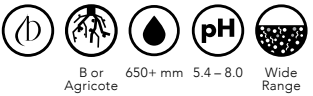
White clover has relatively little winter growth, is slower to grow in the spring than ryegrass and is susceptible to shading. Spring management aimed at keeping pastures short and leafy is therefore important to maintain good clover content and to capitalise on its good growth and feed value in summer.

In white clover, a large leaf size generally means less stolons, but more potential yield. A high stolon density and smaller leaf size means that there's better tolerance of adverse conditions, such as drought, pests, close grazing or pugging. It's important to select the right clover for the situation based on these attributes. Small- medium leaf size varieties will offer better persistence and often greater nitrogen fixation under sheep and extensive beef enterprises, whereas the larger leaf varieties are better suited to dairy and beef operations with good rotational grazing. It is often useful to use a smaller and a larger variety in a pasture blend.

Large leaf

Storm

White clover



- Australian bred white clover
- Tall plant that can aggressively compete in a mixed sward with ryegrass
- Excellent seedling vigour and is quick to establish with very high yield potential across all seasons
- Stolon density of Storm is high compared to other large leaf types
- Persistent under cutting and remains dense
- High production in winter and summer.

Strawberry clover 1 – 3 kg/ha (in a mix)

Trifolium fragiferum

Strawberry clover is very successful in areas where a long term, hardy pasture is required. It is especially useful in developed swamp country where soil types and drainage vary across a paddock. This is a true perennial clover that tolerates waterlogging and drought, and is suitable for neutral to alkaline soils, although it will survive in more acidic conditions. Strawberry clover is often used in slightly saline areas, as it is more salt tolerant than white clover and most sub-clovers. It is quite slow to establish, but will form a large crown in 2–3 years, and can become the dominant legume in a pasture sward. It is often used in extensive grazing areas as a component in ryegrass, tall fescue or phalaris pasture. It is very tolerant of close grazing by sheep and extensive beef once established.

Sub-clover

Subterranean clover 6 – 10 kg/ha (in a mix)
Trifolium subterraneum spp.

Sub-clovers are one of the most widely used multi-purpose pasture legumes used to supply high feed quality and enhance soil health. The term sub-clover refers to a group of three species:

ssp subterraneum: Black seeded, acidic (3.8) – neutral soils, most soil textures, low-medium rainfall

ssp yanninicum: White seeded, acidic – neutral pH, medium-heavy soils, medium rainfall

ssp brachycalycinum: Mildly acidic (4.5) – alkaline soils, medium-heavy soils, medium rainfall

The features mentioned above will vary between varieties.

Sub-clovers can contain varying levels of phytoestrogens that may affect fertility in sheep, although more recent varieties generally have lower levels. Sub-clover can cause bloat.

They are usually quite susceptible to RLEM; monitoring and control is needed for best performance.

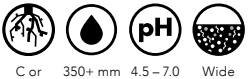
Seeds are relatively large and sowing rates need to be 2 or 3 times higher than most other clovers in order to reach a similar plant density. Sub-clovers are annuals and re-seeding is needed to provide persistent nitrogen fixation and quality in the pasture. Once a pasture has been established with sub-clover, a couple of years of re-seeding will help create a seed bank to back-up the occasional failed season.

Sub-clovers have been developed for varying rainfall and flowering dates. It is highly recommended to sow at least two varieties with differing flowering dates, so as to allow for a spread of flowering and seed-set as frosts, drought, grazing, pests and herbicides may reduce seed set or cause failure. In areas with an early spring, it is suggested to sow an early and a mid-flowering type. In later areas, sow a mid-maturing and a late variety. Levels of hard-seed will vary between cultivars, although most varieties have at least some hard seed component.

Early season

Losa

Subterraneum clover

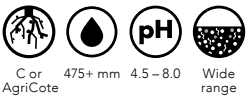


- Early season maturity – 97 days to flowering (Perth)
- More productive replacement for Dalkeith and Daliak
- Much improved early vigour
- High hard seeds (30%) for good regeneration and persistence
- Very leafy variety forming a dense and erect stand
- Suited to lower rainfall areas and cropping rotations.

Mid season

Campeda

Subterraneum clover

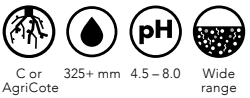


- Mid season maturity – 123 days to flowering (Perth)
- Greater winter vigour and growth than Woogenellup
- Higher total herbage production and disease tolerance
- Much higher level of hard seeds (29%)
- Increased disease resistance
- High total seed yield and excellent regeneration
- Replacement for Goulburn and Woogenellup
- Alternative for Seaton Park.

Late season

Denmark

Subterraneum clover

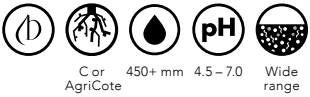


- Late season maturity – 144 days to flowering (Perth)
- Replacement for Karridale and Mount Barker
- Greater full season dry matter production
- Resistance to clover scorch and root rot
- One of the few subs that can continue to grow after flowering
- Highly productive high rainfall/irrigation option.

Mid season

Monti

Yanninicum clover



- Flowers earlier than Trikkala and Gosse
- Produces excellent early winter growth
- Excellent adaptation to the shorter growing seasons experienced over the last decade
- Produces excellent seed yields and regenerates reliably with a high level of hard seeds (36%)
- Has better tolerance to phytophthora root rot and clover scorch than Trikkala
- Well suited to areas receiving an annual rainfall of more than 450mm and prone to waterlogging.

Early season

Mawson

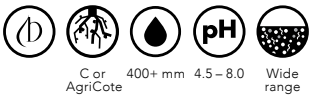
Brachycalycinum clover

- Early 88 days to flower sub-clover bred in Australia by SARDI
- Suitable for a long-term permanent pasture in shorter growing season environments
- Excellent long-term persistence
- Suited to both alkaline and mildly acidic soil types
- Higher levels of hard seed (43%)
- Improved seed yield over similar maturity varieties
- Excellent seed burial (65%).

Mid season

Mintaro

Brachycalycinum clover

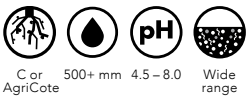


- Mid season maturity – 114 days to flowering (SA)
- Setting a new standard in mid maturity sub-clover
- Extremely vigorous establishment and winter growth
- High hard seed (45%) and very good regeneration
- Large leaved, upright very productive variety
- Particularly well suited to mildly acidic to alkaline soils.

Mid-late season

Antas

Brachycalycinum clover



- Late season maturity – 144 days to flowering (Perth)
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- Resistance to clover scorch and root rot
- One of the few subs that can continue to grow after flowering
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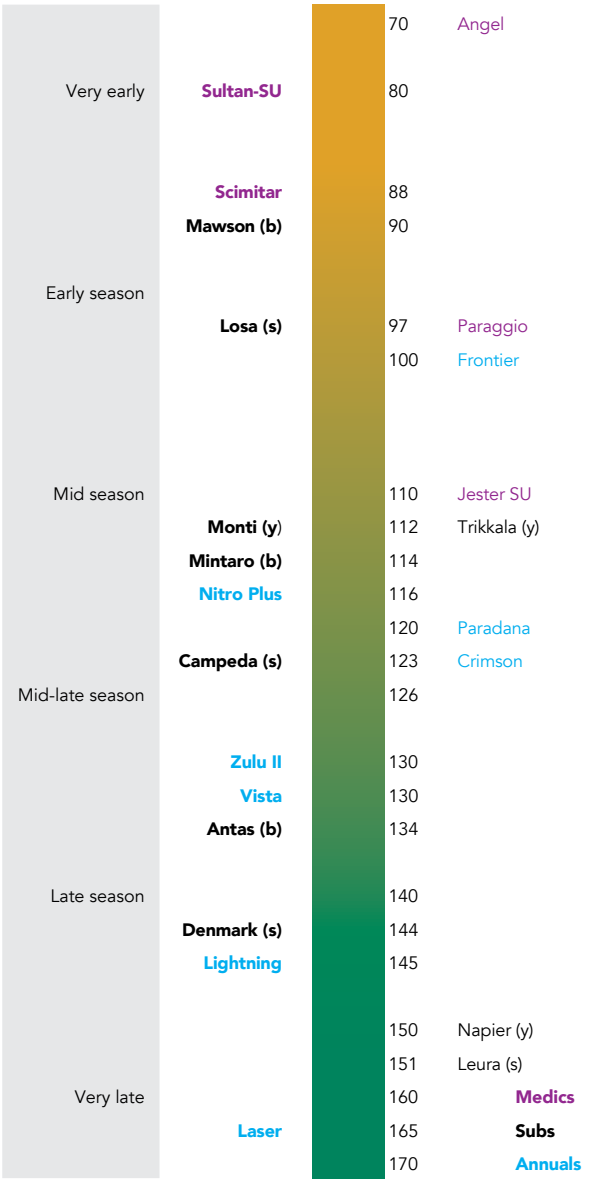
Sub and annual clover maturity dates



Annual clovers

Annual clover offers a range of grazing, hay and silage options with multiple benefits including nitrogen fixation, weed control rotations and disease breaks. The addition of annual clovers to grass or hay mixes can increase feed quality, feed protein levels and provide nitrogen for grass or cereal to grow.

Paddock and grazing management

Annual clovers are suited to rotational grazing. When used in a mixed sward, graze to manage grass but ensure animals do not re-graze areas, as this will greatly affect the recovery of annual clover. In pure stands, avoid grazing in the middle of winter. Don't graze below 5–8cm to allow maximum recovery. Avoid pugging.

In general, growth period between grazing will be around 50–60 days in winter and 30–40 days in spring. These clovers are generally annual options only, however hard seeded varieties (e.g. balansa) can be locked up just prior to flower initiation. They will then flower and set seed, and providing there is initial dry matter, graze hard prior to the autumn break to allow maximum germination.

Monitor stock – especially relating to issues such as bloat and excess protein. Certain weather conditions, lack of fibre and other energy sources can cause some stock issues. Remove stock during such times. Allow access to good quality water.

Balansa clover 2 – 5 kg/ha (in a mix)

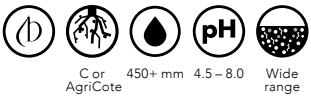
Trifolium michelianum

Annual legume for medium rainfall areas that suits most soils of acid - neutral pH. Tolerates mild salinity and some waterlogging. Suitable for grazing and fodder conservation with fair winter growth. It is very early flowering and seed set can be affected by frosts. Often used as part of a high density legume mix as the earliest flowering component. Also useful as an alternative to sub-clover in perennial pastures, or to add bulk and quality to annual and Italian ryegrass hay crops. Regenerates by re-seeding. Hard-seeded.

Late maturing

Vista

Balansa clover



- Late season maturity – approximately 130 days
- Superior spring/early summer growth
- Tolerates waterlogging and mild soil salinity
- Highly tolerant to clover scorch
- Well suited for annual/short term ryegrass mixes
- High quality hay or standing feed
- High hard seed levels aid regeneration
- Replaces and supersedes Bolta and Paradana.

Persian clover 2 – 5 kg/ha (in a mix)

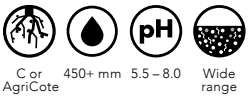
Trifolium resupinatum spp. resupinatum

Annual legume for medium rainfall areas that suits most soils of neutral-moderately alkaline pH. Tolerates mild salinity and some waterlogging. Suitable for grazing and fodder conservation with fair-good winter growth. Also useful as an alternative to sub-clover in perennial pastures, or to add bulk and quality to annual and Italian ryegrass hay crops. Regenerates by re-seeding. Hard-seeded (*ssp. resupinatum*) and soft-seeded varieties (*ssp. majus*) available.

Soft seeded

Laser

Persian clover - spp. majus



- Late season Persian – approximately 165 days to flowering
- Well suited to irrigation and summer rainfall
- Suitable for multiple grazing and hay cuts
- Used for fodder cropping and high density legume (HDL) mixes
- Improved rust resistance compared to Maral/Shaftal
- Superior quality to Maral/Shaftal
- Suitable for mixes with short term ryegrass
- Typically 20–30% more yield than Shaftal.

Soft seeded

Lightning

Persian clover - spp. majus

- Mid season maturity – about 145 days to flowering
- Vigorous, erect to semi-erect annual clover
- Establishes quickly from a later sowing
- Tolerates waterlogging and mild soil salinity
- Forage/fodder cropping/high density legumes or annual mixes
- Can be sown with oats or short-term ryegrass.

Very Hard seeded

Strathwood

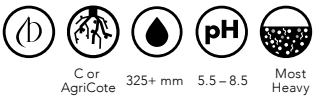
Persian clover - spp. resupinatum

- Early maturing – 72 to 125 days
- Very hard seeded – will ensure good regeneration
- Alternative to medics and early subs in low rainfall zones.

Hard seeded

Nitro Plus

Persian clover - spp. resupinatum



- Early-mid season maturity – as early as 68 days to flowering
- Prostrate-semi-prostrate self-regenerating annual clover
- Average 114 days to flowering
- High hard seed level – excellent regeneration
- Tolerates waterlogging and mild soil salinity
- Resistant to clover scorch and phytophthora root rot
- Suitable for haymaking and grazing
- Excellent cereal rotation legume
- Supersedes Kyambro.

Arrowleaf clover 2 – 5 kg/ha (in a mix)

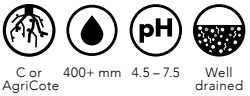
Trifolium vesiculosum

Annual legume for medium rainfall areas that suits well- drained soils of acid-neutral pH and tolerates mild salinity. Suitable for grazing and fodder conservation with fair winter growth. It is very late flowering and seed set can be affected by drought. Often used as part of a high density legume mix as the latest flowering component. It is also useful as an alternative to sub-clover in perennial pastures, or to add bulk and quality to annual and Italian ryegrass hay crops. Not known to cause bloat. Regenerates by re-seeding. Hard-seeded.

Very hard seeded

Zulu II

Arrowleaf clover



- Approximately 130 days to flowering
- Excellent tolerance to acid soils
- Excellent spring and early summer growth
- Well adapted to loamy and deep acidic sandy soils
- Deep taproot which can increase growth in drier seasons
- High level of hard seed ensures good regeneration
- Not known to cause bloat.

Medics

Well suited to semi-arid agricultural zones, annual medics (*Medicago spp.)* are often used to provide high quality feed for livestock. They also improve soil fertility through nitrogen fixation and act as a disease break for various cereal root pathogens. These self-regenerating pasture species have relatively high levels of hard seeds. This enables them to persist through cropping phases and regenerate in subsequent years as pasture. In an exciting recent development, Barenbrug has released varieties that have tolerance to residual Group B (sulfonylurea) herbicides, which are commonly used in areas normally suited to medics.

Barrel medic 2 – 4 kg/ha (in a mix)

Medicago truncatula

Annual forage legume that suits neutral to alkaline pH range. Suits low-moderate rainfall extensive grazing areas. Good for cereal/pasture rotations. Regenerates by re-seeding. Typically very hard-seeded.

Jester-SU

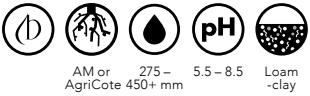
Barrel medic

- SU (sulfonylurea) residue tolerant
- Hard seeded barrel medic
- Similar flowering time to Jester
- Good aphid resistance (BGA & SAA)
- Australian bred.

Mid maturing

Sultan-SU

SU tolerant barrel medic



- First barrel medic with tolerance to SU herbicide residues
- Early maturing (~ 70-90 days to flowering), similar to Caliph and Angel
- Caliph hybrid with improved regeneration
- Less hard seeded than Caliph (~ 85% cf 95%), similar to Jester
- Good aphid resistance (BGA & SAA)
- Boron tolerant

Burr medic 2 – 4 kg/ha (in a mix)

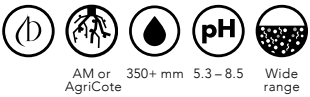
Medicago polymorpha

Annual forage legume that suits heavier soils of neutral to alkaline pH range. Suits low-very low rainfall extensive grazing/cropping areas. Good for cereal/pasture rotations that have longer pasture phase. Can tolerate some waterlogging. Regenerates by reseeding. Higher level of soft seeds than strand or barrel medics.

Early-mid maturing

Scimitar

Spineless burr medic



- Early to mid season – approximately 90 days to flowering
- Erect growth habit with high herbage and seed production
- Maturity is seven days later than Santiago
- Adaptable variety which grows on wide range of soils
- High percentage of soft seed (24%) – Santiago (8.5%)
- Excellent ley farming option with denser regeneration
- Increased salinity tolerance over other medics
- Better waterlogging tolerance.

Other medics

Strand medic 2 – 4 kg/ha (in a mix)

Medicago littoralis

Annual forage legume that suits sandy/loamy soils in the neutral to alkaline pH range. Suits low-very low rainfall extensive grazing areas. Good for cereal/pasture rotations. Regenerates by re-seeding. Typically very hard-seeded.

Snail medic 2 – 4 kg/ha (in a mix)

Medicago scutellata

Annual forage legume that suits heavier soils with a neutral to alkaline pH range. Suits low-moderate rainfall extensive grazing/cropping areas. Good for cereal/pasture rotations. Regenerates by re-seeding; soil disturbance often needed to obtain a good strike. Large seed pods are easily grazed by sheep.

Alfalfa

Grow with Confidence

Alfalfa

Alfalfa

Medicago sativia

Alfalfa is used as a long term pasture for grazing and/or hay production, a short term stand in cropping rotations, or as the legume component of mixed pastures. Being a legume, alfalfa has the ability to fix atmospheric nitrogen, providing nitrogen for its own growth, to companion species or increasing soil nitrogen levels for subsequent crops.

Alfalfa can utilise more rainfall and dry the soil profile with a large taproot that can easily grow to three metres depth or more to access deep soil moisture. This taproot also acts as an energy store for the plant, making established alfalfa very hardy.

Alfalfa has a moderate tolerance of salinity, which combined with its ability to dry the soil profile and lower the water table makes it a useful tool in managing soil salinity, particularly as an option in recharge areas.

The main limitations to the use of alfalfa include soil waterlogging and high soil aluminum (Al3+) levels which inhibit root development and cause difficulties with establishment.

Modern alfalfa varieties are now available that have been developed under intensive grazing conditions, with adequate resistance to key pests and diseases, ensuring they have the best chance of performing in a wide range of environments across the globe.

Selection of the right alfalfa variety is a crucial component of establishing a successful, productive and profitable alfalfa stand.

	350–400 mm rainfall	450–600 mm rainfall	600–800 mm rainfall	800 mm+ rainfall/ irrigation
Sowing rates kg/ha	4–6	6–8	10–15	18–35

Yield potential and fertility

Alfalfa can produce a wide range of yields potentially ranging up to 10–25 tonnes DM/ha/yr. Phosphurus and potassium (K) maintenance are essential, especially in a cut and carry operation where high levels of K (20–30K/t of DM) leave the paddock. For each 10t DM this equates to 200 kg calcium (Ca), and when compared to 360 kg Ca in one tonne of limestone lime, indicating that on average 1T lime/ha every two years or so is required to maintain calcium nutrition as well as to help manage pH and aluminium.

Fertiliser is generally applied at intervals that suit the grower. Ideally this is programmed with each cut, but may be only once or twice a year. Molybdenum (Mo) is essential for plant growth and healthy nitrogen fixation. Consider applying 150–200 g/ha of sodium molybdate or equivalent every 4–5 years where levels are typically low or Mo is neglected from other parts of the system or rotation. Mo should always be applied with copper included in the program to help avoid animal health issues.

Crop removals: For each tonne of dry matter (DM) removed, the following nutrients are lost.

Nitrogen	20–30 kg
Phosphorus	2–3 kg
Potassium	15–20 kg
Sulphur	2–4 kg
Calcium	10–17 kg
Magnesium	2–4 kg
Zinc	20–50 g
Copper	5–10 g
Boron	25–40 g
Manganese	35–50 g
Iron	50–100 g

As a pasture mix

When sowing alfalfa as a pasture mix, establish it with a low vigour grass such as a winter active fescue, phalaris or a winter active cocksfoot. It may be better to establish the alfalfa first and introduce the companion varieties a season or two later, especially for producers unfamiliar with alfalfa management.

Undersowing in cereals

If undersowing alfalfa with a cereal grain crop, cut the cereal rate back to 50% to ensure a good alfalfa stand is maintained. Expect lower cereal yields as a consequence.

Cutting

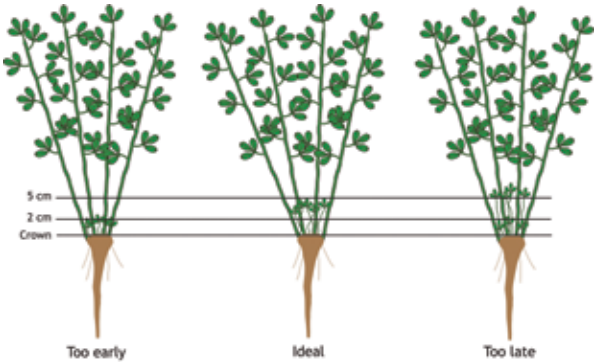
Cutting alfalfa needs to be done at or a bit before 10% flowering, but note the height of new shoots at the base of the crop, and ensure that they are not damaged as they will be the next crop (best method of assessing cutting timing). Conditioner rollers are useful for quick drying. Double conditioning has been used. Re-cutting depends on seasonality, climate and dormancy.

Dormancy	Days (potential cutting interval under ideal summer growing conditions)
Winter dormant	30 – 34
Winter active	27 – 30
Highly winter active	25

Grazing management

Ideal management of grazing would require a short, sharp grazing period of 2–3 days, followed by a rest and regrowth period of around 20–25 days over summer and longer over winter, with the stock introduced at around 5–10% flowering and the crop evenly defoliated. This, however, is rarely achievable due to various factors, but the principles borne in mind and grazing management adopted which tends towards this regime. In practice, alfalfa will handle limited set-stocking for a period of weeks or a month or two. If periods of set-stocking or lax rotational grazing are likely to occur, there are a number of key things to bear in mind and include in the program.

Stock will tend to graze the leaves in preference to the stems. This may lead to excessive protein intake leading to issues such as red-gut, and potentially bloat. In terms of stock performance, lax grazing may see an initial increase in performance, then the production levels fall off as stock are left with a high proportion of stalks on offer. Try to adopt a system where the entire stalk is consumed along with the leaves. Stock density will be important. Modern cultivars selected for high leaf:stem ratio such as the SARDI range will also help. Consumption of the leaf and stalk together is a relatively balanced diet for ME, CP and fibre.



Root reserves

Allowing the crop to have at least one good flowering per year will aid replenishment of root reserves. Ideally, use the appearance of new shoots at the base of the plant (approximately 10% flowering) to determine cutting/grazing timing – this will help top-up root reserves during the year. This will ideally take place in mid-late autumn, as the plant will then contain good reserves to come away the following spring. The feed reserve built up over the rest period in autumn can be fed off as valuable early winter feed, prior to winter cleaning sprays.

Winter dormant alfalfa

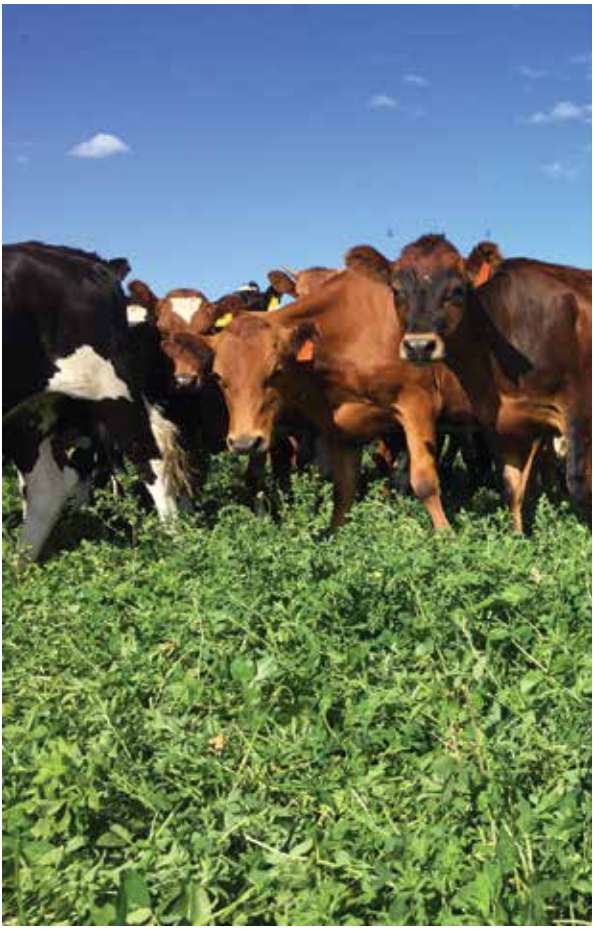
Winter dormant alfalfas grow actively through spring and summer and into early autumn when growth rates decline. They can be very productive under high rainfall or irrigation, but less productive than winter active types in regions with winter dominant rainfall below 650 mm.

These varieties generally have a low prostrate crown giving good grazing tolerance and improving persistence. They also have a high leaf to stem ratio which can contribute to higher feed and hay quality. Winter dormant alfalfas are not suited to late autumn/early winter sowing.

These alfalfas are best suited to irrigated hay production or long-term pasture situations in colder, wetter environments, where rainfall continues into late spring and early summer, and winter grazing is provided by other pastures or crops. Winter dormant alfalfas can also be used in mixtures with perennial grasses.

Grazing tolerant alfalfa

Growers should select alfalfa cultivars developed for and selected under grazing in Australia. These have been screened and re-selected under protocols which provide such features as a low and broad crown, high number of auxiliary buds, and have been subjected to very high grazing pressure for extended periods. The Australian program run by SARDI and Barenbrug has these features built in as breeding objectives, which result in the high resilience to grazing of all varieties in the range.



Dormancy 6

SARDI-Grazer

Alfalfa

- The most grazing tolerant commercial alfalfa variety currently available in Australia
- Winter active
- Persists under periods of set-stocking up to two months once established
- Requires minimal rotational grazing management
- Exceptional persistence across a range of environments from low to high rainfall, dryland and irrigation
- Broadly adapted to a variety of farming systems
- Well suited to mixed swards with perennial grasses such as winter active tall fescue, cocksfoot or phalaris.

SARDI-Grazer is the most persistent and grazing tolerant alfalfa currently available in Australia. A new variety, it was established primarily for use in cropping rotations, where large paddocks limit the use of rotational grazing. It delivers superior persistence where uneven grazing causes areas of paddocks to be heavily grazed before others can be properly utilised. It is also useful in permanent pastures in the medium to high rainfall areas where long periods of continuous grazing (more than four weeks) by sheep or cattle is common practice.

SARDI-Grazer was developed by SARDI and the Department of Agriculture and Food, Western Australia, with funding from the GRDC. The final parental plants used to develop this variety were selected based on resistance to aphids and diseases (BGA, SAA, PRR and Anthracnose), herbage yield and quality plus winter activity rating. SARDI-Grazer is the ideal choice for grazing enterprises where mob sizes restrict rotational grazing and when a long-term stand is required.

Winter active alfalfa

Winter active alfalfas have an intermediate crown and can provide excellent grazing tolerance and persistence. They are the most versatile and therefore the most popular lucerne group, giving good growth into late autumn and holding their quality longer than highly winter active varieties.

Winter active varieties are best suited to medium term mixed farming situations that require grazing tolerance and the ability to make good quality hay. They are well suited to irrigated or dryland production and are useful as a pure stand or as a perennial legume component in pasture blends for regions with 450–650mm winter dominant rainfall.

These alfalfas also make excellent permanent summer forage crops in the high rainfall dairy regions because they provide feed over a longer period than summer brassicas without the same insect problems.

Dormancy 7

SARDI-7

Alfalfa

AL or AgriCote | 350+ mm | 5.0 – 8.0 | Deep well drained

- Broad adaptability - Shown to grow/persist in acidic soils down to pH 4.5$CaCl_2$
- Exceptional persistence
- High yielding, multi-purpose with excellent persistence
- Strong pest and disease resistance and good grazing tolerance
- Improved performance in cold, wet environments
- Well suited to grazing and hay production with a broad crown and high leaf to stem ratio.

Highly winter active alfalfa

Highly winter active alfalfas are bred for late autumn/ early winter sowing and have excellent seedling vigour for undersowing. Some of the newer Australian bred material in this group has increased grazing tolerance because it was selected from and developed for these broadacre grazing systems.

These alfalfas have a more upright crown and erect growth habit and are well suited to a 2–4 year cropping rotation system in the 300–500 mm rainfall zones. They provide maximum growth from winter dominant growing season rainfall. Generally highly winter active lucernes do not persist as well as more dormant types.

Dormancy 9

Bar ST

Alfalfa

AL or AgriCote | 350+ mm | 5.0 – 8.0 | Deep well drained

- Salt tolerance demonstrated in establishing alfalfa
- Strong plant vigor and establishment
- Highly resistant to fusarium wilt, hytophthora root rot and pea aphid
- Resistant to anthracnose

Dormancy 10

SARDI-10

Alfalfa

AL or AgriCote | 350+ mm | 5.4 – 8.0 | Deep well drained

- Multiple screens for excellent disease and insect resistance
- Very good seedling vigour
- Highly productive 3–4 year option
- Suited to cropping rotations, pasture mixes and year round hay production systems
- Improved forage production and persistence over SARDI 10
- High winter growth and grazing tolerance.

Dormancy 10

PX1

Alfalfa

AL or AgriCote | 350+ mm | 5.0 – 8.0 | Deep well drained

- High yield potential especially in desert environments
- Superior establishment and reduced time to first cut
- Bred for improved persistence and productivity over traditional dormancy 10 varieties
- Good all round pest and disease resistance/tolerance

Dormancy 10

PX2

Alfalfa

AL or AgriCote | 350+ mm | 5.0 – 8.0 | Deep well drained

- Exceptional forage yield in both temperate and desert environments
- Semi erect plant growth habit
- High winter growth and grazing tolerance
- Excellent disease and insect resistance package
- Impressive all year forage production
- Superior early yield PX2 25% higher than CUF 101

Dormancy 11

Alfamaster 11™

Alfalfa

AL or AgriCote | 350+ mm | 5.0 – 8.0 | Deep well drained

- Ideally suited to hot, desert environments
- Short-term rotations for high output farming
- Excellent pest and disease resistance
- Exceptional seedling vigour
- Amazing regrowth after cutting and grazing
- Perfectly suited to desert environments where they are utilised under high intensive farming systems.

Forage brassicas and herbs

Grow with Confidence

Forage herbs

Chicory 5 – 8 kg/ha

Cichorium intybus

Chicory is a persistent leafy herb lasting 2–3 years with a large tap root. It performs best in fertile, free draining soils in regions of greater than 550 mm rainfall. It has potential for high dry matter of excellent quality with most growth through warmer periods.

Chicory should be sown at 5–6kg/ha as a sole stand or at 1–2kg/ha as part of a grass clover mix. Often used as an annual (summer) forage in combination with millet, clover or forage brassicas.

Chicory requires a well prepared seed bed and soil temperatures of greater than 10°C for successful establishment. Chicory should be rotationally grazed on a 4–6 week rotation and will require added nitrogen for maximum performance.

High yield

Commander

Chicory

550+ mm 4.5 – 7.5 Most soil types

- Chicory for high performance sites
- 15–20% higher yield than prostrate types
- Performs all year round including winter
- Fast establishment and regrowth after grazing
- High quality winter active forage chicory
- Erect growth habit offers high utilisation
- Responds to summer rain and irrigation
- Low crown gives good persistence over 2–3 years
- Alternative to brassicas for summer forage
- Sown at 5–6 kg/ha with legumes and 1–2 kg/ha as part of a pasture mix

Vetch

Grow with Confidence

Vetch

Vetch is a winter and spring growing annual legume that is commonly used as a disease break in cereal cropping rotations.

Vetch is often sown in combination with cereals for quality hay. It is often highly sought as a fodder to support dairying due to excellent quality and palatability.

It may be suitable for spring sowing in higher latitude, cold winter areas. Common vetch may be used for grain. Vetch has the ability to improve soil fertility by fixing large amounts of nitrogen (N) to the soil, which helps to meet the needs of following crops. It responds well to a wide range of soil types, however it does not tolerate water-logging.

There are a number of different vetch species, the most useful being:

Common vetch *(Vicia sativa)*
Suited to grazing, silage, hay, grain, larger seed size, lower % hard-seeded.

Woolly-pod vetch *(Vicia villosa)*
Suited to grazing, silage, hay, smaller seed size (grain is toxic to stock: make hay before pod-set). Generally higher % hard-seeded than common vetch. 15–20% higher hay yield potential than common vetch.

Purple vetch *(Vicia benghalensis)*
Suited to grazing, silage, hay, grain hard-seededness varies with cultivars. (Outclassed by new common and woolly-pod types.)

Sowing time: As a rule of thumb, very often the best sowing window for a district coincides with barley sowing time:

- Lower rainfall, spring dry areas April – May
- Medium rainfall areas May – June
- Higher rainfall/cold winter areas June – August (or later).

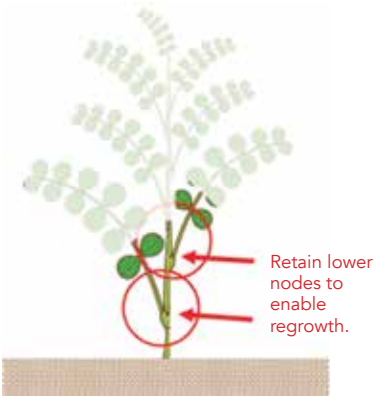
Inoculation: Group E inoculant ought to be applied to seed where vetch, peas or faba beans have not been grown previously.

Sowing rates: There is some variation in seed sizes, common vetch the largest, woolly-pod the smallest, requiring allowance for seeding rate, depending on the species being sown. Target plant densities are usually from 40 to 70 plants/m^2. Cereal vetch mixes are generally about 2:1 to 1:2 w/w, depending on seed sizes, and desired outcome.

Vetch – typical sowing rates kg/ha				
	Sole stand		In a mix (cereal)	
Species	Lower rainfall	Higher rainfall	Lower rainfall	Higher rainfall
Common vetch	30–50	50–70	25–40	30–50
Woolly-pod vetch	15–30	30–40	15–25	25–30
Purple vetch	30–40	40–60	20–30	30–40

Sowing depth:
Heavier soils: 10–20 mm Lighter soils: 15–40 mm

Grazing There is some potential for carefully managed grazing of vetch crops. During the growing phase, allow the plant to develop secondary nodes prior to grazing, and manage grazing such that a good number of these are preserved to provide for regrowth potential. Common vetch may be grazed through flowering or as a standing hay crop. Woolly-pod vetch must not be grazed after pod-set.



Woolly pod vetch 15 – 30 kg/ha

Soft-seeded

RM4

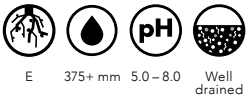
Woolly pod vetch

- Best early vigour of all lines in SARDI research trials
- Long-term average dry matter yield 108% of Capello
- Early maturity - can be cut for hay 10–15 days earlier than current varieties
- Good frost tolerance in international testing
- Soft seeded.

Soft-seeded

Capello

Woolly pod vetch

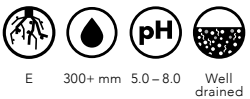


- Softer seeded than other woolly pod vetches
- Reduces problems of volunteer vetch plants
- Suitable for grazing, hay and green manuring
- Highly efficient nitrogen fixation
- Offers a disease break in cropping rotations
- Can reduce black root rot in cotton rotations
- Resistance to spot, rust and ascochyta.

Hard-seeded

Haymaker Plus

Woolly pod vetch



- Hard seeded, good regeneration from seed
- Selected for improved DM production over Namoi
- Suitable for grazing, hay and green manuring
- Highly efficient nitrogen fixation
- Offers a disease break in cropping rotations
- Resistance to spot, rust and ascochyta.

Forage cereals

Grow with Confidence

Forage cereals

The Barenbrug program of breeding and development that underlies the release of varieties is unmatched. New varieties are developed for tolerance to multiple grazing, high quality and high forage yields. Further evaluation in tough conditions means that these true forage cereals have the ability to perform as needed for the Australian grazing and forage industries.

Forage cereals are a group of species that are used for a specific seasonal grazing and/or fodder requirement. Whilst most cereals may offer some grazing or silage/ hay making opportunity, true forage cereals are developed with traits that include:

- Rapid establishment
- Fast recovery from grazing
- Higher early season grazing yield
- Higher proportion of leaf over stem material
- Increased tillering capacity
- Generally higher feed quality and forage yield than grain-type cereals.

In most areas where winter feed with a subsequent fodder opportunity is needed, forage oats, triticale and barley may be planted from late summer through to mid-winter. Some oats and barley may also have application for late winter and early spring sowing in southern areas with excellent results. Where summer and early autumn feed is needed, forage sorghum and millet are also very useful options. These may also be conserved as silage or hay if required.

Forage cereals may play a significant role as a break crop as part of a pasture renovation program and at the same time provide a valuable feed source when other options may be unreliable. Cereal forage crops may be further enhanced by the inclusion of other species such as vetch, field peas, short-term ryegrass, annual clovers and forage brassicas.

Establishment

Forage cereals are well suited to sowing into either a prepared seed bed, or more commonly, by direct drilling into spray-fallows or crop residues. Consider the paddock history, or conduct a soil test to determine fertiliser requirement. However, a modest application of DAP or similar at the time of planting is usually beneficial. Consider the options for pre-emergent herbicides and insecticides where appropriate, as they will give the crop the best chance to out-compete pests. In heavy trash situations, incorporating an early application of a molluscicide for slugs or snails may be necessary.

Sowing depth should be between 10–35mm, although slightly deeper sowing is often still satisfactory. Assess the crop for weeds again when it has developed 3–4 true leaves and treat accordingly. Forage cereal crops are generally ready for a light first grazing when 20–25cm high, down to about 10cm. This will be around 6–8 weeks after sowing depending on conditions, and the crop can be allowed to re-grow for multiple subsequent grazings.

Forage oat, triticale & barley

	500mm rainfall	600mm rainfall	700mm rainfall	800mm rainfall	Irrigation
Sowing rates kg/ha	40–60	70–90	80–90	80–100	100–120

Grazing management

True forage cereals are developed to withstand grazing pressure and can be grazed through winter, with minimal loss of total forage yield if grazed correctly. The crop should only be grazed when the roots have developed sufficiently to anchor the plants so that they will not pull out. This is generally the case once the crop has reached 25cm in height. Ideally the crop should be grazed before the first node has developed, to avoid the loss of the nodes and resulting tiller death. As a rough guide the crop should be grazed at a height of 25–30cm.

How hard to graze

Post-grazing height is critical in maintaining crop yield. The crop should be grazed to no lower than 10cm or just above the first node. If the first node is removed, regrowth will be significantly reduced as the removal of the node will result in the death of that tiller. True forage cereals do have the ability to re-tiller post-grazing. However, this regrowth will be slower than growth from established tillers, resulting in diminished production.

Ongoing management

Rotational grazing is the best way to maximise crop production and the crop can be re-grazed each time it reaches 25–30cm in height. As the crop progresses, it is inevitable that the nodes will begin to rise and additional care must be taken to avoid over-grazing and tiller death. Grazing crops at these later stages of development will most likely reduce the yield at final harvest. Set-stocking of forage cereal crops will often give the best results for fattening cattle, particularly in northern Australia. For best results the stocking rate needs to be adjusted depending on the growing conditions and growth rate of the crop.

Adverse conditions

Grazing when the soil is very wet will result in crown and root damage, and recovery and total yield will be reduced. If conditions become very dry, grazing to 10cm to remove leaf tissue may aid survival by reducing evapotranspiration.

Forage oats 60 – 120 kg/ha

Avena sativa

Forage oats are a broadly adapted and reliable winter forage crop and are the most widely used of the forage cereals. Easy to establish, they are the only true forage cereal that can be sown in late summer and early autumn, giving forage oats the highest potential yield of the forage cereals.

Forage oats have a winter habit – growth will slow over the colder months and are slow to establish if sown too late. They produce reasonably well from a late winter/early spring planting given a higher sowing rate. In southern Australia, barley yellow dwarf virus (BYDV) is a significant disease, limiting production in susceptible varieties.

Express

Forage oat

400+ mm 4.5 – 8.0 Most soil types

- Exceptional early vigour
- High winter and good overall yield
- High quality, leafy feed
- Excellent BYDV tolerance
- Suitable for grazing, silage and hay
- Suits southern climate zones
- Replacement for Mammoth.

Wizard

Forage oat

400+ mm 4.5 – 8.0 Most soil types

- High yielding – 9% over Aladdin and Genie, 15% over Drover and Taipan
- Good early growth
- Excellent recovery from grazing and cutting
- Currently resistant to most Australian pathotypes of leaf rust
- Medium maturity
- Well suited to northern climate zones.

Forage triticale 60 – 120 kg/ha

X Triticosecale

Triticale is a cross between wheat and cereal rye. Combining the quality and yield of wheat and the broad adaptability of rye, triticale is an extremely hardy and adaptable species. It has good disease resistance and is suited to a wide range of climates and growing conditions including light, sandy soil. It can also tolerate acid soils and waterlogging better than other forage cereal species, and has a more developed root system, giving better suitability to light soils.

The reliable grain yield of triticale is the key factor in its use for whole crop silage production. With whole crop silage, the crop is taken through to near maturity and while other cereals lose feed quality rapidly after emergence and continue to fall, the quality of triticale increases as the grain fills.

Crackerjack 2

Forage triticale

- Mid/late maturity
- Stripe rust resistant
- Very high forage yield or whole crop silage option
- Excellent winter vigour
- Very good resistance to lodging
- Long and broad leaves
- Can be sown earlier than the original Crackerjack.

Saia Supreme

Oats

- Early sown forage/hay option
- Fine stemmed tall variety
- Grows in wide range of soil type
- Provides extended grazing from early sowings
- Moderate resistance to cereal cyst nematode.

Forage barley 60 – 100 kg/ha

Hordeum vulgare

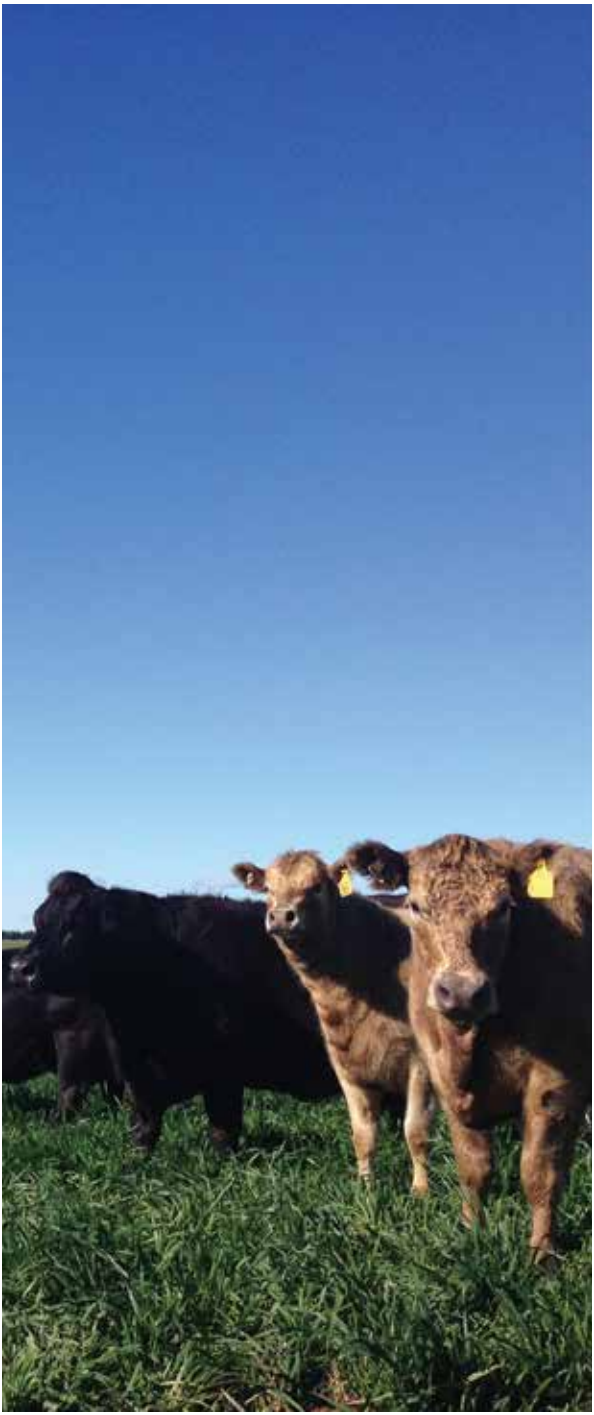
Barley has fast establishment and high winter production. It is best suited to late planting situations where its quick early growth under cold conditions is an advantage over other forage cereals. Barley provides excellent forage for grazing, hay or silage, with good forage quality. The later planting window gives more flexibility with late finishing crops like maize and earlier finish gives the best chance of getting the summer crops sown early into adequate soil moisture.

Dictator 2

Forage barley

450+ mm 5.4 – 8.0 Most soil types

- True forage barley bred to replace Dictator
- 15–20% higher DM yield than Moby
- Fastest winter growth of all true forage cereals
- Ideal for late sowing
- Rapid establishment and early growth
- Quick regrowth after grazing
- Awnless – suits haymaking as well as silage
- Highest feed quality of forage cereal options:
  - Higher metabolisable energy (ME)
  - Lower neutral detergent fibre (NDF)
- Very high stock acceptance.



Summer crops

Grow with Confidence

Barenbrug summer crop program

Barenbrug is now a major player in this exciting sector thanks to a formal licencing agreement with NUSEED Pty Ltd to licence, market and distribute their existing grain sorghum, forage sorghum and sunflower products and have access to Nuseed germplasm.

This agreement includes a plant breeding program, allowing Barenbrug to develop our own sorghum and sunflower varieties to bring exciting new products to market.

The expanded sorghum and sunflower program offer means Barenbrug can capitalise on our significant investment in capability and infrastructure, including the new state-of-the-art $15-million warehouse facility in Toowoomba, supported by our expanded team across Australia.

The range of summer crop varieties available from Barenbrug is second to none, with a product to suit every situation and purpose.

Photo: Scott Commens

Forage sorghum

Forage sorghum 4 – 25 kg/ha

Sorghum spp.

A warm-season, annual grass used for strip grazing, silage and hay, capable of very high yields under the right conditions. Irrigation usually essential for best performance. There are many varieties, hybrids and sub-types — select with care to suit your local conditions. In southern Australia, cool tolerant varieties should be used. It should be sown when soil temperature is over 16°C and rising. Crops less than 50cm high, or under drought or other stresses, may create issues with prussic acid poisoning, depending on the condition of the crop and the variety.

Hybrid forage sorghum

- Typically fast to graze: 7 to 8 weeks
- Prussic acid risk
- Medium stem thickness.

Sudan grasses

- Lower yield than hybrid forage sorghums
- Fine stems
- Quicker initial growth
- Lower prussic acid risk.

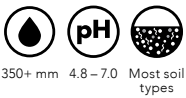
Sweet sorghum

- Retain feed value and palatability as they mature
- Thick stems
- Higher levels of prussic acid during early growth
- Used for silage and stand-over feed.

Sudan x sudan grass

Nudan

Forage sorghum

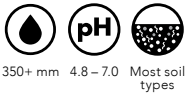


- Lower prussic acid levels
- Fine stemmed for quicker drydown after cutting
- Excellent leaf to stem ratio resulting in reduced wastage
- Rapid regrowth and recovery
- Ideal for intensive grazing for sheep and cattle
- Well suited to earlier grazing
- First choice for quality hay production.

BMR sorghum x BMR sudan

Revolution BMR

Forage sorghum

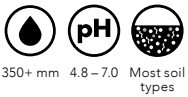


- Superior 12 gene BMR release
- Extremely vigorous hybrid well suited to early sowing
- Lower prussic acid levels - recommended for early grazing
- Fine stemmed and very leafy ideal for hay making and silage
- BMR technology may boost weight gain and milk production by around 20%
- Contains lower amounts of lignin.

Sorghum x sudan grass

Lush

Forage sorghum

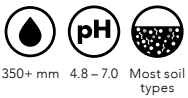


- Lower prussic acid levels
- Fine stemmed, especially at higher planting rates
- Very leafy forage with excellent leaf to stem ratio
- Suits intensive grazing and high stocking rates
- Ideal for early grazing
- Makes excellent hay due to high leaf ratio and regrowth ability.

Sweet sorghum x sweet sorghum

Hunnigreen

Forage sorghum



- High energy feed with superior sugar content
- Quality increases with maturity
- Excellent standover feed for late grazing into autumn and winter
- Late flowering reduces ergot risk
- Suitable for grazing and some hay making situations
- Excellent for silage
- Leafy with excellent palatability
- Can be grazed all summer.

Grain sorghum

Cracka

Grain sorghum

400+ mm 6.0 – 9.0 Deep vertisols / duplex red soils

- Semi-open head type
- Medium height
- 70–72 days to flowering
- Mid maturity option
- Excellent seed size
- Low-moderate stay green (dries off well pre-harvest)
- Good lodging tolerance
- Well suited to dryland and irrigation.

Liberty

Grain sorghum

400+ mm 6.0 – 9.0 Deep vertisols / duplex red soils

- White grain sorghum
- Midge tested 4
- Semi-open head type
- Medium – tall height
- 75–80 days to flowering
- Mid - late maturity option
- Moderate stay-green (standard spray out practices)
- Moderate lodging tolerance
- Excellent pollen producer (reduces ergot risk).

Tropical Crops

Grow with Confidence

Tropical crops

At Barenbrug we specialise in the highest quality pastures, forages and field crops. We offer an extensive range of seed species and varieties to help our customers grow highly productive pastures to maximise their output from the furthest reaches of northern Australia to the colder temperates of Tasmania and west across the country.

With a commitment to research and innovation, Barenbrug strives for continuous improvement of our product range in facilities and testing sites throughout Victoria, New South Wales and Queensland. We take a collaborative approach with leading agricultural plant breeding and research organisations to ensure our proprietary varieties meet the demands of our challenging industry.

Our highly experienced and knowledgeable team of territory managers can offer valuable and timely advice to guide farmers and retailers to make informed decisions that suits their local environments.

With a focus on research, Barenbrug strives to improve the range of tropical grasses and legumes to provide

the highest quality pastures for the industry with best practice management. Farmers can be confident that Barenbrug seed has optimised pasture performance for grazing livestock while maintaining the health of the soil.

Developing an improved pasture in the tropics and sub-tropics is no easy task. It can require a substantial investment of time, planning and management to achieve a successful result.

Barenbrug can make this task a lot easier with a group of dedicated and experienced territory managers providing advice on a range of improved pasture products, backed by services that are second to none with ongoing support to ensure continued improved pasture success.

Our seed treatments - AgriCote™, OptiCOTE™ and OptiSelect™ - provide improved pest protection and greater success rate in pasture establishment through improved seed quality, allowing you to grow with confidence.

Tropical legumes

Ebony
Cowpea

- An extremely versatile summer forage providing good grazing, hay and silage options
- Prostrate growth habit that can withstand harder grazing
- Improved root and stem rot resistance
- Great source of nitrogen fixation in summer rotation
- Ideal for producing high quality summer finishing feed
- Nil prussic acid poisoning issues
- Suitable as a companion legume with millet and forage sorghum.

Presto
Burgundy bean

- Hardy, non-bloating tropical and sub-tropical legume
- Earlier maturing variety selected for shorter growing seasons
- Recruits readily from seed and regenerates from the crown
- Highly palatable – live weight gain up to 1.0Kg/head/day+
- Drought and cold tolerant.

Garnet
Burgundy bean

- Hardy, non-bloating tropical legume
- Later maturing variety selected for longer growing seasons
- Recruits readily from seed and regenerates from the crown
- Highly palatable – live weight gain up to 1.0Kg/head/day+
- Drought and cold tolerant.

Amiga

Stylo

400+ mm 5.4 – 8.0 Many soil types

- Highly palatable and persistent, improved Verano-type stylo
- Suited to cooler, more arid regions of the tropics
- Easy to establish, produces an abundance of seed
- Exhibits greater anthracnose tolerance than Verano
- Exceptional tolerance to drought conditions.

Siran

Stylo

400+ mm 5.4 – 8.0 Many soil types

- Erect shrubby perennial that can grow up to two metres tall
- Exhibits greater anthracnose tolerance than Seca
- Widely adapted and can persist under heavy grazing
- Shows good tolerance to drought and is suited to a wet-dry climate
- Produces large quantities of high protein nutritious feed for the dry season.

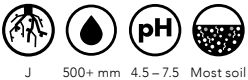
Ray Desmanthus®

Desmanthus

400+ mm 6.5 – 9.0 Medium to heavy

- Highly palatable, non-toxic tropical legume (no mimosine)
- Ideally suited to heavy clay soils
- Exceptional persistence – recruits readily from seed and regenerates from the crown
- Drought tolerant – deep tap rooted perennial able to access moisture
- Tolerant to frost and heavy grazing
- No requirement for height management.

Dolichos
Lablab



J | 500+ mm | 4.5 – 7.5 | Most soil types

- Rangai (late-flowering) and Highworth (earlier-flowering) varieties available
- Annual vining tropical legume suitable for green manure and grazing
- Also suitable for browsing game
- Drought tolerant once established.

Sustain LS®
Lablab

600+ mm | 5.0 – 7.5 | Light to heavy

- Rongai dolichos lab lab proprietary type
- Late maturity
- Higher leaf density
- Reduced vine thickness
- More seeds per kilogram
- Ideal companion legume species option
- High dry matter production

Milgarra
Butterfly pea

500–1500 mm | 4.5 – 8.7 | Most soil types

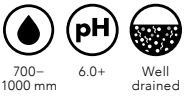
- Easy to establish and persistent non-bloating tropical legume
- Tolerant of heavier clay soils
- High palatability, digestibility and protein content
- High forage and seed production ability.

Cavalcade
Centro

700–1500 mm | 5.0 – 8.5 | Wide ranging

- Fast growing twining, climbing annual
- Suited to higher rainfall areas with pronounced wet and dry seasons
- High forage and seed yields
- High quality feed and high palatability
- Suitable in pastures for grazing and hay production.

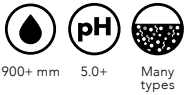
Glycine (Tinaroo / Cooper)



- Productive, palatable and persistent climbing deep rooted legume
- Tinaroo pushes longer into cooler months but slower to establish
- Cooper faster establishing, tolerates drought and waterlogging better than Tinaroo
- Combines well with creeping and tussock grasses.

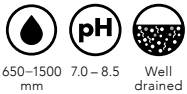
Greenleaf

Desmodium



- Trailing, vine type, perennial legume with a strong taproot
- Good early and late season growth
- Shade and frost tolerant
- Combines well with both creeping and tussock grasses.

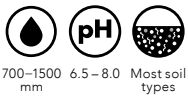
Leucaena



- Highly productive with high nutritive quality
- Extremely drought tolerant
- Retains leaf during dry periods
- Combines well with tropical grasses.

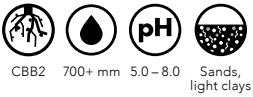
Siratro

Aztec atro



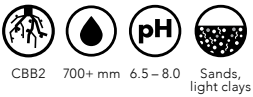
- Drought hardy, non-bloating, highly palatable
- Highly productive and persistent with ideal grazing management
- Widely adapted to soils of different textures and pH levels, including saline soils
- Intolerant of flooding or waterlogging
- Aztec variety has improved rust resistance over Siratro.

Ubon
Stylo



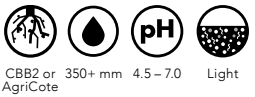
- High resistance to anthracnose
- Highly productive erect to semi-erect short-lived perennial
- Up to 19% crude protein
- Prefers well-drained soil types
- Moderately tolerant to high aluminium, but not high salinity
- Available ex Thailand.

Fine Stem
Stylo



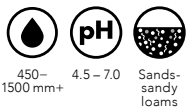
- Buried crown protects plant from fire, frost and heavy grazing
- More cold tolerant than most warm season legumes
- Responds well to heavy grazing pressure
- Good palatability
- Largely resistant to anthracnose
- Efficient in extracting calcium and phosphorus from the soil
- Naturalises on suitable country.

Seca
Stylo



- Suitable for sub-tropical regions
- Cold tolerant
- Free draining soils
- Thrives under heavy grazing.

Wynn
Cassia

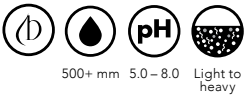


- Hardy, persistent tropical legume
- Grows in soils of low fertility
- Rapid establishment and spread
- High seed producer
- Adapted to acid soils.

Tropical grasses

Endura Rhodes®

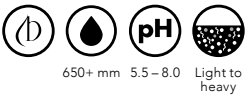
Rhodes grass - diploid



- Later flowering than Katambora Rhodes grass types
- Higher leaf to stem ratio, with a finer stem
- Highly suited to hay production – makes exceptional hay
- Aggressive, spreading, stoloniferous growth habit
- Nematode resistant – ideal rotational strategy option.

Mariner

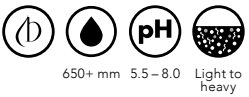
Rhodes grass - tetraploid



- Later flowering than Samford or Callide
- Higher leaf to stem ratio, with a finer stem
- Highly palatable, producing high quality feed
- Aggressive, spreading, stoloniferous growth habit
- Highly suited to both grazing and hay making.

Finecut

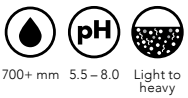
Rhodes grass - diploid



- Bred for increased dry matter, silage and hay production
- Upright growth habit, more uniform flowering, and finer stems than Katambora
- Adapted to a wide range of soil types, with similar salt tolerance to Katambora

Callide

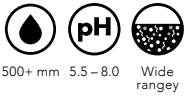
Rhodes grass - tetraploid



- Highly palatable, very late flowering and productive stoloniferous grass
- Well suited to companion legumes such as Siratro and burgundy bean
- Ideal for quality grazing and/or hay making.

Katambora

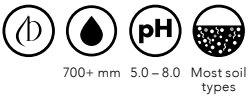
Rhodes grass - diploid



- Highly stoloniferous, versatile and earlier flowering than Callide
- Greater drought tolerance and ability to grow on lower fertility soils
- Withstands soil/moisture variations and periodic waterlogging.

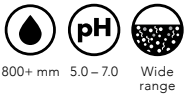
Mulato II

Hybrid Brachiaria



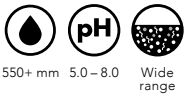
- Suitable for environments generally considered outside the normal adaptation range for many Brachiaria species
- Will tolerate acid soils of high aluminum
- Forage yields recorded up to 27mt DM/ha/year and 17% crude protein
- Very palatable, grazing and drought tolerant
- Recommended for cattle, sheep and goats
- Suitable for direct grazing, cut-and-carry methods, bailing and ensilage
- Available ex Thailand, USA and Mexico.

Splenda
Setaria



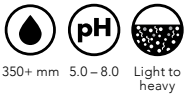
- Hardy, high yielding and later maturing. Suited to the sub-tropical regions
- Very palatable. May be heavily grazed without risk of plant death
- Relatively frost tolerant, withstands waterlogging.

Megamax®059
Panic grass



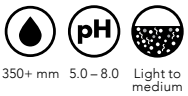
- Increased yield and production
- Higher persistence
- Larger leaves
- Strong tillering capacity
- Improved forage quality and grazing tolerance.

Biloela
Buffel grass



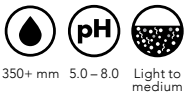
- Taller, more robust buffel, later maturity
- Suited to heavy soil types
- Greater drought tolerance.

Gayndah
Buffel grass



- Finer, medium height buffel that establishes readily
- Adapted to a wide range of soil types, medium maturity
- Good stock tolerance.

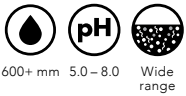
USA
Buffel grass



- Fine stemmed, medium height, dense variety
- Early maturity, purple flowers
- Suitable for lighter-textured, well drained soils.

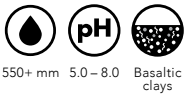
Creeping Bluegrass

Bisset/Hatch



- A hardy grass that will invade speargrass and establish on clays
- Bisset is finer leafed and roots down more strongly than Hatch
- Good for erosion control.

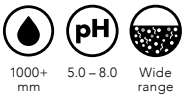
Floren Bluegrass



- Thrives on heavy soils and periodic inundation
- Forms large tussocks and will compete with weeds once established
- Highly palatable.

Humidicola

Tully grass



- Highly stoloniferous and can tolerate prolonged waterlogging
- Vigorous and dense mat forming growth habit
- Withstands heavy grazing with minimal weed invasion.

Bambatsii Panic

500+ mm 5.0 – 8.0 Clay loams

- High yielding and palatable perennial grass
- Distinctive bluish leaves with prominent white mid rib
- Tolerates saline soils, waterlogging, drought conditions and has some tolerance to frost. Also tolerates heavy black clays and melon hole country.

Gatton Panic

650+ mm 5.0 – 8.0 Fertile/ lighter

- Very palatable, shade tolerant grass with broad green leaves
- More vigorous and drought tolerant than Green panic
- Suited to sub-tropical areas with fertile, well drained soils.

Green Panic

650+ mm 5.5 – 8.0 Fertile/ lighter

- One of the most palatable tropical species
- Suited to higher rainfall regions and fertile well drained soils
- Needs to be managed well, doesn't handle heavy grazing.

Dilatatum

Paspalum

750+ mm 4.5 – 8.0 Fertile

- Palatable, tufted perennial grass
- Best suited to high fertility soils, moderate frost tolerance
- Good grazing tolerance, with quick return after grazing.

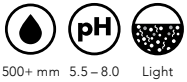
Wettsteinii

Paspalum

- Palatable, productive perennial with a stoloniferous habit
- Tolerant of a wide range of soils including poor drainage
- Moderate frost tolerance, good flooding and is shade tolerant.

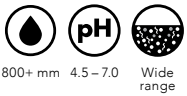
Premier

Digit grass



- Highly productive, robust tufted perennial that is palatable and persistent
- Well adapted to inland regions with lower rainfall and has some frost tolerance
- Drought, fire and cold tolerance
- Low in oxalate.

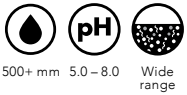
Signal Grass



- Forms a dense, high yielding sward, tolerates heavy grazing
- Has an aggressive stoloniferous root system and long trailing stems
- Best suited to humid tropical, high rainfall regions.

Sabi Grass

Urochloa



- Palatable, hardy and quick to establish perennial tropical grass
- Well suited to the dry tropics
- Responds well to rainfall and grows in a range of well drained soil types.

Mitchell Grass

250-550 mm | 7.0 – 8.5 | Cracking clays

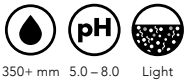
- Fast responsiveness to rainfall following heavy grazing
- Tolerant of heavy grazing
- Hardy grass – excellent drought tolerance for marginal country
- Drought dormancy allows survival during extended dry periods.

Purple Pigeon Grass

500 - 1200 mm | 5.5 – 8.5 | Fertile loams - heavy clays

- Large, vigorous seed with excellent establishment
- Easy to establish on heavy, black cracking-clay soils
- Suited to heavier soils
- Drought tolerant
- High growth rate.

Consol
Lovegrass



- Highly persistent on light sandy soils
- Tolerant of low pH and high exchangeable aluminium
- Requires intensive grazing management to maintain feed quality.

Mombasa
Guinea Grass

- Tall, stoloniferous, upright growth habit (tussock)
- Leafy grass very suitable for cut-and-carry, rotationally grazing or set-stocking
- Suitable for all livestock types, including horses
- Available ex Thailand, North and South America.

Tropical grass sowing guide

Variety	Rainfall (mm)	Preferred Soil Type	Water-logging	Frost	Drought
Bambatsii Panic Grass	500	Clay loams	Good	Good	V.Good
Buffel Grass - USA, Gayndah, Biloela, Lakota	350	Light to medium soil types, however, Biloela tolerates heavier soil types	Poor	Poor to Fair	V.Good
Consol Lovegrass	350	Light soils	Poor	Fair	Good
Creeping Bluegrass - Bisset - Hatch	600	Wide ranging, tolerates lower fertility	Poor	Fair	Fair
Floren Bluegrass	550	Basaltic clays and heavy alluvial soil	Good	Fair	Fair
Guinea Grass	900	Wide ranging fertile soils	Fair	Fair	Good
Humidicola - Tully Grass	1000	Varying, tolerates lower fertility	Good	Poor	Fair
Indian Bluegrass - Keppel	500	Varying	Poor	Fair	V.Good
Mitchell Grass - Curly	250	Alkaline, cracking, poor clays	Poor	Poor	V.Good
Panic Grass - Megamax® 059, 049	450	Deep fertile, loams	Poor	Fair	Fair
Panic Grass - Green - Gatton	650	Fertile and lighter	Poor	Fair	Fair
Paspalum*	750	Fertile soil types	Good	Good	Fair
Premier Digitaria	500	Lighter soil types	Poor	Fair	V.Good
Purple Pigeon Grass	600	Self-mulching clays	Good	Good	V.Good
Rhodes Grass - Katambora, Callide, Mariner, Endura Rhodes®	650	A wider range of light to medium soil types	Fair	Fair	Fair
Setaria Grass - Splenda Narok, Solander, Kazungula	800	Varying	V.Good	Good	Fair
Signal Grass*	800	Varying	Fair	Poor	Good
Urochloa - Sabi Grass	500	Varying	Fair	Poor	Good

*Available as bare seed only

AgriCote

Planting Rate (kg/Ha)

	Marginal Dryland	Good Dryland	Irrigated	Comments
	3–5	8–12	12 –15	Cool season greenness, tolerates heavy grazing, heavy black soils, periodic waterlogging and saline areas.
	4–6	8–12	12 –15	Most widely planted sub-tropical grass in northern Australia, hardy and productive with high fertility.
	4–6	8 –12	12 –15	Highly persistent on light, sandy soils. Not highly palatable.
	6–8	10 –12	12 –15	A hardy grass that will invade speargrass and establish on clays. Bisset is finer leafed and roots down more strongly than Hatch. Good for erosion control.
	2–3	6 – 8	10 –12	Used to re-grass flood plains colonised by Lippia.
	2–6	8–10	12–15	Higher quality short to medium variety with finer stems. Highly productive with excellent cool season tolerance.
	4–6	8 –12	12 –15	Adapted better to wetter, lower lying areas than signal grass. Will invade and outcompete giant rats tail grass.
	4–6	8 –12	12 –15	A hardy, free seeding plant spread widely throughout Northern Qld and Central Qld.
	3–6	8–12	12 –15	Most palatable Mitchell grass variety. Summer rainfall dominant species tolerant of heavy grazing. Excellent option to provide bulk during the dry (non-growing) winter season.
	3–6	10 –12	12 –15	Improved persistence over other panic grasses with increased forage quality and cool season growth.
	3–6	10 –12	12 –15	Grows best on high fertility soils. Gatton panic grass tolerates textured soil types and shade, but can be preferentially grazed. Green panic grass is more tolerant of shade.
	2–5	8 –12	12 –15	Palatable, tufted, grazing tolerant perennial grass best suited to higher fertility, high rainfall areas.
	4–6	8 –12	12 –15	Perennial tufted grass suited to acidic, sandy soils of low fertility.
	4–6	8 –12	12 –15	Medium-term perennial suited to self-mulching clays.
	5–7	8 –12	15 – 20	Katambora is a productive diploid, highly stoloniferous grass, suitable for erosion control. Callide is a productive tetraploid, palatable grass suited to fertile soils and higher rainfall environments. NB: All Rhodes grasses are quick to establish and have moderate salt tolerance.
	2–6	8 –12	12 –15	Hardy and palatable coastal grass well suited to sub-tropical regions.
	2–6	8 –10	12 –15	Valuable grass in the wet tropics, when nitrogen fertilised.
	2–6	8 –10	12 –15	Low growing, tufted, stoloniferous, perennial grass with a creeping growth habit. Used in tropical cattle grazing systems, roadside stabilisation, erosion control and mine rehabilitation.

Tropical legume sowing guide

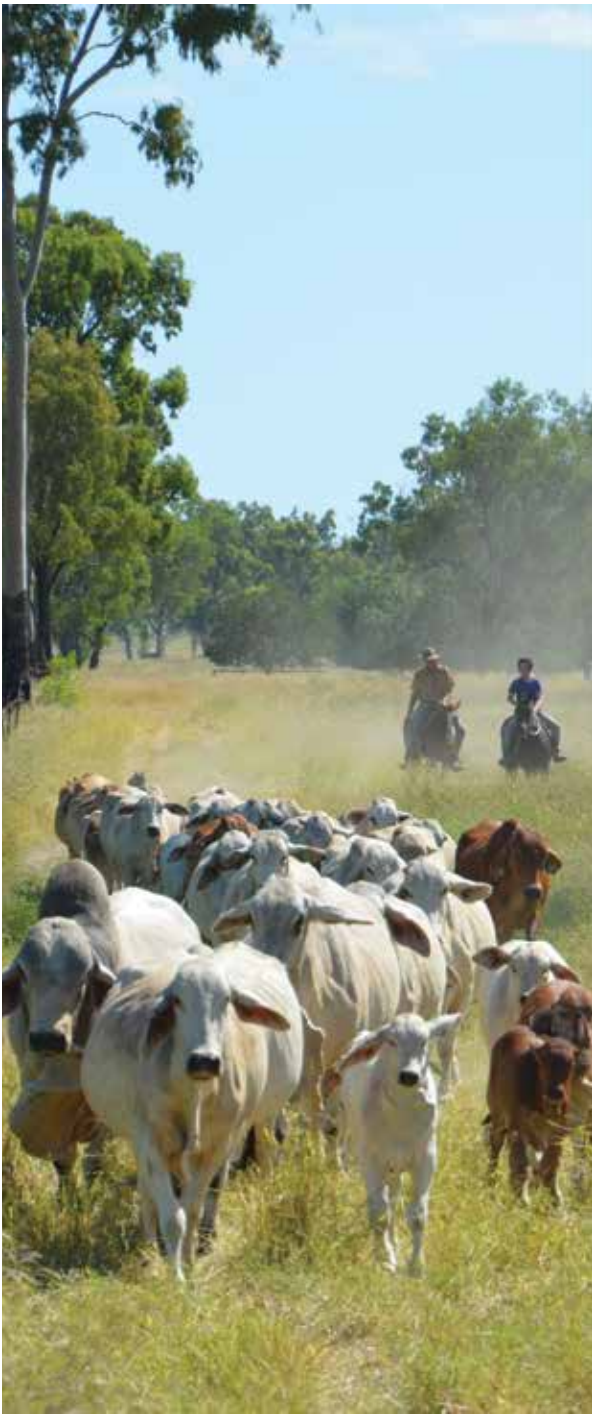
Variety	Rainfall (mm)	Preferred Soil Type	Water-logging	Frost	
Burgundy Bean (Presto/Garnet)	400	Light-Heavy	Fair	Fair	
Centro (Cavalcade)	800	Fertile soil types	V.Good	Poor	
Desmanthus - Ray, Marc	500	Medium-Heavy	Poor	Fair	
Glycine (Tinaroo/Cooper)	750	Medium-Heavy	Poor	Fair	
Greenleaf Desmodium	500	Light-Medium	Good	Fair	
Leucaena (Cunningham)	600	Well drained, fertile	Poor	Fair	
Alfalfa (SARDI range)	400	Light-Medium	Poor	V Good	
Medic Burr (Scimitar)	350	Medium-Heavy	Fair	Good	
Medic Barrel (Paraggio/ Jester/Sultan-SU)	350	Light-Heavy	Fair	V Good	
Medic Snail (Sava)	350	Medium-Heavy	Fair	Good	
Milgarra Butterfly Pea	550	Medium-Heavy	Fair	Poor	
Siratro (Aztec Atro)	700	Medium-Heavy	Fair	Poor	
Stylo Caribbean (Verano/ Amiga) – Hamata type	400	Light	Fair	Fair	
Stylo Fine Stem	700–900	Light-Medium	Poor	Fair	
Stylo Guianensis - Beefmaker®	850	Light well drained	Fair	Poor	
Stylo Shrubby (Seca/ Siran) – Scabra type	350	Light	Fair	Poor	
White clover (Storm)	800	Medium-Heavy	Good	Fair	
Wynn Cassia	400	Light-Medium	Poor	Fair	

Marginal Dryland: 6–8 kg/Ha • Good Dryland: 10–12 kg/Ha • Irrigated: 22–25 kg/Ha

AgriCote

Planting Rate (kg/Ha)

	Drought	Oversow	Planting TIme
	Good	3–4	Spring/Summer
	Good	3–8	Spring/Summer
	Good	2–4	Spring/Summer
	Good	3–8	Spring/Summer
	Poor	2–4	Spring/Summer
	V.Good	4–6	Spring/Summer
	V Good	1	Spring/Summer
	Good	2–4	Autumn/Spring
	Good	2–4	Autumn/Spring
	Good	2–4	Autumn/Spring
	Good	4	Spring/Summer
	Good	3–8	Spring/Summer
	Good	1-5	Spring/Summer
	V.Good	2–5	Spring/Summer
	Fair	2–5	Spring/Summer
	V.Good	1–5	Spring/Summer
	Good	1–2	Spring/Summer
	V.Good	2–5	Spring/Summer



Turf and lawns

Grow with Confidence

Turf and lawns

Amenity, aesthetics and leisure are a vital part of the structure and tempo of our world. Barenbrug are global leaders in turf seed and have an unsurpassed range of turf solutions for sporting activities, landscaping and pleasure pursuits. Turf seed and its resultant plant surface plays a big role in the enhancement of green spaces and a strong correlation to making life beautiful.

The most important decision when establishing turf is choosing the correct variety or mix. When making the decision on which seed bland to use, will depend on your situation and desired outcome. Consider the following as part of your decision making process:

- Suitability to climatic region
- Quality of variety
- Maintenance
- Wear tolerance
- Shade
- Drought tolerance/ water use
- Time of year for sowing

Barenbrug's Turf portfolio covers offer a wide range of turf grasses that have been trialled and tested independently for many years with pleasing and reliable performance.

Key product groups within the portfolio available are:

- Turf type ryegrasses
- Turf type fescues
- Bentgrasses
- Other specialty grasses
- Kentucky bluegrass
- Warm season species such as bermudagrass (couch), kikuyu, and other C4 species

Starting a new lawn

Getting a new lawn right is very satisfying. It should not be taken on lightly however, and there are some important things to consider and do to help ensure best results. Spring and autumn are ideal times to plant lawn seed as there is usually adequate moisture and warm temperatures. Avoid very cold and hot dry months particularly if water restrictions are in place as germinating lawn seed must not be allowed to dry out.

Ten steps to a fine lawn

1. Cultivate and spray: Eliminate weeds and cultivate. Either cultivate first to a depth of 100–150mm, or spray out the existing cover with a glyphosate based herbicide. Remove any lumps, rocks, rubbish and plant material.

2. Fix soil problems: Sandy soil may require organic matter and clay soil gypsum. A simple pH test should be performed. Top soil should be in the range 6.0 – 7.5 pH. Acidic soils may require an application of lime.

3. Level surface: Make the surface as even as possible avoiding humps and hollows where water will sit. Use a board, smudge or other suitable levelling device. (It is advisable to install watering and or drainage systems at this stage.)

4. Weed seeds: Water if needed and allow 10–14 days for a fresh germination of weeds. Cultivate again or spray the weeds once more.

5. Good seed bed: Use a light roller to create a firm soil base, then rake the surface lightly to make a good seed bed, so that there is enough loose soil to evenly cover the seed.

6. Seed sowing: Seed should be broadcast on the surface and then raked lightly into the soil providing good seed to soil contact. A lawn starter fertiliser may be incorporated at this time. Keep some seed in reserve to patch up any areas that were missed or are damaged while the lawn is establishing.

7. Watering: Keep the seed bed moist to help even and reliable germination. Once the lawn has started to grow, water daily and then reduce watering as the lawn becomes established.
It is better to water deeply once or twice a week to encourage deeper root growth. Do not water in the heat of the day and avoid night watering as this may encourage fungal diseases.

8. Mowing: For new lawns mow when the grass is 8–10cm high taking off only the top 1/3 of the plant, as young grass can be damaged by close mowing. Do not mow when the grass and ground is damp and be careful not to drag the mower around corners as this can pull out young plants. For established lawns, no more than one third of the leaf should be removed each time. Increasing the mower height can allow the root system of the grass to develop and maintain grass density.

9. Weed control: Weeds can be unsightly and compete with the new or established lawn. Depending on the weeds present, there are a number of preparations available for most situations. Consult an advisor on the best way to proceed and carefully follow directions on herbicide labels. For new lawns, weed control should generally be performed after the third mowing. In existing lawns, weed spraying is usually conducted in autumn, winter or spring.

10. Fertiliser: A good time to fertilise is generally before a period of good rainfall, however it is best to follow the instructions from the fertiliser supplier. Usually, a complete NPK fertiliser will be required. Use accurate spreading equipment as over-fertilising can lead to unsightly patches.

Turf grass species

Premier 3 Perennial Ryegrass

Lolium perenne
Sowing rate: new field: 400 – 500kg/ha
Oversowing bermudagrass: 250 – 500kg/ha

- Fast germination
- Wear tolerance
- Outstanding shoot quality
- Deep green colour
- Dense tillering
- Strong disease tolerance

Barolympic Perennial Ryegrass

Lolium perenne
Sowing rate: new field: 400 – 500Kg/Ha
Oversowing bermudagrass: 250 – 500 Kg/Ha

- Superior tolerance to close-mowing and high wear
- Ultrafine perennial ryegrass
- Applicable to sports fields and golf
- Over sow on bermudagrass or kikuyu
- Ultrafine, dense turf

RPR Regenerating Perennial Ryegrass

Lolium perenne
Sowing rate: New field: 400 – 500kg/ha
Oversowing bermudagrass: 250 – 500kg/ha

- Horizontal habitat via determinate stolons
- High wear tolerance
- Stronger than most perennial ryegrass
- Use in sports pitches

Turf Tall fescue

Festuca arundinacea
Sowing rate: 400 – 500Kg/Ha

- Deep root system
- Hard wearing
- Dark green colour
- Dry tolerant
- Also refer to RTF®

RTF® Rhizomatous Tall Fescue

Festuca arundinacea
Sowing rates: new lawn/turf: 300 – 500 kg/ha

- Turf type tall fescue
- Excellent colour and texture
- Ability to self repair bare spots
- Deep rooted for drought and heat conditions
- Low lawn maintenance
- Grows in sun or shade

Warm season turf

The success of planting cool or warm-season grasses, lies in timing your seeding to suit your grasses optimal growth periods. As a rule, cool season species best period of growth is between 30–40 days prior and post frosts. Warm season species however, have their best period of growth when temperatures rise above 16˚C.

Monaco Bermudagrass (couch)

Cynodon dactylon

Sowing rate: 0.5 – 1kg/100m²

- Excellent drought and heat tolerance
- Fast establishment
- High colour retention and fast spring green up
- Ideal for tropical, transition and temperate climates
- Excellent density and wear tolerance
- Winter hardiness

Maya Bermudagrass (couch)

Cynodon dactylon

Sowing rate: 0.5 – 1kg/100m²

- Excellent colour
- Excellent texture and density
- Broad adaptation of environments
- Excellent disease resistance
- Use on lawns, parkland, sports fields, golf

Transcontinental Bermudagrass (couch)

Cynodon dactylon

Sowing rate: 1kg/100m²

- Fast establishment
- Drought tolerant
- Cost effective
- Cold tolerance for winter persistence
- Quick establishment and vigour

Kikuyu

Pennisetum clandestinum

Sowing rate: 0.5 – 1.5kg/100m²

- Light green in colour
- Excellent for erosion control
- Medium traffic tolerance
- Excellent drought tolerance with some salt tolerance
- Suitable for roadsides, nature strips, lawns, sporting fields

Carpet Grass

Axonopus fissifolius

Sowing rate: 1kg/100m²

- Narrow leaf, creeping grass
- Dense turf, with shiny leaves
- Grows well in full sun
- Low maintenance for lawns
- Suited to tropics and sub tropics

Penascola

Bahia

Sowing rate: 3 – 4kg/100m2

- Warm-season turf grass – light green colour
- Excellent for long term erosion control
- Prefers full sun but can handle some shade
- Excellent heat tolerance and drought tolerance
- Excellent choice for low water and low nutrient situations
- Preferred lawn mow height 40-50 mm
- Performs well in low fertile sandy soils
- Good traffic tolerance

Queensland Blue Couch

Digitaria didactyla

Sowing rate: 1kg/100m²

- Soft, fine leaf grass for lawn
- Blue-green tinge
- Suited to neutral to acid soils
- Drought tolerance
- Prefers full sun
- Tolerant of temporary waterlogging

Zoysia

Japonica

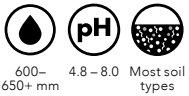
Sowing rate: 1kg/100m²

- Low maintenance, slow growing
- Tolerates low fertile soils
- Hardy variety that can withstand heavy use
- Shade tolerant

Traded varieties

Victorian

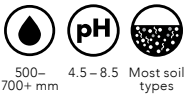
Perennial ryegrass



- Early heading ryegrass with generally reliable persistence
- Suited to marginal ryegrass regions with lower rainfall
- Significantly lower production and quality than most modern ryegrasses.

Holdfast

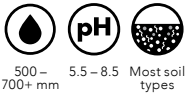
Phalaris



- Semi erect to erect winter active variety
- Good seedling vigour
- Superseded by Holdfast GT
- Good tolerance to acid soils.

Sirosa

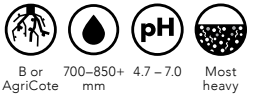
Phalaris



- Semi-erect winter active variety
- Variable growth habit – more erect than Australian
- Outclassed by the more persistent Holdfast GT.

Haifa

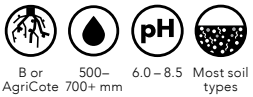
White clover



- Large-leaved, upright variety
- Performs well in warm temperate and sub-tropical areas
- Good heat tolerance and seed setting ability.

Palestine

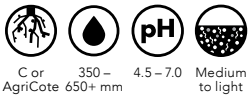
Strawberry clover



- Prostrate growing perennial clover with vigorous spring/summer growth
- More productive than O'Connors in winter and early spring
- Withstands waterlogging and saline conditions.

Dalkeith

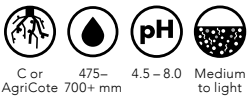
Subterraneum clover



- Early season maturity – 97 days to flowering (Perth)
- Good early root growth and establishment
- Susceptible to clover scorch
- Our improved alternative is Losa.

Seaton Park

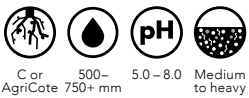
Subterraneum clover



- Early season maturity – 112 days to flowering (Perth)
- Good resistance to phytophthora root rot
- Our improved alternative is Campeda.

Trikkala

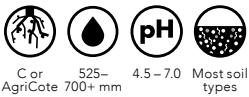
Yanninicum clover



- Early season maturity – 112 days to flowering (Perth)
- Moderately resistant to clover scorch
- Our improved alternative is Monti.

Woogenellup

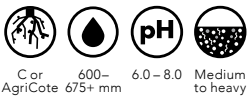
Subterraneum clover



- Mid season maturity – 130 days to flowering (Perth)
- Susceptible to clover scorch and root rot
- Our improved alternative is Campeda.

Clare

Brachycalycinum clover



- Late mid season maturity – 136 days to flowering (Perth)
- Susceptible to clover scorch and phytophthora root rot
- Our more productive alternative is Antas.

Paradana
Balansa clover

- Mid season maturity – approximately 120 days to flowering
- Tolerates waterlogging and mild soil salinity
- Our improved alternative for higher rainfall areas is Vista.

Parabinga
Barrel medic

- Early maturing – 88 days to flowering (Perth)
- Very high levels of hard seed
- Possible replacement – Toreador.

Paraggio
Barrel medic

- Mid maturing – 98 days to flowering (Perth)
- Adaptable variety with good early vigour
- Our improved alternative is Sultan-SU.

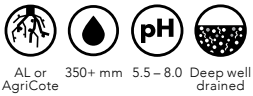
Namoi
Woolly pod vetch

- Mid maturing self regenerating annual
- Indeterminate flowering
- Suitable for grazing, hay and green manure
- Outclassed by Capello.

Popany
Purple vetch

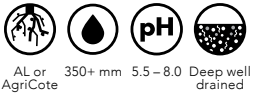
- Late maturing variety
- Suitable for grazing, hay or green manure
- Mostly grown as a mixture with cereals.

Aurora
Alfalfa



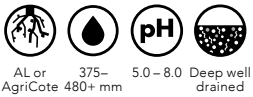
- Semi winter active with a dormancy rating of 6
- General purpose cultivar suited to dryland and irrigation
- Alternative to Hunterfield and Trifecta
- Outclassed by Genesis II and SARDI-Grazer.

Siriver
Alfalfa



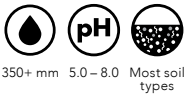
- Highly winter active with a dormancy rating of 9
- Suitable for hay production under irrigation and rotational grazing
- Derived from Hunter River and CUF101

Sequel
Alfalfa



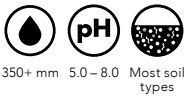
- Susceptible to stem nematode and bacterial wilt
- Shows high susceptibility to winter leaf diseases
- Our alternative is SARDI 10 Series 2.

Saia
Forage oat



- Early sown forage/hay option
- Fine stemmed tall variety
- Grows in wide range of soil types.

Shirohie
Forage millet



- Fast growing, high yielding forage
- Good rebound from grazing
- Easy grazing management (no prussic acid)
- Sow when soil temp stabilises at 14°C or above.

Japanese
Forage millet

350+ mm 5.0 – 8.0 Most soil types

- A warm-season, fast growing annual grass
- Recommended soil temperatures of 14oC and rising for germination
- Most widely used for grazing and amenity purposes
- Useful variety for temperate regions.

Pearl millet
Pennisetum glaucum

Pearl millet has the capacity to grow very high forage yields. It is the preferred option for the warm sub-tropical and tropical north as pearl millet generally out performs Japanese types. Pearl millet should be sown at a soil temperature of 16°C and rising, preferable 18°C.

Siberian millet
Echinochloa frumentacea

A warm-season, slower-maturity species with a more prostrate habit. It has a high tiller density and recovers well from grazing or machine harvesting. Siberian millet should be sown once soil temperatures are over 16°C and is most suitable for areas with a mild start to spring and long, warm summers.

Seed technology and general information

Seed coating

Barenbrug offers a range of seed technology options that have been developed for specific plant species. There are generally two types of coatings available:

- Lime-based coating: typically used for legumes and tropical grasses (resulting in a 'build-up', ie. weight gain of the seed)
- Film-coating: typically used for grasses or field crops to deliver a chemical seed coating (negligible weight gain for the seed).

Barenbrug's premium seed coating is available for pasture legumes, tropical grasses and forage herb species. It is designed to deliver significant advantages to plant establishment through insect and fungicide protection, inoculant bacteria (on most legumes) and micronutrients. This coating technology also significantly improves the handling aspects of some seeds, enabling more efficient distribution across the paddock, which is particularly important for aerial application of some tropical species.

A systemic insecticide can also be included to protect seedlings from biting and sucking insects for up to four weeks during establishment. This also offers 'stress shield' benefits, which help to protect treated plants during extended dry periods. A fungicide which protects the seed against fungal diseases, can also be included.

Tailored seed enhancement

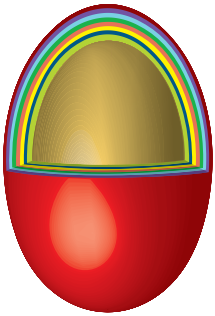
Seed enhancement is designed to improve seedling establishment by delivering improved early seedling vigour and root development through the inclusion of growth promotants and dormancy breaking technologies. It includes nutrients designed to be immediately available to the seedling and provides protection against fungal diseases through a fungicide treatment. In addition, Barenbrug seed technology features encapsulated rhizobia which prolongs shelf life of treated legumes and helps to ensure good legume nodulation in the paddock, maximising your investment.

Seed
Typical coating make-up

Lime Coating
creates a favourable germination environment

Fungicide Protection
option of pythium and phytopthera protection

Protective Polymer
protects and isolates bacteria

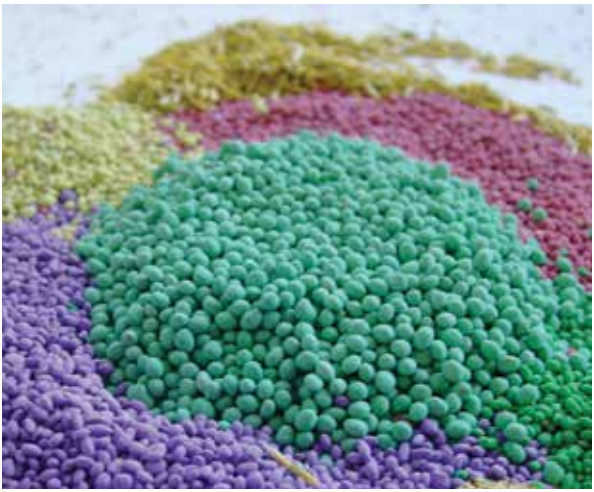


Bonding Polymer
bonding seed capsule

NPKS and T.E. Nutrients
immediate rhizobia and seedling nutrition

Growth Promotant
promotes establishment and seed vigour

Biological Inoculant
promotes establishment and seed vigour



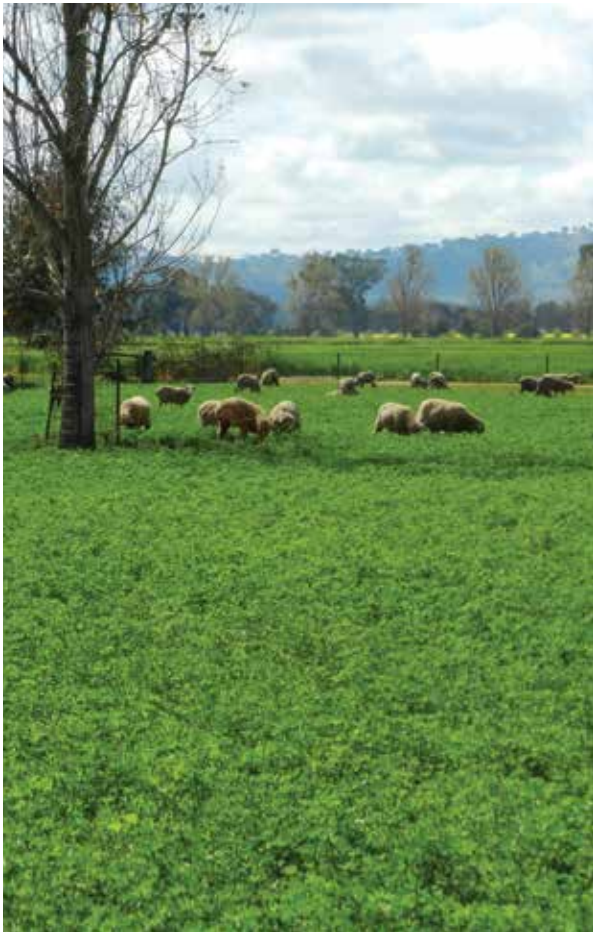
Rhizobium inoculation group	Suitable species	Notes
AL	Lucerne	
	Strand medic	
	Disc medic	
AM	All other annual medic species	Annual medics except Strand and Disc
B	White clover	Suits most perennial clovers
	Red clover	
	Berseem clover	
	Alsike clover	
	Strawberry clover	
C	Balansa clover	Suits most annual clovers
	Persian clover	
	Arrowleaf clover	
	Sub-clovers - all types	
	Rose clover	
	Crimson clover	
F	Field peas	
	Vetch	
	Faba beans	
	Lentils	
G	Lupin	Group G and Group S can be interchanged
H	Soy beans	
I	Cowpeas	
	Mungbeans	
J	Pigeon peas	
	Lab Lab	
M	Glycine	
	Siratro	
	Wynn cassia	
N	Chickpeas	
S	Serradella	Group S and Group G can be interchanged
SU343	Birdsfoot trefoil	
WSM1497	Biserrula	
CB1717	Burgundy bean	
CC283b	Caucasian clover	
CB3126	Desmanthus	
CB782	Kenya white clover	
CC829	Lotus	
SRDI554	Messina	
WSM1292	Sulla	

Seed weights

Species	Seeds/gram
Pasture grasses	
Ryegrass - diploid	500 – 600
Ryegrass - tetraploid	250 – 300
Tall fescue	400 – 450
Phalaris	500 – 550
Cocksfoot	1000 – 1100
Brome grasses	100 – 120
Timothy	2500 – 2800
Tall wheat grass	150 – 200
Pasture legumes	
White clover	1500 – 1800
Red clover - diploid	500 – 550
Red clover - tetraploid	300 – 350
Strawberry clover	650 – 700
Balansa clover	870 – 1100
Arrowleaf clover	650 – 750
Berseem clover	440 – 480
Persian clover	750 – 900
Sub-clover	90 – 150
Lucerne	400 – 480
Barrel medic	230 – 300
Burr medic	230 – 300
Other forages	
Chicory	600 – 800
Plantain	500
Forage rape	300 – 350
Turnips	200 – 400
Swede	250 – 450
Kale	200
Forage barley	22 – 30
Forage oats	23 – 30
Forage triticale	20 – 25
Forage sorghum	30 – 45
Millet	150 – 200
Common vetch	15 – 25
Woolly pod vetch	20 – 40

Common animal health issues

Barenbrug offers the following information in good faith that it may help to develop strategies and tactics on farm to assist production. Barenbrug do not have any claims to be experts in veterinary science. The information here is far from comprehensive, but may prove a useful starting point to provide the reader with some considerations when developing your plans. If topics relating to management of ill livestock are of interest or importance, seek further information from animal health specialists.



Common animal health issues from pastures and forage crops

Issue	Typical signs / situations	Useful responses and management options
Acidosis/Laminitis /Founder/Grain poisoning	High sugar levels and low rumen pH from excessive grains, high sugar forages. Often combination of crushed grain and lush feed. Signs: loss of appetite, listlessness, dehydration, scouring, blindness, spasm, death.	Remove crushed grains. Feed additives such as Bentonite, lime-stone and bicarb soda drench. Introduce concentrates slowly and monitor. Avoid high % brassica petiole in diet. Increase fibre to stimulate saliva / cud-chewing.
Annual ryegrass toxicity (ARGT)	Wimmera ryegrass seed head in late spring with slimy exudate from the nematode Anguina funesta in combination with a bacterium. Signs: high stepping gait, nervous convulsions, collapse, death.	Monitor possible paddocks for signs. Gramoxone pasture top in mid spring. Burn affected stubbles. Grass-free pasture phase/ crop it out. Avoid buying hay or poorly produced grain from affected areas. Reduce reliance on Wimmera ryegrass. Use certified annual ryegrass seed.
Bloat	Gorging of high legume pastures of red, white, sub-clovers and lucerne, often in wet conditions. Signs: rapid breathing, distended left abdomen, animals appear distressed, eyes bulging, deaths.	Avoid putting empty/ hungry animals onto such pastures, or do so only for brief periods and monitor. Increase fibre offer (hay), teric based blocks, bloat capsules, spray bloat oil pre-grazing, oil drenches.
Facial eczema (Mycotoxicosis)	Most common from Feb to May, with lots of plant litter in the pasture. Signs: mild photosensitisation (sun burn) to severe jaundice and death.	Move stock to longer pasture; avoid paddocks cut for hay or late topped, these can be more toxic due to pasture litter. Introduce zinc in ration. Avoid mouldy hay/silage. Test feed grains for mycotoxins.
Ergotism/Heat stress/Fescue foot (a mycotoxicosis)	Infected seed in pastures or hay etc, often paspalum, but many species of grass included. Uncharacteristic panting and seeking shade/ water-holes in hot weather. Reduced weight-gain/ milk. Fescue with wild endophyte in cold seasons, esp. horses, cattle develop lameness (fescue foot). Low conception rates, muscle tremors, incoordination or foot gangrene and death in severe cases. From wild endophyte in ryegrass or fescue.	Remove stock to safer pastures, do not offer feed from infected summer pastures or pasture hay from such sources. Avoid set-stocking suspect fescue dominant pastures in colder months. Introduce new species or renew pastures with "safe" endophyte options.

Issue	Typical signs / situations	Useful responses and management options
Hypocalcaesemia / Milk fever	Late pregnancy and early lactation. Signs: proppy gait, bellowing, muscle spasms, tremors, staggers, convulsions, sudden death.	Feeding hay with ground lime-stone, quality clover and lucerne hay is good. Calcium/magnesium blocks. Intravevous drips. Avoid cereal hay, grains, sorrel, kikuyu. Give shelter in cold weather.
Hypomagnesemia /Grass tetany	Low magnesium levels often on winter grazed cereals. Signs: proppy gait, bellowing, muscle spasms, tremors, staggers, convulsions, sudden death.	Feeding hay with causmag, quality clover hay is good. Mg bullets, and licks/grass tetany blocks, lower K fertiliser levels in autumn. Magnesium injections.
Lupinosis (Mycotoxicosis)	Sheep feeding on lupin stubbles in damp summer. Jaundice, photosensitivity, weak animals evident in the mob.	Monitor stock on lupin stubble paddocks when summer rains are about.
Nitrate poisoning	High N in feed: ryegrasses, cereals, maize, brassicas. Nitrate levels too high in rumen: high respiration rate, gasping, convulsions, and death. Blood is typically brown. Can cause abortion.	Nitrate levels in feed <10g/kg DM to be safe. Monitor stock on lush green feed or Group I sprayed weed-dominant sites. Grazing management and moderate use of N fert are the main things.
Phalaris staggers	Occurs after a longer grazing period, mainly in cobalt deficient areas in autumn. Animals stagger, head nodding, obviously bad gait, collapse, rapid heartbeat, nervous tremors, death.	Avoid temptation to put hungy sheep on first green pick in autumn. Use sentinel sheep and monitor. Use of colbalt supplements orally. Remove sheep from affected pastures, some affected ones may recover - can take up to a week. Alternate feeds.
Phalaris sudden death	Often within a few hours of being introduced to phalaris pastures. Breathing problems, blue gums, rapid heatbeat and often death.	As for phalaris staggers, but cobalt has no effect.
Phytosensitivity	Grazing brassicas too early. Avoid too high percentage in the diet. Redness and swelling on exposed areas: blistering of ears and face. Liver damage and unable to process plant toxins and over-load of chlorophyll.	Remove stock and find shade, monitor grazing of brassicas - reduce percentage of brassica in diet/eat bulbs/stem as well as leaves (break-fence). Avoid weeds like Patersons' curse, ragwort, storksbill.

Issue	Typical signs / situations	Useful responses and management options
Phyto-oestrogens	Common in the older types of red clovers, sub-clover pastures, sometimes in lucerne (often 80% + legume pastures of this nature). Maybe 10 – 20% failure to join. Increased birthing problems.	Pasture selection during flushing/joining periods and pregnancy. Manipulate balance of pasture swards: sprays, oversowing, grazing management.
Prussic acid (Hydro cyanic poisoning)	Typically relates to grazing of immature, droughted or frosted forage sorghum. Any stress on it including herbicides will increase to HCN. Muscle trembling, staggers, gasping, collapse, coma, death.	Affected stock should be removed and treated with sodium thiosulphate. Do not graze immature or stressed crops. Do not introduce hungry/empty stock. Provide sulphur lick blocks. Use low prussic acid varieties.
Pulpy kidney (enterotoxaemia)	A clostidial disease. Poor movement of food through the gut causing a build-up toxin in the intestine. Sudden death with or without convulsions.	Vaccination at key times. Provide hay/silage and grazing management when going on to lush feed.
Red gut	Grazing lush legumes, esp. lucerne, occasionally on other quality pasture/forages. Signs: intense reddening of the intestine and sudden death.	Remove animals from lucerne or fodder crop. Offer hay or silage. Grazing management: on-off cycle and monitor feed.
Red water	High sulphur levels in brassicas, immature crops, seed heads on canola crops and other brassicas going to seed. Animal urine turns/ runs red.	Remove stock and wait for brassica to mature. On-off grazing management. Reduce fertiliser S in programs.
Vetch seed	Toxicity from grazing stubbles where vetch grain has been produced or consumption of hay cut after pod-fill.	Avoid grazing stubbles from vetch seed production. Monitor hay production. Can be fatal to most forms of livestock.

Seed certification

The Australian Seeds Authority (ASA) is responsible for controlling seed certification in Australia. Seed certification protects the identity of a cultivar and provides the assurance that you can buy seed that is as close as possible to the genetics of the variety originally selected by the breeder. Operated under protocols from the International Seed Testing Authority (ISTA), seed laboratories, staff and paddock inspectors are qualified and authorised under strict guidelines.

A crop is required to be grown to specific standards. For example, to grow Bealey ryegrass for seed, the paddock needs to be free from any other ryegrass varieties for at least the two previous seasons. This eliminates risk of contamination. Before harvest, the crop is required to pass an in-field inspection by an authorised third party. After harvest, cleaning and packaging, the resultant seed is tested by the authorised laboratory and needs to be of sufficient purity. For example, perennial ryegrass of first generation is required to be a minimum of 98% pure seed and a maximum 0.7% other seed. Full guidelines for certification requirements are available at www.oecd.org/agriculture/seeds/rules-regulations

All certified Barenbrug seed will have certification tags attached to the sacks. Certification certificates are available on request.

Seed analysis certificate

A seed analysis certificate documents the quality of a seed line and if it has been laboratory tested in a standard way. All seed has its own line number which is printed on the side of the seed sack, with each line having its own analysis certificate.

The seed certificate will usually show some or all of the following information:

Cultivar tested	Name and or variety number designation
Species	Botanical name
Seed line number	A unique number that identifies the seed lot, also stamped on the sacks
Date of test	Date sample analysis was completed and reported
Purity	% pure seed, and contaminants including inert matter and/or other seeds
Germination	% live seed: may involve breaking dormancy with KNO_3 and/or pre-chilling
Normal seedlings	Length of test will depend on seed type, typically assessed at emergence of cotyledons or primary leaf from seed coat or coleoptiles
% first count	Often sufficient. A high % can indicate good vigour and vice-versa
% final count	% of normal seedlings after standard germination period
Abnormal seedlings	% slow or obvious distorted: split coleoptiles, missing parts, stunted, etc
Hard seed	As a %: Long term form of dormancy, only applicable to legumes
Fresh un-germinated	As a %: indicates short-term form of dormancy, commonly found in tests close to harvest, often identified with KNO_3 and/or pre-chilling
Dead seed	As a %: indicated by failure to germinate or decayed/ damaged seed
Bulk search	Contaminants in very low levels, not enough to show in purity sample

Some other tests sometimes performed:

Tetrazolium (TZ)	A quick test using stain to identify germinable seed
Vigour testing	Often using conductivity, applicable to legumes, sometimes unreliable
1000 gwt	The weight in grams of 1000 seeds, used for calculating sowing rates
Anguina	Presence of galls from the ART associated nematode Aguinia funesta
Endophyte %	In perennial ryegrass or tall fescue (either seed or seedling grow out) • NEA, NEA2, NEA4, AR1 or AR37 : 70%+ of seed have stated endophyte • LE or 'Low endophyte' : a low level of seeds have any endophyte
GMO testing	Specific reporting for the detected presence of GM events.

For enquiries relating to our products please contact us.

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