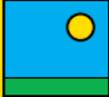
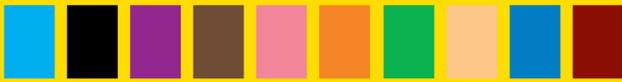


**Heritage**seeds 

# SEED GUIDE

EDITION FIVE



**INTERNATIONAL**

**INSIST  
ON THE  
YELLOW  
BAG**

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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<sub>2</sub>).



### **PREFERRED SOIL TYPE**



**PASTURE GRASSES**



**PASTURE LEGUMES**



**ALFALFA**



**FORAGE BRASSICAS AND HERBS**



**VETCH**



**FORAGE CEREALS**



**TROPICALS**



**TRADED VARIETIES**



**SEED TECHNOLOGY**

*The information presented in this publication is offered in good faith, based on seed industry data and relevant advice. Every effort has been made to ensure accuracy and freedom from error. Heritage Seeds, its agents or advisors accepts no responsibility for any loss or actions arising from viewing the publication's content.*



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## ABOUT HERITAGE SEEDS

# HERITAGE SEEDS LEADER IN RESEARCH AND DEVELOPMENT

Heritage Seeds 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 both domestically 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 Heritage Seeds in providing farmers with high performance products to improve productivity and maximise profitability.



# PASTURE SELECTION

## 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 thus maximising your profits. Whether you are growing winter 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/year for each paddock. If the paddocks are different sizes, you need to calculate grazings/ha. 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.

# PASTURE SELECTION

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

- Soil type
- Soil fertility/nutrient levels including pH
- Aspect
- Moisture – rainfall, timing, irrigation, dry periods
- Heat and cold
- Latitude/photoperiod
- Insect and other invertebrate pests
- Vertebrate pests
- Weed control options
- 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.

# PASTURE SELECTION

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.
<b>Annual / Seasonal 6-12 mths</b>	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
<b>Short Term 2-5 years</b>	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
<b>Perennial 5 years +</b>	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.

# PASTURE SELECTION

Typical annual rainfall range			Winter dominant					
350	400	450	500	550	600	650	700	750+
Sheep, beef, wool Dry extensive			Mixed grazing Good extensive			Finishing / dairy Intensive		

## Phalaris

Winter active



## Cocksfoot

Winter active



Intermediate



Summer active



## Tall fescue

Winter active



Summer active



## Perennial clovers

White



Strawberry



## Sub-clovers

Sub



Yann.



Brachy.



## Alfalfa



## Medics



## Chicory



## Plantain



Key:



Usually suitable



Suitable under some circumstances



Generally not suitable

# PASTURE SELECTION

Irrigation	Hot, dry summers, days often >32° C	Varieties	Page
		Holdfast GT + others	22
		Kasbah	25
		Howlong	25
		Safin	25
		Prosper	27
			
		Storm	29
		Palestine	30
		Campedda + others	33
		Monti + others	34
		Antas + others	35
		SARDI varieties	51
		Sultan-SU, Scimitar	43-44
		Commander	60
		Plantain	56

# PASTURE SELECTION

## ANNUALS/SHORT-TERM AUTUMN PLANTING

	Desired use					
	Autumn feed gap	Winter feed gap	Silage	Hay	Summer feed gap	
<b>Annual clovers</b>						
Arrowleaf	Red	Orange	Green	Green	Orange	
Balansa	Red	Orange	Green	Green	Orange	
Persian	Red	Orange	Green	Green	Orange	
<b>Forage cereals</b>						
Oats	Green	Green	Green	Green	Orange	
Barley	Green	Green	Green	Green	Orange	
Triticale	Green	Green	Green	Red	Red	
Ryecorn	Green	Green	Orange	Red	Red	
<b>Vetch</b>						
Woolly pod	Red	Orange	Green	Green	Red	
Key:	Green	Usually suitable				
	Orange	Suitable under some circumstances				
	Red	Generally not suitable				

# PASTURE SELECTION

Cold  
winters,  
Soil temp  
<8° C for  
winter

## Suitable varieties Page

	Zulu II, Cefalu	40
	Vista, Bolta	37
	Laser + others	38
	Mammoth + others	61
	Dictator 2	64
	Crackerjack 2	62
	Ryecorn	64
	Capello + others	59

# PASTURE SELECTION

**SOW  
YELLOW.  
GROW  
CONFIDENT.**

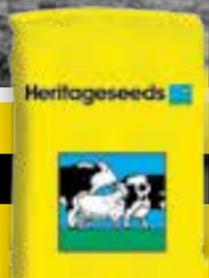


# PASTURE SELECTION

**Heritageseeds** 



**GROW WITH CONFIDENCE**  
INSIST ON THE YELLOW BAG



# 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 over-sowing.

### **Italians**

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 over-sowing into existing pastures as a boost for a year or two.

### **Annuals**

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.

# PASTURE GRASSES

## 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.

<b>DRY TOLERANCE SUMMER DORMANCY</b> ↕ <b>RESPONSIVE TO SUMMER MOISTURE</b>	Very early	<b>EARLIER, LARGER SPRING FLUSH</b> ↕ <b>MORE EVEN SPRING GROWTH</b>
	Early	
	Mid season	
	Very late	

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 runs 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.

# PASTURE GRASSES

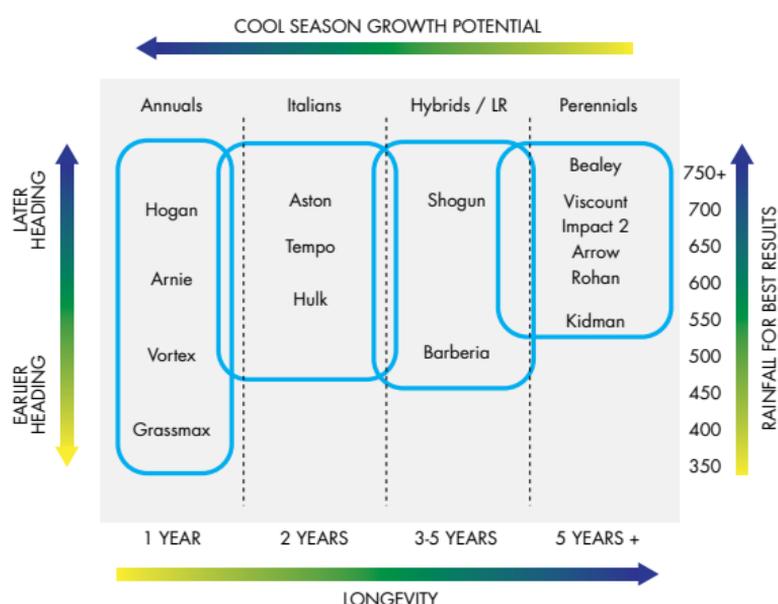
It is often beneficial to have a range of heading dates on farm:

## Early varieties:

- Suit paddocks or locations that typically finish earlier e.g. lighter soils
- 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.

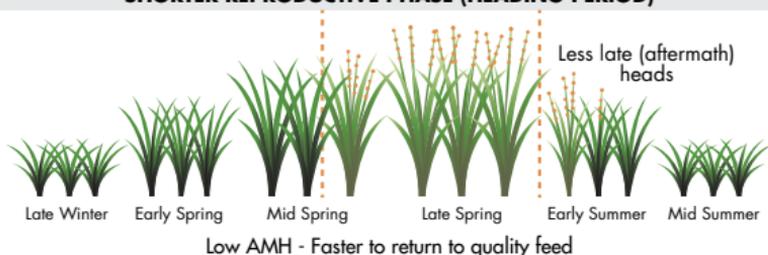


# PASTURE GRASSES

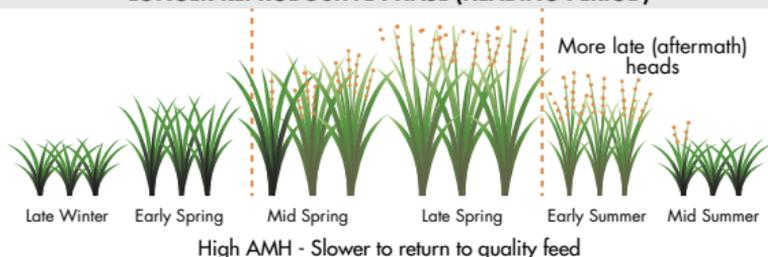
## AFTERMATH HEADING

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 lower for a longer period due to the stalk content.

### SHORTER REPRODUCTIVE PHASE (HEADING PERIOD)



### LONGER REPRODUCTIVE PHASE (HEADING PERIOD)



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.

# PASTURE GRASSES

## RYEGRASS PLOIDY: DIPLOID AND TETRAPLOIDS

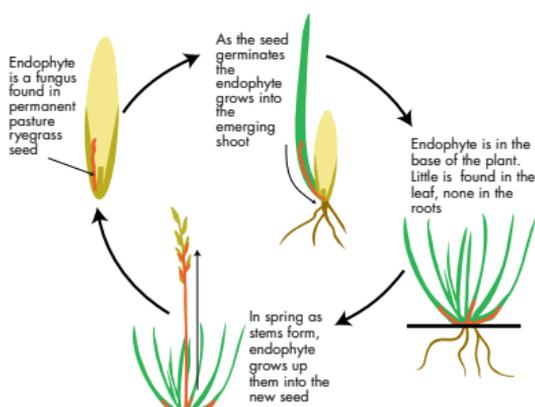
Ryegrass is naturally a diploid, meaning it has two sets of chromosomes. Some varieties are tetraploids: artificially developed by plant breeders to have four sets of chromosomes. This practice was first developed in Holland in the 1960s and has since become common in plant breeding. The practice does 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
<b>Features</b>	• 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
<b>Benefits</b>	• 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
<b>Disadvantages</b>	• 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
		• Easily over-grazed

# PASTURE GRASSES

## RYEGRASS ENDOPHYTE

Ryegrass endophyte can contribute to pasture persistence and animal performance. An endophyte is a fungus that lives naturally in a plant. In the wild and cultivated areas there are many different grasses and endophytes, often they have a special and unique symbiotic relationship with each other. The grass offers the fungus nutrient, a home and a method of multiplication and dispersal. The fungus gives the plant some protection from pests and over-grazing, by producing alkaloid chemicals that perform insecticidal and anti-feeding functions, thus helping the plant's survival.



**Endophyte life-cycle.** The endophyte transfers with the seed or with harvested material. Silage or hay made from high endophyte pastures will still contain the toxins.

Naturally occurring ryegrasses usually contain endophytes that produce fairly high levels of these chemicals in the plant at certain times of the year, most notably when seed heads are developing in late spring, and in early autumn when coming out of summer dormancy. Ideally we want the pasture to have the plant-survival characteristics that normal endophyte offers, but without health effects or production losses. In some situations though, particularly where animals are being very intensively produced, the staggers and heat stress issues affect the economic performance of the farm to a point where other options should be considered and carefully taken up.

There are several endophyte options currently available. Each has its own characteristics, so it is important to understand the difference between them and to which farm situations they are best suited. It is also important to reflect that the endophyte is only one feature of a cultivar, and genetic potential, resilience of the cultivar itself, and pasture fertility and management will have a great bearing on performance and persistence.

# PASTURE GRASSES

## RYEGRASS ENDOPHYTE OPTIONS

**NEA / NEA2** – An ideal endophyte for intensive farming situations. It provides excellent control of most insects, including Argentine stem weevil, black beetle and root aphid, giving a level of protection that is well proportioned to levels of insect pressure. NEA2 also provides excellent animal performance and staggers-free pasture. Available in tetraploid and diploid varieties.

**AR1** – A suitable endophyte for most medium to high rainfall farming situations. It provides very good resistance to many insects, and good persistence in many regions when matched with superior ryegrass varieties. AR1 also gives excellent animal performance and health with no chance of ryegrass staggers. This endophyte may not be suitable for areas where black beetle is a problem.

**Endo5/AR5** – Endo5 provides staggers-free pasture, although it may slightly reduce live weight gain in lambs. Currently the only commercial cultivars with Endo5 are tetraploid varieties. Does not appear to control root aphid to the extent of NEA2.

**AR37** – Provides high overall insect resistance and is suitable for situations where pest pressures are high. It can cause ryegrass staggers (although less often and usually less severe than standard endophyte) and can impact animal production. It is not recommended for deer or horses and caution is needed when grazing with sheep.

**Standard endophyte (SE)** – Not recommended for sowing in most situations. Standard endophyte is more likely to cause staggers when appropriate conditions prevail for alkaloid production, and can significantly reduce lamb growth, beef production and milk production in dairy cows. Not recommended for horses. Has contributed to concerns with animal welfare on occasions. Also called High Endophyte (HE), Wild-Type (WT). Not available in varieties with high production potential.

**Without endophyte (WE, Nil)** – Removing endophyte eliminates any animal health problems, but insect resistance is also lost and ryegrass pastures rarely persist well as a result.

# PASTURE GRASSES

## HARDY PERENNIAL GRASSES

### Phalaris

*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 cockchafer 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 through 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).

	Soil type		Rainfall pattern		
	Light skeletal soils	Medium heavy soils	Winter dominant, short spring	Winter dominant, longer spring	Even distrib./ some summer moisture
Advanced AT	Green	Green	Orange	Green	Orange
Holdfast GT	Orange	Green	Orange	Green	Green
Australian	Red	Green	Red	Orange	Green

# PASTURE GRASSES

**Winter active**

## 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  $\text{CaCl}_2$  3.8 and  $\text{Al}^{3+}$ % of 20-50%, 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 as well, although due to its broad breeding background will also produce well in soils of a pH above 4.0.

**Key:**  Good option  
 Often suitable  
 Not recommended

	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					
Australian					

# PASTURE GRASSES

## HOLDFAST GT

PHALARIS

Winter active



500+  
mm

4.5 – 8.5

Most soil  
types

- Grazing tolerant winter active phalaris bred by the CSIRO
- Holdfast GT 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 stager causing alkaloids
- Its ability to grow in moderately acidic conditions increases its area of adaptation
- CSIRO released Holdfast GT as a grazing tolerant replacement for Holdfast. It has been bred from Holdfast and other winter active varieties. Once established, Holdfast GT can be set-stocked and will provide a productive long term stand.



## 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  $\text{CaCl}_2$  if needed/plausible, or use Advanced AT
- Apply superphosphate if Olsen P is 8-10ppm 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 stems from summer regrowth.

# PASTURE GRASSES

## Cocksfoot

*Dactylis glomerta*

**2-4 kg/ha in a mix,  
6-8 kg/ha as dominant species**

Cocksfoot is a tussocky, true perennial grass that suits lighter, well drained soils. It is 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.

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 summer dormancy, with the highly summer dormant Kasbah at one end, summer active Safin at the other and the intermediate Howlong in between. Plant breeding has also taken place to select for fines leaves,



# PASTURE GRASSES

leading to increased overall stock acceptance.

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 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 alfalfa, white clover, red clover, strawberry clover and sub-clovers.

## SAFIN COCKSFOOT

### Summer active



600+  
mm



4.0 – 8.0



Free  
draining

- 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.

## HOWLONG COCKSFOOT

### Intermediate



400+  
mm



4.0 – 8.0



Free  
draining

- 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.

## KASBAH COCKSFOOT

### Summer dormant



400+  
mm



4.0 – 8.0



Free  
draining

- Hardy, deep-rooted perennial grass that is well suited to dry conditions and acid soils
- Good seedling vigour and early growth producing tillers
- Classed as a Mediterranean type (summer dormant), which is more tolerant of harsh dry conditions
- Maximum herbage production is during the autumn and winter period
- Excellent summer dormancy compared to other Mediterranean types.

## 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 Kasbah.

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.

# PASTURE GRASSES

## 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 flood irrigation where high 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.

## PROSPER

TALL FESCUE

### Winter active



450+ mm 5.0 - 8.0

Most  
Soils

- 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

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 alfalfa. 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, alfalfa 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. AgriCote treated seed contains the correct rhizobium strain as well as important trace elements and vital seedling protection.

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



# PASTURE LEGUMES

## White clover

2 - 5 kg/ha (in a mix)

*Trifolium repens*

White clover is tolerant of, 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. However 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.

## STORM

WHITE CLOVER



**Large leaf**  
B or 650+ mm 5.4 - 8.0 Wide Range  
Agricote

- 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.

# PASTURE LEGUMES

## **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.



# PASTURE LEGUMES

## 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 yannicum:** 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.

Sub-clover is a high quality protein feed. Sometimes older stock or those not used to an enriched diet will need greater management. In mixed swards, graze pasture according to grass stage e.g. introduce stock at 3 leaf stage of ryegrass or 5 leaf stage of phalaris. Sub-clover will survive as long as there is an accompanied 'spelling' phase. Opening up the sward will allow sunlight for the clover to grow and compete.

# PASTURE LEGUMES

## MEDIC, SUB AND ANNUAL CLOVER MATURITY DATES

Very Early	SULTAN-SU	80	
	SCIMITAR	88	
	MAWSON (b)	90	
Early Season	LOSA (s)	97	Paraggio
	STRATHWOOD CEFALU	110	Jester
Mid Season	MONTI (y)	112	Trikkala (y)
	MINTARO (b)	114	
	NITRO PLUS	116	
		120	Paradana
	BLAZA	122	
	CAMPEDA (s)	123	Crimson
Mid-late Season	GOSSE (y)	126	
	ZULU II	130	Bolta
	VISTA	132	
	ANTAS (b)	134	
		140	
Late Season	DENMARK (s)	144	
	LIGHTNING	145	Shaftal
		150	
Very late	NAPIER (y)	150	
		160	MEDICS
	LASER	165	SUBS
	170	ANNUALS	

# PASTURE LEGUMES

## LOSA

SUBTERRANEUM CLOVER



C or  
AgriCote



350+ mm



4.5 – 7.0



Wide  
Range

**Black seeded**

- 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.

## CAMPEDA

SUBTERRANEUM CLOVER



C or  
AgriCote



475+ mm



4.5 – 7.0



Wide  
Range

**Black seeded**

- 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.

## DENMARK

SUBTERRANEUM CLOVER



C or  
AgriCote



550+ mm



4.5 – 7.0



Wide  
Range

**Black seeded**

- 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.

# PASTURE LEGUMES

## **MONTI** YANNINICUM CLOVER



**White seeded**

C or  
AgriCote

450+ mm

4.5 - 7.0

Wide  
Range

- 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
- 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.



# PASTURE LEGUMES

## MAWSON BRACHYCALYGINUM CLOVER



C or AgriCote 325+ mm  
4.5 – 8.0 Wide Range

### White seeded

- 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 than other similar maturity varieties
- Excellent seed burial (65%).

## MINTARO BRACHYCALYGINUM CLOVER



C or AgriCote 400+ mm  
4.5 – 8.0 Wide Range

### White seeded

- Mid season maturity – 114 days to flowering (Turrefield)
- 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.

## ANTAS BRACHYCALYGINUM CLOVER



C or AgriCote 500+ mm  
4.5 – 8.0 Wide Range

### Black seeded

- Mid-late season maturity – 134 days to flowering (Perth)
- Exceptionally vigorous establishment
- Amazing winter growth and total production
- Most productive sub-clover available
- Higher level of hard seed offering better persistence
- Widely adapted – mildly acid to alkaline soils
- Has very large leaves offering good grazing and hay production.

# PASTURE LEGUMES

## 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, protein of feed 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.

# PASTURE LEGUMES

## **BOLTA** BALANSA CLOVER



**Late maturing**

C or  
AgriCote

650+  
mm

4.5 – 8.0

Most Soil  
Types

- Late season maturity
- Excellent spring/early summer growth, 40% more than Paradana
- Particularly well suited to annual/short term ryegrass mixes
- High quality hay or standing feed
- High hard seed for regeneration.

## **VISTA** BALANSA CLOVER



**Late maturing**

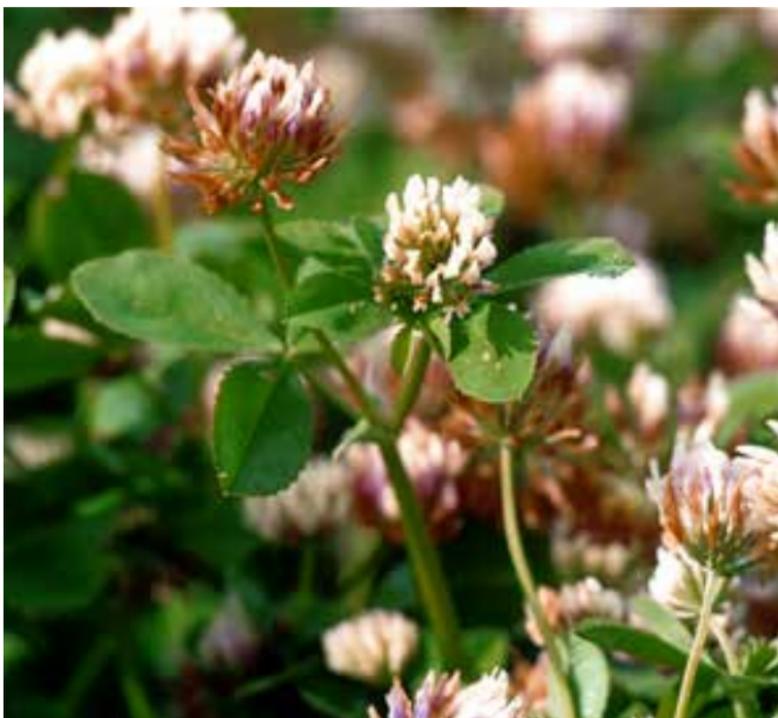
C or  
AgriCote

450+ mm

4.5 – 8.0

Wide  
Range

- 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.



# PASTURE LEGUMES

## Persian clover

2 - 5 kg/ha (in a mix)

*Trifolium respunitum*

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



C or AgriCote 550+ mm 5.5 - 8.5 Wide Range

- 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 mixes
- Improved rust resistance compared to Maral/Shaftal
- Superior quality to Maral/Shaftal
- Suitable for mixes with short term ryegrass.

**Soft seeded**

## LIGHTNING

PERSIAN CLOVER



C or AgriCote 450+ mm 5.5 - 8.0 Wide Range

- 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.

# PASTURE LEGUMES

## STRATHWOOD

PERSIAN CLOVER



C or AgriCote



300+



5.5 - 8.5



Most Soil Types

**Very hard seeded**

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

## NITRO PLUS

PERSIAN CLOVER



C or AgriCote



325+ mm



5.5 - 8.5



Wide Range

**Hard seeded**

- Early-mid season maturity – as early as 68 days to flowering
- Prostrate to 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.

## Berseem clover

**2 - 5 kg/ha (in a mix)**

*Trifolium alexandrinum*

Annual legume for medium-high rainfall areas that suits medium-heavy soils of neutral - moderately alkaline pH. Suitable for grazing and fodder conservation with reasonable winter growth. Can be affected by frosts. Often used as part of a high density legume mix and can produce multiple hay cuts. Regenerates by re-seeding. Soft-seeded.

## ELITE II

BERSEEM CLOVER



B or AgriCote



750+ mm



5.5 - 8.0



Most Heavy

**Late maturity**

- Particularly late maturing – approximately 160-190 days
- Slender, hollow branched stems and trifoliolate leaves
- Not known to cause bloat
- Vigorous winter growth with a flush of growth in spring
- Offers multiple fodder cuts and high quality hay
- Particularly suitable for high production hay, silage or green manure
- Good tolerance to clover scorch.

# PASTURE LEGUMES

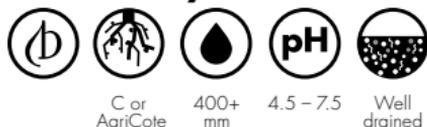
## Arrowleaf clover 2 - 5 kg/ha (in a mix)

*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.

### CEFALU ARROWLEAF CLOVER

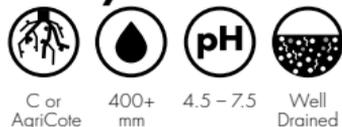
#### Very hard seeded



- Early maturity – approximately 110 days to flowering
- Excellent tolerance to acid soils
- Deep taproot can reach perched water tables increasing growth in drier seasons
- Early maturity – 20 days earlier than Zulu II
- Not known to cause bloat
- Excellent regeneration from hard seed
- Suited to green manuring
- Upright growth habit making it well suited to grazing or hay.

### ZULU II ARROWLEAF CLOVER

#### Very hard seeded



- 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.

# PASTURE LEGUMES

## Crimson clover

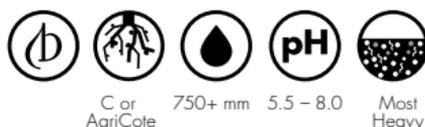
2 - 5 kg/ha (in a mix)

*Trifolium incarnatum*

Low pH tolerant annual for medium rainfall areas with well drained soils. Suitable for grazing and fodder conservation with reasonable winter growth. Traditionally used as a pioneer plant on acid soils of limited fertility. Regenerates by re-seeding. Soft-seeded.

**Soft seeded**

## BLAZA CRIMSON CLOVER



- Mid season maturity – approximately 122 days to flowering
- Shows good early vigour and winter production
- Excellent pioneering plant, especially on acid soils
- Adapted to a large range of soil types, grows well in light soils
- Suitable for grazing fodder, green manure and high density legumes
- Provides large red flowers through spring.



# PASTURE LEGUMES

## 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, Heritage Seeds has released varieties that have tolerance to residual Group B (sulfonylurea) herbicides, which are commonly used in areas normally suited to medics.

### Barrel medic

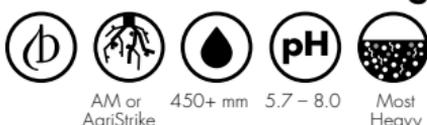
**2 - 4 kg/ha (in a mix)**

*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 BARREL MEDIC

#### Mid maturing



- Hard seeded barrel medic
- Mid season (110 days to flowering)
- Similar maturity to Paraggio
- Jemalong hybrid with improved performance
- Vastly improved aphid resistance (BGA and SAA)
- Retains distinctive leaf blotch of Jemalong
- Regenerates well after cropping phase of 1-3 years
- Superior to Paraggio and Parabinga.

# PASTURE LEGUMES

## 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 and SAA)
- Boron tolerant.

### Mid maturing



AM or AgriCote

275 - 450+ mm



5.5 - 8.5



Loam-Clay



# PASTURE LEGUMES

## Burr medic

*Medicago polymorpha*

**2 - 4 kg/ha (in a mix)**

Annual forage legumes are suited to a range of soil types from light/medium loams to heavier textured soils of moderate acid, to alkaline pH range. They suit low to very low rainfall extensive grazing/cropping areas. Good for cereal or pasture rotations that have a longer pasture phase. Is the most waterlogging tolerant of all the *Medic spp* and is able to cope with mild soil salinity levels. Regenerates by reseeding. Higher level of soft seeds than strand or barrel medics.

## SCIMITAR

SPINELESS BURR MEDIC

### Early-mid maturing



- 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.

# PASTURE LEGUMES

## 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.

### **Disc medic**

**2 - 4 kg/ha (in a mix)**

*Medicago tornata*

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



# ALFALFA

## SPECIALTY FORAGES

This group of species are often used for more specific outcomes: to fill a feed gap, fodder production, a stepping stone in a renovation program or as a break crop. They have terrific yield potential and good gains may be made through their inclusion in a forage production program.



## Alfalfa

*Medicago sativa*

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 ( $Al^{3+}$ ) 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.

	350-400mm Rainfall	450-600mm Rainfall	600-800mm Rainfall	800mm+ Rainfall/Irrigation
<b>SOWING RATES KG/HA</b>	4-6	6-8	10-15	18-35

# ALFALFA

## YIELD POTENTIAL AND FERTILITY

Alfalfa can produce a wide range of yields potentially ranging up to 10-25 tonnes DM/ha/yr. Phosphorous (P) 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, indicated 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 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 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.

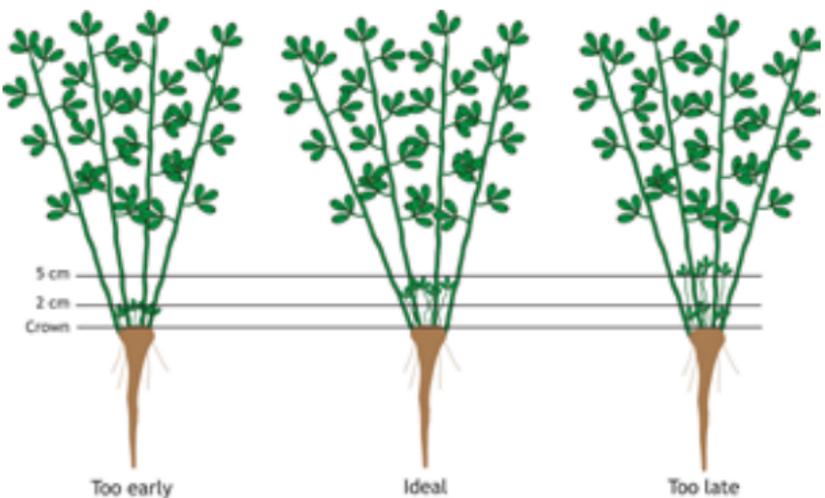
## CUTTING

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

## 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 (approx. 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.



# ALFALFA

## GRAZING

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 is however 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.

## SEMI-WINTER DORMANT ALFALFA

Semi-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 650mm.

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. Semi-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. Semi-winter dormant alfalfas can also be used in mixtures with perennial grasses.

## GRAZING TOLERANT ALFALFA

Select alfalfa cultivars are developed for and selected under intensive grazing systems. These varieties 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. One of the world's leading programs run by SARDI and Heritage Seeds, has these features built in as breeding objectives, which result in the high resilience to grazing of all varieties in the range.

### SARDI-GRAZER ALFALFA

- The most grazing tolerant commercial alfalfa in Australia
- Semi-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.

#### Dormancy 6



AL or  
AgriCote

325+ mm



5.8 – 8.0

Deep  
Well  
Drained

SARDI-Grazer is the most persistent and grazing tolerant alfalfa in Australia. 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.

# ALFALFA

## 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 alfalfa 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

5.8 - 8.0

Deep  
Well  
Drained

- Produces many fine, upright stems which carry a high number of large leaves
- Persistent and tolerant of grazing
- Broad pest and disease resistance profile
- Higher total dry matter than more winter dormant varieties
- Suited to continual harvesting, hard grazing and treading
- Replacement for the original SARDI 7.



## HIGHLY WINTER ACTIVE ALFALFA

Highly winter active alfalfa has excellent seeding vigour for undersowing. Some of the more recently bred Australian material in this group has increased grazing tolerance because it was selected from and developed for these broadacre grazing systems.

Highly winter active types generally have more upright crowns and erect growth habits that are suitable for 2-4 year rotations in high rainfall or irrigation zones. They provide maximum growth from winter dominant rainfall growing season rainfall. Generally higher winter active alfalfas do not persist as well as more dormant types.

### SARDI 10

ALFALFA

SERIES 2



AL or AgriCote

350+ mm

5.8 – 8.0

Deep Well Drained

### Dormancy 10

- Multiple screens for excellent disease and insects 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.

### PEGASIS

ALFALFA



AL or AgriCote

350+ mm

5.8 – 8.0

Deep Well Drained

### Dormancy 9

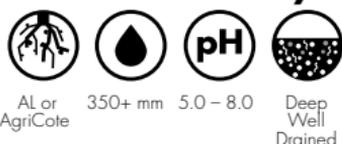
- Bred for excellent production and persistence
- Excellent option when very productive plant stands need to be maintained for 3-4 years in rain fed or irrigated conditions
- Highly resistant to spotted alfalfa aphid, resistant to pea aphid and resistant to phytophthora root rot.

# ALFALFA

## HERITAGE ST

ALFALFA

### Dormancy 9

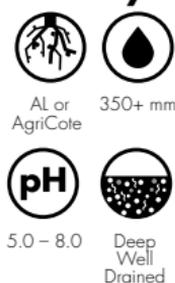


- Excellent short term rotation variety for 2-3 year stand
- Highly vigorous regrowth after cutting
- Improved salt tolerance in establishing alfalfa stands
- Excellent pest and disease resistance/tolerance for major strains.

## ALFAMASTER 9™

ALFALFA

### Dormancy 9

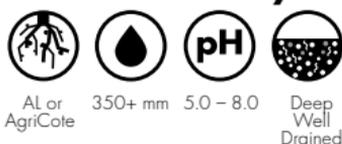


- Highly winter active with a dormancy rating of 9
- Increased herbage production per cut and per year – on average 21% over CUF101
- Selected for better persistence and proven consistent production over the years
- Highly resistant to pea aphid, stem and root rot nematodes, and fusarium wilt. Resistant to other aphid types, anthracnose, phytothera root rot and bacterial wilt
- Good regrowth after cutting or grazing
- Excellent seedling vigour.

## HERITAGE 10

ALFALFA

### Dormancy 10



- Upcoming release with an expected dormancy rating of 10
- High grazing tolerance > suited to grazing systems
- Selected for improved persistence over traditional dormancy 10s
- Good all round pest and disease resistance/tolerance.

## ALFAMASTER 10™

ALFALFA

- Highly winter active variety with a dormancy rating of 10
- Provides an extra cut per year due to increased winter activity
- Superior herbage production and good regrowth – on average 17% higher than CUF101
- Highly resistant to pea aphid and fusarium wilt. Resistant to other aphid types, anthracnose, phytothera root rot, stem and root knot nematodes and bacterial wilt
- Superior option for short term rotation with maximised herbage production
- Excellent seedling vigour.

### Dormancy 10



AL or AgriCote 350+ mm



5.0 – 8.0



Deep Well Drained

## HERITAGE ENDURANCE

ALFALFA

- Upcoming release with an expected dormancy rating of 10
- Erect plant growth habit
- High winter growth and grazing tolerance
- Excellent disease and insect resistance package
- Impressive all year forage production

### Dormancy 10



AL or AgriCote



350+ mm



5.0 – 8.0



Deep Well Drained

## ALFAMASTER 11™

ALFALFA

- Highest level winter activity – dormancy 11
- Ideally suited to hot, desert environments
- Short term rotations for high output farming
- Excellent pest and disease resistance
- Excellent seedling vigour.

### Dormancy 11



AL or AgriCote 350+ mm



5.0 – 8.0



Deep Well Drained

# FORAGE BRASSICAS AND HERBS

## FORAGE HERBS

### Chicory

*Cichorium intybus*

**5 - 6 kg/ha**

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 550mm 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.

### COMMANDER

CHICORY

**Winter active**



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.

### Plantain

*Lantago lanceolata*

**3 - 5 kg/ha**

A drought tolerant, deep tap-rooted perennial herb with high digestibility. Spring or autumn sown, with potential for year-round growth. Usually sown as a specialist paddock as weed control in mixed stands may be problematic. Has application in wet and slightly acidic sites where alfalfa persistence may be compromised.

# FORAGE BRASSICAS AND HERBS



# VETCH

## VETCH

Vetch is a winter and spring growing annual legume that is commonly used as a disease break in cereal cropping rotations. A multi-purpose crop, it offers high feed value and is ideal for hay production, early grazing as green pasture, dry grazing or green/brown manure.

Vetch is often sown in combination with cereals for quality hay. Vetch 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*)

e.g. Morava, Rasina, Volga, Languedoc and Blanche fleur. Suited to grazing, silage, hay and grain. Larger seed size, lower % hard-seeded.

### **Woolly-pod vetch** (*Vicia villosa*)

e.g. Capello, RM4, Haymaker and Namoi. Suited to grazing, silage and 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*)

e.g. Popany. Suited to grazing, silage, hay and 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<sup>2</sup>.

## Woolly pod vetch

15 - 30 kg/ha

**Soft-seeded**

### RM4

WOOLLY POD VETCH



E

375+ mm

5.0 - 8.0

Well Drained

- 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
- Less than 5% hard seed
- Soft seeded.

**Soft-seeded**

### CAPELLO

WOOLLY POD VETCH



E

375+ mm

5.0 - 8.0

Well Drained

- Softer seeded type
- 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

WOOLLY POD VETCH



E

325+ mm

5.0 - 8.0

Well Drained

- 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

## 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.

Forage oats are easy to establish and 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 barely yellow dwarf virus (BYDV) is a significant disease limiting production in susceptible varieties.

## WIZARD FORAGE OAT

### True forage cereal



400+ mm 4.5 – 8.0 Most Soil Types

- Sets a news benchmark in yield – 6% over Aladdin and Genie, 15% over Drover and Taipan
- Good early growth
- Excellent recovery from grazing and cutting
- Currently resistant to all Australian pathotypes of leaf rust
- Medium maturity
- Well suited to sub tropical/tropical oat growing areas.



# FORAGE CEREALS

## **GENIE** FORAGE OAT

### True forage cereal



400+ mm 4.5 – 8.0 Most Soil Types

- Excellent seedling vigour leading to more early growth
- Very late maturity and stays leafy into late spring
- Up to 15% higher yields – more feed
- Potentially more durable leaf rust resistance
- Well suited to sub tropical/tropical oat growing areas.

## **MAMMOTH** FORAGE OAT

### True forage cereal



400+ mm 4.5 – 8.0 Most Soil Types

- True forage oat
- Exceptional early vigour
- High winter and good overall yield
- High quality, leafy feed
- Excellent BYDV tolerance
- Suitable for grazing, silage and hay
- Suits more temperate climate zones.

# FORAGE CEREALS

## Forage triticale

*X Triticosecale*

**60 - 120 kg/ha**

Triticale is a cross between wheat and cereal rye or rye corn. 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 climbs again as the grain fills.

### True forage cereal

## CRACKERJACK 2

FORAGE TRITICALE



450+ mm 4.8 – 8.0 Most Soil Types

- 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.

# FORAGE CEREALS

**True forage cereal**

## SAIA SUPREME

©ATS



350+ mm 5.0 – 8.0 Most Soil Types

- 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 CEREALS

## Forage barley

60 - 100 kg/ha

*Hordeum vulgare (H. distichum L)*

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

### True forage cereal



450+ mm 5.4 - 8.0 Most Soil Types

- True forage barley bred to replace Dictator
- 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.

## Forage wheat

60 - 100 kg/ha

*Triticum aestivum*

Long-season wheat varieties offer high quality winter grazing with the potential for silage. Awnless varieties are also suitable for hay. Einstein wheat (p.173) is a suitable variety for grazing, grain, silage or hay. Dry-matter yield through autumn and winter is typically less than the potential offered by other cereal species.

## Cereal rye (ryecorn)

40 - 60 kg/ha

*Secale cereale*

Rye has the potential for quick winter feed for a late sowing window, and may be used as a cover crop in some lighter-soil situations. Feed value declines rapidly from late winter and rye crops should be terminated before spring, as silage or hay have poor stock acceptance, very high fibre and little feed value.

## **Pearl millet**

**4 - 15 kg/ha**

*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 zones as pearl millet generally well-out performs Japanese types. Pearl millet should be sown at a soil temperature of 16°C and rising, preferable 18°C.

## **Siberian millet**

**8 - 25 kg/ha**

*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.

# TROPICALS

## TROPICALS

The northern research team is based in Toowoomba Australia and has four primary sites at Gatton (SE Qld), Oakey (SW Qld), Kingaroy (Wide Bay, Qld) and Blanchview (SE Qld). In addition, secondary trial sites are located at Mareeba (Far North Qld), Charters Towers (North Qld), Emerald (Central Qld), Rockhampton (Central Qld), Moree (NW NSW), Coonabarabran (Central Western NSW), Grafton (Central Coast NSW), Northern WA and NT. These sites are used to test the 'area adaptability' of each variety.



## EBONY PR

COWPEA

### Multi-graze cowpea



400+ mm 4.0 – 7.0 Wide Range

- 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

### Multi-purpose legume



400+ mm 4.5 – 8.0 Light to Heavy

- Shorter maturing season burgundy bean
- Capable of producing feed later in the season
- Palatable, high protein legume suited to short season regions.

## GARNET

BURGUNDY BEAN

### Multi-purpose legume



400+ mm 4.5 – 8.0 Light to Heavy

- Produces forage late into the season
- Capable of having some regeneration from plants and seeds
- Highly palatable, high protein feed source.

# TROPICALS

## SIRAN

STYLO

### High protein legume



450+ mm 4.5 – 7.0 Light

- An 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 highly nutritious feed for the dry season.

## AMIGA

STYLO

### High protein legume



400+ mm 5.4 – 8.0 Light

- Highly palatable and persistent hamata type stylo
- Suited to cooler more arid regions of the tropics
- Easy to establish
- Produces an abundance of seed.

## LAKOTA

BUFFEL GRASS



300+ mm 5.5 – 8.0 Light to Medium

- Good early feed coming out of winter
- A degree of cold tolerance, very suited to low rainfall winter dry zones
- Highly productive in a range of soil types.

## MULATO II

HYBRID BRACHIARIA



700+ mm 5.0 – 8.0 Most Soil Types

- 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.

## MEGAMAX™ 059

PANIC GRASS



550+ mm 5.0 – 8.0 Most Soil Types

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

### Quality

Forage quality data collected at Tamworth NSW clearly demonstrates the high quality of Megamax 059™ vs superseded Gatton and Green cv.

Cv/Line	NDF (%)	ADF (%)	CP (%)	DMD (%)
<b>MEGAMAX 059™</b>	<b>59.1</b>	<b>27.7</b>	<b>14.3</b>	<b>65.2</b>
<b>Gatton</b>	58.9	24.6	13.3	63.2
<b>Green</b>	63.7	29.0	14.1	63.3



# TROPICALS

## TROPICAL GRASSES

### BILOELA BUFFEL BUFFEL GRASS



350+ mm 5.5 – 8.0 Light to Heavy

- Taller, more robust buffel, later maturity
- Establishes readily in heavy soil types
- Greater drought tolerance.

### GAYNDAH BUFFEL BUFFEL GRASS



350+ mm 5.5 – 8.0 Light to Medium

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

### USA BUFFEL BUFFEL GRASS



350+ mm 5.5 – 8.0 Light to Medium

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

### CREEPING BLUEGRASS

(Bisset/Hatch)



600+ mm 5.0 – 7.0 Wide Range

- Good drought and grazing tolerance stoloniferous grass
- Bisset is finer in the stem, and later maturing than Hatch, that roots at the nodes
- Suitable for hay production, and a wide range of soil types, including soils of low fertility
- Can be slower to establish than other grasses.

### FLOREN BLUEGRASS



650+ mm 5.5 – 8.0 Basaltic Clays

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

## CONSOL LOVEGRASS



400+ mm 4.0 – 6.0 Light Soils

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

## HUMIDICOLA TULLY GRASS



1000+ mm 4.5 – 7.5 Wide Range

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

## BAMBATSII PANIC GRASS



450+ mm 5.5 – 8.0 Clay Loams

- High yielding and palatable perennial grass
- Distinctive bluish leaves with prominent white mid rib
- Tolerates periodic waterlogging, drought conditions and has some tolerance to frost. Also suited to heavy black cracking clay soils.

## GATTON PANIC GRASS



500+ mm 5.5 – 8.0 Fertile and 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 GRASS



500+ mm 5.5 – 8.0 Fertile and 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.

# TROPICALS

## MOMBASA GUINEA GRASS



1000+ mm    5.0 – 8.0    Most soil types

- 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, USA and Mexico.

## DILATATUM PASPALUM



800+ mm    5.5 – 8.0    Wide Range

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

## WETTSTEINII PASPALUM



400+ mm    4.5 – 8.0    Wide Range

- 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



400+ mm    5.5 – 8.0    Light

- 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.

## CALLIDE RHODES GRASS



700+ mm    5.5 – 8.0    Wide Range

- 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**



500+ mm



5.5 – 8.0



Wide  
Range

- 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.

## **SPLENDA SETARIA**



800+ mm



5.0 – 7.0



Wide  
Range

- 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.

## **SIGNAL GRASS SIGNAL GRASS**



800+ mm



4.5 – 7.0



Wide  
Range

- 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.

## **UROCHOLA SABI GRASS**



500+ mm



5.0 – 8.0



Wide  
Range

- 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.

# TROPICALS

## TROPICAL LEGUMES

### UBON STYLO



CB82



700+



5.0 – 8.0



Sands  
- light  
clays

- 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.

### FINESTEM STYLO



CB82



700+



6.5 – 8.0



Sands  
- light  
clays

- 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



CB82 or  
AgriCote



350+



4.5 – 7.0



Light

- Widely adapted and very drought tolerant scabra type
- Well suited to soils low in phosphorus
- Tolerant of heavy grazing
- Well suited to extensive grazing systems.

### DOLICHOS LABLAB



J



500+



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.

### TINAROO GLYCINE



M or  
AgriCote



800+



6.0 – 8.0



Medium  
to heavy

- Later flowering variety than Cooper
- Performs best on deep, free-draining fertile soils
- Productive and persistent under correct management.

## COOPER GLYCINE



M or  
AgriCote



800+



6.0 - 8.0



Medium  
to heavy

- Early flowering variety
- Quicker to establish than Tinaroo
- More drought tolerant than Tinaroo.

## SIRATRO TROPICAL LEGUME



M or  
AgriCote



700+



5.0 - 8.0



Wide  
range  
types

- Best suited to grazing permanent pastures
- Prefers well drained soils of moderate fertility
- Suitable for soil conservation.

## WYNN CASSIA



M or  
AgriCote



400+



5.0 - 8.0



Light

- Non-bloating, free seeding self regenerating annual
- Adapted to low fertility and acid soils
- Low palatability, particularly young growth.

## MILGARRA BUTTERFLY PEA



M or  
AgriCote



550+



5.0 - 8.0



Medium  
to heavy

- Suited to heavy clay and surface crusting soils
- Non-bloating, fast establishing perennial forage legume
- Persistence depends on grazing management.

## GREENLEAF DESMODIUM



800+



5.0 - 8.0



Light to  
medium

- Perennial vining tropical legume
- Can be used for dryland and irrigated pastures, cut and carry, green manure or hay and silage
- Prefers moderate fertility and can tolerate waterlogging.

## CAVALCADE CENTRO



CB1923  
or  
AgriCote



700+



5.0 - 8.5



Sand to  
heavy  
clay

- High quality forage for pastures and ley farming, production of hay and legume cubes
- Well adapted to the dry tropics, tolerates seasonal flooding and adapts to a wide range of soil conditions including heavy clays but excluding very acid, low-fertility soils
- Self-regenerating annual that grows and spreads rapidly
- High yielding and palatable.

# TROPICALS

## TROPICAL SOWING GUIDE

Variety	Rainfall (mm)	Preferred Soil Type	Water-logging	Frost	Drought
Bambatsii Panic	500	Clay loams	Good	Good	V.Good
Buffel Grass - USA, Gayndah, Biloela	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 - Bissett - Hatch	600	Wide ranging, tolerates lower fertility	Poor	Fair	Fair
Floren Bluegrass	550	Basaltic clays and heavy alluvial soil	Good	Fair	Fair
Panic Grass - Green - Gatton	650	Fertile and lighter	Poor	Fair	Fair
Panic Grass - Megamax™ 059	550	Fertile and lighter	Poor	Fair	Fair
Humidicola* - Tully Grass	1000	Varying, tolerates lower fertility	Good	Poor	Fair
Indian Bluegrass	500	Varying	Poor	Fair	V.Good
Kikuyu Grass - Whittet	1000	Red loams and basaltic soils	Good	Good	Fair
Premier Digitaria	500	Lighter soil types	Poor	Fair	V.Good
Paspalum*	750	Fertile soil types	Good	Good	Fair
Purple Pigeon Grass	600	Self-mulching clays	Good	Good	V.Good
Rhodes Grass - Katambora, Callide	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

Planting Rate (kg/Ha) <b>AgriCote</b>			Comments
Marginal Dryland	Good Dryland	Irrigated	
3-5	8-12	12-15	Cool season greenness, tolerates heavy grazing, heavy black soils, periodic water-logging and saline areas.
4-6	8-12	12-15	Deep rooted, drought tolerant sub-tropical grass, that is 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 leaved 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.
3-6	10-12	12-15	Grows best on high fertility soils. Gatton panic tolerates textured soil types and shade, but can be preferentially grazed. Green panic more tolerant of shade.
3-6	10-12	12-15	Improved persistence over other panic grasses with improved forage quality and cool season growth.
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 tropical and sub-tropical areas.
2-3	8-12	12-15	Has high fertility requirements and does best in moist and elevated, fertile basaltic tablelands.
4-6	8-12	12-15	Perennial tufted grass suited to acidic, sandy soils of low fertility.
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	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.

# TROPICALS

Legume Over-planting	Minimum Rainfall (mm)	Drought Tolerance	Frost Tolerance
Burgundy Bean (Presto/Garnet)	400	Good	Fair
Centro (Cavalcade)	800	Good	Poor
Desmanthus	500	Good	Fair
Glycine (Tinaroo/Cooper)	750	Good	Fair
Greenleaf Desmodium	500	Poor	Fair
Joint Vetch (Jester/Lee)	1200	Poor	Poor
Leucaena (Cunningham)	600	V.Good	Fair
Lucerne (SARDI range)	400	V.Good	V.Good
Medic Burr (Scimitar)	350	Good	Good
Medic Barrel (Paraggio/Jester/Sultan-SU)	350	Good	V.Good
Medic Snail (Sava)	350	Good	Good
Milgarra Butterfly Pea	550	Good	Poor
Peanut (Pinto/Amarillo)	1000	Fair	Fair
Shaw Creeping Vigna	1200	Poor	Poor
Siratro (Aztec)	700	Good	Poor
Stylo Shrubby (Seca/Siran) – Scabra type	350	V.Good	Poor
Stylo Caribbean (Verano/Amiga) – Hamata type	400	Good	Fair
Stylo Fine Stem	700–900	V.Good	Fair
White Clover (Haifa/Storm)	800	Good	Fair
Wynn Cassia	400	V.Good	Fair

- Alfalfa sowing rates for pure stands
- Marginal Dryland: 6-8 kg/Ha
- Good Dryland: 10-12 kg/Ha
- Irrigated: 22-25 kg/Ha

# TROPICALS

Water-logging	Preferred Soil Type	Planting Rate (kg/Ha) <b>AgriCote</b> OVERSOW	Planting Time
Fair	Light+Heavy	3-4	Spring/Summer
V.Good	Fertile soil types	3-8	Spring/Summer
Poor	Medium-Heavy	2-4	Spring/Summer
Poor	Medium-Heavy	3-8	Spring/Summer
Good	Light+Medium	2-4	Spring/Summer
V.Good	Light+Heavy	2-4	Spring/Summer
Poor	Well drained, fertile soils	4-6	Spring/Summer
Poor	Light+Medium	1	Autumn/Spring
Fair	Medium-Heavy	2-4	Autumn/Spring
Fair	Light+Heavy	2-4	Autumn/Spring
Fair	Medium-Heavy	2-4	Autumn/Spring
Fair	Medium-Heavy	4	Spring/Summer
Fair	Medium-Heavy	8-12	Spring/Summer
Good	Medium-Heavy	1-2	Spring/Summer
Fair	Medium-Heavy	3-8	Spring/Summer
Fair	Light	1-5	Spring/Summer
Fair	Light	1-5	Spring/Summer
Poor	Light+Medium	2-5	Spring/Summer
Good	Medium-Heavy	2-6	Autumn/Spring
Poor	Light+Medium	3	Spring/Summer

# TRADED VARIETIES

## RYEGRASSES

### VICTORIAN PERENNIAL RYEGRASS

Diploid



600-  
650+



4.8 – 8.0



Most Soil  
Types

- 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

Winter active



500-  
700+



4.5 – 8.5



Most Soil  
Types

- Semi erect to erect winter active variety
- Good seedling vigour
- Bred by the CSIRO breeding program
- Good tolerance to acid soils.

### SIROSA PHALARIS

Winter active



500 -  
700+



5.5- 8.5



Most Soil  
Types

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

## PASTURE LEGUMES

### HAIFA WHITE CLOVER

Large leaved



B or  
AgriCote



700 -  
850+



4.7 – 7.0



Most  
Heavy

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

### PALESTINE STRAWBERRY CLOVER

Hard seeded



B or  
AgriCote



500 -  
700+



6.0 – 8.5



Most Soil  
Types

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

# TRADED VARIETIES

## NUNGARIN SUBTERRANEUM CLOVER



C or  
AgriCote



250 -  
400+



4.5 - 7.0



Medium  
to Light

**Black seeded**

- Early season maturity – 77 days to flowering (Perth)
- Very high levels of hard seed and seed yield
- Still a useful cultivar for marginal rainfall areas.

## DALKEITH SUBTERRANEUM CLOVER



C or  
AgriCote



350 -  
650+



4.5 - 7.0



Medium  
to Light

**Black seeded**

- 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



C or  
AgriCote



475 -  
700+



4.5 - 8.0



Medium  
to Light

**Black seeded**

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

## TRIKKALA YANNINICUM CLOVER



C or  
AgriCote



500 -  
750+



5.0 - 8.0



Medium  
to Heavy

**White seeded**

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

## WOOGENELLUP SUBTERRANEUM CLOVER



C or  
AgriCote



525 -  
700+



4.5 - 7.0



Most Soil  
Types

**Black seeded**

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

# TRADED VARIETIES

## CLARE BRACHYCALYCIUM CLOVER



C or  
AgriCote



600 -  
675+



6.0 - 8.0



Medium  
to Heavy

### Black seeded

- 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



C or  
AgriCote



450 -  
550+



4.6 - 7.8



Most Soil  
Types

### Mid maturing

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

## SHAFTAL PERSIAN CLOVER



C or  
AgriCote



600 -  
800+



6.0 - 8.5



Most Soil  
Types

### Soft seeded

- Late season maturity – about 160 days to flowering
- Historically known as Shaftal Clover
- Vigorous erect growth but susceptible to Rust
- Our improved alternatives are Laser and Lightning.

## PARABINGA BARREL MEDIC



AM or  
AgriCote



250 -  
350+



5.7 - 8.5



Wide  
Range

### Early maturing

- Early maturing – 88 days to flowering
- Very high levels of hard seed
- Possible replacement – Sultan-SU.

# TRADED VARIETIES

## PARAGGIO BARREL MEDIC

Mid maturing



B or  
AgriCote



350 -  
450+



>5.7



Heavier  
Textured

- Mid maturing – 98 days to flowering
- Adaptable variety with good early vigour
- Our improved alternative is Jester.

## NAMOI WOOLLY POD VETCH

Hard seeded



E or  
AgriCote



400 -  
650+



5.0 – 8.0



Most Soil  
Types

- Mid maturing self regenerating annual
- Indeterminate flowering
- Suitable for grazing, hay and green manure
- Outclassed by Capello and RM4.

## BLANCHEFLEUR COMMON VETCH

Hard seeded



E or  
AgriCote



350 -  
650+



5.0 – 8.0



Most Soil  
Types

- Mid maturity variety
- Low hard seed levels
- Suitable for grain, hay or green manure
- Outclassed by Rasina.

## POPANY PURPLE VETCH

Soft seeded



E or  
AgriCote



450 -  
600+



5.0 – 8.0



Wide  
Range

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

# TRADED VARIETIES

## ALFALFA

### AURORA ALFALFA

#### Dormancy 6 | Semi winter active



AL or  
AgriCote



350+mm



5.5 - 8.0



Deep  
Well  
Drained

- Semi winter active with a dormancy rating of 6
- General purpose cultivar suited to dryland and irrigation
- Alternative to Hunterfield and Trifecta
- Outclassed by SARDI-Grazer and SARDI 7 Series 2.

### SIRIVER ALFALFA

#### Dormancy 9 | Highly winter active



AL or  
AgriCote



350+mm



5.5 - 8.0



Deep  
Well  
Drained

- Highly winter active with a dormancy rating of 9
- Suitable for hay production under irrigation and rotational grazing
- Derived from Hunter River and CUF101
- Outclassed by Pegasus and SARDI 10 Series 2.

### SEQUEL ALFALFA

#### Dormancy 9 | Highly winter active



AL or  
AgriCote



375 -  
480+



5.5 - 8.0



Deep  
Well  
Drained

- Susceptible to Stem Nematode and Bacterial Wilt
- Shows high susceptibility to winter leaf diseases
- Our improved alternatives are Pegasus and SARDI 10 Series 2.

# TRADED VARIETIES

## FORAGE CEREALS

### SAIA FORAGE OAT

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



350+mm 5.0 – 8.0 Most 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.



350+mm 5.0 – 8.0 Most Soil Types

### JAPANESE FORAGE MILLET

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



350+mm 5.0 – 8.0 Most Soil Types



# SEED TECHNOLOGY AND GENERAL INFORMATION

## SEED COATING

Tailored seed coatings are primarily used to enhance seed establishment, the delivery of rhizobia for legume inoculation and to improve handling and ballistics properties for aerial seeding. Heritage Seeds 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).

**AgriCote:** Heritage Seeds premium seed coating technology AgriCote is available for pasture legumes, tropical grasses and forage herb species. It is designed to deliver significant advantages to plant establishment through insect protection (Gaucho®), fungicide protection, inoculant bacteria (on most legumes) and micro-nutrients. 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. For more information about AgriCote refer to page 90.

**Gaucho Film Coat:** A film-coat of Gaucho insecticide is designed to protect seedlings from biting and sucking insects (including red-legged earth mites) for up to four weeks during establishment. Gaucho Film Coat offers 'stress shield' benefits, which help to protect treated plants during extended dry periods. Gaucho Film Coat also includes a fungicide which protects the seed against fungal diseases.

**Poncho Film Coat:** Poncho Plus insecticide is designed to protect seedlings from chewing as well as biting and sucking insects for up to four weeks during establishment. It includes the active ingredient in Gaucho Film Coat offers 'stress shield' benefits, which help to protect treated plants during extended dry periods. Poncho Film Coat also includes a fungicide which protects the seed against fungal diseases.

# SEED TECHNOLOGY AND GENERAL INFORMATION

**OptiCote:** offers both fungicide and insecticide protection for sorghum and corn crops. A film coating of Vitavax® and Gaucho is used on corn. Thiram and Gaucho/Cruiser® are used for sorghum.

**OptiCote PLUS:** consists of the ingredients of OptiCote as mentioned above, but also includes Concept II® seed safener, for the use of Dual Gold herbicide in sorghum.

*@Concept II, Cruiser and Dual Gold are registered trademarks of Syngenta.*

*@Gaucho, Poncho Plus are registered trademarks of Bayer.*

*@Vitavax is a registered trademark of Crompton.*



Untreated vs Treated

# SEED TECHNOLOGY AND GENERAL INFORMATION

	SEED COATING	SEED BUILD	CHEWING INSECTS
Temperate grasses	Gaicho Film Coat	No Build	
Temperate grasses	Poncho Film Coat	No Build	✓
Temperate legumes	AgriCote	Yes	
Forage brassicas	Poncho Film Coat	No Build	✓
Forage herbs	AgriCote	Yes	
Alfalfa	AgriCote	Yes	
Tropical grasses	AgriCote	Yes	
Tropical legumes	AgriCote	Yes	
Corn / maize	OptiCote	No Build	
Grain sorghum	OptiCote	No Build	
Grain sorghum	OptiCote Plus	No Build	

# SEED TECHNOLOGY AND GENERAL INFORMATION

BITING / SUCKING INSECTS	FUNGICIDE	TRACE ELEMENTS	RHIZOBIA	STRESS SHIELD	LIME
✓	✓			✓	
✓	✓			✓	
✓	✓	✓	✓	✓	✓
✓	✓			✓	
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓				
✓	✓				
✓	✓			Plus Concept II® Seed Safener	

# SEED TECHNOLOGY AND GENERAL INFORMATION

## AgriCote®

### TAILORED SEED ENHANCEMENT

AgriCote is designed to enhance 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. AgriCote also includes insecticidal treatments that offer protection from biting and sucking insects. In addition to all of these state-of-the-art elements, AgriCote also features encapsulated rhizobia which prolongs shelf life of treated legumes and helps to ensure good legume nodulation in the paddock maximising your investment.

Potential benefits include:

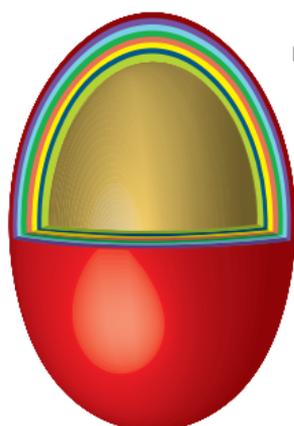
- Dormancy breaking technology which is not available in any other seed coat
- Improved plant establishment
- Improved early root growth and development
- NPK nutrients and trace elements that are immediately available to the seedling
- A more robust seedling for slow establishing grasses
- Encapsulated rhizobia for longer shelf life
- Protection against biting and sucking insects
- Protection against fungal diseases
- Better ballistic properties for flying onto hill country.

**AgriCote Seed**  
typical coating make-up

**Lime Coating**  
creates a favourable  
germination environment

**Fungicide Protection**  
option of pythium and  
phytophthora protection

**Protective Polymer**  
protects and isolates bacteria



**Bonding Polymer**  
bonding AgriCote 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

# SEED TECHNOLOGY AND GENERAL INFORMATION

RHIZOBIUM INOCULATION GROUP	SUITABLE SPECIES	NOTES
AL	Alfalfa	
	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	
E	Field peas	Group E and Group F can be fully interchanged
	Vetch	
F	Faba beans	Group E and Group F can be fully interchanged
	Lentils	
G	Lupin	Group G and Group S can be interchanged
H	Soybeans	
I	Cowpeas	
	Mungbeans	
J	Pigeon peas	
	Lab Lab	
N	Chickpeas	
S	Serradella	Group S and Group G can be interchanged
<b>SPECIALTY:</b>		
SU343	Birdsfoot trefoil	
WSM1497	Bisurella	
CB1717	Burgundy bean	
CC283b	Caucasian clover	
CB782	Kenya white clover	
CC829	Lotus	
WSM1292	Sulla	

# SEED TECHNOLOGY AND GENERAL INFORMATION

## SEED WEIGHTS

SPECIES	SEEDS/GRAM
<b>Pasture grasses</b>	
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
<b>Pasture legumes</b>	
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
Alfalfa	400 - 480
Barrel medic	230 - 300
Burr medic	230 - 300
<b>Other forages</b>	
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

*Note: Many seed sizes and weights will vary markedly depending on seed growing conditions, seed processing and cultivars.*

## COMMON ANIMAL HEALTH ISSUES FROM PASTURE AND FORAGE CROPS

Heritage Seeds offers the following information in good faith that it may help to develop strategies and tactics on farm to assist production. Heritage Seeds does 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.



# SEED TECHNOLOGY AND GENERAL INFORMATION

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 <i>Anguina funesta</i> in combination with a bacterium. Signs include 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 alfalfa, 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.

# SEED TECHNOLOGY AND GENERAL INFORMATION

Hypocalcaemia / 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 alfalfa hay is good. Calcium/magnesium blocks. Intravenous 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 levels of fert 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 hungry sheep on first green pick in autumn. Use sentinel sheep and monitor. Use of cobalt 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 heartbeat and often death.	As for phalaris staggers, but cobalt has no effect.
Phytosensitivity	Grazing brassicas too early. Avoid too high % 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 % of brassica in diet/ eat bulbs/stem as well as leaves (break-fence). Avoid weeds like Patersons' curse, ragwort, storksbill.

# SEED TECHNOLOGY AND GENERAL INFORMATION

ISSUE	TYPICAL SIGNS / SITUATIONS	USEFUL RESPONSES AND MANAGEMENT OPTIONS
Phyto oestrogens	Common in the older types of red clovers, sub-clover pastures, sometimes in alfalfa (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, over-sowing, grazing management.
Prussic acid (Hydro cyanic poisoning)	Typically relates to grazing of immature, droughted or frosted forage sorghum. Any stress on it really 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 clostridial 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. alfalfa, occasional on other quality pasture/forages. Signs: intense reddening of the intestine and sudden death.	Remove animals from alfalfa 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 TECHNOLOGY AND GENERAL INFORMATION



# SEED TECHNOLOGY AND GENERAL INFORMATION

## 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, 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.seedtesting.com.au](http://www.seedtesting.com.au)

All certified Heritage Seeds' 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.

*Specific certificates may also be issued for some other circumstances*

# SEED TECHNOLOGY AND GENERAL INFORMATION

The 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 <sub>3</sub> 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 good enough). 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 <sub>3</sub> 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 <i>Anguina funesta</i>
Endophyte %	In perennial ryegrass (either seed or seedlings grow outs) <ul style="list-style-type: none"> <li>• NEA2, AR1 or AR37 : 70%+ of seed have stated endophyte</li> <li>• LE or 'low endophyte' : a low level of seeds have any endophyte</li> </ul>
ELISA test	For the presence of AR1 endophyte (either seed or seedlings grow outs)
GMO testing	Specific reporting for the detected presence of GM events.

## NEW VARIETIES

Heritage Seeds' ongoing commitment to research and development continues to be realised in the release of new cultivars. A number of potential new varieties are listed here. Our intention is to continue thorough evaluation prior to their release, to assure their suitability and they offer opportunity to add to the productivity of our customers.

<b>PASTURE LEGUMES:</b>	
Lofty	Brachycalycinum sub-clover with improved yield and seed regeneration
<b>TROPICALS:</b>	
Lakota	Buffel grass with improved cold tolerance and broader adaptation
MegaMax™ 059	Panic grass with improved yield and persistence
<b>FORAGE CEREALS:</b>	
Wizard	Forage oat
Hercules	Forage oat

## SUPERCEDED/RETIRED VARIETIES

Plant-breeding and evaluation trials continue to bring forth new cultivars with improved characteristics and performance. For convenience, the following table describes recent cultivar changes to our portfolio:

<b>PASTURE LEGUMES:</b>	
Bolta balansa	replaced by Vista, p37
Angel medic	replaced by Sultan-SU, p43
Jester medic	replaced by Sultan-SU, p42
<b>ALFALFA:</b>	
SARDI 5	replaced by SARDI-Grazer, p51
SARDI 7	replaced by SARDI 7 Series 2, p52
SARDI 10	replaced by SARDI 10 Series 2, p53
Venus	replaced by SARDI-Grazer, p51
<b>TROPICALS:</b>	
B1 burgundy bean	replaced by Garnet, Presto, p67



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