

Heritageseeds 



ALFALFA PRODUCTION INTERNATIONAL GUIDE

EDITION 3

GROW WITH CONFIDENCE

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Heritageseeds 



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.



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ALFALFA DEVELOPMENT UPDATE

Heritage Seeds continues to lead the improvement of alfalfa forage solutions through a number of exciting projects including important partnerships with the South Australian Research and Development Institute (SARDI) and Grasslanz Technology. These programs focus on the continual development of cultivars for the Australian environment and international markets. New varieties are continually being assessed in the field, via replicated trials and laboratory screening for improvement on aspects such as overall yield, seasonal yield, persistence, disease and pest tolerance and forage quality.

Breeding objectives:

- Overall yield
- Persistence
- Winter activity
- Pest and disease tolerance
- Grazing tolerance
- Wide adaptability.

Heritage Seeds has a partnership with Grasslanz Technology in New Zealand, with the main focus on breeding highly winter active varieties for the international market. This work is undertaken in the heartland of the Australian alfalfa seed production region at Keith, South Australia. Heritage 10 and Heritage Endurance are the first two commercially available varieties set for release in 2018/19.

Our established relationship with the internationally recognised SARDI program continues to develop varieties for both international and Australian markets.

Unique trait development

Acid tolerance

Heritage Seeds has been working on solutions for regions with soils which have lower than ideal levels of pH. This development work has focused on using new strains of rhizobium that is hoped to improve root nodulation and overall establishment.

Glyphosate herbicide tolerance

A pool of genetics has been selected and developed to potentially allow for the post emergent use of glyphosate herbicide over alfalfa – at seedling stage. This will offer an additional and potentially cost saving weed control option to the alfalfa management tool kit. The project is progressing well with some management information, stewardship and regulatory factors to be finalised. This variety will be a '7' dormancy for broad adaptability. GHT alfalfa has been developed without the use of Genetically Modified Organisms (GMO) in this particular case.

AGRONOMY NOTES

TO AID PREPARATION, ESTABLISHMENT AND MANAGEMENT

Alfalfa is a highly productive perennial plant that will generally out-yield most other pasture species in light-medium soils in dry environments. It provides excellent, palatable, nutritious feed, and should be a strong consideration where site factors and management provides the opportunity for production.

Alfalfa is deep rooted, very drought hardy and provides benefits such as high animal performance and nitrogen fixation (for itself and subsequent crops). It also offers an opportunity for a productive break crop or long-term pasture, that may also aid the management of weedy grass species.

Dormancy groups

There are three main dormancy groupings for alfalfa. The ratings are based on how much growth the variety produces in the winter months (all dormancy groups grow actively in summer if moisture is available). The suitability for purpose of each is largely dependent upon its dormancy rating.

Winter dormant alfalfa with ratings of 5 or less are sometimes considered for low-stock density, extensive systems, specialty hay cutting or for cold environments, which would likely kill highly winter active types.

Dormancy	Winter activity rating	Life expectancy	Suitability
Winter dormant	4 to 5	8 years plus	Grazing and fine cut hay
Winter active	6 to 7	5 to 8 years plus	Grazing, hay, general purpose
Highly winter active	8 – 11	3 to 4 years plus	Winter feed, hay production, short pasture phase

Varieties with a dormancy rating of 1–5 are only suitable for early autumn or spring sowing. Those with a rating of 6–10, are suitable for later autumn sowing under most circumstances.

Dormancy 6–7 varieties are generally termed winter active (WA) or alternatively semi-winter active. This group offers the most flexibility and productive potential longer term, general purpose grazing or fodder production. Furthermore, in circumstances where a winter dominant rainfall pattern is the norm, 6–7 rated alfalfa probably has the opportunity to capture the potential growth in cooler seasons compared to those rated 5 or lower.

Dormancy 8–11 types are termed highly winter active (HWA). They may suit a short-term pasture phase to capture year-round production. Most frequently used where fast rotation is required. Highly winter active varieties will typically have a shorter life-span of around 3–4 years, although some varieties, including SARDI 10 Series 2 have exhibited improved persistence in many circumstances.

DORMANCY RATINGS



Sowing rates

Sowing rates for alfalfa depend mostly on available moisture (rain or irrigation):

Rain	Kg/ha	Plant counts/m ² (after 1st summer)
Marignal dryland (350–450mm)	4–6	15–40
Dryland (450–600mm)	6–8	50–70
Favourable dryland (600–800mm)	10–15	80–130
High rainfall/irrigated (800mm+ /irrigated)	18–35	150–200+

Note: The sowing rate is determined by the soil type. On heavier soils use the higher end of the rate range.

Thicker sowing gives thinner stems – can be used for irrigated hay production as a tool.

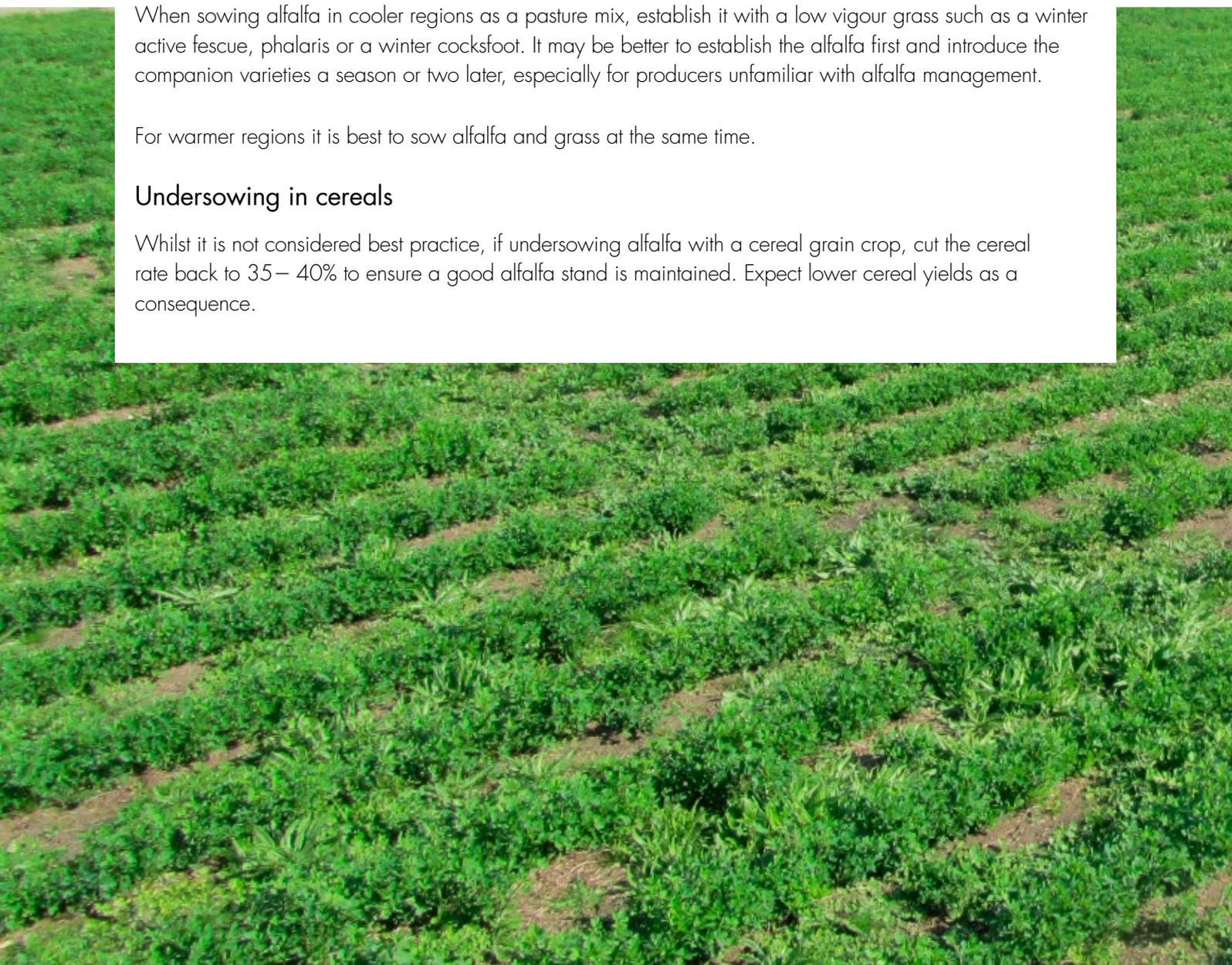
As a pasture mix

When sowing alfalfa in cooler regions 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.

For warmer regions it is best to sow alfalfa and grass at the same time.

Undersowing in cereals

Whilst it is not considered best practice, if undersowing alfalfa with a cereal grain crop, cut the cereal rate back to 35–40% to ensure a good alfalfa stand is maintained. Expect lower cereal yields as a consequence.



Fertility

It is important to test the soil for phosphorus, potassium, aluminium and calcium. Lime is also critical to adjust soil pH, so ensure to conduct a soil test to check to see if it is needed. A pH (CaCl₂) should be > 5.4, ideally > 5.8. Aluminium at depth should also be considered and paddock avoided if judged potentially problematic. A lower pH with low Al³⁺ (<5%) may still be a suitable site however.

Sow with low nitrogen, good phosphorus and possibly potassium fertiliser. Molybdenum (Mo) and boron should be considered where soils are typically low or application has not occurred for some years. A small amount of nitrogen may be needed until plants are established, but excessive nitrogen at sowing can have a negative impact on rhizobia infection/nodulation of the alfalfa roots.

Establishment

The ideal soil temperature for establishing alfalfa is 12°C and rising. Alfalfa seed is small so ensure to sow close to the surface at approximately 10–15mm deep. It is also important that there is enough soil moisture to support germination. Roll lightly if the soil is fluffy.

For spring-sown dryland crops, target the earlier end of the range in regions with higher temperatures and shorter springs. In mild summer areas with irrigation, alfalfa can be sown right through spring and summer. In hot summer areas, alfalfa is best sown through autumn. Direct drilling or full cultivation are both suitable.

Young alfalfa plants are fairly sensitive to frosts however once established, plants can survive temperatures below zero Celsius.

Seed coating

It is recommended to use a coated seed that includes the correct inoculants, essential trace elements and an insecticide for early protection from red legged earth mites (REM) and alfalfa flea. With sensible storage, AgriCote seed coating will last for six months and will be useful for up to 12 months or longer.

Seed coating will decrease the seed count from approximately 440,000/kg, but this should not affect the sowing rate as establishment should be higher due to the benefits and protection afforded by the seed coating.



Weed control

An alfalfa crop needs to be well managed to out compete weeds and produce high yields for hay and or grazing. Any problems should be identified and rectified promptly.

Possible weed control spray options:

Pre-planting	First year post-emergence	Second and subsequent years
<ul style="list-style-type: none"> • Knock down spray to remove actively growing weeds. • Trifluralin should be used to curtail early weed competition; at rates depending on soil type. • Pendimethalin can also be used. 	<p>The following options can be used up to the 8th leaf stage:</p> <ul style="list-style-type: none"> • 1st trifoliolate leaf – 2,4-DB, bromoxynil. • 2nd trifoliolate leaf – Flumetsalum, Imazamox, Imazethapyr. • 3rd trifoliolate leaf – Bromoxynil, + diflufenican, prometryn. 	<ul style="list-style-type: none"> • Spray-seed + Diuron (take some care with the winter active varieties). • Simazine (may be a better option for winter actives). • Saflufenacil and Terbutylazine may also be considered. • Options as per 1st year, but check for weed size and rates vary. • Group A grass herbicides.

Pests

A crop of alfalfa takes a year to fully establish and a young alfalfa crop needs to be monitored for pests. Using resistant varieties and coated seed should be strongly considered. Always check for red legged earth mites (RLEM) and use bare earth insecticide controls. Once established, alfalfa may be afflicted by a number of pests including mites, alfalfa flea, aphids, cockchafer, armyworm and in some environments slugs. Monitoring and swift treatment should be adopted to help assure productivity and feed quality.

Increasing plant numbers in a thin stand

After an alfalfa stand has been established for a year or two, there usually tends to be an accumulation of toxins in the soil from plant litter and trash. This process of autotoxicity from the exudates of decaying plant material can prevent the establishment or recruitment of new alfalfa seedlings. If required, re-sowing is best attempted in autumn due to competition from the existing crop in spring growth.

Usually, however, the best plan is to start again as there is likely a disease, pest or nutrition problem which has led to low plant numbers. Alternatively, a thinning stand can be over sown with an alternative species to complement production and give extended life and performance.

Root reserves

Allowing the crop to have at least one good flowering per year will aid replenishment of root reserves. Ideally use the appearance of new shoots at the base of the plant (approximately 5-10% 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.

Cutting

Cutting alfalfa has traditionally been done at 5 – 10% flowering, which is well suited to plants with a dormancy rating of 4 – 9. However, highly winter active varieties with a rating of 10 plus, should be cut at budding or no later than 2 – 5%.

It is important to 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.

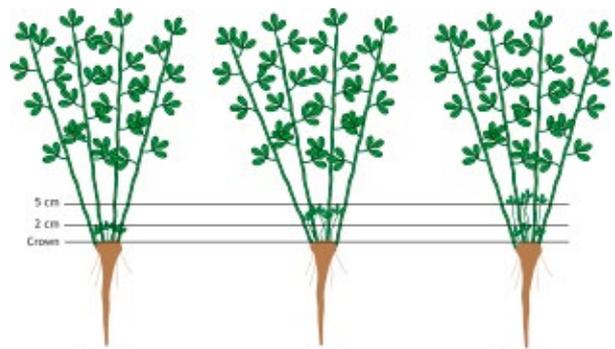
Dormancy	Days (potential cutting interval under ideal summer growing conditions)
Semi winter active	30–34 days
Winter active	27–30 days
Highly winter active	20–25 days

Indicative feed value of alfalfa (5–10% flowering):

ME 10½ MJ ME/kg DM

CP 18–20%

NDF 50–55%





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 have a preference for grazing 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 to stem ratio such as the SARDI and Grasslanz range, will also help. Consumption of the leaf and stalk together is a relatively balanced diet for ME, CP and fibre.

Allowing the crop to have at least one good flowering per year will aid replenishment of root reserves. Ideally use the appearance of new shoots at the base of the plant (approximately 5-10% 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.

Grazing tolerance trials

Grazing tolerance (GT) has been soundly validated in some very good cultivars - notably SARDI-Grazer and SARDI 7 Series 2. A new grazing trial at Howlong, New South Wales, is now entering its third year. Whilst we know that SARDI-Grazer is a well-tested and reliable option, there is opportunity to demonstrate the relative merits of a properly developed GT variety compared to common Aurora. At the same time, other offerings in the seed market that make claims to grazing tolerance are being assessed. In the two years of the trial being underway, SARDI-Grazer is an absolute stand-out, with Aurora plant density and performance well behind. Another cultivar making claims to GT appears to have less tolerance again than common Aurora. This trial will give producers added confidence of properly developed grazing tolerance traits and put some additional clarity on the true nature of other offerings.

Nutrition and fertiliser

Regular soil tests should be taken to monitor nutrient levels and maintain or enhance production. Tissue testing can also be used as an aid in understanding macro and micro nutrient deficiencies.

Alfalfa can produce a wide range of yields potentially ranging up to 10–30 tonnes DM/ha/yr. For each 10t DM this equates to 200 kg Ca, and when compared to 360 kg Ca in one tonne of limestone lime, indicated that on average 1 tonne lime/ha every 2 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 300–500 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. Molybdenum 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	50–150 g

TERMINATING AN ALFALFA STAND

If it is necessary to terminate alfalfa, glyphosate, clopyralid, dicamba or Grazon Extra can be used. For best results, this should occur when the alfalfa is actively growing, before it starts going dormant/less active. The plant also needs to have a good leaf area of up to 30–40cm high, typically 18–24 days after defoliation. Avoid the temptation to graze or cut for hay before terminating, as control is often unsatisfactory.

GRAZING TOLERANT ALFALFA

Most alfalfa cultivars can be grazed with success, however periods of continuous or repeated close grazing will quickly thin out stands of varieties not specifically developed and evaluated for this purpose.

True grazing tolerant varieties have been screened and re-selected under protocols which provide such features as a low and broad crown, high numbers of crown buds and have been subjected to very high grazing pressure for extended periods. This does not mean that such varieties ought to be treated in such a brutal fashion as a rule, but allows the producer a longer-term stand that will have greatly improved capacity to survive and produce where periods of set-stocking and/or lax grazing are likely. Appropriate fertiliser, weed and pest maintenance will still be required for best results. Also consider that some level of winter growth activity is appropriate, as this will enable forage production through the typically cool-season dominant rainfall pattern.

SARDI-GRAZER ALFALFA

Dormancy 6 Winter Active

 325mm+

 Deep & well drained

 pH 5.0–8.0

 AL or AgriCote 

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 [blue green aphid (BGA), spotted alfalfa aphid (SAA), phytophthora root rot (PRR), anthracnose (Anth)], herbage yield 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.

Key features:

- The most grazing tolerant commercial alfalfa variety in Australia
- 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 including quality hay
- Well suited to mixed swards with perennial grasses such as winter active tall fescue, cocksfoot, phalaris or sub-tropical grasses.

Grazing tolerance and recovery of SARDI-Grazer



WINTER ACTIVE ALFALFA

Winter active alfalfas are the most versatile, providing good growth into late autumn and retain their quality longer than highly winter active varieties. Best suited to medium-term mixed farming situations that require grazing tolerance and the ability to make reasonable quality hay. They are ideal for both 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.

SARDI 7 SERIES 2 ALFALFA

Dormancy 7 Winter Active



350mm+



Deep & well drained



pH 5.0–8.0



AL or AgriCote

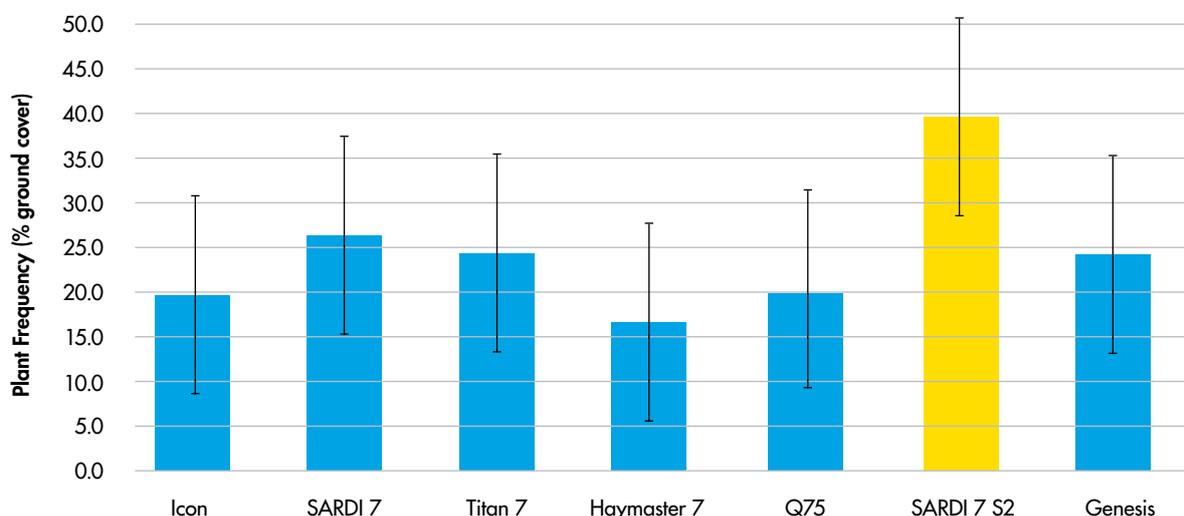


SARDI 7 Series 2 is the next generation winter active alfalfa. It is even more versatile, broadly adapted and persistent than SARDI 7 offering greater performance in cold, wet environments where alfalfa can struggle. It has been bred specifically for farming operations and will perform well in both dryland and irrigated systems. It offers superior performance where persistent, high producing alfalfa stands are required and in grazing situations where winter produced feed can be utilised.

Key features:

- Even more broadly adapted and grazing tolerant than SARDI 7
- High yielding, multi-purpose with excellent persistence
- Strong pest and disease resistance and good grazing tolerance
- Improved performance in cold, wet environments
- Well suited to grazing and hay production with a broad crown and high leaf to stem ratio.

Persistence of lucerne varieties after an average of 4.6 years on acidic soils at Avoca, Hamilton, Coleraine (Victoria), Culcairn and Coolac (New South Wales). Varieties are in increasing order of winter activity class.



As above highlights, due to SARDI 7 Series 2 broad adaptation and selection in cool wet acidic environments, it has excellent persistence in acidic sites.

HIGHLY WINTER ACTIVE ALFALFA

Highly winter active alfalfas are bred for late autumn/early winter sowing and have excellent seedling vigour for undersowing. Generally, they have a more upright crown, erect growth habit and are well suited to a 2–4 year cropping rotation system in 300–500 mm rainfall zones. They provide maximum growth from winter dominant growing season rainfall. Some of the newer Australian-bred varieties in this group have increased grazing tolerance because they were selected from and developed for broadacre grazing systems.

ALFAMASTER 9[®] ALFALFA

Alfamaster 9[®] is a highly winter active type. It has been bred for excellent forage production and persistence under irrigation rotations outcompeting CUF101 in USA trials. Alfamaster 9[®] demonstrates excellent seedling vigour and establishment compared to other varieties and will form a very leafy and densely branched growth habit with large erect crowns. These features will allow Alfamaster 9[®] to deliver improved productivity and performance compared to many other highly winter active varieties, particularly when highly productive stands need to be maintained for 2 to 3 years under irrigated situations.

Dormancy 9 Highly Winter Active

 350mm+
/Irrigated

 Deep & well drained

 pH 5.0–8.0

 AL or AgriCote

Key features:

- Selected for better persistence and proven consistent production over the years
- Highly resistant to pea aphid, stem and root knot nematodes and fusarium wilt. Resistant to other aphid types, anthracnose, phytophthora root rot and bacteria wilt
- Good regrowth after cutting or grazing
- Excellent seedling vigour.

SARDI 10 SERIES 2 ALFALFA

SARDI 10 Series 2 is a highly winter active alfalfa with the greatest activity rating over any other SARDI variety. During its development, the breeder was successful in focusing on improving the very popular SARDI 10. The greatest emphasis was on increasing forage production and quality, pest and disease resistance, persistence and grazing tolerance. A key physical feature is the greatly improved leaflet density down the length of each stem.

Dormancy 10 Highly Winter Active

 350mm+
/Irrigated

 Deep & well drained

 pH 5.0–8.0

 AL or AgriCote



Key features:

- 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
- Very good seedling vigour
- Highly productive 3 – 4 year+ option
- Multiple screens for excellent disease and insect resistance
- Perfectly suited to desert environments where they are utilised under high intensive farming systems.

ALFAMASTER 10[®]

ALFALFA

Alfamaster 10[®] has been bred for excellent production and persistence under irrigation rotations achieving an average of 17% over and above CUF101 in USA trials. Alfamaster 10[®] demonstrates excellent seedling vigour and fast establishment compared to other highly winter active types and will form a very leafy and densely branched growth habit with large erect crowns. These features will allow it to deliver superior productivity and performance compared to many other highly winter active hay varieties, particularly when very productive stands need to be maintained for 2 to 3 years under irrigated situations.

ALFAMASTER 11[®]

ALFALFA

NEW

Alfamaster 11[®] is one of the world's first alfalfa varieties with a dormancy rating of 11. It has been designed for high input/output farming systems and demonstrates superior production and persistence under irrigation rotations. Significant improvements have been made over CUF101 and other high dormancy USA bred varieties, particularly when grown in desert environments. It demonstrates excellent seedling vigour and faster establishment compared to other highly winter active types and will form a very leafy and densely branched growth habit. These features will allow it to deliver superior productivity and performance compared to other highly winter active hay varieties and is best utilised for irrigated 2 to 3 year stand rotations.

Dormancy 10 Highly Winter Active



350mm+
/Irrigated



Deep & well drained



5.0-8.0



AL or AgriCote

Key features:

- Potential for extra cut per year due to increased winter activity
- Superior herbage production and excellent regrowth – on average 17% higher than CUF101
- Highly resistant to pea aphid and fusarium wilt. Resistant to other aphid types, anthracnose, phytophthora root rot, stem and root knot nematodes and bacterial wilt
- Superior option for short term rotation with maximised herbage production
- Excellent seedling vigour
- Perfect for cut and carry operations in desert environments.

Dormancy 11 Highly Winter Active



350mm+
/Irrigated



Deep & well drained



5.0-8.0



AL or AgriCote

Key features:

- One of very few varieties worldwide available with a dormancy rating of 11
- Ideally suited to hot, desert environments
- Short-term rotations for high output farming
- Excellent pest and disease resistance
- Exceptional seedling vigour
- Amazing regrowth after cutting and grazing
- Perfectly suited to desert environments where they are utilised under high intensive farming systems.

PEGASIS

ALFALFA

Pegasus is a highly winter active variety with a dormancy rating of 9. It has been bred for excellent production and persistence in both irrigated and dryland situations. It has a very leafy and densely branched growth habit with large spreading crowns. This allows it to deliver improved performance compared to many other highly winter active varieties, particularly when productive stands need to be maintained for 3 to 4 years+. Pegasus can be grown successfully for hay or silage.

Dormancy 9 Highly Winter Active



Key features:

- Bred for excellent production and persistence in both irrigated and dryland situations
- Excellent option when very productive plant stands need to be maintained for 3 - 4 years+ in rain-fed or irrigated conditions
- Very leafy and densely branched growth habit with large spreading crowns
- Highly resistant to spotted alfalfa aphid, resistant to pea aphid and resistant to phytophthora root rot
- Excellent forage quality when used as hay or silage.

HERITAGE 10

ALFALFA

NEW

Perfectly suited to cut and carry operations, Heritage 10 is a high performing, highly winter active variety bred from elite parent material from Australia and the USA. It demonstrates extremely fast establishment and will provide high year round forage yield, which means it can be adapted to various farming systems that demand high performance products.

Dormancy 10 Highly Winter Active



Key features:

- Upcoming release with a dormancy rating of 10
- Bred for improved persistence and productivity over traditional dormancy 10 varieties
- Good all round pest and disease resistance/tolerance.

HERITAGE ST™

ALFALFA

NEW

Heritage ST™ is highly winter active variety with a dormancy rating of 9. Developed from elite germplasm from the USA and Argentina, it provides excellent forage quality, performance and persistence by out competing varieties such as CUF101 (23%) and HybriForce 800 (13%) in Argentina. Heritage ST™ offers improved salt tolerance for germinating seedlings over other traditional alfalfa varieties. This allows for potentially better establishment in regions where moderate salt levels can limit plant establishment. Heritage ST™ is a superior alternative to Alfamaster 9®.

Dormancy 9 Highly Winter Active



Key features:

- Dormancy 9 winter activity rating
- Demonstrated >20% productivity over CUF101 in Argentina
- Salt tolerance demonstrated in establishing alfalfa
- Strong plant vigor and establishment
- Highly resistant to fusarium wilt, phytophthora root rot and pea aphid
- Resistant to anthracnose.

HERITAGE

ENDURANCE

ALFALFA

NEW

Similar to Heritage 10, Heritage Endurance is bred from elite parent material from Australia and the USA. A highly winter active variety, once established it will persist well from year to year to provide superior all year round forage yield so it can be adapted to grazing/hay cut farming systems.

Dormancy 10 Highly Winter Active



Key features:

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

ALFALFA VARIETY ADAPTATION CHART

Product	Dormancy Rating	Rainfall (min)	Sowing rate (low-med rainfall)	Sowing rate (med-high rainfall)	Sowing rate (irrigation)
SARDI-GRAZER ALFALFA	6	325mm +	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
SARDI 7 ^{NSW} ALFALFA	7	350mm +	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
ALFAMASTER 9 ALFALFA	9	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
HERITAGE ST ALFALFA	9	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
PEGASIS ALFALFA	9	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
SARDI 10 ^{NSW} ALFALFA	10	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
HERITAGE 10 ALFALFA	10	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
HERITAGE ENDURANCE ALFALFA	10	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
ALFAMASTER 10 ALFALFA	10	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha
ALFAMASTER 11 ALFALFA	11	350mm+ or Irrigation	4–10 kg/ha	6–15 kg/ha	18–35 kg/ha

Disease and pest resistance							
pH (CAC12)	Soil Type	Inoculant	Suitability	Spotted Alfalfa Aphid	Blue Green Aphid	Phytophthora Root Rot	Anthracnose
5.0–8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H S G C	HR	HR	R	R
5.0–8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H S G C	HR	HR	HR	HR
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H C	HR	HR	R	R
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H G C	HR	HR	R	R
5.0 – 8.0	Light-to-medium & heavy, deep well drained soils	AgriCote or AL	H G C	HR	LR	R	R
5.8–8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H G C	HR	HR	R	R
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H G C	HR	HR	R	R
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H G C	HR	HR	R	R
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H C	R	R	R	R
5.0 – 8.0	Light-to-medium & heavy, deep, well drained soils	AgriCote or AL	H C	R	R	MR	R

Suitability key:

H = Hay

S = Silage

G = Grazing

C = Cut and Carry

Disease and pest resistance key:

LR = Low Resistance

R = Resistant

S = Susceptible

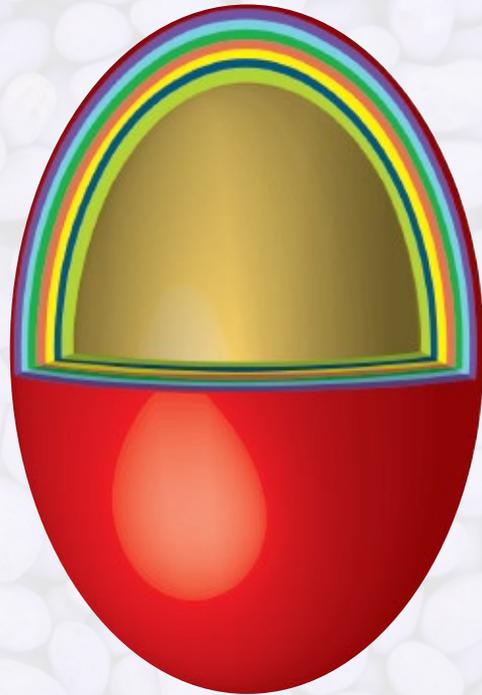
HR = Highly Resistant

MR = Moderately Resistant

SEED COATING

Using coated seed when sowing alfalfa has become the accepted best practice in Australia in recent years.

Alfalfas are available from Heritage Seeds with the proprietary AgriCote seed coating technology. AgriCote is designed to deliver enhanced seedling establishment through the inclusion of growth promotants, essential micro-nutrients and fungicide seed protection. In addition, AgriCote provides seedlings with protection from biting and sucking insects through the inclusion of Gaucho insecticide seed treatment. For alfalfa seed, AgriCote also contains encapsulated rhizobia bacteria, meaning your seed is pre-inoculated and ready to sow.



Bare seed vs AgriCote

ALFALFA PREPARATION CHECK-LIST

Site preparation	Yes	No-Action required:
Alfalfa not grown in site for at least 2 years	✓	Crop for at least 2 years with alternative species.
Drainage OK. (casual water lays < 1 day)	✓	Improve drainage or select alternative site.
pH (CaCl ₂) > 5.7	✓	Increase pH through liming or select alternative site.
Exchangeable Al ³⁺ < 5%	✓	Decrease aluminium at depth through liming over a number of years or select alternative site.
Weed burden previously reduced	✓	Crop for 1–2 years with cereals or other grain crops, paying attention to weed control.
Irrigation available	✓ Spring sow	Autumn or early spring sow.
Winter active variety (dormancy rating >6)	✓ Autumn or spring sow	Spring sowing recommended in winter cold areas, for winter dormant varieties.

Variety to fit the job:

Plan for:		2–3 years	3–4+ years	5–8+ years	8–10+ years
Dedicated hay production	First choice	ALFAMASTER 10 ALFALFA	SARDI 10 Ⓢ ALFALFA	SARDI 7 Ⓢ ALFALFA	SARDI-GRAZER ALFALFA
	Good alternative	ALFAMASTER 11 ALFALFA	HERITAGE 10 ALFALFA		
Dual purpose hay and grazing	First choice	HERITAGE 10 ALFALFA	SARDI 10 Ⓢ ALFALFA	SARDI 7 Ⓢ ALFALFA	SARDI-GRAZER ALFALFA
	Good alternative	SARDI 10 Ⓢ ALFALFA	HERITAGE 10 HERITAGE ENDURANCE		
Grazing/ extensive pasture	First choice		SARDI 10 Ⓢ ALFALFA	SARDI-GRAZER ALFALFA	SARDI-GRAZER ALFALFA
	Good alternative		HERITAGE ENDURANCE	SARDI 7 Ⓢ ALFALFA	

LONGEVITY INCREASES →

HAY QUALITY INCREASES →

DM YIELD PER ANNUM INCREASES ←

GRAZING TOLERANCE INCREASES →

SOWING RATE KG/HA INCREASES ↑

Alfalfa sowing rates

Annual rainfall	Marginal dryland (350mm–450mm)	Dryland (450mm–600mm)	Favourable dryland (600mm–800mm)	High rainfall/irrigated (800mm+/irrigated)
kg/ha	4–6	6–8	10–15	18–35

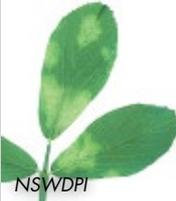
It is strongly recommended that prior to sowing, a pre-plant, pre-emergent herbicide be considered. Herbicides such as trifluralin and pendimethalin are commonly used with good success. Consult an agronomist and check label instructions before proceeding. Low-till/no-till systems can be used to good effect, but paddock preparation, weed burden and herbicide spray systems need to be considered and prepared for prior to sowing.

COMMON ALFALFA PESTS

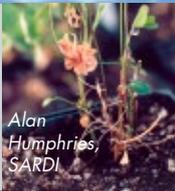
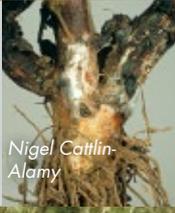
		Description	Damage	Control
Aphids	Bluegreen Aphid (BGA) <i>Acyrtosiphon kondoi</i>  <p><i>Photo: Andrew Weeks (Cesar)</i></p>	Primary pest of alfalfa and other legume crops. Adults and wingless forms are dull blue-green to 3mm long. Long legs and antennae compared to other aphids. Colonies are active and multiply in autumn, winter, spring and in summer in cooler zones.	Initially attack buds, upper stems and new shoots, causing yellowing, stunted growth and leaf drop. Curling of leaves is typical indication. Particularly damaging in dry-stressed crops. May also be a vector for some virus diseases.	Sow less susceptible varieties such as SARDI range. Use seed treated with correct systemic insecticide, monitoring, and an integrated spray program. Selective options for aphids are readily available and should be used to protect beneficial/parasitic insect populations. Rotational grazing or harvesting may significantly reduce aphid damage.
	Spotted Alfalfa Aphid (SAA) <i>Therioaphis trifolii</i>  <p><i>Photo: Andrew Weeks (Cesar)</i></p>	Widespread pest of pasture legumes. Aphids are up to 2mm long, yellow to pale green. Up to 6 rows of dark spots on upper abdomen. Mostly active spring to autumn.	Cause whitening of leaf veins, wilting and leaf-fall, usually starting near the crown of the plant and migrating upwards. May cause plant/stand death. May also be a vector for some virus diseases.	
Beetles	Blackheaded cockchafers <i>Acrossidus spp.</i>  <p><i>Photo: Andrew Weeks (Cesar)</i></p>	Black-brown shiny scarab 10-12mm in length. Adults emerge to fly in mid-late summer, laying eggs in short, (often) weaker pastures. Eggs hatch early autumn. Larvae fairly wriggly, off-white, slender body from 3-15mm. Shiny black head.	Most severe in mid-late autumn in existing or newly direct drilled pastures. Burrowing undermines roots, and grubs will surface feed on all useful pasture plants including grasses, alfalfa & clovers. Burrows found near soil piles.	Cultivation, fallow or break crops may assist. Phalaris and cocksfoot more resilient than other pasture species. Readily controlled with insecticide sprays.
	Wireworm and False Wireworm <i>Elateridae spp and Gonocephalum spp.</i>  <p><i>Photo: Andrew Weeks (Cesar)</i></p>	Wire-worm: Dark-grey-brown-black oblong. Also known as click beetle. False wireworm: Adult similar colours but oval shape. Cream-yellow-golden larvae. Distinctly segmented body.	Eggs laid on or just below surface. Eat germinating seeds and roots of young seedlings. Usually in upper 5cm of soil. Adults may chew and ringbark seedling stems. Often a pest of weedy or trashy sites, especially lo/no till situations.	Reduce crop trash. Cultivation and knock-down and fallowing. Knock-down insecticides. Suitable seed coating insecticide.
Moths	Heliothis <i>Helicovera spp.</i>  <p><i>Photo: Andrew Weeks (Cesar)</i></p>	Adults brown with a light pattern to 25mm. Wings held flat. Caterpillar larvae from 1.5mm to 50mm. Light brown with dark heads, developing stripes as they age.	Eggs single or in small clusters. 1mm diameter, white, domed become orange-brown prior to hatching. Will chew large holes in leaves. Also feed on many other crops.	Cultivation and knock-down insecticide before sowing. Monitoring of crops through life-span. Chemical control.
	Corbie grubs <i>Oncopera spp.</i> 	Brown-grey moths to 30mm long, 40mm wingspan. Eggs <1mm laid in long grass and trash, initially cream turning black over time. Larvae from 3mm to 60mm long, grey-purple with shiny head. Soil tunnels with clean entrance (no spoil).	Caterpillars from 30mm or so will surface feed at night to denude pastures of perennial grasses, especially from late autumn - early spring. Weakened root system and crows feeding will lead to pulling and bare patches in paddocks.	Keep pastures short or well grazed through late spring and summer. Chemical control is effective with timely application, usually mid-autumn.
	Greasy, Pink, Brown (True) Cutworms <i>Agrotis spp.</i> 	Often one of 3-4 species, including Bogong moth. Adults grey-brown from 36 to 45mm wingspan. Larvae up to 50mm long, grey to dark grey, often pinkish, plump, found just at or below soil surface, often curled up.	Eggs laid in moist, loose soil. Young larvae may chew foliage, larger caterpillars cut stems of seedlings at ground level. Mostly feed at night. Also feed on other crops including establishing pasture. May be found virtually year-round.	Cultivation and knock-down insecticide before sowing. Monitoring of early crops stages. Chemical control.

	Description	Damage	Control	
Weevils	<p>Sitona weevil <i>Sitona discoideus</i></p>  <p>Photo: Andrew Weeks (Cesar)</p>	<p>Small grey-tan weevil to 3mm long. Grubs to 3mm, chubby pale and legless, often feed on or burrow into legume nodules. Adults disperse by flying.</p>	<p>Larvae feed on roots of alfalfa and other pasture legumes and flat-weeds. Grasses rarely affected by grubs, but adults will feed on most pasture species including grasses, leaving a scalloped leaf edge. Young tillers in no-till very susceptible.</p>	<p>Cultivation and fallow. Chemical control may be an option if needed in heavy infestations.</p>
	<p>Whitefringed weevil <i>Naupactus leucoloma</i></p>  <p>Photo: Andrew Weeks (Cesar)</p>	<p>Adults grey-tan with dark striations, large weevil to 12mm long. Larvae to 12mm, fat, cream with pale indistinct head region with distinct chewing mouth parts.</p>	<p>Most often a pest of alfalfa, especially 2-3 year old stand out of no-till establishment when damage may appear as wilting and plant loss in summer. Avoid close cropping with other hosts e.g. potatoes, peas, etc.</p>	<p>Farm hygiene, crop rotations and cultivation. Cereal break crop. Soil fumigation has been performed. Sprays ineffective.</p>
Others	<p>Red-legged earthmite (RLEM) & Blue oat mite (BOM) <i>Halotydeus destructor</i>, <i>Penthaleus spp.</i></p>  <p>Photo: Cesar</p>  <p>Photo: Cesar</p>	<p>Especially problematic in emerging and seedling alfalfa. Mites will suck the nutrients from swelled seeds, and young plants. If plants are older, a typical whitening/silvering of part or all of the leaflets is evident.</p>	<p>Use seed treated with correct systemic insecticide, monitoring, and an integrated spray program.</p>	
	<p>Alfalfa flea <i>Sminthurus viridus</i></p>  <p>Photo: Andrew Weeks (Cesar)</p>	<p>Wingless, yellow-green insect from 1-3mm in size. Pale yellow eggs laid in spring and autumn or in moist summer areas in clusters at soil level. Adults have a leaping action and often call 'springtails'.</p>	<p>Spring and autumn, summer pastures also affected. Clover, grass and alfalfa leaves initially speckled then windowed out. Severe infestations may strip leave back to veins and petioles.</p>	<p>Monitoring of pastures or crops. Close grazing to admit summer heat/sunlight into canopy. Chemical control.</p>
	<p>Wingless grasshopper <i>Phaulacridium vittatum</i></p>  <p>Photo: D Hobern, Atlas of Living Australia</p>	<p>Grey-brown adults to around 18-20mm. Occasionally develop wings to fly short distances. Eggs laid in autumn to 20mm under soil surface, hatching early summer. Juveniles from 4-5mm pinkish, to brown 8-10mm, size increasing with maturity.</p>	<p>Summer and autumn pest. Prefer to feed on broad-leaved species, especially clovers and broad-leaved weeds and often found on overgrazed sites. May do severe damage in dry years on green summer pastures.</p>	<p>Improve pasture growth ensuring grasses are well maintained. Chemical control.</p>
	<p>Slugs and Snails (many species)</p>  <p>Photo: Cesar</p>	<p>Slugs may be black-grey to yellow-brown, from 1mm to 35-50mm. Eggs often clusters in soil and trash 1-1.5mm soft, white-translucent. Snails of various sorts including garden snails and conical (pointed).</p>	<p>Newly hatched, very small slugs may feed within drill-rows and not emerge to take surface baits. Damage may occur to all parts of plants at any stage. Seedlings especially vulnerable. Older leaves typically have oblong windows rasped out.</p>	<p>Sow seed with an approved slug bait in problem situations. Monitor and re-apply if needed. Cultivation will assist initially. Harrowing or rolling may be beneficial.</p>

COMMON ALFALFA DISEASES

		Cause	Symptoms & Damage	Control Options	
Seedling	Damping-off <i>Pythium spp.</i> , <i>Rhizoctonia solani</i> , <i>Fusarium spp.</i> , <i>Phytophthora spp.</i>	 NSWDPI	Fungal complex affecting emerging seedlings. Very common in most soils under continually wet conditions. Spores spread by water, wind, soil etc. Exacerbated by over-watering and sowing seed too heavily.	Seedlings may either fail to emerge or shortly after emergence, wilt and fall over with characteristic wasting of stem, often with dark lesions. May severely reduce viability of a new stand.	Use of seed treated with appropriate fungicide or AgriCote. Sow in conditions that promote rapid establishment (good seed-bed, warmer rather than cooler).
	Alfalfa mosaic virus (AMV)	 Alan Humphries, SARDI	Virus hosted by alfalfa, perennial clovers, french beans and peas. Spread by aphids. Infected seed is most likely initial cause of stand infection.	Continuum from minimal to severe stunting of growth, pale mottling of leaves. Some strains under heavy infection may lead to stand death.	Sow seed known to be free of AMV. Control of vectors (aphids) especially in spring before numbers build up.
	Common leaf spot <i>Pseudopeziza medicaginis</i>	 Alan Humphries, SARDI	Fungus hosted by alfalfa, clovers and medics. Spread by crop debris and wind, rain etc. Development of diseases usually seen in cool-moist weather over mid-late winter, or occasionally on new re-growth after hay cutting.	Circular brown-black spots to 3mm over upper leaf surface. Leaves curl, yellow, brown and fall off. May also affect leaf petioles. Severe infections although rare, may reduce yield and feed quality.	Fungicide options may be available. Rotational grazing, removing whole crop and good crop hygiene is usually all that is required.
Leaf and stem	Pepperspot <i>Leptosphærulina trifolii</i>	 Alan Humphries, SARDI	Fungus hosted by alfalfa, clovers and medics. Spread by crop debris and wind, rain etc. Development of diseases usually seen in cool-moist weather over mid-late winter, or occasionally on new re-growth after hay cutting.	Circular brown-black spots to 3mm over upper leaf surface. Leaves curl, yellow, brown and fall off. May also affect leaf petioles. Severe infections although rare, may reduce yield and feed quality.	Fungicide options may be available. Rotational grazing, removing whole crop and good crop hygiene is usually all that is required.
	Downy mildew <i>Peronospora trifoliorum</i>	 NSWDPI	Widespread and occasionally important fungal disease hosted by alfalfa and perennial clovers. Fungus develops under damp conditions and may carry-over in infected plant crowns. Dispersed by wind etc.	Autumn sown, slowly establishing seedlings the most readily affected. Lightening and curling of leaflets. Underside may be slight purple to grey. Affected young stems/shoots may wilt and die. Often first cut of the season is the most affected.	Complete grazing and regular harvesting to reduce canopy and local humidity.

Root and Crown diseases

	Cause	Symptoms & Damage	Control Options
Phytophthora (root rot) <i>Phytophthora medicaginis</i>  Alan Humphries, SARDI	Fungal disease hosted by alfalfa and medics, and also chickpeas and carrots. Initially may reduce establishment by damping off. Usually the greatest cause of stand death in heavier/wet soil conditions in southern Australia.	Yellowing, dwarfing and die-back/thinning of stands, often in large patches. Stubby or very reduced root system. Roots with dark lesions on the surface or within. Severely reduced viable stand-life.	Paddock selection/improved irrigation/drainage management. Good crop rotations. Use of resistant cultivars.
Bacterial wilt <i>Pseudopeziza medicaginis</i>  NSW DPI	Bacterial disease common in older varieties. May be spread by seed, hay, farm machinery etc.	Symptoms start to develop in stands from 2–3 years old as stunted and yellow, possibly with scorched leaf margins. Roots will be progressively affected by dark discoloration and plants eventually die.	Use resistant varieties. Farm hygiene. Seed from a reliable source.
Anthracnose <i>Colletotrichum trifolii</i>  Alan Humphries, SARDI	Fungal infection spread by plant debris, rain or too tight crop rotations. Warm, moist conditions favour disease. Typically appears in crops after 1–3 years in intensive alfalfa production areas where susceptible cultivars are used.	Wilted stems on individual plants or in patches, with characteristic 'hook' of upper stem. Pale brown-grey lesions with dark spots and dark borders at base of stems.	Use of resistant cultivars. Long cropping breaks. Reduced canopy humidity (mowing/grazing) if warm-humid conditions persist.
Rhizoctonia (canker / stem-blight) <i>Rhizoctonia solani</i>  Alan Humphries, SARDI	Fungus hosted by most pasture species, cereals and oilseeds. Infections start from small black sclerotia on dead plant material. Sclerotia germinate under moist, warm conditions and infest a host.	Stand may slowly thin over a number of years to become unviable. Seen as a dark canker or girdling of stems at or just below soilline. Exacerbated by moist conditions and mechanical damage.	Use low-crown varieties that may reduce impact of grazing or machinery. Reduce canopy cover, and thus humidity under warm-wet conditions.
Verticillium wilt <i>Verticillium albo-atrum</i>  William M Brown Jr - Bugwood.org	Fungal wilt disease hosted by wide variety of plants including potatoes, tomatoes, maple trees, brassicas and some nuts and fruits. No reliable cases reported in lucerne in Australia. Significant quarantine issue.	Wilting is usually the end-stage of the disease as the plant dies. Earlier disease progress may include leaf yellowing, plant stunting or internal stem staining.	Most modern varieties are bred to be resistant. Quarantine screening of imported material. Farm hygiene.
Sclerotinia (crown and stem rot) <i>Sclerotinia trifoliorum</i>  Nigel Catlin-Alamy	Fungal disease hosted by most pasture legumes. Dormant phase as black sclerotes. Cool, damp conditions in lush, dense crops are ideal for infection. Spread by wind, rain, plant litter etc.	Crowns and base of stems initially affected, causing wilting and death of plants. White mould on affected plant parts. Black sclerotes from within the stems and crown. Individual plants or whole stand may be affected.	Use seed from a reliable source, free of sclerotes. Good cropping breaks between susceptible crops. Canopy management to reduce local humidity.

CONTACTS

For enquiries relating to our products please contact Heritage Seeds' International Sales and Marketing team:

Colin Grant

+61 403 465 515

cgrant@heritageseeds.com.au

Level 1, 145 South Terrace
(PO Box 6175
Halifax Street)
Adelaide South Australia 5000
AUSTRALIA

Nathan Smith

+61 408 655 220

nsmith@heritageseeds.com.au

Level 1, 145 South Terrace
(PO Box 6175
Halifax Street)
Adelaide South Australia 5000
AUSTRALIA

Robert Hedge

+61 421 585 644

rhedge@heritageseeds.com.au

Unit 2, 553 Boundary Road
(PO Box 76 Brisbane Markets,
Queensland 4106)
Richlands Queensland 4077
AUSTRALIA

Kathy Gray

+61 429 532 210

kgray@heritageseeds.com.au

Unit 2, 553 Boundary Road
(PO Box 76 Brisbane Markets,
Queensland 4106)
Richlands Queensland 4077
AUSTRALIA

www.heritage-seeds.com.au/international

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