

HERITAGE SEEDS INTERNATIONAL

ALFALFA PRODUCTION GUIDE

> INSIDE:

This guide contains information about best practices for variety selection, paddock preparation and growing alfalfa for both grazing and hay production.



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SARDI ALFALFA BREEDING PROGRAM

The South Australian Research and Development Institute (SARDI) manages the largest and longest running alfalfa breeding program in the country which is at the forefront of developing new Australian-bred varieties for a vast range of differing environments and conditions.

Heritage Seeds has a long, proud history with the initiative and has been an important part of its success. Since 1992, Heritage Seeds has worked closely with SARDI to help ensure new varieties are developed based on market requirements so only the best are chosen for commercial release. Following the withdrawal of the NSW DPI from alfalfa breeding, SARDI is the only program with the resources and ability to deliver the most widely adaptable and thoroughly tested alfalfa varieties in the country.

SARDI's industry-leading research and development facilities are like no other. Every year, over 50 new lines are tested using a network of up to 40 locations. After 6-7 years of continuous trialling in harsh, real farm situations, the best of these lines are selected from the field and subjected to intensive disease and pest resistance screening, before being incorporated into a new variety.

The years of commitment by SARDI and Heritage Seeds has resulted in the collection of an extensive pool of outstanding alfalfa genetics with an inherent toughness and field tolerance which has been achieved through extensive trialling and selection. These varieties are uniquely placed and broadly adaptable to all kinds of conditions offering proven performance, field tolerance, grazing persistence, fast regrowth and pest and disease resistance.

The SARDI breeding program produces alfalfa varieties that can offer:

- A range of winter activity and dormancy
- Superior yield and after-cutting growth
- Resistance to alfalfa pests and diseases
- Adaptability to varying climates and soil types
- High forage quality
- Persistence under extreme grazing management
- Suitability for mixed farm situations.



Forage yield evaluation trial.



alfalfa being tested under drought and sheep grazing conditions.



Field adoption and tolerance trial.

ALFALFA VARIETIES

WINTER DORMANT ALFALFA

Winter dormant alfalfa grows actively through spring and summer and into early autumn when growth rates decline. These varieties are best suited to irrigated hay production or long-term pasture situations in colder, wetter environments, where rainfall continues into late spring and early summer, and winter grazing is provided by other pastures or crops. Winter dormant alfalfa isn't suited to late autumn/early winter sowing.

Sardi 5
Semi winter dormant lucerne

325 mm+ 5.8 - 8.0 Deep well drained AL or AgriCOTE

Dormancy 5 Semi-Winter Dormant

SARDI 5 is a semi winter dormant variety with a winter activity rating of 5. It has a bushy growth habit, fine stems and a low, broad crown making it very persistent under grazing. SARDI 5 performs well in both irrigated and dryland environments and is particularly suited to challenging cold, wet environments, or sites with known disease pressure. It's best suited to farming systems where long-term persistence, summer production and herbage quality are the most desired traits and winter production is not required.

Key features:

- Semi winter dormant variety with fine stems and a low, broad crown
- Suited to challenging, wet, cold environments
- Persistent under grazing and performs well in both irrigated and dryland environments
- Good Anthracnose and Phytophthora root disease resistance
- Ideal for hay production with very bushy and dense growth.

WINTER ACTIVE ALFALFA

Winter active alfalfa is the most versatile, providing good growth into late autumn and hold 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. It is ideal for irrigated or dryland production and are useful as a pure stand or as a perennial legume component in pasture blends for regions with 450 - 650 mm winter dominant rainfall. These varieties 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-Grazer
Winter active lucerne

325 mm+ 5.8 - 8.0 Deep well drained AL or AgriCOTE

Dormancy 6 Winter Active

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

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
- Well suited to mixed swards with perennial grasses such as winter active tall fescue, cocksfoot or phalaris.

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 AN), 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.

Sardi 7

Winter active lucerne

350 mm+ 5.8 - 8.0
 Deep well drained
 AL or AgriCOTE
 Irrigation

Dormancy 7 Winter Active

SARDI 7 is a robust variety with exceptional versatility for continuous cutting, hard grazing or blending with other species to produce highly productive pastures. It has the unusual combination of winter growth, grazing tolerance and forage quality as well as persistence normally associated with a more dormant type. SARDI 7 will provide valuable growth into late autumn and early winter until annual pastures kick in. Its broad disease resistance profile and real farm breeding background ensure it works across a range of soil types, climates and farm management conditions.

Key features:

- Very persistent and tolerant of grazing, resulting in highly productive long-term stands
- Broad low crown, many fine upright stems which carry a high number of large leaves
- Broad pest and disease resistance profile
- Higher total dry matter than more winter dormant varieties
- Suited to continual harvesting, hard grazing and treading
- Bridges the summer and autumn feed gaps.

Series 2 Sardi 7

Winter active lucerne

350 mm+ 5.8 - 8.0
 Deep well drained
 AL or AgriCOTE
 Irrigation

Dormancy 7 Winter Active

NEW

SARDI 7 Series 2 is the next generation winter active alfalfa. It is even more versatile, broadly adapted and persistent than SARDI 7 offering a greater performance in cold, wet environments where alfalfa can struggle. It offers superior performance where persistent, high-producing alfalfa stands are required and in grazing situations where winter produced feed can be utilised. SARDI 7 Series 2 is also the only alfalfa in Australia with any tolerance to the new highly virulent BGA strain.

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.

SARDI 10 CROPS IN SOUTH AFRICA AND SAUDI ARABIA



A third year SARDI 10 stand yielding in excess of 30m DM/year at "Jan Kempdorp" - Northern Cape, South Africa.



SARDI 10 stand at Upington - Northern Cape, South Africa.



SARDI 10 stand at Almarai, Saudi Arabia.

HIGHLY WINTER ACTIVE ALFALFA

Highly winter active alfalfa is bred for late autumn/early winter sowing and have excellent seedling vigour for under-sowing. They have a more upright crown, erect growth habit and are well suited to a 2-4 year cropping rotation system in 350-500 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.

Sardi 10

Highly winter active lucerne

350 mm+ 5.8 - 8.0
 Deep well drained
 AL or AgriCOTE
 Irrigation

Dormancy 10 Highly Winter Active

SARDI 10 is a highly winter active alfalfa with the maximum winter activity rating. It is an upright robust variety that combines seedling vigour, rapid regrowth, good grazing tolerance and persistence. It has an erect crown with fine-to-medium stem thickness and carries a high number of large leaves growing from nodes throughout the length of the stem. It has exceptional seedling vigour and quick regrowth after cutting and/or grazing. It performs well in both irrigated and dryland environments.

Key features:

- Highly productive 3-4 year+ option suited to dryland systems with a winter dominant rainfall pattern
- Valuable in farming systems with intensive management, such as dairy farms
- Exceptional seedling vigour and regrowth after cutting and or grazing
- Broad base of pest and disease resistance with no weakness to any of the major alfalfa diseases
- High winter growth and good grazing tolerance
- Suited to cropping rotations, pasture mixes and hay production systems requiring maximum yield.

Series 2 Sardi 10

Highly winter active lucerne

350 mm+ 5.8 - 8.0
 Deep well drained
 AL or AgriCOTE
 Irrigation

Dormancy 10 Highly Winter Active

NEW

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.

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.

AGRONOMY NOTES TO AID PREPARATION, ESTABLISHMENT AND MANAGEMENT OF ALFALFA

DORMANCY GROUPS

There are three main dormancy groupings for alfalfa, all of which reliably have a typical life span as described below. The suitability for purpose of each variety is dependent upon its dormancy rate.

Dormancy	Dormancy rating	Life expectancy	Suitability
Winter dormant	3 to 5	8 years +	Grazing and fine cut hay
Winter active	6 to 7	6 to 8 years +	Grazing/hay, general purpose
Highly winter active	8 to 10	3 to 5 years +	Winter feed, hay production, short pasture phase

Maximum production of an alfalfa stand is in years 1 to 6, and then tapers off unless very well maintained. alfalfa varieties with a dormancy rating of 1-6 are only suitable for early autumn or spring sowing in cold winter areas. Varieties with a rating of 7-10, are suitable for autumn sowing under most circumstances. The annual growth of winter dormant alfalfa tapers off earlier as the season cools in autumn, but will often start producing again earlier in the following spring.

SOWING RATES

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

Rain	kg/ha	Plant counts (after 1st summer)
350-450 mm	4-6	15-40
450-600 mm	6-8	50-70
600-800 mm	10-15	80-120
800 mm+/Irrigation	18-35	130-160

Thicker sowing gives thinner stems which can be used for irrigated hay production as a tool. Allow for germination % and an establishment factor of 65-75%.

SEED COATING

It is recommended to use a coated seed that includes the correct inoculants and an insecticide for early protection from red legged earth mites (RLEM) and alfalfa flea. With sensible storage, AgriCOTE Pro-Tech 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 400,000/kg to 330,000/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.

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 10-15 mm 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, sow late winter to right throughout spring. 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 is the most usual option.

FERTILITY

It is important to test the soil for phosphorus, potassium, aluminum and calcium. Lime is also critical to adjust soil pH, so be sure to conduct a soil test to check to see if it is needed. Soil pH levels (CaCl₂) should be >5.8, ideally >6.0. aluminium at depth should also be considered and paddock avoided if judged potentially problematic.

Sow with low nitrogen, good phosphorus and potassium fertiliser. Molybdenum and boron should be considered where soils are typically low in these trace elements or application has not occurred for some years. A small amount of nitrogen may be needed until plants are established.

INCREASING PLANT NUMBERS IN A THIN STAND

There is a toxic (allelopathic) effect due to exudates in residue, trash and plant litter. This can be problematic for new seedlings once alfalfa has been in the paddock for 9-12 months. If an alfalfa stand fails to establish sufficiently, re-sowing is best attempted in autumn due to competition in spring. The best plan however is to start again as there is likely a disease, pest or nutrition problem which has led to low plant numbers.

LONGEVITY

Depending on the plant numbers and the cropping rotation, the life and value of an alfalfa stand can be increased through over-sowing with a medium-term winter active ryegrass grass.

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. A typical weed control program is provided below:

Pre-planting	First year – post-emergence	Second and subsequent years
Knockdown spray to remove actively growing weeds	The following options can be used up to the eighth leaf stage:	Spray-seed + Diuron (take some care with the winter active varieties)
Trifluralin should be used to curtail early weed competition; at rates depending on soil type	First trifoliolate leaf - 2, 4 - DB, Bromoxynil	Simazine (may be a better option for winter actives)
Pendimethalin can also be used	Second trifoliolate leaf - Flumetsalum, Imazamox, Imazethapyr	Options as per first year, but check for weed size as application rates vary
	Third trifoliolate leaf - Bromoxynil, Diflufenican, Prometryn	Group A grass herbicides

PESTS

An alfalfa crop 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 such as omethoate or bifenthrin for a longer term effect. Slugs and snails should be baited appropriately.

AS A PASTURE MIX

When sowing alfalfa as a pasture mix, establish it with a slower establishing grass such as a tall fescue, phalaris or sub-tropical perennial where appropriate. In some circumstances it may be better to establish the alfalfa first and introduce the companion varieties a season or two later.

UNDERSOWING

If under-sowing 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. In these instances, 2,4 - DB is a good herbicide option amongst others.

CUTTING

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

INDICATIVE FEED VALUE OF ALFALFA

ME	10½ MJ ME/kg DM
CP	18-20%
NDF	50-55%

CROP REMOVALS

Estimated nutrient removal rates/tonne of dry matter (DM) are below:

Nitrogen	20-30 kg	Magnesium	2-4 kg
Phosphorus	2-3 kg	Zinc	20-50 g
Potassium	15-20 kg	Copper	5-10 g
Sulphur	2-4 kg	Boron	25-40 g
Calcium	10-17 kg	Manganese	35-50 g
		Iron	50-150 g

Regular soil and tissue tests should be taken to monitor nutrient levels.

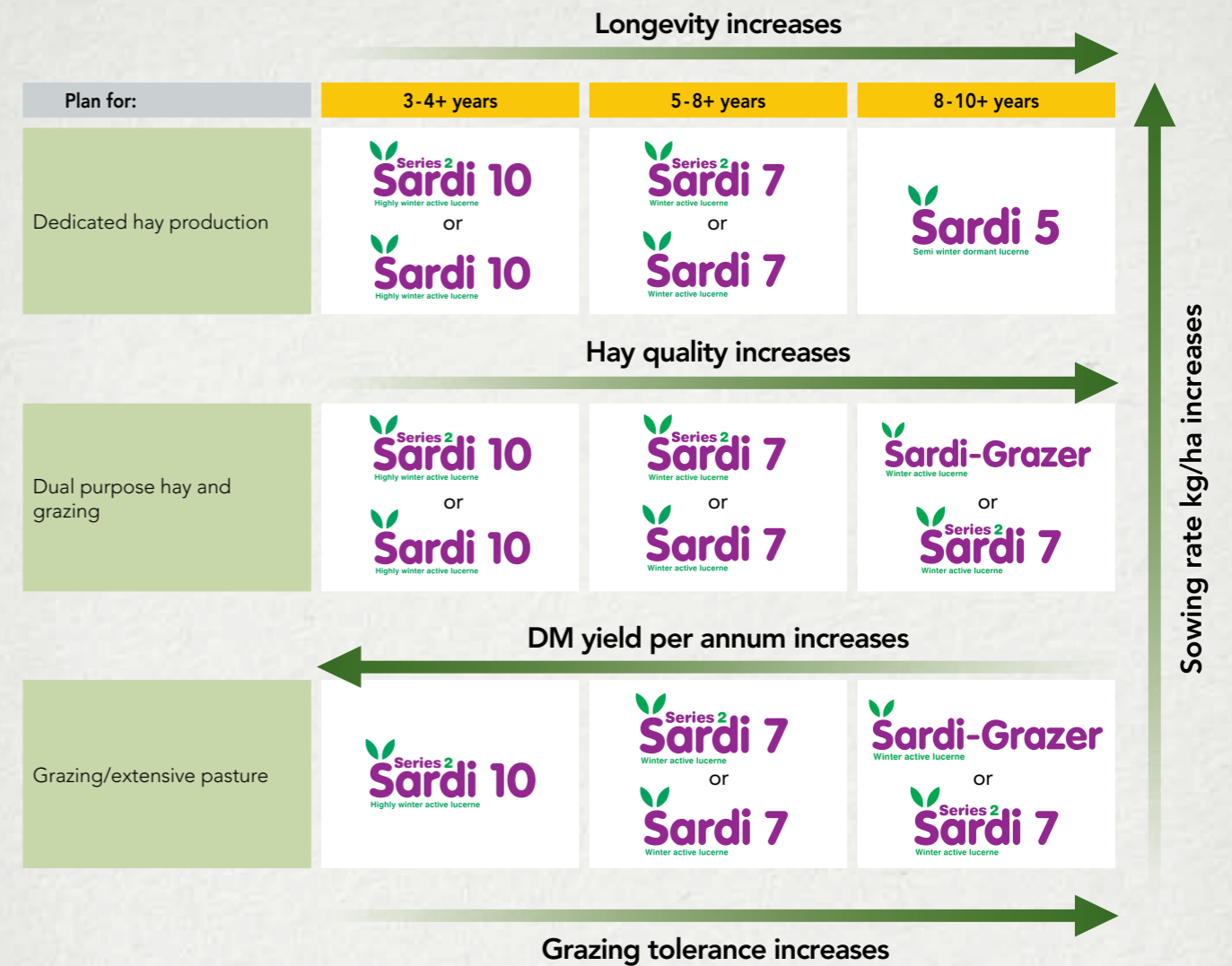
alfalfa can produce 10- 25 tonne DM/ha/yr. For each 10 tonne DM this equates to 200 kg Ca. When compared to 360 kg Ca in 1 tonne of limestone lime, this indicated that on average 1T lime/ha every 2 years or so is required to maintain calcium nutrition as well as to help manage pH and aluminium. Fertiliser 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.

ALFALFA READY RECKONER

ALFALFA PREPARATION CHECKLIST

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

VARIETY TO FIT THE JOB



ALFALFA SOWING RATES

Annual rainfall	350 mm-450 mm	450 mm-600 mm	600 mm-800 mm	800 mm+/ Irrigated
kg/ha	4-6	6-8	10-15	18-35

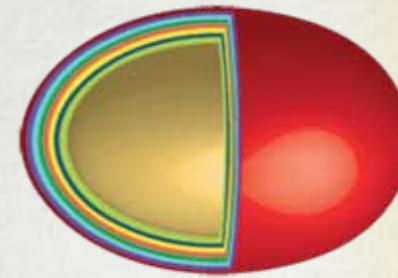
It is strongly recommended that prior to sowing, a pre-plant pre-emergent herbicide be considered. Herbicides such as trifluralin and pendimethalin are commonly used with good success. Consult an agronomist and check label instructions before proceeding. Low-till/no-till systems can be used to good effect,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

ALFALFA PRODUCT ADAPTION CHART

Product	Sardi 5	Sardi-Grazer	Sardi 7	Sardi 7 Series 2	Sardi 10	Sardi 10 Series 2
Dormancy Rating	5	6	7	7	10	10
Rainfall	325 mm - 400 mm	325 mm - 400 mm	350 mm - 425 mm	350 mm - 425 mm	350 mm+(sth) 425 mm+(nth)	350 mm+(sth) 425 mm+(nth)
Region	All states	All states	All states	All states	All states	All states
Sowing rate (low-med rainfall)	2-8 kg/ha	2-8 kg/ha	2-8 kg/ha	2-8 kg/ha	2-8 kg/ha	2-8 kg/ha
Sowing rate (med-high rainfall)	6-15 kg/ha	6-15 kg/ha	6-15 kg/ha	6-15 kg/ha	6-15 kg/ha	6-15 kg/ha
Sowing rate (irrigation)	18-35 kg/ha	18-35 kg/ha	18-35 kg/ha	18-35 kg/ha	18-35 kg/ha	18-35 kg/ha
pH (CACl ₂)	5.8-8.0	5.8-8.0	5.8-8.0	5.8-8.0	5.8-8.0	5.8-8.0
Soil Type	Light-to-medium and heavy, deep, well-drained soils	Light-to-medium and heavy, deep, well-drained soils	Light-to-medium and heavy, deep, well-drained soils	Light-to-medium and heavy, deep, well-drained soils	Light-to-medium and heavy, deep, well-drained soils	Light-to-medium and heavy, deep, well-drained soils
Inoculant	Pro-Tech or AL	Pro-Tech or AL	Pro-Tech or AL	Pro-Tech or AL	Pro-Tech or AL	Pro-Tech or AL
Suitability	H S G	H S G	H S G	H S G	H S G C	H S G C
Disease and pest resistance	Spotted alfalfa Aphid	HR	HR	HR	HR	HR
	Blue Green Aphid	HR	HR	HR	HR	HR
	Phytophthora Root Rot	HR	R	HR	HR	R
	Anthrachnose	HR	R	HR	HR	R

Suitability key: H = Hay S = Silage G = Grazing C = Cut and Carry
 Disease and pest resistance key: LR = Low Resistance S = Susceptible MR = Moderately Resistant
 R = Resistant HR = Highly Resistant

Seed Coating



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

GRAZING TOLERANCE AND RECOVERY OF SARDI-GRAZER



1. SARDI-Grazer continuous grazing trial.



2. SARDI-Grazer after eight months of continuous grazing.



3. Recovery from grazing six weeks later.



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