Your guide to Regrassing

ravensdown

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0800 100 123
ravensdown.co.nz

Introduction

Paddock Identification › **Species & Cultivar Selection** › **Spray Out** › **Sowing** › **Post Sowing Management**

The aim of this regrassing brochure is to provide insight into how the combination of Ravensdown's fertiliser, seed and agrochemical products work together to increase farm performance.

With a regrassing programme it is very important to reduce as many of the risks as possible. The process starts with identifying the paddocks that require regrassing to lift production. The next step is to understand what is limiting pasture production. Is it soil nutrition, insects, pasture species etc? The use of Ravensdown **Smart Maps** provides a clear understanding of the inputs required for optimal growth, allowing a more informed regrassing decision.

The most cost effective form of weed control is prior to drilling. Identifying any problem weeds and insects to ensure an effective spray-out will assist in improving pasture establishment. The choice of which species and cultivar to sow has a large influence on the success of the regrassing programme. There are several options presented in this brochure and Ravensdown have a number of specialist seed experts who are only too happy to assist, should you need advice.

Effective post sowing management will increase the likelihood of success of your re-grassing programme and allow you full benefits from the new pastures. After sowing, the paddock will require regular monitoring for potential weed and insect issues. Should chemical treatment be required, the appropriate action needs to be taken prior to grazing. After the first grazing an application of nitrogen can assist pasture development. A good nutrient management plan will help make sure the right balance is achieved.

Contents

Integrated forage solutions

Ravensdown can provide you with all the essential products, service and knowledge for regrassing this autumn. This includes customised fertiliser recommendations, AgChem for spray-outs and post emergence weed and insects sprays, and a full range of forage seed options.

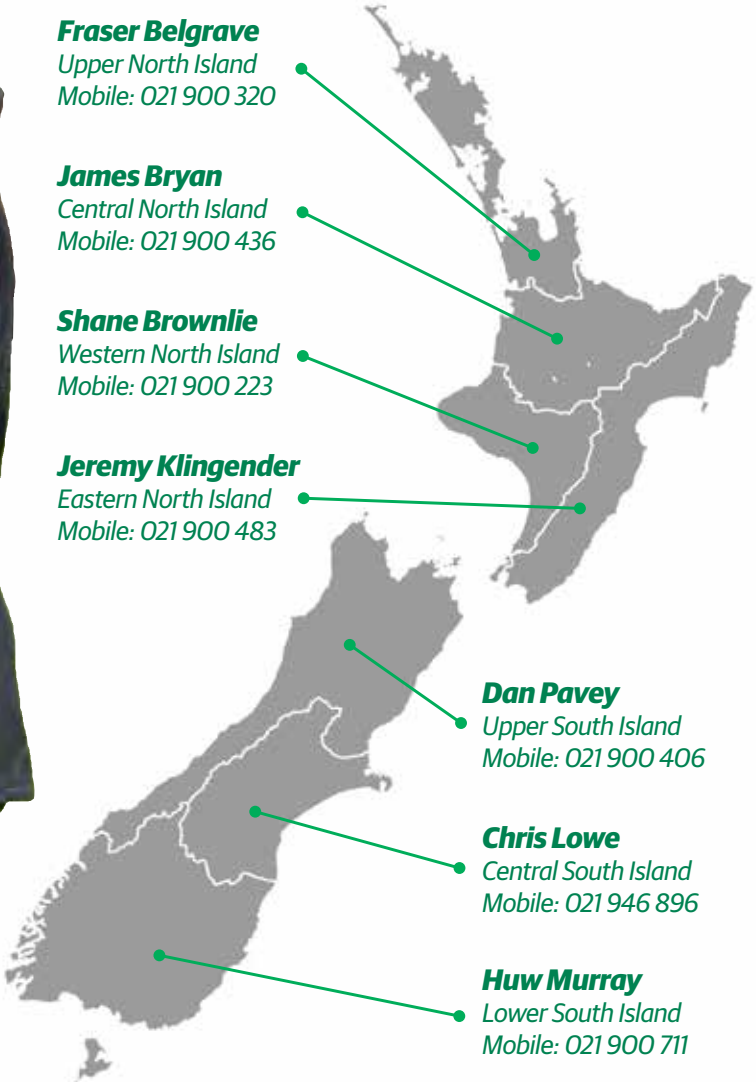
We have teamed up with Cropmark Seeds as our technology partner to provide leading edge forage technologies such as festuloliums (interspecies cross of perennial ryegrass and meadow fescue) and an animal safe endophyte that provides above and below ground insect protection.

The Cropmark forage plant breeding program is recognised for the high performance of the varieties it produces. All Cropmark's varieties have been thoroughly trialled and tested and selected for their proven high performance on farm. Varieties such as **Matrix**, **Ultra**, **Sonik**, and **Bullet** continue to show superior performance on farm and in independent industry trials and performance evaluation indices.

Agronomy Support

Ravensdown realise the importance of accurate advice and the ability to think outside the square to maximise your farm production. Supporting our regional Agri Manager's are seven Regional Agronomists who can assist you with technical knowledge around Seed, AgChem and the associated management to maximise your production.

Regional Agronomists



Fraser Belgrave
Upper North Island
Mobile: 021 900 320

James Bryan
Central North Island
Mobile: 021 900 436

Shane Brownlie
Western North Island
Mobile: 021 900 223

Jeremy Klingender
Eastern North Island
Mobile: 021 900 483

Dan Pavey
Upper South Island
Mobile: 021 900 406

Chris Lowe
Central South Island
Mobile: 021 946 896

Huw Murray
Lower South Island
Mobile: 021 900 711

Ravensdown Seed

Formulated pre-mixes

Ravensdown is proud to offer you a range of **High Performance Pasture Mixes™** to suit a wide range of livestock classes, farm and soil types, and geographical regions.

Each mix is designed to obtain maximum performance from your farming system and conditions.

Endophytes

Pasture grasses can contain different endophytes (fungi which grow within the plant and help protect the plant against insect pests). The type of insect which they protect against varies from endophyte to endophyte.

Some endophytes can cause grass staggers and/or heat stress. Different livestock classes also vary in their sensitivity to endophytes, and therefore endophytes are a key determinant of which pasture variety or mix to use

Full range of cultivar options

We can offer a full range of forage options to ensure the total Integrated Forage Solution for your farm.

Custom mixes

In addition to our especially formulated **High Performance Pasture Mixes™**, we are able to design specialist mixes to best match your specific needs and desires.

Delivery

You can choose between delivery direct to farm, or you can arrange to collect your seed from your nearest Ravensdown depot. Specify this when ordering.

Ordering seed

To order your seed requirements or for further information, please contact your local Agri Manager or call Ravensdown on 0800 100 123.

Above and below ground
Unrivalled insect tolerance

The **GrubOUT® U2** endophyte provides unrivalled tolerance of host grasses against attack from grass grub larvae, black beetle adults and larvae, porina caterpillar, black field cricket, Argentine stem weevil, and more.

GrubOUT® U2 contains loline alkaloids which act as feeding deterrents to insect pests, while having no known ill effect on livestock or livestock performance.

Through its superior protection of host grass plants against insect pests, the **GrubOUT® U2** endophyte delivers dramatically improved pasture persistence, even under severe insect infestation.

Endophyte	Insect Tolerance	Ability to Cause Grass Staggers
GrubOUT® U2	Black beetle adults and larvae, grass grub larvae, porina caterpillar, black field cricket, Argentine stem weevil, root aphid	No
AR1	Argentine stem weevil, pasture mealy bug	No
AR37	Black beetle adults, porina caterpillar, Argentine stem weevil, root aphid, pasture mealy bug	Yes (Sheep and deer)
NEA2	Black beetle adults, Argentine stem weevil, pasture mealy bug, limited tolerance to root aphid	No
Endo5	Black beetle adults, Argentine stem weevil, pasture mealy bug, limited tolerance to root aphid	No
Standard endophyte	Black beetle adults, Argentine stem weevil, pasture mealy bug, limited tolerance to root aphid	Yes (All livestock)
Nil endophyte	Nil	No

Sowing

- A sowing rate of 25-30kgs is recommended.
- Like Barrier Combo, Barrier is more sensitive to sowing conditions than perennial ryegrass.
- Getting good seed to soil contact is important, as is soil temperature at sowing.
- Sowing it shallow, into a fine, firm, moist and well compacted seed bed will aid establishment.
- Full cultivation is recommended over direct drilling or broadcasting to get best results.
- Soil temperatures of 12 degrees or more will enhance establishment speed.
- Sowing Barrier with ryegrasses isn't recommended. Bear in mind that sowing with another species could give insects a feed source, and depending on what companion grass is sown into the Barrier, could result in grazing variances due to the superior palatability of Barrier.
- Where high insect pest populations exist (e.g. grass grub, porina, black beetle) get them under control first through cultivation and/or the application of a suitable insecticide. And always use treated seed in such situations.

Benefits

- Protection against root and top feeding insect pests including grass grub larvae, black beetle adults and larvae, porina caterpillar, black field cricket, Argentine stem weevil and more
- Improved pasture persistence
- No known ill-effects to sheep, cattle or deer
- Enhanced livestock performance, better farm profit potential

The **GrubOUT® U2** endophyte is available in **Barrier perennial forage grass** (see page 11).

Pasture Management

- Barrier is extremely palatable and stock will graze it to very low levels if given the chance.
- Sowing Barrier with ryegrasses isn't recommended. Another grass species could give insects a feed source, and depending on what companion grass is sown into the Barrier, could result in grazing variances due to the superior palatability of Barrier.
- Rotational grazing is recommended.
- Being a Festulolium, Barrier is very responsive to nitrogenous fertilisers.

Ravensdown HP AR37 Mix

Contents

- *Alto AR37 perennial ryegrass*
- *Demand white clover*
- *Large leaf white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*

*Chico chicory, Tonic plantain, red clover, *Mixing fee applies*

"Robust and Persistent"

A high performing pasture mix with the AR37 endophyte for increased insect protection over AR1 cultivars, based on **Alto AR37** perennial ryegrass.

Key traits

- High year-round pasture production and quality
- High quality clover content
- Late flowering with low aftermath seeding
- Suited to either sheep and beef or dairy systems

Details

The **HP AR37 Mix** is based on the proven Alto AR37 cultivar with excellent rust and pulling tolerance, with persistent and productive medium and large leaved white clovers for increased quality.

If insects such as black beetle or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Suited for cattle and sheep systems where insects such as Argentine stem weevil, porina and black beetle adults are causing pasture persistency issues. In situations where below ground insects such as grass grub and black beetle are causing damage as well as above ground insect, the use of Barrier perennial forage grass is recommended. Discuss with your local Agri Manager.

AR37 is not recommended for deer or horses as it can cause staggers.

Grass Component

Alto AR37 perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR37	+14	Diploid	9	Very High	500

Alto AR37 is a fine leaved and densely tillered ryegrass, with the inclusion of the AR37 endophyte suited to a range of sheep and cattle farming systems. Alto AR37 has high production over the spring, summer and autumn months.

Ravensdown HP Endurance Mix

Contents

- *Matrix SE enhanced perennial ryegrass*
- *Demand white clover*
- *Large leaf white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*

Chico chicory, Tonic plantain, red clover, Vision cocksfoot

**Mixing fee applies*

"Production and persistance"

A high performance, persistent pasture mix based on **Matrix** standard/high endophyte enhanced perennial ryegrass, for use where high insect pressure (particularly from black beetle attack) is limiting pasture production and persistence.

Key traits

- Proven and reliable high performing diploid enhanced perennial ryegrass
- Strong persistence under insect attack
- Very strong winter, early spring growth providing feed when most needed
- Suitable for full pasture renovation and under-sowing

Details

The **HP Endurance Mix** provides the best combination of highest performing, persistent enhanced perennial grass and high yielding persistent white clover. Standard/high endophyte containing grasses can occasionally cause grass staggers in late summer, and should not be used with susceptible stock such as horses, deer and alpacas.

If insects such as porina or grass grub are causing persistency issues, refer to the Endophyte and section on page 5.

Suitability / Use

Ideally suited to areas where black beetle is prevalent (Waikato, Bay of Plenty, Northland), where persistence is an issue and where farmers are less concerned about grass staggers. Recommended for high performance systems, irrigated or higher rainfall, rotational grazing and set stocking.

Not recommended for animals sensitive to endophyte induced grass staggers such as deer, horses, goats or alpacas.

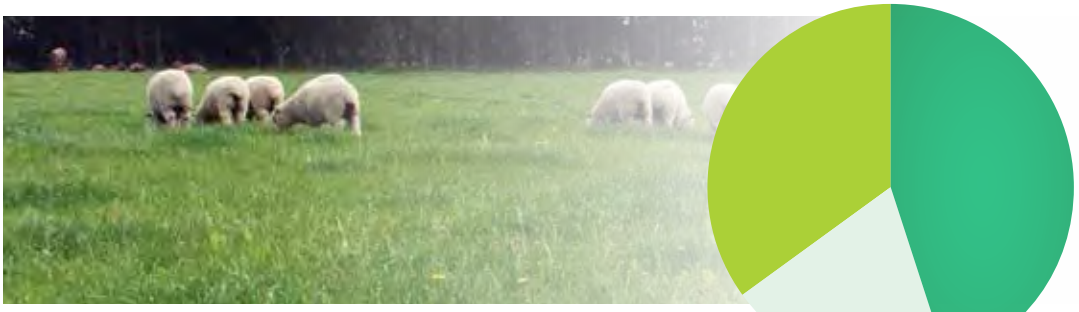
Grass Component

Matrix SE enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
Standard / high	+ 23	Diploid	9	Very high	500+

Matrix is a thoroughly proven and reliable very late heading (+23 days) diploid inter-species cross of perennial ryegrass and meadow fescue parentage. High yielding across all seasons of the year, but especially strong winter, early spring growth relative to other perennial ryegrass varieties; providing feed when it is needed most around calving and lambing. High in pasture quality (ME and digestibility), and highly palatable due to its meadow fescue content. Excellent disease resistance, especially against leaf rust. Excellent persistence.

Ravensdown HP Sheep & Beef Mix



Contents

- *Ultra AR1 enhanced perennial ryegrass*
- *Arrow AR1 perennial ryegrass*
- *Demand white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*
Chico chicory, Tonic plantain, red clover
**Mixing fee applies*

"Production when you need it"

A specially designed animal-safe mix for sheep and beef pastures based on **Ultra AR1** enhanced perennial ryegrass and **Arrow AR1** low endophyte perennial ryegrass; and providing increased early spring production and summer quality.

Key traits

- High pasture production and quality
- Increased early spring growth
- Densely tillered grasses for increased grazing tolerance
- Animal safe endophyte

Details

The **HP Sheep and Beef Mix** is designed specifically for increased winter and early spring growth for calving and lambing.

The **HP Sheep and Beef Mix** combines one of the leading late flowering perennial grasses, a mid-heading perennial grass with low aftermath seeding with a well-known, trusted and persistent high yielding medium leaf white clover and a large leaf white clover.

If insects such as black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Ideally suited to a wide range of high performance sheep, cattle and deer farming systems including irrigated / higher rainfall or dryland, and to both rotational grazing and set stocking.

Grass Component

Ultra AR1 enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1	+ 20	Diploid	9	Very high	500+

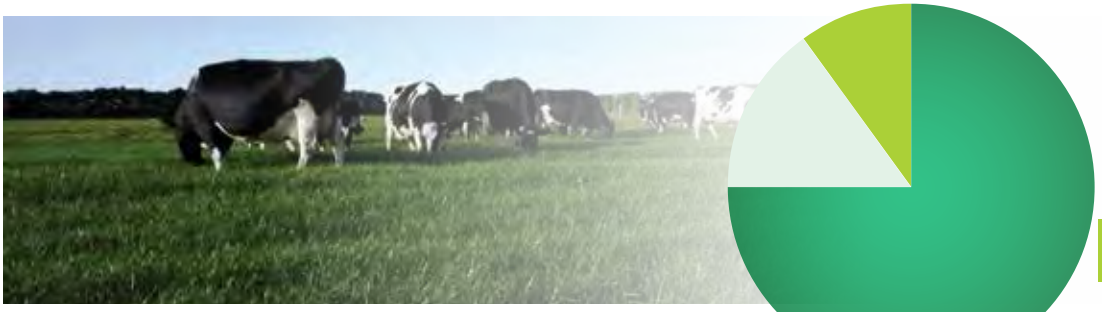
Ultra is a densely tillered, late heading diploid interspecies cross of perennial ryegrass and meadow fescue parentage. Extremely high yielding across a range of seasons, with strength in autumn, winter, late spring and summer which suits many dairy farm systems.

Arrow AR1 perennial ryegrass

Endophyte	Heading Dates *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1	+ 6	Diploid	9	High	500+

Arrow delivers high winter and early spring growth to compliment the winter and late spring growth of **Ultra**, more matching the demands of a sheep and beef breeding system.
Arrow has a medium erect growth habit allowing good clover compatibility, improving feed quality and animal production. **Arrow** has proven to have very good persistence and rust resistance in on-farm trails.

Ravensdown HP Dairy Mix



Contents

- *Ultra AR1 enhanced perennial ryegrass*
- *Demand white clover*
- *Large leaf white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*
Chico chicory, Tonic plantain, red clover
**Mixing fee applies*

"Quality and quantity"

A high performance, animal-safe pasture mix using **Ultra AR1** enhanced perennial ryegrass as a base.

Key traits

- High year-round pasture production and quality
- Low aftermath seeding
- Excellent grazing tolerance
- High quality clover content

Details

The **HP Dairy Mix** is designed specifically for the needs of dairy farms in regions where insects such as Argentine stem weevil are causing persistence issues.

The **HP Dairy Mix** combines one of the leading perennial grasses for production with a well-known, trusted and persistent, high yielding medium leaf white clover and a large leaf white clover.

If insects such as black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Ideally suited to a wide range of high performance dairy or cattle farming systems including irrigated / higher rainfall or dryland, and to both rotational grazing and set stocking.

Grass Component

Ultra AR1 enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1	+ 20	Diploid	9	Very high	500+

Ultra is a densely tillered, late heading diploid interspecies cross of perennial ryegrass and meadow fescue parentage. Extremely high yielding across a range of seasons, with strength in autumn, winter, late spring and summer which suits many dairy farm systems.

Ravensdown HP Dryland Mix

Contents

- *Ultra AR1 enhanced perennial ryegrass*
- *Vision cocksfoot*
- *Demand white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*
Chico chicory, Tonic plantain, red clover
**Mixing fee applies*

"Dryland production"

A high performance, animal-safe pasture mix for improved summer drought tolerance, based on **Ultra AR1** enhanced perennial ryegrass and **Vision** cocksfoot.

Key traits

- Improved summer dry tolerance and production
- Proven, reliable high performing grass and clovers
- Combination of persistent, high nitrogen fixing and high yielding white clovers
- Very strong year-round growth

Details

The **HP Dryland Mix** is designed specifically for the needs of farmers in areas that are prone to summer dry. The inclusion of **Vision** cocksfoot to the mix will provide valuable feed where moisture limits ryegrass growth.

If insects such as black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Ideally suited for more reliable year-round feed, improved summer growth and persistence under non-irrigated and summer-dry farming systems throughout New Zealand, under rotational grazing or set stocking.

Grass Components

Ultra AR1 enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1	+ 20	Diploid	9	Very high	500+

Ultra is a densely tillered, late heading diploid interspecies cross of perennial ryegrass and meadow fescue parentage. Extremely high yielding across a range of seasons, with strength in autumn, winter, late spring and summer which suits many dairy farm systems.

Vision Cocksfoot

Endophyte	Heading Date *(days cf Nui)*	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(mm)*
NIL	Mid heading	7	Medium-high	450+

Vision has a semi erect growth habit, good winter activity and is mid-season flowering. It has a finer stem and leaf than some cocksfoots, but is not excessively dense, allowing for good compatibility with other grasses and clovers in pasture mixes. Has improved disease resistance.

Ravensdown HP Swardmaster Mix

Contents

- *Ultra AR1 enhanced perennial ryegrass*
- *Kai tetraploid perennial ryegrass*
- *Chico chicory*
- *Red clover*
- *Demand white clover*

Pre-mixed into convenient 1ha (25kg) size bags.

"Maximise animal growth"

A high performance, animal-safe pasture mix based on **Ultra AR1** enhanced perennial ryegrass and **Kai** tetraploid low endophyte perennial ryegrass; and providing high summer quality for improved livestock performance.

Key traits

- High production potential
- Increased summer production
- Very high quality
- Very high livestock fattening & finishing potential

Details

The **HP Swardmaster Mix** is designed specifically for the needs of fattening/finishing operations where summer growth and quality are desired. The inclusion of **Chico** chicory increases the animal uptake of key minerals and enhances livestock performance.

The inclusion of **Kai** tetraploid perennial ryegrass increases the palatability and metabolisable energy (ME) of the sward, combined with **Chico** chicory and red clover lifts the potential animal performance to very high levels.

If insects such as black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Ideally suited for more reliable year-round feed, improved summer growth and quality under rotational grazing and set stocking for high performance and finishing systems for a range of stock classes.

Not recommended for areas where insects such as black beetle, porina or grass grub reduce pasture persistence.

Grass Components

Ultra AR1 enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1	+ 20	Diploid	9	Very high	500+

Ultra is a densely tillered, late heading diploid interspecies cross of perennial ryegrass and meadow fescue parentage. Extremely high yielding across a range of seasons, with strength in autumn, winter, late spring and summer which suits many dairy farm systems.

Kai LE perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
Low endophyte (LE)	+ 20	Tetraploid	9	Very high	500+

Kai is a densely tillered, late flowering tetraploid perennial ryegrass with very high quality and disease tolerance. **Kai** has high total annual production with winter and spring being key growth months. **Kai** will recover quickly from grazing due to its high tiller density under rotational grazing systems.

Ravensdown HP Southern Mix

Contents

- *Ultra LE enhanced perennial ryegrass*
- *Demand white clover*
- *Red clover*

Pre-mixed into convenient 1ha (25kg) size bags.

Optional extras*
Chico chicory,
Tonic plantain
**Mixing fee applies*

"Low endophyte production"

A high performance, low endophyte pasture mix based on **Ultra** enhanced perennial ryegrass; providing the best combination of highest performing animal safe perennial grass and with the inclusion of white and red clover.

Key traits

- Proven, reliable high performing ryegrass and clovers
- Animal-safe (low endophyte)
- Very strong winter, early spring growth providing feed when most needed
- Contains Southland bred Demand white clover
- High animal performance potential

Details

The **HP Southern Mix** has been designed for increased forage production where insects are unlikely to affect pasture persistence. The mix is based on the high performing **Ultra** enhanced perennial ryegrass, combined with red clover and Southland bred **Demand** white clover.

Summer quality and growth is increased with the inclusion of red clover to maximise animal growth potential.

If insects such as Argentine stem weevil, black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Suitability / Use

Ideally suited to high performance farming systems in areas where insect pressure is low, such as in Southland, South Otago and the lower West Coast.

Grass Component

Ultra LE enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
Low endophyte (LE)	+ 20	Diploid	9	Very high	500+

Barrier perennial forage grass

"Unrivalled insect tolerant pastures"

Barrier is a perennial grass inter-species cross between perennial ryegrass and meadow fescue (often termed a 'festulolium'). It is a very palatable to livestock, with high livestock performance potential and won't cause grass staggers or heat stress.

Key traits

- Protection against root and top feeding insect pests including grass grub larvae, black beetle adults and larvae, porina caterpillar, black field cricket, Argentine stem weevil and more
- Improved pasture persistence
- No known ill-effects to sheep, cattle or deer
- Enhanced livestock performance

Details

Containing the GrubOUT U2 endophyte, Barrier has high endophyte infection levels, and strong insect pest tolerance of a wide range of insect pests including grass grub larvae, black beetle adults and larvae, porina caterpillar, black field crickets, Argentine stem weevil etc. Can be lethal to porina caterpillar.

GrubOUT® U2 contains loline alkaloids which act as strong feeding deterrents to insect pests but do not cause grass staggers or heat stress it can be used safely with sheep, cattle, deer and goats.

Suitability / Use

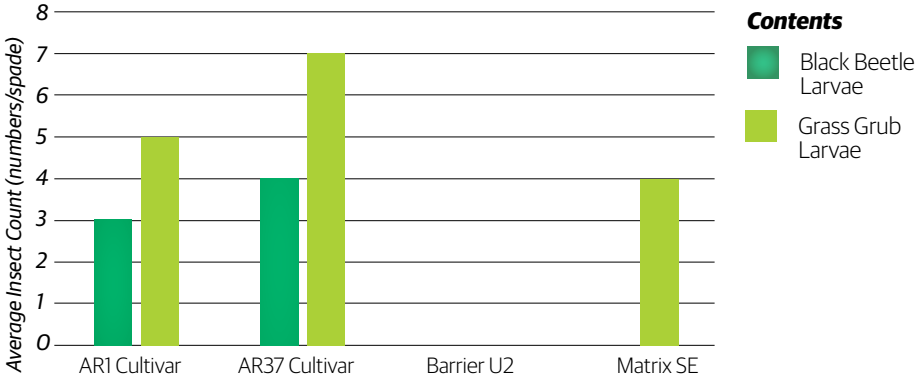
Recommended for use with all high performance systems and livestock types (sheep, cattle, deer and goats) where pasture pests are limiting the persistence of ryegrass. Being a festulolium, animal preference and performance is high.

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Insect Tolerance	Min Rainfall *(ml)*
GrubOUT U2	+10	Diploid	Crown Rust:8 Stem Rust: 7	Very high	+650

Performance

Average insect counts from a Te Awamutu on farm demonstration

Total sample numbers: 25 per treatment | Sample date: 22nd March 2013, trial sown: 11th May 2010



Blade Italian ryegrass

"Bulk feed when you need it"

An exciting new broad leafed, densely tillered diploid Italian ryegrass, bred for fast establishment and very strong year-round growth with high winter, spring yields to help minimise feed deficits at that time of the year.

Key traits

- Rapid establishment and re-growth
- High yield performance across all seasons, with strong winter and spring growth
- Very late heading (+24 days)
- Very good disease resistance

Details

Blade Italian ryegrass is suitable for short term pastures (1-2 years) or for over-sowing into run-out or damaged pastures to extend their life.

Being very late heading (+24days) and with very good disease resistance, it will maintain feed quality for up to ten days longer into spring/summer than traditional Italian ryegrass varieties, making it ideally suited for improved milk yields and livestock finishing around this time.

Suitability / Use

Recommended for use with all high performance systems and livestock types (sheep, cattle, horses, deer, and goats) as a specialist short term (1-2 year) pasture, or for over-sowing into run-out or damaged pastures to extend their life.

Cropmark Blade Italian ryegrass

Persistence	Heading Date *(days cf Nui)*	Sowing Rate *(kgs/ha)*	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter and Early Spring Activity	Min Rainfall *(ml)*
1-2 years	+ 24	20-25	9	Very high	450+

Performance

Pooled Yield Results - Italian Ryegrasses (results expressed as a % of the Mean of the trial)							
Variety	**Establishment**	**Autumn**	**Winter**	**Early Spring**	**Late Spring**	**Summer**	**Total**
Blade	**117**	**109**	**111**	**116**	**112**	**109**	**110**
Asset AR37	69	111	95	93	100	118	106
Sonik	105	104	112	106	102	105	104
Tabu	107	106	106	103	97	105	102
Feast 2	101	101	98	101	104	100	101
Warrior	103	105	101	101	99	91	99
Accelerate	102	91	98	102	98	96	97
Velocity	96	72	79	77	88	76	80
Mean (kg DM/ha)	1,752	3,419	1,192	1,923	3,351	4,101	13,151
LSD (5% level)	81	294	100	127	193	237	631
CV%	11.6	19.5	20.8	16.4	14.3	13.7	11.9

Source: Pooled dry matter yield results of 12 trials conducted by Cropmark Seeds Ltd on farms in at Hamilton, Tokoroa, Taupo, Fielding Masterton, Ashburton, Burnham, Norwood, Woodbury, Milton, Knapdale and Dacre, 2010-2014.

Ultra Enhanced® perennial ryegrass

"The ultimate in pasture yield performance"

Ultra Enhanced® perennial ryegrass has excellent year-round yield performance, with high winter and spring production, and is high in metabolisable energy (ME) content.

Key traits

- Performs exceptionally well in all regions
- High animal performance potential
- Strong disease resistance
- Suitable for all livestock classes

Details

Ultra Enhanced® perennial ryegrass is an interspecies cross between perennial ryegrass and meadow fescue to combine stock palatability and forage production. **Ultra** is a densely tillered cultivar and is extremely high yielding across all seasons, but especially in winter and early spring.

Suitability / Use

Suitable for all livestock classes, with rotational grazing maximising production while performing very well under set stocking situations.

The type of endophyte used will depend on the insect pressures, with low endophyte being recommended in areas where Argentine stem weevil, porina, grass grub and black beetle are not expected to reduce pasture persistency, and AR1 being used where Argentine stem weevil is likely to cause persistency issues.

If insects such as black beetle, porina or grass grub are causing persistency issues, refer to the Endophyte sections on page 5.

Ultra Enhanced ryegrass

Endophyte	Heading Dates *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
AR1, LE	+ 20	Diploid	9	Very high	500+

Performance

- Reliably high performance in the industry's National Forage Variety Trials (NVFT)
- Consistently high rankings in the DairyNZ Forage Value Index for overall economic merit and for seasonal yield performance throughout the country, as the table (right) shows.

DairyNZ Forage Value Index Results - Perennial Ryegrass for Ultra AR1

NZ Region	Upper North Island	Lower North Island	Upper South Island	Lower South Island
Star rating (1-5)	4	4	4	4
Economic Merit ranking	$118-$289	$292-$431	$262-$387	$230-$340
Winter DM	3	3	3	3
Early Spring DM	4	4	4	4
Late Spring DM	3	3	3	3
Summer DM	5	4	4	4
Autumn DM	4	4	4	4

Evaluation date: 1st December 2014. For more information on the DairyNZ Forage Value Index, visit www.dairynz.co.nz

Matrix Enhanced® perennial ryegrass

"Proven, reliable, high yield and persistence"

Matrix Enhanced® perennial ryegrass is known for its high yields and persistence with strong year-round yields and high pasture quality.

Key traits

- Proven cultivar for production and persistence
- Very high winter and spring production
- High animal performance potential
- Fast re-growth post-drought

Details

Matrix Enhanced® perennial ryegrass is a thoroughly proven interspecies cross between perennial ryegrass and meadow fescue to combine stock palatability and forage production. **Matrix** is a densely tillered cultivar and is extremely high yielding across all seasons, but especially in winter and spring. Farmers nationwide have been impressed with its production and persistence under challenging environmental conditions.

Suitability / Use

Suitable for use as a high performing grass under rotational grazing and set stocking in a range of environments. **Matrix** should be used where pastures are not persisting due to over grazing or insect attack.

Matrix is available in both standard/high endophyte and low endophyte. Standard/high endophyte is recommended to be used with cattle and sheep only. It should not be used where susceptible animals such as horses, goats or alpacas are likely to be grazing, or in areas where the management of grass staggers is difficult.

If insects such as porina or grass grub are causing persistency issues, refer to the Endophyte section on page 5.

Cropmark Matrix enhanced perennial ryegrass

Endophyte	Heading Date *(days cf Nui)*	Ploidy	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter Activity	Min Rainfall *(ml)*
Standard / High, LE	+ 23	Diploid	9	Very high	500+

Performance

- **Matrix** has consistently performed to extremely high levels in the industry's National Forage Variety Trials (NVFT) and is unbeaten in the "North Island Trials – Perennial Ryegrass".
- **Matrix** also gets the maximum 5 star rating in DairyNZ' s Forage Value Index (FVI) in the Upper North Island region.

DairyNZ Forage Value Index Results - Perennial Ryegrass for Matrix SE

NZ Region	Upper North Island	Lower North Island	Upper South Island	Lower South Island
Star rating (1-5)	5	4	4	4
Economic Merit ranking	$290-$463	$292-$431	$262-$387	$230-$340
Winter DM	3	3	3	3
Early Spring DM	5	4	4	4
Late Spring DM	4	2	2	2
Summer DM	5	4	4	4
Autumn DM	4	4	4	4

Evaluation date: 1st December 2014. For more information on the DairyNZ Forage Value Index, visit www.dairynz.co.nz

Other ryegrass options

Ravensdown has strategically partnered with Cropmark Seeds to make available leading edge forage technology to you. However, we can access a range of other forage cultivars to allow us to offer complete forage solutions to you.

Below is a selection of cultivars we can offer. Please contact your local Agri Manager or Customer Centre for more information or other cultivar options.

Cultivar	Endophyte Options	Heading Date	Comments
Diploid Perennial Ryegrass			
Ultra	AR1, LE	+20	A densely tillered cultivar with very high year-round production suitable for all livestock classes, with excellent disease resistance for increased forage quality.
Matrix	SE, LE	+23	Thoroughly proven cultivar with good year-round production with excellent growth over winter and early spring.
Abermagic	AR1 , LE	+19	Bred in the UK with good late spring and summer growth, being marketed as a cultivar with high sugar levels.
Alto	AR1, AR37, LE	+14	A general purpose ryegrass with fine and densely tillered leaves and good rust tolerance. Very good late spring and summer growth.
Arrow	AR1, LE	+7	Performs well in all seasons with high winter/early spring growth.
Bronte	AR1	+20	General purpose densely tillered perennial ryegrass that suits a range of stock classes with good autumn, winter and early spring growth.
Ceres One50	AR1, AR37, LE	+20	A general purpose medium leaf size ryegrass with high autumn and winter yields. Good tolerance to root pulling.
Expo	AR1, LE	+21	A densely tillered ryegrass suited to a range of stock classes with good cool season production and low aftermath heading.
Extreme	AR1, LE	0	A productive ryegrass with higher water soluble sugar levels than Bronsyn and Samson.
Grasslands Nui	LE	0	An older common cultivar with poor summer quality and poor rust tolerance. Now superseded by newer, higher performing varieties.
Grasslands Request	AR1, AR37	0	A low aftermath heading cultivar with good growth in spring, summer & autumn.
Rohan	NEA2, LE	+18	A spreading ryegrass with dense tillers and fine leaves.
Trojan	NEA2	+16	Bred for high forage production with key strengths in winter, early spring & autumn.
Tetraploid Perennial Ryegrass			
Kai	LE	+20	Superior yield performance across all seasons with very high winter and early spring growth. Has excellent disease resistance.
Bealey	NEA2, LE	+25	High winter and summer growth, with good persistency and resistance to rust and pulling.
Base	AR1, AR37	+22	A densely tillered tetraploid ryegrass ideally suited to dairy or intensive sheep/beef farms, with low aftermath heading.
Hybrid Ryegrass			
Shogun	NEA-type	+26	A tetraploid with excellent year-round production with high feed quality due to late flowering and low aftermath heading.
Italian Ryegrass			
Blade	Nil	+27	Latest release from Cropmark with fast establishment, extremely high yield potential, excellent summer quality and very good disease tolerance.
Sonik	Nil	+17	A densely tillered diploid ryegrass with very good persistence under grazing and excellent year-round production.
Feast II	Nil	+17	High summer quality and animal performance with high disease tolerance
Tabu	Nil	+13	Fast establishing diploid cultivar with high winter and annual yield potential.

Bullet annual ryegrass

Faster, higher yielding, flexible winter feed

A rapidly establishing tetraploid annual ryegrass with superior cool season performance and re-growth.

Key traits

- Rapid establishment
- Exceptional autumn, winter and spring yields
- Excellent disease resistance
- High pasture quality

Details

Bullet annual ryegrass is a densely tillered, upright growing and highly palatable tetraploid Westerwolds annual ryegrass which has outstanding performance. Key features are speed of establishment, high growth rates over autumn, winter and late into spring, coupled with high pasture quality and palatability. An ideal winter break crop which makes excellent quality silage.

Performance

An ideal 6-9 month specialist winter feed suited to all areas of New Zealand, for both grazing as well as silage and hay use. Recommended for all livestock types. Due to its high pasture quality (ME and digestibility), Bullet has the potential to produce high quality silage and hay. Bullet should be autumn sown and can be late sown.

Cropmark Bullet annual ryegrass

Persistence	Heading Dates *(days cf Nui)*	Sowing Rate *(kgs/ha)*	Rust Resistance *(1 = susceptible, 9 = resistant)*	Winter and Early Spring Activity	Min Rainfall *(ml)*
6-9 months	+ 14	25-30	9	Very high	450+

Pooled Yield Results - Tetraploid Annual Ryegrasses (results expressed as % of the Mean of the trial)				
Variety	**Establishment**	**Autumn**	**Winter**	**Early Spring**
Bullet	**103**	**102**	**105**	**104**
Zoom	97	102	103	102
Winter Star2	105	102	96	99
Archie	99	98	98	98
Tama	96	96	98	97
Mean (kg DM/ha)	2,396	2,662	4,957	10,015
LSD (5% level)	119	114	208	320
CV%	11.7	10.1	9.9	7.6

Source: Pooled yield results of 11 trials conducted by Cropmark on farms in the Waikato (3), Taranaki, Hawkes Bay, Canterbury (4) and Southland (2), 2008 - 2010

Five key steps for effective regrassing

The main reason for regrassing is to improve farm profitability through increasing pasture and animal production efficiency. There are a number of factors that should be considered before deciding to regrass, including historic animal and pasture dry matter production data, farm management plans, soil fertility and characteristics, desired pasture species and visual perception.

1. Soil/paddock issue identification

The first step is to identify the reasons why the paddock isn't meeting your expectations. It could be a number of reasons including soil fertility or compaction, insect damage, weeds and pasture species present. These issues need to be addressed first in order to get the maximum benefit from the new pasture. The use of **Smart Maps** to look at historic pasture production and inputs will allow for a more informed decision.

Ideally, this decision process should be made at least six months prior to spray-out to allow time for soil tests to be completed and any remedial soil nutrient work to start.

2. Species and cultivar selection

Deciding on whether to go through a crop rotation or grass to grass is the next decision. Low nutrient levels and perennial weed issues may require a cropping phase to remove the limiting factors, or if a pest like clover root weevil is an issue, a cropping phase may also be required to remove the insects' food source for a season to reduce pressure on the newly-sown pasture.

The cultivar selection process can be a complex one with there being many options available. If a break crop of brassicas is being used, the main decision factor is the time to first grazing, for example, leafy turnips requiring an approximate 50 day period from germination to first grazing. Multiple grazing is expected from leafy turnips during summer in moist or irrigated environments. The next best option might be rape, with the timeframe to first grazing being 90-110 days. Ensuring the sown crop can be grazed at the right time and meets your expectations is very important.

If pasture is being sown, there are many options available. Deciding whether to sow short rotation or longer term perennial pastures, what endophyte type and flowering date to choose, knowing what stock classes will be grazing the paddocks and the potential for insect damage are key questions. The arrival of the **GrubOUT® U2** technology now available in **Barrier perennial forage grass** is a step forward in endophyte protection of pasture against key pests such as grass grub and black beetle. Ryegrass is the main pasture grass of New Zealand, but depending on your environment and grazing systems, other options include tall fescue, grazing brome, cocksfoot or other species such as herbs (chicory or plantain) and legumes (annual or perennial clovers and lucerne).

Your local Agri Manager can talk to you about the best options for your situation.

3. Spray-out

Identifying problem weeds is an important initial step in the spray-out. Weeds such as clovers, docks, buttercups, sheep sorrel, yarrow, thistles, ragwort, plantains and dandelions aren't effectively controlled with glyphosate alone.

The use of a companion herbicide is highly recommended to ensure effective weed control (Table 1: Summary of Companion Herbicide Options).

TABLE 1: SUMMARY OF COMPANION HERBICIDE OPTIONS

Companion Herbicides	Tribenuron-methyl e.g. Granit	Thifensulfuron-methyl e.g. Backup	Dicamba e.g. Dicam 480		Clopyralid e.g. Multiple		2, 4-D e.g. Pasture Guard® 2, 4-D 680	
Extra Weeds Controlled	Clovers, sheep sorrel, thistles, ragwort, wireweed, yarrow	Buttercup, dock	Clovers, dandelion, dock, mallow, pennyroyal, mayweed, ragwort, sheep sorrel, thistles, wireweed		Clovers, dandelion, plantains, thistles, yarrow (yarr)		Nettles, ragwort, storksbill, thistles	
Plant-back period	14 days: grasses, clovers, cereals, brassicas	14 days: grasses, clovers, cereals, brassicas	0 days: grasses, cereals, brassicas	28 days: clovers	0 days: grasses, cereals, brassicas	3-6 months: clovers, legumes	10 days: grasses, cereals	1 month: clovers, brassicas

It is very important to get these weeds under control in the spray-out. With the combination of grass, clover and the increasing popularity of pasture herbs such as chicory and plantain, there are reduced herbicide options for controlling these weeds in newly sown pastures.

An example of only glyphosate being used in the spray-out showing a dandelion surviving the spray-out.

For perennial weeds with large root systems, such as couch/twitch, docks or Californian thistles, a single spray will not provide effective control. A combination of cropping, grazing management and chemical options will be required. Depending on the weeds present, the management and treatment options will vary, so speak to your local Agri Manager for more information about your specific situation.

Insects may also be a reason for pasture renewal; therefore identification of the damaging insects will affect the control methods used. Soil dwelling insects such as grass grub, black beetle and porina will require different control methods to above ground insects such as Argentine stem weevil and slugs.

See the Pests section (page 24) for further information.

4. Sowing

Regardless of the sowing/drilling method used, good paddock preparation is vital for establishment success, including removal of resident insects and weeds. A flat, even and weed-free seed bed should be targeted to allow for consistent sowing depth and competition-free establishment.

Seed sowing depth is a balance between ensuring adequate seed/soil contact, moisture supply for germination, and allowing smaller seeds such as clovers and herbs to establish. Ideally seed depth should be 1-2cm to allow clovers and herbs to establish more successfully.

Soil temperature is a major factor in determining germination speed, with different pasture species requiring different temperatures for rapid germination. Soil temperatures above 10^{0}C are ideal for the main pasture species; ryegrass, clovers and herbs. For cooler soil temperatures germination of species will reduce, with clover and chicory being first affected.

Combining a good seed bed, sowing depth and soil temperature will allow for a quick and even establishment and reduce the risk of one of these factors limiting the potential of the new pasture.

Direct drilling

There can be many benefits from direct drilling, such as conserving soil moisture and structure and reducing erosion. A double spray programme is highly recommended when direct drilling to ensure effective weed control and reduced resident insect populations. A double spray programme is based on glyphosate and a companion herbicide in the first spray-out, waiting at least 2-4 weeks for another weed strike, and applying a lower rate of glyphosate and insecticide in the second spray.

Refer to Table 1 on companion herbicides to ensure the correct choice is made depending on the weeds present, and the plant-back period required for the pasture species being sown.

The inclusion of insecticides is highly recommended in the second spray to remove any resident insects that may cause damage to emerging plants. In addition to using an insecticide, the use of treated seed will also reduce the potential impacts of insects on emerging plants.

Removing as much trash as possible prior to sowing is good practice to reduce environments that favour insects. Grazing management before and after spraying will reduce the amount of trash present. Take care to observe any grazing withholding periods required.

Cultivation helps reduce the slug population, as well as some other insect pests, so the risk of slug damage is higher in direct drilled paddocks. A newly sown crop is very susceptible to slug damage through the damp and warm environment created by current pasture/crop. Ensuring an effective spray-out programme will reduce the feed available to the slugs, reducing their population and increasing the effectiveness of Endure slug bait.

Slug population monitoring should start after the first spray-out by placing damp sacks, boards or similar objects in the paddock and checking underneath for slugs 2-3 days later. If more than 3-4 slugs per sack are found, it is recommended to treat the paddock.

Endure® slug bait can be mixed and broadcast with fertiliser prior to drilling the crop or soon after. Ravensdown has conducted independent testing to show that **Endure®** slug bait is effective when mixed with fertiliser and spreads evenly. Although **Endure®** is guaranteed to be effective up to 21 days after application, ongoing monitoring of slug populations is advised to ensure any future hatching of slugs can be controlled prior to crop damage.

Cultivation

It is highly recommended to use glyphosate prior to cultivation as cultivation alone is not 100% effective at creating an ideal weed-free seedbed. The use of **Glyphosate G360** or **540** with **Accelerate** will reduce the rain-fastness period to 20 minutes and allow cultivation to begin after one day if annual weeds, and three days if perennial weeds are present. In most cases, it is also beneficial to use a companion herbicide to improve control of those weeds not effectively controlled by glyphosate alone (Table 1: Summary of Companion Herbicide Options)

Even though insect populations can be reduced with cultivation, it is advisable to continue monitoring because some insects are mobile and populations can build up again.

5. Post sowing management

Paddock monitoring is required to ensure early identification of any insect, weed or any other establishment issues.

Weed control in new pasture

Early application of herbicides increases the available options and effectiveness of herbicides. With clover being present in the majority of pasture mixes, accurate herbicide recommendations are required to maintain or increase clover content.

The best time to control seedling weeds in new pasture is before the first grazing (when the weeds are smaller and more vulnerable) and the clovers have at least two true trifoliate leaves. Take care to observe any grazing withholding periods required and allow sufficient time for herbicides to take effect on the weeds before grazing after spraying.

TABLE 2: NEW PASTURE HERBICIDE OPTIONS

Active Ingredient	Flumetsulam	MCPB & MCPA	MCPB & Bentazone	Bentazone
Product Name	**AIM®**	**Pasture Guard® Nurture**	**Pasture Guard® Elite**	**Pasture Guard® Bentazone**
Key Benefit/ Description	A grass, clover and chicory friendly herbicide for broadleaf weed control in new and established pasture. Plus Aim® will control atrazine resistant fathen.	A clover safe herbicide making it suitable for young pastures containing seedling clovers. Plus it is very effective on seedling thistles and a wide range of broadleaf weeds in new pasture.	A clover friendly herbicide for selective control of thistles and certain broadleaf weeds that are difficult to control with MCPB including: chickweed, cleavers, mayweeds, nettle, spurrey, storksbill, twin cress and willow weed.	A clover friendly herbicide that is useful in new pasture mixtures that is particularly effective against black nightshade, chamomiles, cleavers, shepherd's purse, spurrey, stinking mayweed and storksbill.
Pasture Stage	Clovers have at least 2 trifoliate leaves			
Tip	**Collaborate™** Spray Oil must be used with **Aim®.**	More convenient to use than tank mixing MCPA with MCPB; Can be mixed with **Aim®** for increased weed spectrum.	Provides better control of seedling buttercup and thistles where phenoxy herbicide resistance is suspected.	Can be tank mixed with other herbicides such as **Pasture Guard® Nurture** or **Aim®**.
Other products that may be used for the same purpose:	Preside®, Valdo®	Tropotox®, Select™, Thistrol® Plus	Pulsar®	Basagran®, Broadstar®, Dictate®, Troy®

Grazing management

The 'Pluck Test' is the best way to determine if the paddock is ready to be grazed; simply pull the grass out with your fingers and if all the plant leaves snap rather than pull-out, the paddock is ready for animals. Grazing young pastures is ideally done when plants have adequate moisture and/or pugging damage is unlikely. Lighter stock should be used to reduce any treading damage to the newly sown pasture encouraging strong recovery from grazing. Good early weed control and grazing at the right stage will assist the establishment of clovers and other herbs, as well as grasses in the new pasture mix.

After the first grazing, an application of fertiliser (around 30kg/ha of nitrogen), is recommended. This is because at this early stage plant roots are not developed enough to access the required nutrients from the soil, and clovers are not fixing nitrogen from the atmosphere. This application will aid establishment of all components of the new pasture mix.

Pests

Use of insecticides in the spray-out and seed treatment are valuable steps in reducing the potential of insect damage. Following drilling, close paddock monitoring is advised, as insects can migrate from surrounding areas in newly-sown areas and cause damage.

Seed treatment is very effective with moderate insect levels, however in high insect populations there is still a risk of some pasture damage because insects have to feed on the crop to ingest the chemical. This means with high insect numbers there will still be enough 'bites' to cause damage.

The use of selected endophytes to reduce the impact of insects is advisable. There are a number of factors to consider when determining the correct endophyte for your situation. Refer to pages 5 and 6 for more information about endophyte options.

Endophytes take about six weeks to establish in newly-sown seedlings, so it is important to use other control options to prevent damage to grasses during early establishment. Once grasses are well established with multiple tillers, then you can rely on protection from the endophyte.

There are also options available for control of damaging insects in established pastures, other than endophyte. Identification of the insect is vital in ensuring effective treatment.

The table (page 25) is a summary of control options, however your local Agri Manager will be able to identify the damaging insect present and control options.

TABLE 3: INSECT PEST CONTROL OPTIONS

Insect	Cultural Control	Endophyte Options	Chemical Control
Grass grub	Cultivation Mob stocking Heavy rolling with grooved roller	GrubOUT® U2 (larvae only)	Cropcote seed treatment Diazinon based products
Porina	Cultivation	GrubOUT® U2 AR37	Avert 25WP Toppel® 500
Argentine stem weevil	Regrass with effective endophyte	GrubOUT® U2 AR1 AR37 NEA2	Cropcote Plus seed treatment Toppel® 500
Black beetle	Cultivation Crop rotation	GrubOUT® U2 (adult and larvae) AR37 (adult only) NEA2 (adult only)	Cropcote seed treatment
Black field cricket		GrubOUT® U2	Maldison grain bait
Clover root weevil	Crop rotation to remove feed source	n/a	Diazinon based products

Weed control in established pastures

Weeds can come in to pasture over time, and will take advantage of any pasture damage from insects or over-grazing that allows sufficient light for seeds to germinate. The application of herbicides in late autumn/winter is a common practice to reduce the impact weeds have on spring and summer growth. Weeds such as scotch, winged, variegated and nodding thistles and ragwort can be controlled at this time.

Herbicide application should be completed in winter to reduce negative effects the chemicals used have on clover, as the clover is dormant at this time. Common winter pasture herbicide applications involve either MCPA (**Pasture Guard® MCPA 750**) or 2, 4-D (**Pasture Guard® 2, 4-D 680**) due to the wide weed spectrum and cost effectiveness.

Spraying in late autumn/early winter is usually more effective than spraying in spring, as autumn germinating weeds are smaller and easier to control, weather conditions are usually more settled and the risk of clover damage is lower.

Fertiliser requirements for the establishment of new pastures

- Soil testing should be carried out to determine nutrient and lime requirements for successful establishment of pastures following crops. Pasture growth will be compromised if there is not enough of any particular nutrient available for plant uptake. Lime may be required to neutralise soil acidity to create more favourable conditions for soil micro-organisms, worms and plant growth.
- Good forage brassica or summer turnip crops producing yields of 10-12 tonnes of dry matter /hectare remove approximately 200-300 kg of nitrogen, 30-40 kg of phosphorus and 180-300 kg of potassium from soil. NPK removal by other crops such as maize can be higher. Where crops are grazed much of this nutrient (between 70-90%) may be returned to the soil but is often concentrated in areas such as stock camps, gateways and around water troughs.
- In most new pastures, provided all the agronomic factors i.e., seed bed preparation, correct sowing depth, seed viability, suitability of the cultivar for the environment etc., have been taken into account and dealt with appropriately, the two factors that most limit growth are moisture (rain) and nitrogen. There is not much we can do about the weather; however, we can manage nitrogen to improve productivity of new pastures.

- Nitrogen is essential for the establishment of new pastures. Grasses respond quickly to nitrogen when other growing conditions are good. However, if soils are lacking in phosphorus and potassium, the pastures will not be as responsive to nitrogen. Phosphate is required to enhance early root and leaf development. Potassium is important but an understanding of soil levels is needed as high concentrations of potassium can affect magnesium uptake by plants. Clovers, particularly white clovers, need a continuous supply of phosphorus, potassium, sulphur, magnesium, and several trace elements. In addition, soils must not be too acid. Where soils cannot supply these needed elements right through the year at an adequate rate to maintain vigorous clover growth, or where soils are too acid and biological activity is affected, the supply of nitrogen to grasses will diminish, pasture production will fall, and low-fertility tolerant species of grasses will replace high-fertility requiring grasses.
- Fertilisers such as **DAP, Premium 16, Cropmaster 20** or **Cropmaster 15** can be drilled at planting (using a separate dropper to the seed) or broadcast and incorporated prior to sowing seed.
- Apply 60 – 70 kg/ha urea 3-4 weeks after emergence/first grazing to encourage tillering and leaf expansion. Developing a good leaf canopy faster helps suppress germinating weeds.
- Regular applications of nitrogen should continue as clovers do not fix enough nitrogen for the first 12-18 months. Use applications of 60 -70 kg /ha urea, or 90 - 100 kg/ha **Ammo 31** where sulphur is also required. New pastures take at least one year to establish and require special treatment during that year.
- Hay or silage should not be taken from new pastures for at least 12 months as this can cause reduced tillering and root growth and increases the chance of plant death during summer.

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