

Brassica & Pasture Guide





About PGG Wrightson Seeds

PGG WRIGHTSON SEEDS IS A NEW ZEALAND BASED COMPANY AND AUSTRALASIA'S LARGEST SEED COMPANY.

WE HAVE BEEN HELPING FARMERS FOR OVER 160 YEARS.

Research and development are key to our success, we invest well in excess of \$15 million per annum into our forage and endophyte programmes.

We have relationships with two primary research partners:

- AgResearch
- Plant and Food Research

At PGG Wrightson Seeds we appreciate that there is a lot of information around forage options. Our aim is to help remove some of the confusion and make your decision easier. Your local PGG Wrightson Seeds Sales Agronomists are always there to help with your decisions.

Call your local Area Sales Agronomist shown on pages 98-99 or visit us at www.pggwrightsonseeds.com

STOCK SUITABILITY INFORMATION

The following stock type icons shown on the brassica and pasture product pages indicate stock type suitability.



Sheep



Beef



Dairy



Deer

WHY PGG WRIGHTSON SEEDS?

- ✓ We have access to world-leading research and development
- ✓ Animal grazing trials are incorporated into plant breeding
- ✓ We have a strong focus on endophyte technology
- ✓ Staff are practical, focusing on increasing your meat, milk or wool production
- ✓ We have been helping New Zealand farmers achieve their goals for over 160 years
- ✓ We deliver market-leading technologies, like Cleancrop™ Brassica System, Pallaton Raphno® and AR37 endophyte

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New product releases

FULL COMMERCIAL AVAILABILITY



Earnslaw is the latest swede release from PGG Wrightson Seeds. It is a traditional, yellow-fleshed swede which supersedes the current softest swede in the market, Major Plus. Trials to date show that Earnslaw has the additional benefit of improved dry-rot and *Alternaria* tolerance resulting in higher yields and better winter keeping abilities. Refer to page 36 for more information on this exciting new release.

LIMITED AVAILABILITY SPRING 2023



We are excited to announce the release of the latest New Zealand bred chicory, Sika, in spring 2023. This chicory has been developed to meet the requirements of a wide variety of farm systems and can be characterised by rapid establishment, strong seasonal production and improved disease tolerance and persistence. Read more about this versatile, high yielding chicory on page 88.



We are excited to announce the release of Sarge kale, our latest addition to the Cleancrop™ Brassica System.

Sarge is a high yielding, short to medium type kale, which offers an alternative to Kestrel kale when a high degree of weed control is required via the Cleancrop™ system. Due to its stem softness and later flowering, Sarge can be sown to supplement diets of grazing animals not only in winter but can be utilised as an alternative late autumn forage and if lightly grazed can regrow for winter feed. To learn more about Sarge, see page 21.

Social media and Knowledge Base

FOLLOW PGG WRIGHTSON SEEDS ONLINE!

Facebook and Instagram

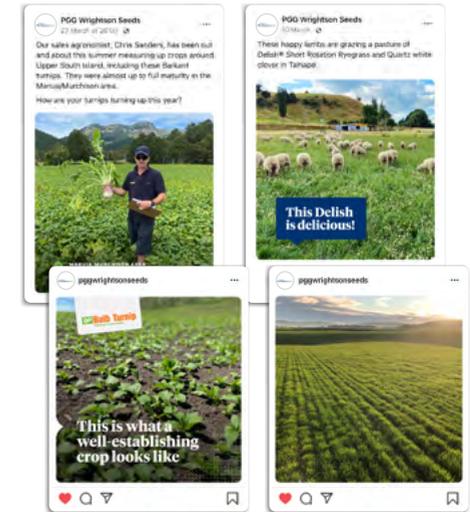
Check the PGG Wrightson Seeds Facebook page for regular updates, the latest advice and occasionally, chances to win. Also join us on our Instagram page to stay up to date with what's happening in the field.

Do share your photos and stories with us via social media, as we love hearing them and having the opportunity to link with the wider PGG Wrightson Seeds community.

Be sure to use #PGWSeeds and #Raphno!

 facebook.com/pggwrightsonseeds

 [pggwrightsonseeds](https://www.instagram.com/pggwrightsonseeds)



STAY IN THE KNOW WITH OUR KNOWLEDGE BASE!

We're passing on our expert knowledge to help you boost your productivity this season.

With the PGG Wrightson Seeds Knowledge Base, you have over 160 years' worth of farming experience and knowledge at your disposal - so get exploring! And remember to check back often, as new information and community articles are added regularly.

 knowledgebase.pggwrightsonseeds.com



Charlotte Westwood and The Rumen Room

Introducing Veterinarian Nutritionist Charlotte Westwood

Charlotte is a qualified veterinarian (BVSc, MANZCVS, PhD) with over 30 years of experience in vet science, animal nutrition and farm systems. In her current role as Veterinary Nutritionist for PGG Wrightson Seeds, she consults widely to a number of large corporate farming businesses and is involved in research and development and extension work with PGG Wrightson Seeds retail customers. Prior to this, Charlotte worked as a cattle veterinarian and as a farm consultant in both New Zealand and Australia.

Charlotte is particularly interested in interactions between nutrition, animal health and reproductive performance of cattle and sheep within pasture, crop or total mixed ration-based farm systems. She has published a number of papers on these topics and is a regular presenter at farming-related conferences.



THE RUMEN ROOM

Join Charlotte's interactive Facebook group "The Rumen Room", where she regularly posts on topics relevant to animal nutrition, farm systems and veterinary science. Charlotte and group members engage in open discussion, share information and gain advice.



Seeds in Action®



SEEDS IN ACTION® SITES ARE A UNIQUE COMBINATION OF REGIONAL RESEARCH AS WELL AS HANDS-ON PRACTICAL DEMONSTRATION SITES.

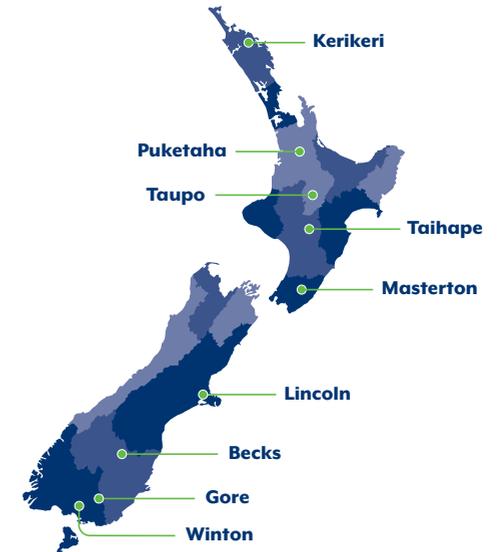
Seeds in Action sites allow anyone with an interest in forage agronomy to see our products and other seed companies' products in real-life situations in their local regional area.

There are nine Seeds in Action sites strategically located throughout New Zealand with a variety of trials, both under commercial farming and trial conditions, designed to assist with cultivar and endophyte selection in a real-world environment. The sites also include sowing rate, cultivation method and seed treatment trials to showcase best practice.

These Seeds in Action sites are the final step in a research and development programme that has been operating in New Zealand for several decades now, with an investment of more than \$15 million per year into the development of new and improved pasture and brassica cultivars.

Open days are held regularly at these sites and tours can be organised by contacting either your seed retailer or local Sales Agronomist. Please see pages 98-99 for contact details.

REGIONAL SEEDS IN ACTION® SITES

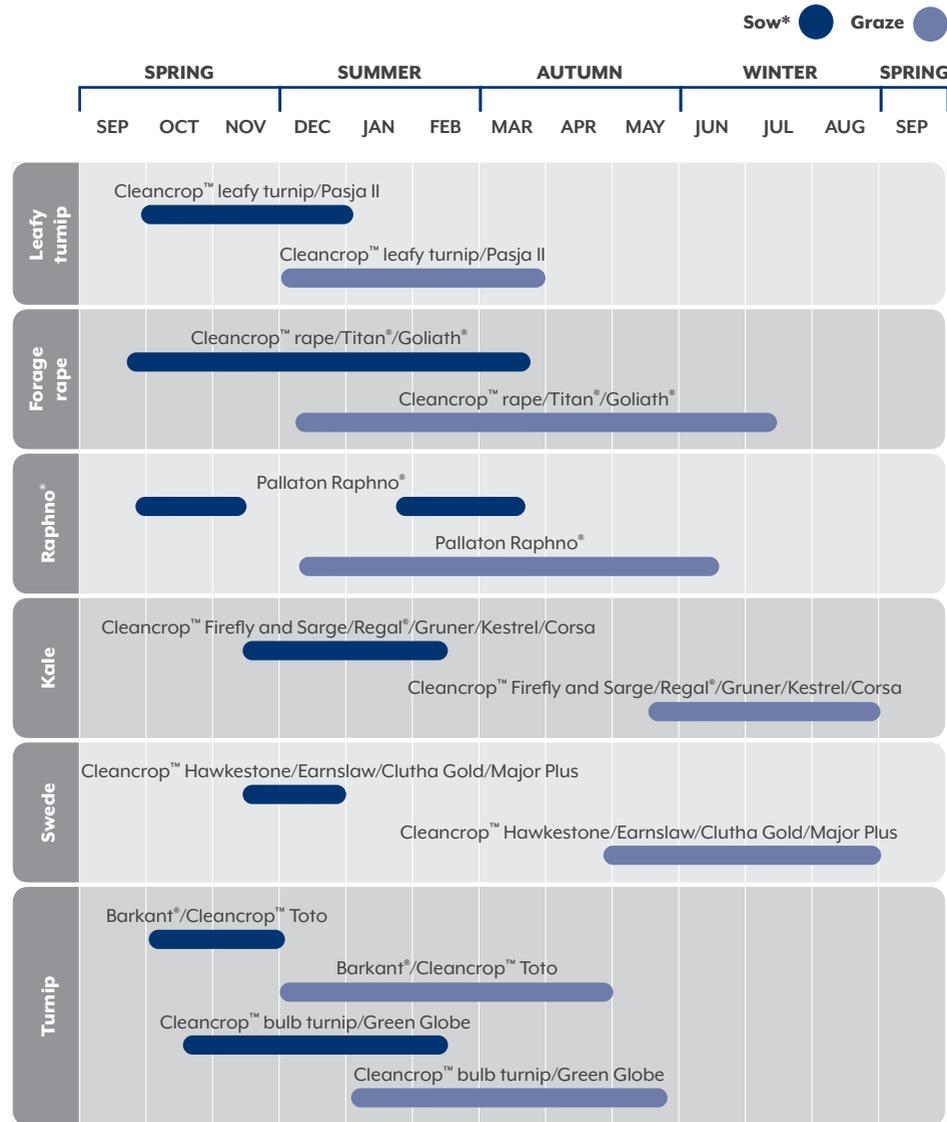


Seeds in Action® site, Masterton



Brassica Systems

Brassica growing and grazing guide



Check with your seed retailer for the best time to sow and graze crops in your area.

*Make sure soil temperatures are around 10°C and rising before sowing.

Planning for grazing brassica crops

PRESOWING

- Choose a paddock away from waterways for winter crops
- Leave an uncultivated buffer zone in hill paddocks (i.e. 3-15 metres, the steeper the hill the bigger the buffer zone) to trap/filter water runoff
- Leave wet areas of the paddock (e.g. temporary streams, swales) uncultivated and fence off during grazing
- Cultivate along the contour (e.g. not up and down to slow runoff)
- Consider direct drilling
- Soil test to establish actual fertiliser requirements

GRAZING MANAGEMENT

- Feed the crop as long narrow breaks rather than wide breaks
- Reduce wastage by moving the fences once or twice daily rather than offering a few days at a time
- Where practical start grazing furthest from the waterway
- Fence off an area creating a lane to gateways
- Adjust feed intake to weather conditions (e.g. if it is cold increase available feed)
- Place supplements in winter brassica crops at the start of winter when soils are not too wet
- Graze sensitive zones (e.g. wet areas) when weather is settled and rainfall low
- Keep livestock out of waterways
- Provide transportable troughs for stock drinking water
- Back fence stock off land that has been grazed

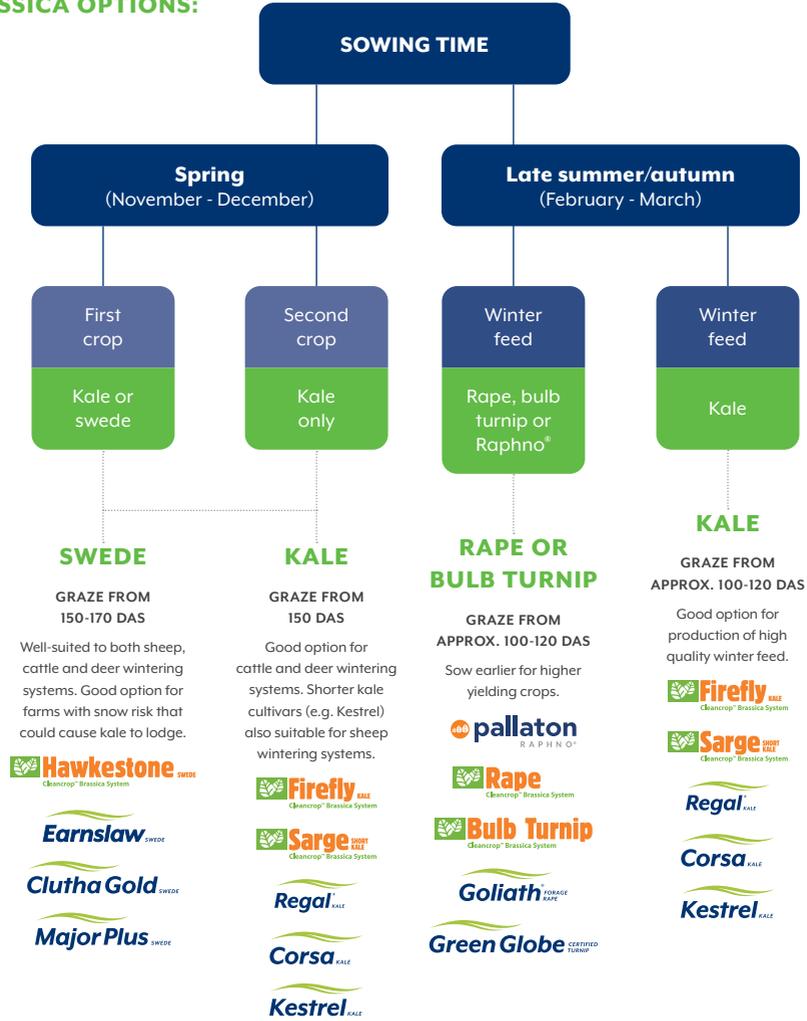
TIP:

Check with your local regional council for their requirements when feeding winter crops

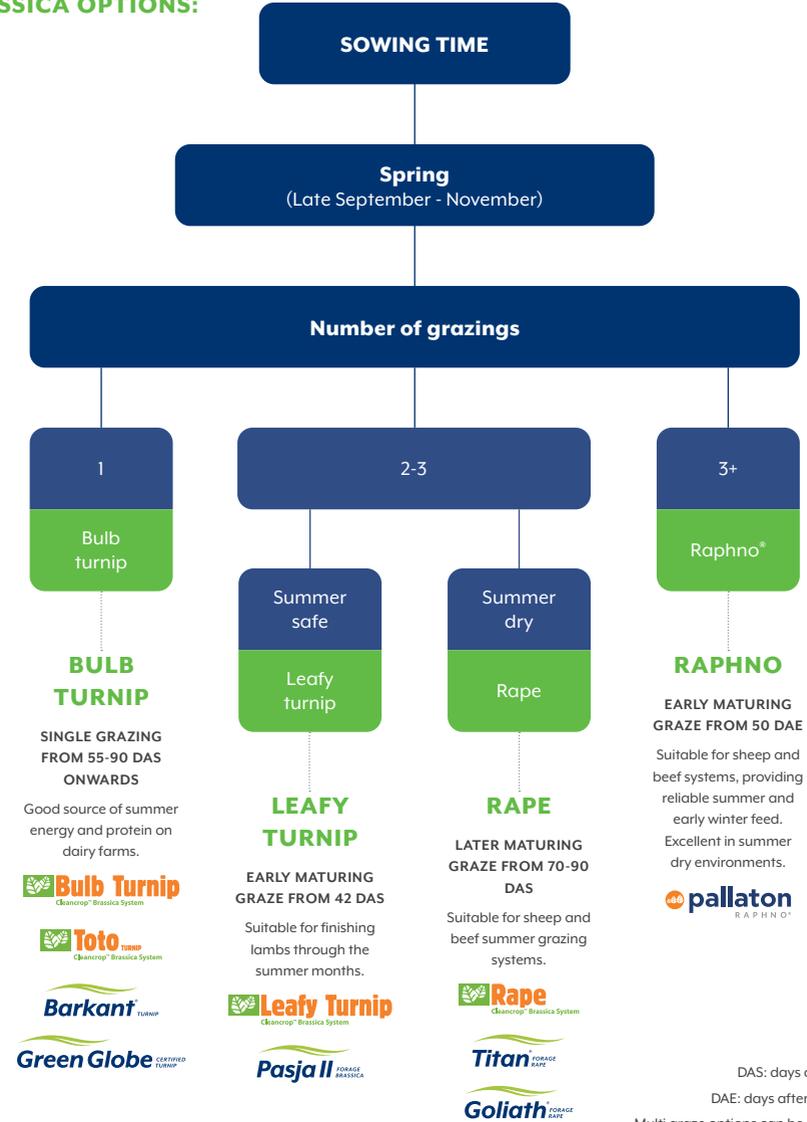


Brassica selection guide

WINTER FED BRASSICA OPTIONS:



SUMMER FED BRASSICA OPTIONS:



DAS: days after sowing
DAE: days after emergence
Multi graze options can be grazed from summer through to the end of winter.

Feeding brassica crops

- Plan ahead with a feed budget. Measure per hectare crop yield (fresh weight x dry matter %). Match feed supply with daily animal demand. Allow for crop wastage during grazing
- Best practise is to obtain an actual dry matter percentage rather than a standard book value
- Test crop for nitrate content before grazing
- Do not allow stock sudden unrestricted access to a brassica crop
- During transitioning, increase feed allocation of brassica crops in small 15-20% increments every two days, building up to a maximum allowance over at least 10-14 days
- Once transitioned, feed no more than 80% to drystock and no more than 35% for lactating dairy cows of diet as brassica crop
- At least 20% of the diet as good quality fibrous supplement (e.g. pasture, hay, baleage or straw) for non-lactating dairy cows, beef cattle and sheep
- Stock must have access to water at all times
- Recognise potential for stock health problems on brassicas
- Discuss trace mineral requirements with your veterinarian. Animal demand for copper, selenium and/or iodine may increase when consuming brassicas

TIP:

Accurate crop yield estimates greatly assist with correct feed allocation for stock

For more information, contact your local Area Sales Agronomist on pages 98-99, visit pggwrightsonseeds.com or freephone 0800 805 505

Cleancrop™ Brassica System

THE CLEANCROP™ BRASSICA SYSTEM IS A CROP AND WEED MANAGEMENT SOLUTION ALL IN ONE.

Only Cleancrop™ combines the power of broad-spectrum herbicide Telar® and plants bred to resist it. Telar takes care of 23 hard-to-control weeds at the time of sowing, freeing up moisture and nutrients to give your crop the best chance of maximising performance and delivering superior returns on your seed investment.



Cleancrop™ brassica seed

Cultivars that have been BRED to be resistant to the sulfonylurea herbicide Telar®



Telar® herbicide

A broad-spectrum herbicide that provides EXCELLENT control of broadleaf weeds from the pre-emerge stage

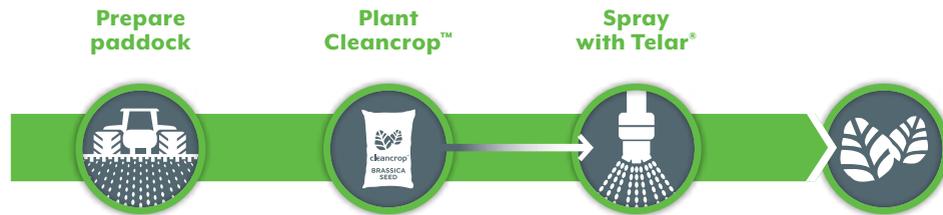


TELAR® HERBICIDE CONTROLS THE FOLLOWING 23 WEEDS:

Calandrinia	Fathen	Scentsless Chamomile	Vetch
Californian Thistle*	Hawksbeard	Scotch Thistle	White Clover
Chickweed	Nodding Thistle	Shepherd's Purse	Wild Turnip*
Cornbind	Rayless Chamomile	Spurrey (Yarr)	Willow Weed
Dandelions	Redroot	Stinking Mayweed	Yellow Gromwell
Docks	Scarlet Pimpernel	Twin Cress	

*Apply Telar® post-emerge when Cleancrop™ brassicas are at the fourth leaf stage. Consult your accredited Agent/Retailer to order your second Telar® spray.

HOW DOES IT WORK?



CLEANCROP™ PACKAGES

The Cleancrop™ Brassica System is available in six cultivars to suit all farm types and stock classes. All Cleancrop™ cultivars are ordered on a per hectare (ha) basis and include 20 g/ha Telar®.

Leafy turnip	4 kg/ha
Forage rape	4 kg/ha
Bulb turnip (summer)	2 kg/ha
Bulb turnip (winter)	1 kg/ha
Toto turnip	2 kg/ha
Hawkestone swede	1 kg/ha
Hawkestone swede (pelleted)	90,000 seeds/ha
Firefly kale (intermediate)	4 kg/ha
Sarge kale (short)	4 kg/ha

Note: The Cleancrop™ Brassica System is unique. PGG Wrightson Seeds sell it as a package, i.e. Seed + Chemical. One item cannot be purchased without the other. Agents/Retailers have to be accredited to sell the Cleancrop™ Brassica System to ensure stewardship is maintained.

CONTROL WEEDS. INCREASE YIELD



The Cleancrop™ Brassica System (seed + herbicide) package enables you to control your weeds at the time of sowing.

CLEANCROP™ BENEFITS

- CONTROL WEEDS** within 48 hours of sowing*
- LOW MOISTURE REQUIRED*** to activate Telar® herbicide
- NO SOIL INCORPORATION REQUIRED**
- ADAPTABLE TO METHOD OF SOWING**

**For the weeds listed on page 17 that require Telar® applied as a foliar spray at post-emergence, an application can be made when the crop is at the fourth true leaf stage or later.*

**When applied pre-emerge Telar® is taken up through the roots of weeds when conditions promote their growth.*

Why use Cleancrop™?

A SIMPLE WEED MANAGEMENT SOLUTION

No other forage brassica system combines the power of traditionally bred herbicide resistant plants plus a broad-spectrum herbicide that will **MAXIMISE CROP PERFORMANCE**.



FURTHER INFO:

Refer to the Cleancrop™ Brassica System Guide for more information.





Firefly kale is a high yielding, intermediate-height kale with a high leaf-to-stem ratio. Excellent crop utilisation by animals due to single plant selection for soft stems during the plant breeding process. Firefly is the first kale cultivar available in the Cleancrop™ Brassica System bred to have a herbicide resistance trait, which allows the application of Telar® herbicide at both pre- and post-emergence for excellent weed control.

- High yielding, intermediate-height kale
- High leaf-to-stem ratio with very good late winter leaf percentage
- Excellent crop utilisation due to selection for soft stems
- Very good winter hardiness and excellent pest and disease tolerance

Agronomic performance of Regal® kale relative to Cleancrop™ Firefly kale

Cultivar	Leaf%	Hundredised total yield	Maturity (DAS)
Cleancrop™ Firefly	33	100	150-220
Regal®	32	101	150-220

Farm type



Days to grazing

- LATE NOVEMBER ONWARDS SOWING**
150-220 days
- LATE OCTOBER SOWING**
100-140 days till first light grazing

Sowing rate

4 kg/ha

Notes to the table:

4 trials: Gore, Hinds, Kimihia and Palmerston North (2015). In these trials conventional herbicides were used on all cultivars. Telar® was not applied. Where Telar® was used for Firefly and no herbicide applied to the other cultivars, we would expect higher yields for Firefly kale.

Limited availability Spring 23



Sarge is a short to medium type kale, which offers an alternative to Kestrel kale when a high degree of weed control is required via the Cleancrop™ system. Sarge has a high leaf-to-stem ratio and is soft stemmed which leads to improved crop utilisation. Due to its stem softness and later flowering, Sarge can be sown to supplement diets of grazing animals not only in winter but can be utilised as an alternative late autumn forage and if lightly grazed can regrow for winter feed. The second kale to be part of the Cleancrop™ Brassica System, Sarge has been bred with a herbicide resistant trait which allows the application of Telar® herbicide at both pre- and post-emergence for excellent weed control.

- High yielding, short to medium height kale
- Excellent stem softness to promote crop utilisation and good stem quality to enhance animal performance
- Large paddle shaped leaves provide exceptional leaf yields and a very high leaf to stem ratio
- Versatility to be used as an autumn forage
- Very good winter hardiness, and late winter leaf percentage
- Late flowering to increase the period of feeding late winter
- First and second crop option

Farm type



Days to grazing

- LATE NOVEMBER ONWARDS SOWING**
150-220 days
- LATE OCTOBER SOWING**
100-140 days till first light grazing

Sowing rate

4 kg/ha





Hawkestone swede is a high yielding, yellow-fleshed, main crop swede with medium maturity. Along with a similar dry rot and clubroot tolerance to Aparima Gold swede, it also has a good tolerance to powdery mildew. With the added benefit of the Cleancrop™ Brassica System, Hawkestone swede is resistant to Telar® herbicide application at both pre- and post-emergence for excellent weed control. It is the first swede cultivar to be single plant selected for lower levels of grazing anti-nutritional glucosinolate compounds (progoitrin, glucobrassicin and neoglucobrassicin levels similar to Aparima Gold Swede).

- High yielding, yellow-fleshed swede with medium maturity
- Similar dry rot and clubroot tolerance to Aparima Gold
- Good leaf disease tolerance
- Plant glucosinolate levels similar to Aparima Gold swede

Agronomic performance of swede cultivars relative to Cleancrop™ Hawkestone swede

Cultivar	Hundredised bulb yield	Hundredised leaf yield	Leaf %	Hundredised total yield	Maturity (DAS)
Cleancrop™ Hawkestone	100	100	24	100	170-220
Aparima Gold	89	118	28	96	170-220
Clutha Gold	104	115	26	106	170-220
Invitation	70	121	35	82	170-220

Farm type



Days to grazing



Sowing rate



Notes to the table:

7 trials: Methven (2013, 2014, 2015), Gore (2013, 2014, 2015) and Palmerston North (2015). In these trials conventional herbicides were used on all cultivars. Telar® was not applied. Where Telar® was used for Hawkestone and no herbicide applied to the other cultivars, we would expect higher yields for Hawkestone swede.



Toto turnip is a high yielding, summer and autumn bulb turnip with early maturity, allowing it to be grazed from 55 days after sowing. A tankard bulb shape alongside great bulb softness promotes excellent crop utilisation by grazing animals. Toto is also part of the Cleancrop™ Brassica System with the added benefit of a herbicide resistance trait, which allows the application of Telar® herbicide at both pre- and post-emergence for excellent weed control.

- High yielding, summer bulb turnip
- Improved turnip mosaic virus tolerance
- Tankard bulb shape to increase crop utilisation
- Able to graze from 55 days after sowing (55-90 DAS)
- Suitable for summer and autumn feed

Farm type



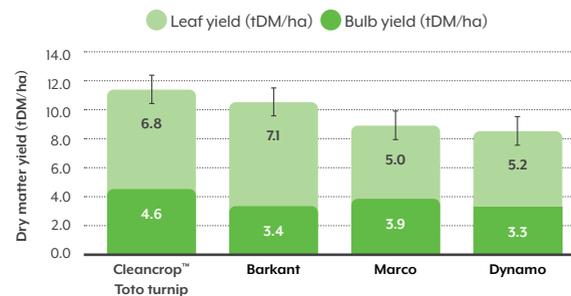
Days to grazing



Sowing rate



Dry matter production of summer bulb turnip cultivars



Notes to the graph:

Combined averages from 2 trials run at Puketaha, Waikato 2018 and 2019. LSD (5%) = 2.00 tDM/ha difference between cultivars must exceed the LSD to be significantly different.

In these trials conventional herbicides were used on all cultivars. Telar® was not applied. Where Telar® was used for Toto and no herbicide applied to the other cultivars, we would expect higher yields for Toto turnip.

Bulb Turnip

Cleancrop™ Brassica System



Cleancrop™ bulb turnip is a high yielding, globe bulb turnip with medium maturity suitable for sowing from late spring through to early summer to supply feed in summer, autumn and early winter months. The added benefit of the Cleancrop™ Brassica System is that plants are bred to resist Telar® herbicide, allowing application at both pre- and post-emergence for excellent weed control.

- High yielding bulb turnip
- Suitable for sowing from late spring through to late summer
- Suitable for summer/autumn/winter feed

Agronomic performance of Green Globe turnip relative to Cleancrop™ bulb turnip

Cultivar	Hundredised bulb yield	Hundredised leaf yield	Leaf %	Hundredised total yield	Maturity (DAS)
Cleancrop™ bulb turnip	100	100	54	100	80-110
Green Globe	87	93	55	90	90-120

Farm type



Days to grazing



Sowing rate



Notes to the table:

4 trials: Kimihia (2013, 2016), Lincoln PFR (2013) and Ruakura (2016). In these trials conventional herbicides were used on both Cleancrop™ bulb turnip and Green Globe. Telar® was not applied. Where Telar® was used for Cleancrop™ bulb turnip and no herbicide applied to Green Globe, we would expect higher yields for Cleancrop™ bulb turnip.

Leafy Turnip

Cleancrop™ Brassica System



Cleancrop™ leafy turnip is a fast establishing, multi-graze variety with reduced flower bolting and 25% more total yield from multiple grazings than Pasja II leafy turnip. As part of the Cleancrop™ Brassica System, it has the added benefit of a herbicide resistance trait allowing Telar® to be applied at both pre- and post-emergence for excellent weed control.

- High yielding - 25% higher than Pasja II
- Multi-graze Pasja type with reduced bolting
- Fast-establishing, high quality feed
- Excellent plant persistence after multiple grazings (moisture dependent)
- Provides a flexible grazing option for all stock classes over summer and autumn
- Minimal ripening required

Agronomic performance of Pasja II forage brassica relative to Cleancrop™ leafy turnip

Cultivar	Hundredised yield 1	Hundredised regrowth 1	Hundredised regrowth 2	Hundredised total yield	Maturity (DAS)
Cleancrop™ leafy turnip	100	100	100	100	42-70
Pasja II	64	85	82	75	42-70

Farm type



Days to grazing



Sowing rate



Notes to the table:

3 trials: Kimihia (2013, 2014, 2015). In these trials conventional herbicides were used on both Cleancrop™ leafy turnip and Pasja II. Telar® was not applied. Where Telar® was used for Cleancrop™ leafy turnip and no herbicide applied to Pasja II, we would expect higher yields for Cleancrop™ leafy turnip.





Cleancrop™ rape is a high yielding, multi-graze forage rape with good leaf percentage and excellent crop utilisation by animals. As part of the Cleancrop™ Brassica System, it has the added benefit of a herbicide resistance trait. Telar® herbicide can be applied at both pre- and post-emergence for excellent weed control, freeing up moisture and nutrients to give this multi-purpose forage rape the best chance of maximising summer, autumn and winter feed.

- High yielding, multi-graze rape with good leaf percentage and crop utilisation
- Multi-purpose forage rape with excellent summer/autumn/early winter feed
- Good regrowth potential with excellent winter keeping ability
- Similar Aphid tolerance as Goliath®
- A new generation rape and kale interspecies cross

Agronomic performance of rape cultivars relative to Cleancrop™ rape

Cultivar	Leaf %	Hundredised total yield	Maturity (DAS)
Cleancrop™ rape	76	100	90-110
Titan®	75	89	70-90
Greenland	70	99	70-84
Goliath®	69	101	90-110
Interval	63	104	90-110

Farm type



Days to grazing



Sowing rate



Notes to the table:

12 Trials: Culverden (2013), Lincoln PFR (2013, 2014), Hawke's Bay (2013), Kimihia Research Centre (2014, 2015, 2016 x2), Gore (2016), Oxford (2016), Taihape (2016) and Ruakura (2016). In these trials conventional herbicides were used on all cultivars. Telar® was not applied. Where Telar® was used for Cleancrop™ rape and no herbicide applied to the other cultivars, we would expect higher yields for Cleancrop™ rape.



THE SUCCESS OF SCIENCE

Pallaton Raphno® is a hybrid between *Brassica oleracea* (kale) and *Raphanus sativus* (radish). This hybrid has brought a number of impressive agronomic attributes into one cultivar, including high forage yield from multiple grazings, drought tolerance, clubroot tolerance and improved insect tolerance.

- **Persistent with excellent regrowth potential** – 100% increase in plant survival relative to forage rape under dryland sheep grazing management
- **High yielding** – 14% increased yield advantage relative to Goliath® forage rape in a multi-graze system (total cumulative dry matter yield from repeat harvests)
- **Drought tolerance** – 38% increase in water use efficiency relative to Goliath® forage rape
- **High clubroot tolerance** to Pukekohe, Hawke's Bay and Southland strains
- **Grazing flexibility** – Graze Pallaton as early as 50 days after emergence (DAE) to increase crop utilisation and optimise regrowth potential. It can be deferred up to 100 DAE, however crop utilisation, regrowth potential and feed quality will be reduced
- **Aphid tolerance** – 32% increase in Aphid tolerance relative to forage rape. Pallaton also has a higher level of tolerance to White Butterfly and Diamondback Moth

Farm type



Days to grazing



Sowing rate



MORE MEAT PER HECTARE

Our trials showed Pallaton delivered 41%* more meat per hectare compared with chicory.

Pallaton Raphno®: total 390 kg/ha versus chicory: total 276 kg/ha

*Trial completed by PhD student Holly Phillips at Massey University. Meat per hectare data was captured over the period 17/01/2020 to 01/05/2020.



Grazing management

PALLATON RAPHNO® GRAZING INDICATOR FOR LAMBS

For the best opportunity to maximise feed quality, increase crop utilisation of lambs and optimise regrowth potential of Pallaton Raphno®, we recommend using the grazing indicator road cone to help with grazing management decisions.



1

PLANT, WAIT AND WATCH

Identify a position for your Pallaton cone in an average area of paddock.

Think about what stock classes you have available.



2

GRAZE!

Once Pallaton reaches the reflective strip on the cone get in and graze.

Note: It must be at least 42 days since planting before grazing can commence.



3

YOU ARE MISSING OUT

Once Pallaton exceeds the height of the cone feed quality and regrowth potential will begin to decline.



FURTHER INFO:

For cattle grazing guidelines and other information, refer to the Pallaton Raphno® Guide.



Kale overview

Kale is generally a spring sown, single graze option providing late autumn/winter feed from May to August. It can also be spring sown for a late-summer protein source to bolster feed supply when pasture quality is low.

Selecting a kale cultivar is a balance between dry matter (DM) yield and forage quality determined by leaf percentage and stem softness. Giant (tall) kale types provide bulk feed but lower forage

quality and crop utilisation, while short types provide a lower DM yield and higher forage quality. Intermediate types offer a balance between DM yield and feed quality.

WHEN TO SOW?

Spring/summer

	Exceptional yield and good quality	Exceptional quality	Exceptional yield	Exceptional yield and more leaf	Exceptional yield and quality with Telar® herbicide resistance	Exceptional quality with Telar® herbicide resistance
Kale type	Intermediate height	Short height	Giant type	Giant type*	Intermediate height	Short height
Potential yield (tDM/ha)	16	14	17	17	16	14
Winter leaf retention	★★★	★★★	★★	★★★	★★★	★★★
Leaf percentage	★★★	★★★	★	★★	★★★	★★★
Stem quality	★★	★★★	★	★★	★★	★★★
	(Page 31)	(Page 32)	(Page 34)	(Page 33)	(Page 20)	(Page 21)

*A new generation giant kale with higher leaf-to-stem ratio and softer stems than traditional giant kales.

STAR CHART KEY

— = None | ★ = Moderate | ★★★ = Good | ★★★★★ = Very good

Note: a difference of one ★ means that there is statistically significant difference.

Choosing the best kale

CANTERBURY TRIAL RESULTS*

A Canterbury study ran from May to September 2013 and compared the forage yields, leaf percentages and feed quality values associated with four kale cultivars: Regal®, Gruner, Kestrel and Rawera. Kale cultivars were sampled on a monthly basis for nutrition value of plant components (stem and leaf).

Dry matter (DM) yield: Regal® and Gruner yielded significantly more DM than Kestrel or Rawera kales. A late-winter flush of leaf growth lifted yields of Regal and Kestrel, but not Gruner or Rawera.

Leaf percentage: Regal® and Kestrel produced more leaf compared with Gruner or Rawera.

Metabolisable energy (MJME) content: Kestrel contained significantly more energy (MJME/kgDM) and less neutral detergent fibre (NDF) than other kale cultivars. While Kestrel recorded a lower DM yield, its energy density lifted the MJME yield per hectare to levels comparable with other cultivars.

Stem quality: Kestrel had the highest quality stem, with 13.0 MJME/kgDM for top stem and 11.6 MJME for stem base. The results indicated Rawera has a very low quality stem base (8.7 MJME/kgDM), almost a 3.3 reduction in the MJME value recorded for top stem.

RECOMMENDATIONS

DM yield: If the amount of feed available is your key requirement, choose Regal® or Gruner. Both kale cultivars produce a high DM yield; however, Regal had a flush of new leaf growth in late winter while Gruner lost leaf. When late-winter leaf and yield is needed, choose Regal over Gruner.

Quality: When stock liveweight gain and/or body condition score is your priority, choose Kestrel. A high quality stem and good leaf percentage allows Kestrel to provide a premium feed option. When quantity and forage quality are equally important, Regal's high leaf percentage and high DM yield delivers on both, optimising performance of your stock.

*Westwood CT, Cutts M, Russell R, O'Brien K (2014). Effect of timing of harvest on nutritive value, and dry matter yield of four cultivars of kale (*Brassica oleracea* L. Var. *acephala*). Proceedings of the New Zealand Grasslands Association (in press).

Regal[®]
KALE



THE KING OF KALES

Regal® kale provides high dry matter yield and good forage quality, the best of both worlds. When your animals require more winter dry matter and more leaf, Regal delivers. New Zealand bred, high-yielding Regal gives you superior pest and disease tolerance. Late winter leafiness means good quality feed that lasts the distance, ideal for pregnant and young stock.

Choose Regal® when your winter priority is for both yield and forage quality

- Exceptional dry matter yields
- Soft stems providing excellent crop utilisation
- High leaf-to-stem ratio, with very good late-winter leaf percentage
- Strong pest and disease tolerance
- New Zealand bred for local conditions
- Intermediate height

Farm type



Days to grazing



LATE NOVEMBER
ONWARDS SOWING
150-220 days

LATE OCTOBER SOWING
**100-140 days till
first light grazing**

Sowing rate



4 kg/ha



TRUSTED NAME, TRUSTED QUALITY KALE

Kestrel kale – for when you need exceptionally high quality winter feed for top animal performance. Kestrel has a high leaf percentage and soft, digestible stems that deliver an energy-dense, easy-to-graze feed. Soft stems offer excellent crop utilisation, even for young sheep, deer and cattle. Late-winter leafiness means better stock performance throughout the season. Kestrel has the adaptability to fit into a range of farm systems and soil types.

Kestrel, the perfect choice when animal performance is your focus

- High leaf-to-stem ratio with very good late-winter leafiness
- High whole plant metabolisable energy (MJME) content
- Excellent stem softness to promote crop utilisation and good stem quality to enhance animal performance
- Bred for low levels of S-methyl cysteine sulphoxide (SMCO)
- Good regrowth if lightly grazed during late summer
- First and second crop option
- Short height

Trusted name, trusted quality kale

Farm type



Days to grazing

 LATE NOVEMBER ONWARDS SOWING
150-220 days

LATE OCTOBER SOWING
100-140 days till first light grazing

Sowing rate

 **4 kg/ha**



CORSA, THE NEW GENERATION GIANT KALE FOR YOUR STOCK

Corsa is a new generation giant type kale that has been bred to revolutionise the giant kale market. With higher leaf percentage and enhanced stem quality than conventional giant kales. Corsa delivers a high yield, high quality feed for your animals.

- High yielding, giant type kale
- High leaf percentage
- Good winter hardiness
- Softer stem compared to other giant type kales
- Good Aphid tolerance
- Highest leaf-to-stem ratio of giant kales

Farm type



Days to grazing

 **150-220 days**

Sowing rate

 **4 kg/ha**

THE TRADITIONAL KALE

Gruner kale is a high yielding, giant type kale with excellent winter hardiness and good Aphid tolerance. Gruner is a suitable option when high dry matter yield is required to feed and maintain a higher stocking rate.

Choose Gruner when dry matter yield is your priority

- High yielding, giant type kale
- Excellent winter hardiness
- Good Aphid tolerance
- A proven and reliable kale for New Zealand farm systems
- Excellent tolerance to frost
- Giant height

Farm type



Days to grazing



Sowing rate



The traditional kale

Swede overview

Swedes are a spring sown, single graze option providing winter feed suited to cool, moist environments.

Swedes can be divided into two categories: soft bulbed, early maturing cultivars (e.g. Major Plus) or later maturing types (e.g. Clutha Gold or Cleancrop™ Hawkestone).

Swedes are more susceptible to diseases including clubroot and dry rot, so should only be considered as a first year cropping option.

WHEN TO SOW?

In environments where crops can be exposed to very cold conditions post-sowing, followed by increasing temperatures, swedes should be sown no earlier than 20 November.

Earlier sowing combined with cold weather conditions can cause 'vernalisation' which means the plant believes it has been through winter and subsequently produces a seed head.

	High yield and early maturity	High yield and medium maturity	Moderate yield and early maturity	High yield, medium maturity and Telar® herbicide resistance
Potential yield (tDM/ha)	18	18	16	18
Days to grazing	150-220	170-250	150-220	170-250
Bulb softness	★★★	★★	★★★	★★
Flesh colour	Yellow	Yellow	Yellow	Yellow
Clubroot tolerance	★	★★	-	★★
Dry rot tolerance	★★	★★	-	★★
Leaf keeping quality	★★	★★	★	★★
	(Page 36)	(Page 37)	(Page 38)	(Page 22)

STAR CHART KEY

— = None | ★ = Moderate | ★★ = Good | ★★★ = Very good

Note: a difference of one ★ means that there is statistically significant difference.



Earnslaw is a traditional, yellow-fleshed swede superseding the current softest swede in the market, Major Plus. Earnslaw retains the same renowned characteristics of Major Plus including early maturity and a soft bulb but has the additional benefit of improved dry-rot and *Alternaria* tolerance resulting in higher yields and better winter keeping abilities. The combination of soft bulb and greater disease tolerance makes Earnslaw swede an ideal swede option for all stock classes including younger growing animals.

Earnslaw is the next generation early maturing swede, soft bulbed swede

- Early maturing main swede crop
- Soft bulb swede like Major Plus
- Disease tolerance to dry-rot and *Alternaria*
- Improved leaf and bulb yield over Major Plus
- Yellow-fleshed, light, purple-skinned bulb
- Pelleted seed available, see page 47 for more information

Farm type



Days to grazing

From 150-220 days

Sowing rate

CONVENTIONAL SOWING OR DIRECT DRILLING
0.8-1.5 kg/ha

PELLETED
90,000 seeds/ha

THE YIELD ADVANTAGE

Clutha Gold is the latest swede bred from the Forage Innovations plant breeding joint venture between Plant and Food Research and PGG Wrightson Seeds and was developed to supersede Aparima Gold swede. Clutha Gold has a significant yield advantage over Aparima Gold while maintaining its disease tolerance to clubroot and dry rot. Clutha Gold also has an additional disease tolerance to the leaf disease, powdery mildew.

The golden opportunity for your business. More yield. More profits

- Very high-yielding main crop swede
- New Zealand bred and tested
- Yellow-fleshed bulb with medium maturity
- Disease tolerance to clubroot, dry rot and powdery mildew
- Excellent winter keeping qualities
- Pelleted seed available, see page 47 for more information

Farm type



Days to grazing

170-250 days

Sowing rate

CONVENTIONAL SOWING OR DIRECT DRILLING
0.8-1.5 kg/ha

PELLETED
90,000 seeds/ha



PGG Wrightson Seeds Sales Agronomist Brian Young (left) and Farmlands Technical Field Officer Mike Magennity (right) inspecting pelleted Clutha Gold swede.

The yield advantage



THE SOFTEST SWEDE

Major Plus is a traditional yellow-fleshed swede with a early maturity date and soft bulb easily consumed by animals. A suitable option for early winter feed before moving stock onto a later maturing Clutha Gold swede crop for mid to late-winter grazing.

Major Plus is the early maturing swede you can count on

- Early maturity
- Good dry matter yields
- Softest bulb swede on the market
- Yellow-fleshed bulb
- Pelleted seed available, see page 47 for more information

Farm type



Days to grazing

150-220 days

Sowing rate

CONVENTIONAL SOWING OR DIRECT DRILLING
0.8-1.5 kg/ha

PELLETED
90,000 seeds/ha



The softest swede

Forage rape overview

Summer/autumn/winter feed suitable for all stock classes. Modern New Zealand bred cultivars are an interspecies cross between rape and kale parentage. Forage rapes range in maturity dates from 70-110 days after sowing, while also having single or multi-graze options.

WHEN TO SOW?

Spring sow for summer, autumn and winter feed. Winter feed from spring sowing is dependent on environment and crop management.

Late summer/early autumn sow when moisture permits for winter feed.

	Forage quality and early maturity	Yield and forage quality	Yield and forage quality with Telar [®] herbicide resistance
Establishment	Spring/summer/autumn	Spring/summer/autumn	Spring/summer/autumn
Days to grazing	70-90	90-110	90-100
Regrowth	★★	★★★★	★★★★
Aphid tolerance	★★★★	★★★★	★★★★
Energy content	★★★★	★★	★★
	(Page 40)	(Page 41)	(Page 26)

STAR CHART KEY

— = None | ★ = Moderate | ★★ = Good | ★★★ = Very good

Note: a difference of one ★ means that there is statistically significant difference.



THE TASTY FORAGE RAPE

Titan® forage rape – the tasty, palatable rape with high grazing preference and rapid acceptance by stock. Titan combines early maturity, high dry matter yields and excellent palatability to deliver a high quality summer/autumn/winter feed option. Strong regrowth potential offers a multi-graze option for all farm systems. Good Aphid and virus tolerance means Titan will last the distance under challenging conditions.

The best choice when forage quality and rapid acceptance by stock is important to you

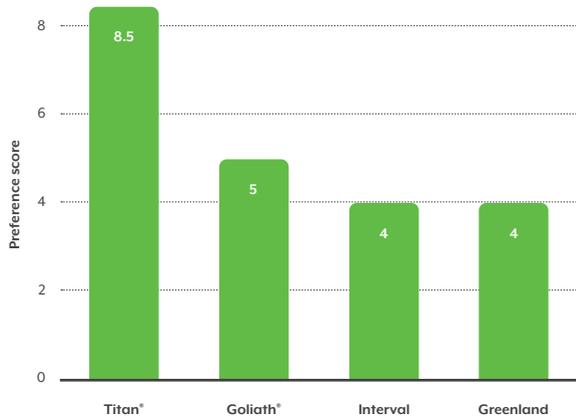
- Highest animal grazing preference forage rape cultivar available
- Very good Aphid and virus tolerance
- Excellent whole plant quality
- Multi-graze option with good regrowth potential
- Early maturing

Stock grazing preference of different forage rapes

Preference score (the higher the score the better):

1 = Crop untouched

9 = Crop completely eaten



Farm type



Days to grazing



Sowing rate



Notes to the graph:

Trial conducted at the Kimihia Research Centre, Canterbury. Sown on 25 November 2007 and visual preference scores taken after the second harvest on 1 April 2008.



THE VERSATILE ALL ROUNDER

Goliath® forage rape – the multi-purpose forage rape that fits all farm systems. Goliath performs well from spring/summer/autumn sowing, offering flexibility to deliver feed when you need it. Graze Goliath once or take advantage of superior regrowth potential for multiple grazings; the perfect versatile feed option for all stock classes. Good Aphid tolerance means Goliath will go the distance.

Goliath® forage rape is ideal when crop versatility and dry matter yield are important to you

- Very good Aphid tolerance
- High dry matter yields
- Multi-purpose forage rape from spring/summer/autumn sowing
- Single or multi-graze feed option
- Superior regrowth potential
- Excellent winter-keeping properties

Farm type



Days to grazing



Sowing rate



The versatile all rounder

Bulb turnip overview

Turnips are a spring/summer/early autumn sown bulb and leaf crop providing a single grazing. Spring sown turnips are generally early maturing, tankard bulb types such as Barkant® or Cleancrop™ Toto providing a high quality, energy-dense feed and a good protein source when summer pasture quality is low.

Summer/early autumn sown turnips are generally later maturing, globe bulb types with improved winter-keeping ability such as Green Globe or Cleancrop™ bulb turnip.

WHEN TO SOW?

Spring sow for summer feed. Late summer/early autumn sow when moisture permits for winter feed.

	Top yield and summer quality Barkant ™ TURNIP	Moderate yield and summer/autumn/winter feed Green Globe <small>CERTIFIED TURNIP</small>	Exceptional summer yield with Telar® herbicide resistance Toto ™ TURNIP <small>Cleancrop® Brassica System</small>	Exceptional yield, more leaf and Telar® herbicide resistance Bulb Turnip <small>Cleancrop® Brassica System</small>
Bulb type	Tankard	Globe	Tankard	Globe
Establishment	Spring	Spring/summer	Spring	Spring/summer
Days to grazing	60-90	90-120	55-90	80-110
Maturity	Early	Late	Early	Medium
Potential yield (tDM/ha)	15	12	15	15
Energy	★★★ <small>(Page 43)</small>	★★ <small>(Page 44)</small>	★★★ <small>(Page 23)</small>	★★ <small>(Page 24)</small>

STAR CHART KEY

— = None | ★ = Moderate | ★★ = Good | ★★★ = Very good

Note: a difference of one ★ means that there is statistically significant difference.



NEW ZEALAND'S LEADING DAIRY TURNIP

Barkant® bulb turnip is one of the highest yielding summer bulb turnips available in New Zealand. You deserve the best turnip on the market and your stock deserve the best quality feed. Barkant offers unbeatable proven performance year after year. Barkant delivers supplementary protein within the leaf and water soluble carbohydrates in the bulb, offering an ideal feed to balance summer pastures.

When you need summer feed, don't look past Barkant®

- High dry matter yields
- High source of metabolisable energy (MJME)
- Tankard bulb shape enhances crop utilisation and reduces the risk of choke
- Early maturing for excellent summer feed
- High leaf-to-bulb ratio resulting in high levels of protein

Farm type



Days to grazing



Sowing rate



THE MULTI-PURPOSE PERFORMER

Green Globe turnip – the reliable turnip that delivers good dry matter yields for your stock. It delivers flexible sowing options. Green Globe will perform in harsh winter conditions and lower soil fertility. When the going gets tough Green Globe performs for your stock.

Green Globe is the dependable turnip for tough conditions

- Multi-purpose turnip suitable for summer, autumn and winter feed
- Proven winter hardiness
- Good yield potential
- Late maturing

Farm type



Days to grazing

90-120 days

Sowing rate

0.8-2 kg/ha



The multi-purpose performer

Leafy turnip overview

Leafy turnips are a spring sown, multi-graze brassica crop that can offer three to four grazings. Leafy turnips are earlier maturing than forage rape, whereby the first grazing is possible from 42 days after sowing.

Generally, leafy turnips are spring sown to provide a high-quality summer feed for drystock farming systems.

Leafy turnips are a shallow-rooted, swollen bulb crop and therefore, they are susceptible to drought

and poor soil fertility. In dryland environments, Pallaton Raphno® with increased drought tolerance may be more suitable.

WHEN TO SOW?

Spring/summer

	Fast summer feed	Yield and forage quality with Telar® herbicide resistance
Bulb type	Swollen root	Swollen root
Establishment	Spring/summer	Spring/summer
Days to grazing	42-70	42-70
Maturity	Early	Early
Potential yield (tDM/ha)	9	11
Grazing/regrowth	Multi-graze	Multi-graze
Energy	★★★	★★★
	(Page 46)	(Page 25)

STAR CHART KEY

— = None | ★ = Moderate | ★★★ = Good | ★★★★★ = Very good

Note: a difference of one ★ means that there is statistically significant difference.



The faster brassica feed

THE FASTER BRASSICA FEED

Pasja II – the brassica to choose when fast, high quality summer/autumn feed is needed for your stock. Pasja II combines early maturity with yield and the option for multiple grazings, providing quality fast feed you can rely on.

Pasja II is the brassica you need for your stock when fast, quality feed is needed

- High dry matter yields
- Excellent plant persistence
- Multi-graze option with excellent regrowth potential (moisture dependent)
- Fast establishing with first grazing possible at 42-70 days
- Minimal ripening required
- Reduced bolting
- A flexible grazing option for summer/autumn feed

Farm type



Days to grazing



Sowing rate



4 kg/ha

Ultrastrike® pelleted swede seed

With a weighted build-up coating (pellet), Ultrastrike® pelleted swede seed can be sown using precision drills. Yield is maximised through the even distribution of seed, sown at the correct rate and depth, that allows bulbs to grow more consistently and be protected from sun exposure or being eaten by birds or pests. Pelletised swede seed now includes phosphate in the seed pellet to aid in establishment and growth.

Ultrastrike® pelleted swede has an optimum sowing rate of 90,000 seeds/ha or 22 cm seed spacing in 50 cm rows. The size specification for pelleted swede seed is 3.25-4.00 mm.

KEY BENEFITS

- Maximum bulb yield through evenly-distributed sowing
- Highly cost-effective outputs
- Easy to sow (one bucket/ha)
- Contains trace element molybdenum for enhanced growth



AVAILABLE CULTIVARS

Cleancrop™ Hawkestone, Earnslaw, Clutha Gold and Major Plus are all available in pelleted form.



CASE STUDY:

Paul and Wendy Stirling Wether Hill Farm, Ohai

Wether Hill farm of Ohai, Southland is farmed by Paul and Wendy Stirling. In previous years, they achieved 10-12 tonne swede crop yields, but after switching to Cleancrop™ Hawkestone pelleted swede, it dramatically increased. Specifically, they had a 19,000 kgDM/ha crop established for \$1,400/ha ultimately providing feed for just 7 c/kgDM! Paul says that along with the large, even bulb size, he is also impressed with how quickly the pelleted seed germinates and gets out of the ground. He says he is getting great payback from the extra investment of precision sowing.

Brassica seed treatment

Ultrastrike® and Superstrike® brassica seed treatments provide broad-spectrum protection against key insects and diseases during plant establishment.

The first four to six weeks after sowing is a critical stage in the life of a new plant, as seedlings emerge and develop their physical make-up. Sowing treated seed provides protection during the germination and establishment stages, when emerging seedlings are most vulnerable to attack from invasive insect pests and disease pathogens.

Seed treatment can improve seed germination, seedling emergence, plant vigour, stand establishment and total yield, helping to ensure the crop is on its way to reaching its full genetic potential. It is a simple and cost-effective means to reduce risk and safeguard investment in forage seed.

ULTRASTRIKE® BRASSICA

Ultrastrike® brassica is a filmcote seed treatment that provides establishing brassica crops with a superior level of insecticide protection in addition to fungicide protection and a start-up supply of molybdenum.



Additive	Pests and disease protection/nutrients	Benefit
Systemic insecticide	Springtail, Aphid, Argentine Stem Weevil (adults and larvae), Nysius*	Above and below ground protection during the first 6 weeks after planting against economically damaging insect pests. Trials have shown protection against Aphids extending out to 8 weeks after planting.
Contact fungicide	'Damping off' (Pythium, Fusarium, Rhizoctonia solani)	Protects the root zone from 'Damping off' fungal pathogens in the first 3-4 weeks of establishment.
Nutrient	Molybdenum	Molybdenum is distributed evenly around the seed and available for fast uptake by the germinating seedling.

*In situations conducive to high Nysius pressure, where a brassica crop is sown next to a lucerne crop or established under hot, dry conditions, a foliar insecticide application may be necessary 2-3 weeks after sowing to enhance seedling protection.

SUPERSTRIKE® BRASSICA

Superstrike® brassica is a filmcote seed treatment that provides establishing turnip and rape crops with insecticide and fungicide protection in addition to a start-up supply of molybdenum.



Additive	Pests and disease protection/nutrients	Benefit
Systemic insecticide	Springtail	Above and below ground protection during the first 6 weeks after planting against New Zealand's most prevalent brassica establishment pest.
Contact fungicide	'Damping off' (Pythium, Fusarium, Rhizoctonia solani)	Protects the root zone from 'Damping off' fungal pathogens in the first 3-4 weeks of establishment.
Nutrient	Molybdenum	Molybdenum is distributed evenly around the seed and available for fast uptake by the germinating seedling.

GAUCHO® BRASSICA

Gaicho® brassica is a filmcote seed treatment that provides brassica crops with protection against common insect pests during plant establishment.



Additive	Pests and disease protection/nutrients	Benefit
Systemic insecticide	Springtail, Aphid, Argentine Stem Weevil (adults and larvae), Nysius*	Above and below ground protection during the first 6 weeks after planting.

*In situations conducive to high Nysius pressure, where a brassica crop is sown next to a lucerne crop or established under hot, dry conditions, a foliar insecticide application may be necessary 2-3 weeks after sowing to enhance seedling protection.



Product profiles for brassica seed treatment

	Ultrastrike® brassica	Superstrike® brassica	Gaucho® brassica
Used in	Drill/broadcast	Drill/broadcast	Drill/broadcast
Insect protection	Aphid	Springtail	Aphid
	Argentine Stem Weevil		Argentine Stem Weevil
	<i>Nysius</i> (Wheat Bug)		<i>Nysius</i> (Wheat Bug)
	Springtail		Springtail
Disease protection	<i>Fusarium</i>	<i>Fusarium</i>	
	<i>Pythium</i>	<i>Pythium</i>	-
	<i>Rhizoctonia solani</i>	<i>Rhizoctonia solani</i>	
Nutrients included	Molybdenum	Molybdenum	-
Sowing rate compared to untreated seed	Same as per untreated seed	Same as per untreated seed	Same as per untreated seed
Withholding period	6 weeks	6 weeks	6 weeks

GAUCHO is a registered trademark of Bayer Crop Science and is a registered pursuant to the ACVM Act 1997.

SEED TREATMENT FOR CLEANCROP™ BRASSICAS

All Cleancrop™ Brassica System products include the Ultrastrike® brassica seed treatment, which provides this leading forage brassica technology with the most comprehensive seed protection in the market.



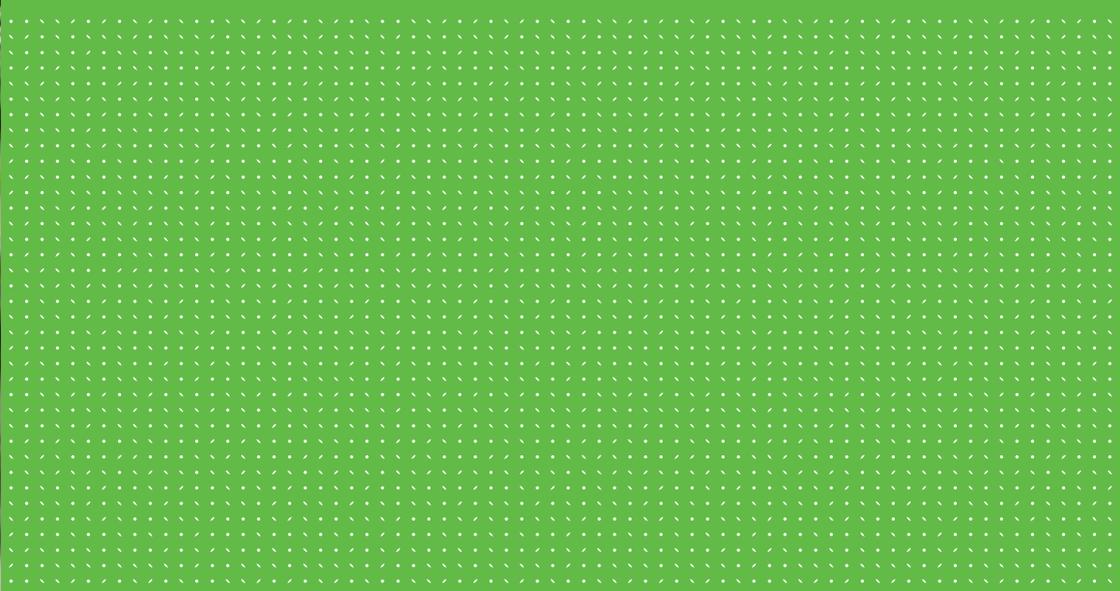
FURTHER INFO:

Visit www.pggwrightsonseeds.com for more information on Ultrastrike®, Superstrike® and Gaucho® brassica seed treatments.





Pasture Systems



Ryegrass selection guide

THE FOUR STEPS TO CHOOSE A RYEGRASS

1. How long do you want it to last?*

- Less than 1 year – Annual ryegrass *see page 80*
- 2 - 5 years – Hybrid ryegrass *see page 75-76*
- 1.5 - 2 years – Italian ryegrass *see page 77-79*
- 5 + years – Perennial ryegrass *see page 66-72*

**Under average or better management, soil fertility, moisture and with the optimum endophyte.*

2. What endophyte do you need?

When selecting the appropriate endophyte for insect protection, it is important to identify the insect pest that poses the highest risk of pasture damage in your farm system. There are endophytes available that offer protection against the following insect pests:

- Argentine Stem
- Black Beetle adult
- Porina
- Pasture Mealy Bug
- Root Aphid

For more information on endophyte insect protection and animal safety see pages 55-59.

3. How will your paddock be grazed?

It is important to identify whether rotational grazing or set stocking will be used, as this will help to determine the most suitable ryegrass. Specifically, diploid and tetraploid ryegrasses perform and grow better under different grazing methods.

- Rotational grazing or short periods of set stocking → Tetraploids
- Rotational grazing, short periods of set stocking and long periods of set stocking → Diploids

For more information on the advantages and management consideration of diploids and tetraploids see pages 60-61.

4. Do you need strong ryegrass growth rates early in spring or is late spring feed quality more important?

Mid-season heading ryegrasses can provide more dry matter yield in early spring. Late season heading ryegrasses produce higher quality feed in late spring. Your farm's ryegrass portfolio should include a range of mid, late and very late heading ryegrasses to deliver a balance of early season growth plus late spring feed quality.

For more information on selecting the right heading date see pages 62-65.

Tips for pasture renewal and persistence

Effective pasture renewal is the result of good planning, utilising best practice techniques and minimising the risk of pasture failure

Achieving the correct combination of endophyte, ploidy pasture type and heading date helps with pasture palatability and persistence. Our Sales Agronomists (see pages 98-99) are dedicated to achieving the best result for you which includes highly palatable and persistent pastures.

- Identify paddocks that are not performing
- Soil test
- Determine your pasture renewal programme
- Decide when you need the growth
- Identify key pasture pest threats in your paddock and region
- Communicate with retailers and contractors
- Prepare a flat, fine, firm and weed-free seedbed
- Sow certified quality, treated seed at the correct sowing rate and depth
- Monitor, monitor, monitor
- Control germinating weeds and insect pests
- Implement best practice new pasture management
- Apply fertiliser to aid growth



Endophyte insect control

RYEGRASS, FESTULOLIUM AND CONTINENTAL TALL FESCUE

The following tables 1-5 have been approved by the New Zealand Plant Breeding and Research Association (NZPBRA) and provide an impartial overview of the insect control and animal safety of commercially available endophytes.

WHAT IS AN ENDOPHYTE?

An endophyte is a fungus found naturally in many grass species, including ryegrass. It provides the

plant with protection from insects, and in return the plant provides the endophyte a place to live and reproduce.

The following ratings on endophyte insect control in tables 1-4 are indicative and may vary slightly between cultivars. If Argentine Stem Weevil or Black Beetle Adults are present at sowing, an appropriate seed treatment is recommended to improve insect control during establishment. These ratings are based in part on glasshouse studies where test plants are 100% infected with endophyte, whereas commercial seed must meet minimum standards of 70% of seeds infected.

Table 1 – Diploid perennial ryegrass

Insect	ARI	NEA2	NEA4	AR37	Standard endophyte	Without endophyte
Argentine Stem Weevil	◆◆◆◆	◆◆◆	◆◆◆	◆◆◆◆ ¹	◆◆◆◆	-
Pasture Mealy Bug	◆◆◆◆	(◆◆◆◆)	(◆◆◆◆)	◆◆◆◆	◆◆◆◆	-
Black Beetle Adult	◆	◆◆◆	◆◆◆	◆◆◆	◆◆◆	-
Root Aphid	- ²	◆◆	◆◆	◆◆◆◆	◆◆	-
Porina	-	Not tested	Not tested	◆◆◆	◆	-
Grass Grub	-	-	Not tested	◆	-	-
Field Cricket	Not tested	Not tested	Not tested	Not tested	Not tested	Not tested

Table 2 – Tetraploid perennial ryegrass

Insect	ARI	NEA2	AR37	Without endophyte
Argentine Stem Weevil	(◆◆◆)	◆◆	(◆◆◆) ¹	-
Pasture Mealy Bug	(◆◆◆◆)	(◆◆◆◆)	(◆◆◆◆)	-
Black Beetle Adult	◆	◆◆◆	◆◆◆	-
Root Aphid	- ²	◆◆	◆◆◆◆	-
Porina	-	Not tested	(◆◆◆)	-
Grass Grub	-	-	◆	-
Field Cricket	Not tested	Not tested	Not tested	Not tested

Table 3 – Italian and short term (hybrid) ryegrass

Insect	ARI	NEA	AR37	Without endophyte
Argentine Stem Weevil	◆◆	Not tested	◆◆◆ ¹	-
Pasture Mealy Bug	(◆◆◆◆)	(◆◆◆◆)	(◆◆◆◆)	-
Black Beetle Adult	◆	◆◆◆	◆◆◆	-
Root Aphid	- ²	Not tested	Not tested	-
Porina	Not tested	Not tested	Not tested	-
Grass Grub	-	-	-	-
Field Cricket	Not tested	Not tested	Not tested	Not tested

Table 4 – Continental tall fescue

Insect	Max P (AR584)	Without endophyte
Argentine Stem Weevil	Not tested	-
Pasture Mealy Bug	Not tested	-
Black Beetle Adult	◆◆◆	-
Root Aphid	(◆◆◆◆)	-
Porina	Not tested	-
Grass Grub	(◆◆)	-
Field Cricket	◆◆◆	-



Black Beetle damage to plant.

Notes on Tables 1-4

- ¹ AR37 endophyte controls Argentine Stem Weevil larvae, but not adults. While larvae cause most damage to pastures, adults can damage emerging grass seedlings. In Argentine Stem Weevil prone areas, it is recommended to use treated seed for all cultivars with novel endophyte.
- ² ARI plants are more susceptible to Root Aphid than plants without endophyte.
- ³ Active against Black Beetle Adults and larvae.

Key to Tables 1-4

- No control
- ◆ Low level control: Endophyte may provide a measurable effect, but is unlikely to give any practical control.
- ◆◆ Moderate control: Endophyte may provide some practical protection, with a low to moderate reduction in insect population.
- ◆◆◆ Good control: Endophyte markedly reduces insect damage under low to moderate insect pressures. Damage may still occur when insect pressure is high.
- ◆◆◆◆ Very good control: Endophyte consistently reduces insect populations and keeps pasture damage to low levels, even under high insect pressure.
- () Provisional result: Further results needed to support the rating. Testing is ongoing.

Data correct at time of print August 2023. For latest data see <http://www.grasslanz.com/understanding-the-science/18-novel-endophyte-technologies>



Argentine Stem Weevil larvae in a damaged ryegrass tiller.

Endophyte animal safety

RYEGRASS, FESTULOLIUM AND CONTINENTAL TALL FESCUE

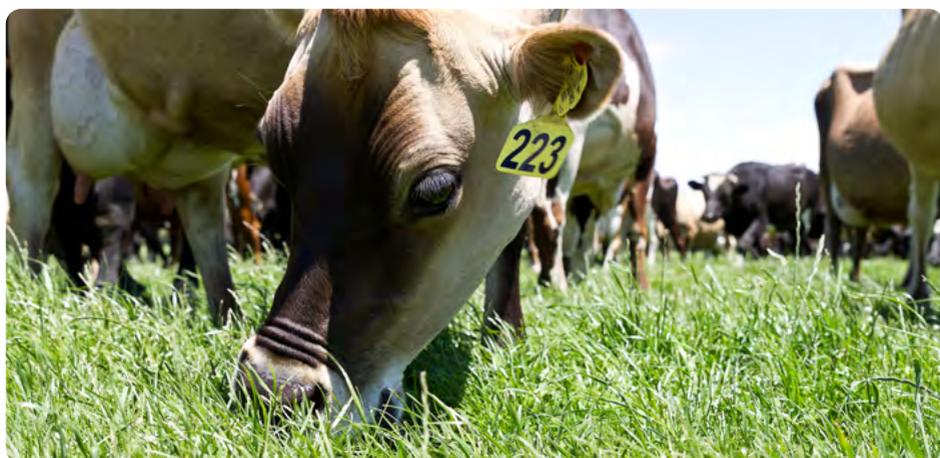
PGG Wrightson Seeds partners with AgResearch to ensure extensive animal safety testing is completed on each ryegrass and endophyte combination. Testing includes laboratory measurements and grazing trials completed under careful supervision and strict animal ethic standards. This standard of testing ensures that each endophyte is thoroughly understood prior to commercial use on farm.

The information in Table 5 is based on animal safety trialling protocols designed to expose animals to simulated worst-case scenario management. This involves forcing them to graze deep into the base of pure perennial ryegrass pastures that have been allowed to grow for several weeks over late spring/summer (similar to a hay crop), where they will encounter the highest concentrations of harmful endophyte chemicals if these are present.

This management does not represent normal farm practice, although similar situations may arise

on farms in rare circumstances. Under normal farm grazing practices, the contribution of basal pasture material to total animal dry matter intake is relatively low, and therefore the intake of harmful chemicals (if they are present) is diluted. Thus, the likelihood of adverse effects on animals is reduced, but the potential for problems to occur may still exist if the endophyte brand is rated less than 4-star for 'freedom from staggers' and/or there are comments on animal performance that flag potential issues.

Comments on animal performance have been moderated based on information from other trials (in addition to the formal animal safety testing protocols), consideration of the 'normal' grazing management practices implemented on farm (see previous paragraph) and recognition that animal diets are very seldom pure ryegrass. Other dietary components such as clovers or non-ryegrass grass species, crops or supplements will dilute the intake of endophyte alkaloids.



Dairy cows grazing Platform AR37 ryegrass.



Table 5 – Animal safety

Endophyte brand	FREEDOM FROM STAGGERS		Effects on animal performance
	Sheep and lambs	Dairy cows and beef cattle	
ARI	◆◆◆◆	◆◆◆◆	High level of animal performance.
AR37	◆◆◆	◆◆◆◆	Typically provides a high level of animal performance. Can cause ryegrass staggers in sheep and lambs in extreme circumstances. Lamb liveweight gain can be reduced during periods of severe staggers. While ryegrass staggers has not been observed in cattle and dairy cows, it could occur on rare occasions.
NEA	◆◆◆◆	◆◆◆◆	High level of animal performance.
NEA2	◆◆◆◆	◆◆◆◆	Typically provides a high level of animal performance. Lamb liveweight gain could be reduced in extreme circumstances. While no effects have been observed in cattle and dairy cows, body temperature could be elevated on rare occasions.
NEA4	◆◆◆◆	◆◆◆◆	Typically provides a high level of animal performance. Lamb liveweight gain could be reduced in extreme circumstances. While no effects have been observed in cattle and dairy cows, body temperature could be elevated on rare occasions.
U2	◆◆◆◆	◆◆◆◆	High level of animal performance.
MaxP (AR584)	◆◆◆◆	◆◆◆◆	High level of animal performance.
Standard endophyte	◆	◆◆	Can cause ryegrass staggers in sheep and lambs, and significantly decrease lamb growth rates in summer and autumn, and significantly increase dags. In dairy cows, it has been shown to depress milksolids production through summer and autumn.
Without endophyte	◆◆◆◆	◆◆◆◆	High level of animal performance.

Key to Table 5

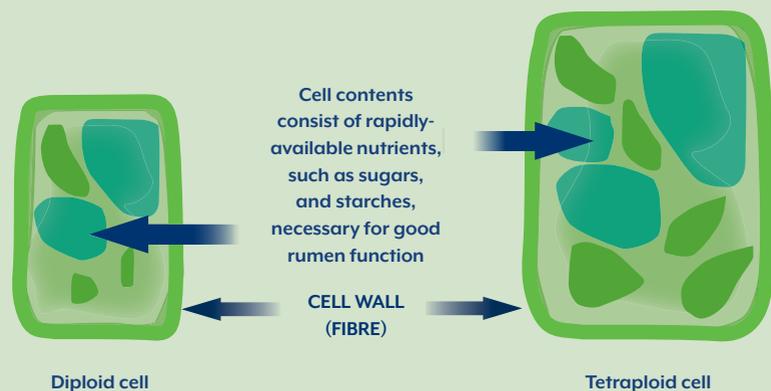
- ◆ Likely to cause severe staggers in most years.
- ◆◆ Can cause severe staggers in some years.
- ◆◆◆ Can cause severe staggers occasionally.
- ◆◆◆◆ Very unlikely to cause staggers.

This table has been approved by the New Zealand Plant Breeding and Research Association (NZPBRA). Data correct at time of print August 2023.

Diploids

DIPLOID AND TETRAPLOID RYEGRASS CELLS

The cells within a diploid ryegrass are smaller than in tetraploids, resulting in a lower ratio of water soluble carbohydrates (sugar) compared to fibre.



Diploid ryegrasses have two sets of chromosomes per cell compared to a tetraploid, which has four. Diploids combine yield and robustness, meaning that even in less than ideal conditions, they are more likely to deliver for your animals.

Dependable diploids

- Densely-tillered
- Good robustness and versatility
- Competitive with weeds
- Persistence in lower soil fertility
- Ideal for grass to grass situations
- Can handle wetter environments
- Able to be set stocked or rotationally grazed



Tetraploids

Intensive farming systems require ryegrasses that produce bulk, high quality feed to drive animal performance and productivity. Tetraploid cultivars are a significant tool in helping achieve this goal, being naturally high in water soluble carbohydrates (sugars).

A tetraploid plant has four sets of chromosomes per cell (a diploid has two sets), which simply means tetraploid ryegrasses are more palatable for your livestock. Animals prefer tetraploids over diploids if they have a choice and often graze tetraploid ryegrass more quickly and evenly.

Tasty tetraploids

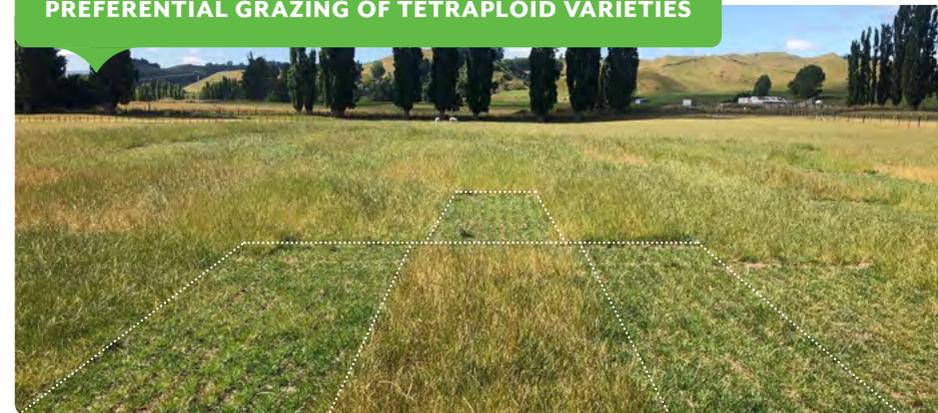
- Fast to establish
- Excellent palatability leading to good pasture utilisation by grazing animals
- Very high quality pasture
- Higher dry matter intakes leading to improved animal performance
- Great for silage quality
- Great clover compatibility - tetraploid ryegrass allows about 10% more clover in the pasture mix

Grazing and pasture management tips

- Tetraploids require a higher sowing rate than diploids, due to a larger seed size
- Should be rotationally grazed or set stocked for short periods only
- Avoid persistent overgrazing. The excellent palatability of tetraploids can easily result in pastures being overgrazed. Monitor post-grazing residuals to avoid these getting too low and comprising ryegrass persistence
- Suitable for a mixed pasture sward with clovers or herbs
- Apply nitrogen as normal – tetraploid ryegrasses are naturally a darker green than diploids, but still require similar amounts of nitrogen

PGG Wrightson Seed has an internationally-delivered tetraploid breeding programme, delivering New Zealand bred and trialled tetraploids that have great palatability, resilience and animal performance benefits.

PREFERENTIAL GRAZING OF TETRAPLOID VARIETIES



Preferential grazing of tetraploid perennial ryegrass varieties (left, right and top centre) over diploid variety (centre).

Heading dates

A grasses heading date is when 50% of the plants have emerged seed heads. Heading dates are defined relative to the cultivar Nui, heading at day 0, which in most years is around the 22nd October. Consider the heading date of ryegrass cultivars as an indicator of when seed head development and the late spring decline in pasture quality will occur.

Heading date	Days relative to Nui (approximately 22nd October)
Nui	0
Mid-season	-7 to +7
Late	+8 to +21
Very late	+22 to +35
Extremely late	+36

Effects of Heading Date on Pasture Production

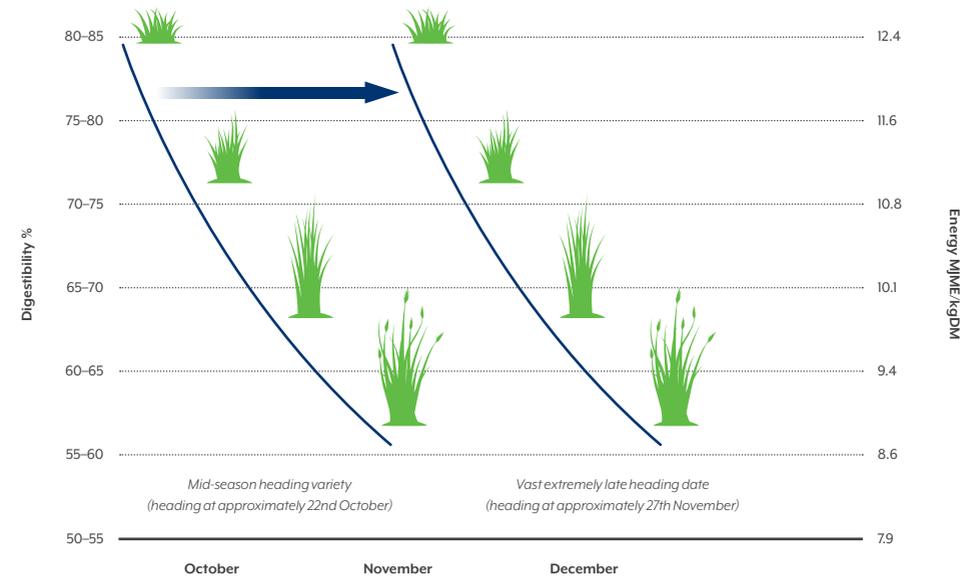
A mid-season heading grass such as Rely (0 days) typically provides greater early spring growth, resulting in a 'spring flush' of feed in the 6 weeks prior to seed head emergence. Late, very late, and extremely late heading cultivars will provide a later spring flush of feed relative to mid-season cultivars.

Delaying the late spring/early summer loss of feed quality

Extremely late heading cultivars such as Vast (+36 days after Nui) are the last to enter their reproductive phase and production of seed heads if left un-grazed. The advantage of very late and extremely late heading date cultivars is that they continue to produce high quality feed into later spring. In some instances extremely late heading cultivars will maintain quality for over a month longer than earlier 'mid-season' heading date cultivars.

Effects of heading dates on pasture quality

Planting part of the farm in extremely late heading cultivars delays the crash in pasture quality by up to 36 days later than mid-season cultivars



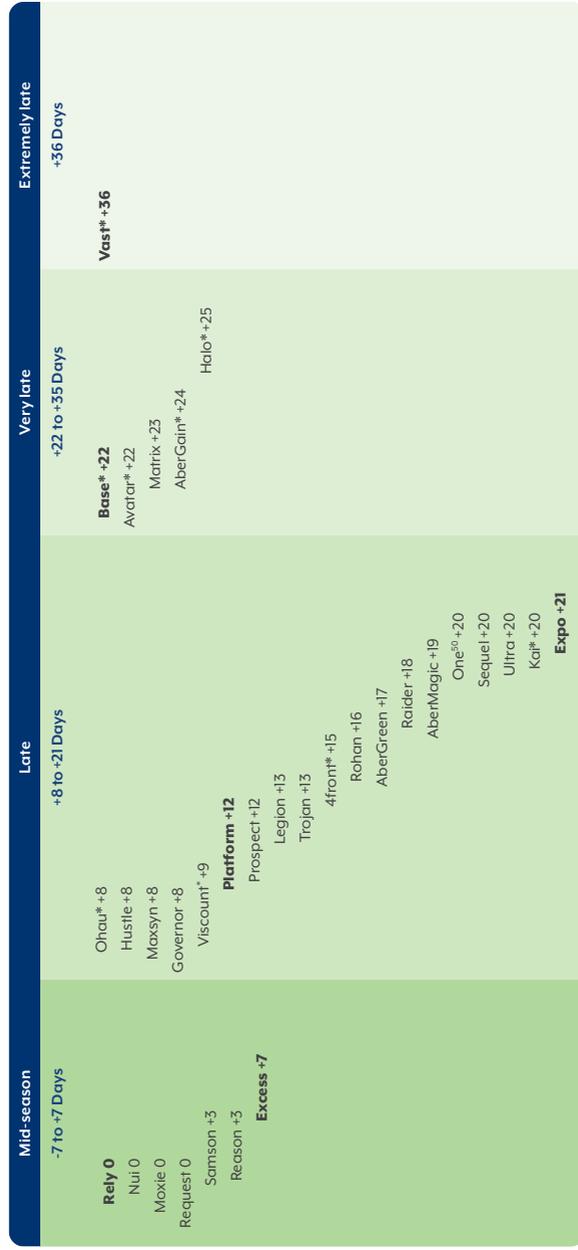
KEY RECOMMENDATIONS

- Sow a range of early and very late/extremely late heading ryegrass cultivars to spread timing of heading and reduce loss of summer pasture quality
- Sow ryegrasses with different heading dates in separate paddocks to maintain a uniform heading date in individual paddocks and assist with strategic timing of grazing or mowing to control seed heads
- Sow no more than 50% of the farm in very late or extremely late heading cultivars to reduce early spring feed pinches

Heading date continuum

Approximate heading dates of long-rotation and perennial ryegrasses relative to Nui at day 0

Heading date of Nui ryegrass is approximately 22nd October.



Tetraploid

< Earlier heading

- Often earlier flush of spring growth
- Earlier seed heads
- Reduced late spring quality
- Better early summer quality if aftermath heading is low

Later heading >

- Can be later flush of spring growth
- Later seed heads
- Better late spring quality
- Reduced early summer quality

Aftermath heading (AMH)

Aftermath heading (AMH) is the ongoing production of seed heads during the summer following the main spring flush. While the main spring flush is critical for seed production, continued production of seed heads through the summer months has a negative impact on pasture quality and therefore animal performance.

PGG Wrightson Seeds' plant breeding team put a larger emphasis on selecting ryegrass varieties with low levels of seed head production through

the summer months. When choosing a ryegrass variety it's important to select a variety that is truly bred for low AMH as this will have significant positive impacts on summer pasture quality.

The photos below demonstrate the differences in cultivar AMH between two cultivars, one bred by PGG Wrightson Seeds with selection for low AMH versus a competitor product displaying significant production of seed heads during the summer months.



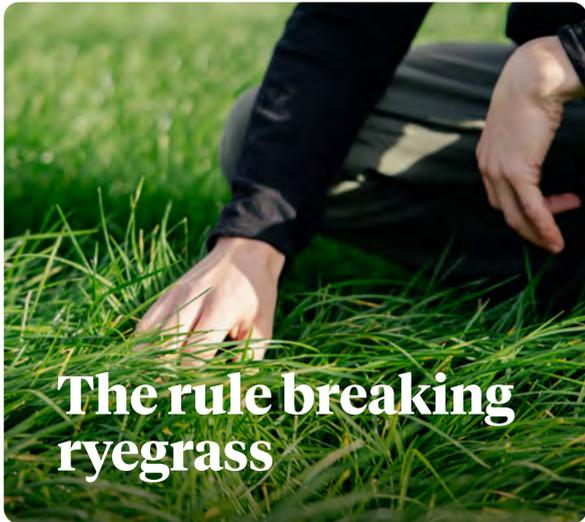
TIP:
Choose cultivars such as Platform or Vast with low AMH to deliver a short, sharp peak of seed heads, followed by a leafy, high quality sward that favours good animal performance

THE RULE BREAKING RYEGRASS

Vast is the next generation in tetraploid perennial ryegrass breeding delivering the ultimate combination of density, quality, production and grazing preference for New Zealand farmers to maximise stock performance and productivity.

With an extremely late (+36 days) heading date, Vast offers the latest heading date on the market. Low seed head production after the initial seeding period in combination with a very late flowering date means Vast will provide high quality feed across the majority of growing season.

- Strong annual production with exceptional summer and autumn productivity
- Extremely late heading date (+36 days) boosting late spring pasture quality
- Diploid-level tiller density to enhance persistence
- Tetraploid grazing preference to drive animal intakes
- Excellent rust tolerance to improve summer and autumn palatability



The rule breaking ryegrass

Farm type



Sowing rate

STANDARD SOWING RATE
22-28 kg/ha

Heading date

Extremely late +36

Example pasture mixes

Dairy pasture mix

Vast perennial ryegrass 25-28 kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

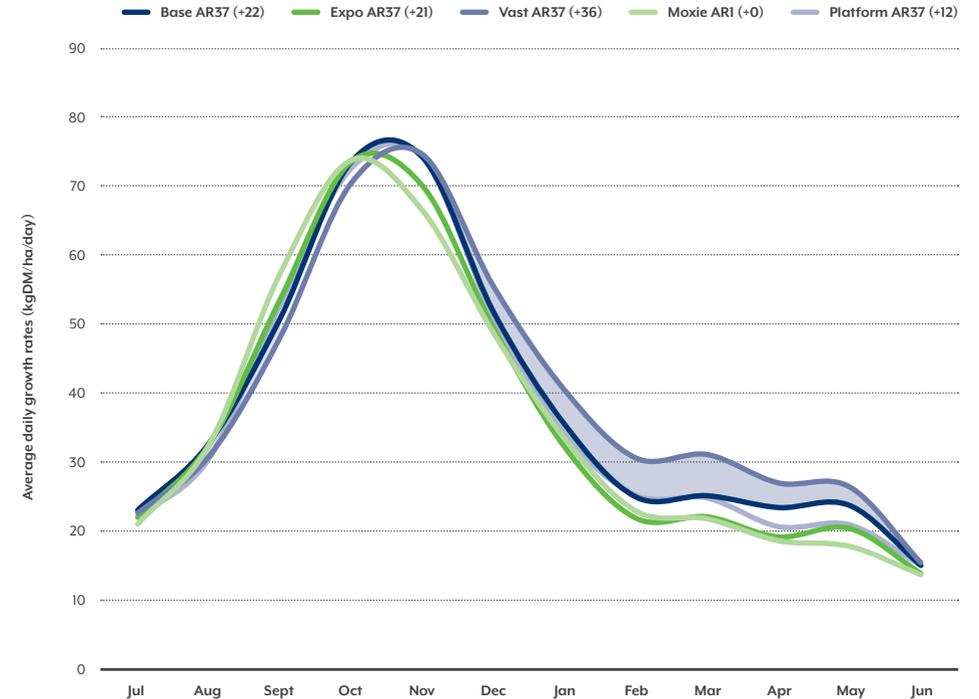
Vast perennial ryegrass 25-28 kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha

For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.

DRY MATTER PRODUCTION

Vast provides strong annual production with exceptionally strong summer and autumn season production advantages. Dry matter production is complemented with diploid level tiller density to enhance persistence.

Average daily growth rates of perennial ryegrass cultivars across 4 trials in Canterbury (2) and Waikato (2); sown 2017 and 2018



Data is the combined mean of 4 three year trials completed in Canterbury (2) and Waikato (2). The value in brackets beside each cultivar name is the cultivar's heading date relative to Nui

ANIMAL PREFERENCE

Production of high-quality feed is finally combined with tetraploid grazing preference to enhance pasture utilisation enabling an efficient pasture based grazing system, assisting with hitting post grazing residual targets in dairy systems and management of summer seed head production in drystock systems.



HIGH QUALITY FEED, MAXIMUM PRODUCTION

Ideal for high performance systems with a focus on pasture management and quality. Base tetraploid perennial ryegrass offers top production with increased animal preference, meaning higher animal intakes and easier management of post-grazing residuals.

Base was selected from high yielding, densely-tillered plants that survived two years of severe drought and hard grazing. Base pastures offer low aftermath heading to maximise summer quality and animal production.

- Exceptional yielding tetraploid perennial ryegrass
- Excellent cool season yields
- Very high tiller density
- AR37 endophyte for strong persistence
- Excellent for dairy and intensive sheep/beef systems
- Best suited to rotational grazing

Farm type



Farm type



Sowing rate

STANDARD SOWING RATE
22-28 kg/ha

Heading date

Very late +22

Example pasture mixes

Dairy pasture mix

Base perennial ryegrass 25-28 kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

Base perennial ryegrass 25-28 kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.



THE QUALITY ALL-ROUND PERFORMER

Platform is a persistent diploid perennial ryegrass[®] offering high yields of quality feed and year-round dry matter production. Outstanding quality is achieved through low aftermath seed head production and fine dense tillers making it a versatile option for productive environments.

Platform has performed strongly in New Zealand trials, demonstrating year-round growth with noted summer/autumn productivity. In independent National Forage Variety Trials, Platform AR37 has performed strongly and demonstrated excellent year-round dry matter production.

- High yielding with strong year-round production
- Excellent feed quality
- Fine leaf with high tiller density
- Late heading date (+12 days)
- Strong persistence (AR37)

**Platform has been bred, selected and successfully tested as a perennial and will function as a perennial ryegrass. Due to a small number of tip awns, Platform is certified as Lolium boucheanum.*



Farm type



Farm type



Sowing rate

STANDARD SOWING RATE
15-25 kg/ha

UNDERSOWING
12+ kg/ha

Heading date

Late +12

Example pasture mixes

Dairy pasture mix

Platform perennial ryegrass 21 kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

Platform perennial ryegrass 21 kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4 kg/ha.

EARLY FEED FOR LIGHTER SOILS

Excess is a medium-leaved, diploid perennial ryegrass bred specifically for tougher environments. It produces exceptionally high dry matter yields and the mid-season heading date provides an earlier flush of spring growth that makes it ideal for lambing and calving.

Excess is a tried and tested perennial ryegrass offering excellent production in more challenging soil types. Recent independent National Forage Variety Trial results demonstrate the productivity advantages Excess AR37 provides in the challenging upper North Island environment.

- Excellent dry matter production
- Strong persistence (AR37)
- Mid-season heading (+7 days)
- Exceptional summer, autumn and winter growth
- Low aftermath seed head emergence
- Proven performance in upper North Island National Forage Variety Trials



**Early feed
for lighter soils**

Farm type



Farm type



Sowing rate

STANDARD SOWING RATE
15-25 kg/ha

UNDERSOWING
12+ kg/ha

Heading date

Mid +7

Example pasture mixes

Dairy pasture mix

Excess perennial ryegrass 2l kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

Excess perennial ryegrass 2l kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.

THE RESILIENT OPTION FOR TOUGHER CONDITIONS

Rely perennial ryegrass is a versatile diploid with fine leaves and dense tillers bred to cater for a range of environments. Rely is a resilient option that can tolerate lower soil fertility and periods of set stocking.

- Excellent dry matter in challenging conditions
- Strong persistence (AR37)
- Fine leaf and dense tillers
- Good rust tolerance
- Very good summer, autumn and winter growth



**The resilient
option for
tougher
conditions**

Farm type



Farm type



Sowing rate

STANDARD SOWING RATE
15-25 kg/ha

UNDERSOWING
12+ kg/ha

Heading date

Mid 0

Example pasture mixes

Dairy pasture mix

Rely perennial ryegrass 2l kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

Rely perennial ryegrass 2l kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.



The brilliant all rounder

THE BRILLIANT ALL ROUNDER

Expo diploid perennial ryegrass provides year-round production of dry matter with very strong cool season growth. Excellent feed quality from a late heading date (+21 days) and higher levels of water soluble carbohydrates (sugars). Expo is a versatile option suitable for both rotational and set stocking grazing systems with medium to high soil fertility.

- Strong, year-round dry matter production
- High water soluble carbohydrate (sugar) levels
- Late flowering and low aftermath heading
- Very high tiller density
- Strong cool season growth

Farm type



Farm type



Sowing rate

STANDARD SOWING RATE
15-25 kg/ha

UNDERSOWING
12+ kg/ha

Heading date

Late +21

Example pasture mixes

Dairy pasture mix

Expo perennial ryegrass 21 kg/ha
Legacy white clover 2 kg/ha
Quartz white clover 2 kg/ha

Sheep and beef pasture mix

Expo perennial ryegrass 21 kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.

THE DRYLAND CONSTANT

Aurus is an upright cocksfoot providing strong summer production and persistence well suited to challenging dryland environments. Aurus' upright growth habit enhances its compatibility with high performing clover varieties, ideal for maximising nitrogen fixation. Plant breeders have selected Aurus for superior yield, strong disease tolerance and a later heading date (+6 days later than Tekapo).

- High yielding variety with improved winter activity over Tekapo
- Upright growth habit allowing good clover content
- Strong persistence
- Excellent drought tolerance
- Suitable for set stocking and hard rotational grazing by sheep
- Excellent *Drechslera* tolerance observed in New Zealand trials



The dryland constant

Farm type



Sowing rate

STANDARD SOWING RATE
6-10 kg/ha

SECONDARY COMPONENT OF PASTURE MIX
1-3 kg/ha

Example pasture mixes

Dryland cocksfoot dominant mix

Aurus cocksfoot 10 kg/ha
Hilltop white clover 4 kg/ha
Bindoon sub clover 6 kg/ha

High fertility cocksfoot dominant mix

Aurus cocksfoot 10 kg/ha
Quartz white clover 2 kg/ha
Hilltop white clover 2 kg/ha

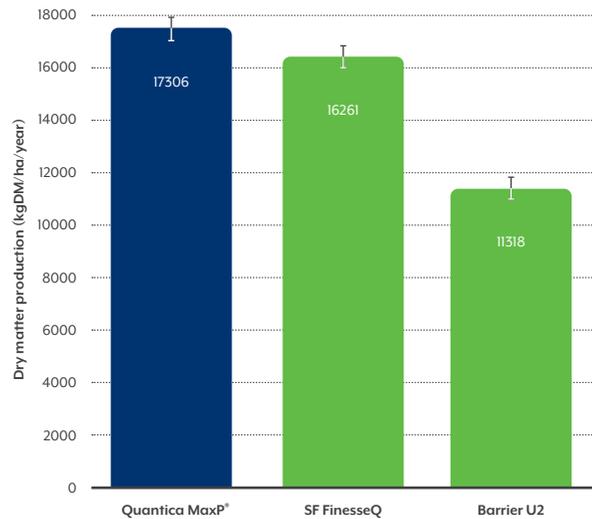
For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.

PRODUCTIVE, PALATABLE AND PERSISTENT

Quantica is a soft, finely-leaved continental tall fescue selected by plant breeders for improved animal palatability and rust resistance. A deep-rooted, robust and productive variety, offering greater persistence than perennial ryegrass. Quantica is able to tolerate waterlogging, soil salinity, Grass Grub pressure and summer dry conditions.

- Soft fine leaves provide increased palatability
- High yielding with improved cool season growth
- Excellent dryland production and autumn drought recovery
- Good disease (crown rust) resistance
- Low aftermath heading
- New Zealand bred for local conditions

Annual dry matter production (kgDM/ha) of tall fescue and festulolium cultivars mean of three years in Lincoln, Canterbury



Mean annual total yield (kgDM/ha) of three years (2016-2019) in Lincoln, Canterbury. Differences between cultivars must exceed the LSD 5% (845 kgDM/ha) to be significant.

Farm type



Sowing rate

STANDARD SOWING RATE
22-32 kg/ha

Example pasture mixes

Dairy pasture mix

- Quantica tall fescue 22-28 kg/ha
- Legacy white clover 3 kg/ha
- Quartz white clover 2 kg/ha

Sheep and beef pasture mix

- Quantica tall fescue 22-28 kg/ha
 - Quartz white clover 2 kg/ha
 - Hilltop white clover 2 kg/ha
- For increased animal performance, nitrogen fixation and pasture management, add Amigain red clover to pasture mixes at 4-6 kg/ha.



THE FLEXIBLE FORAGE

Delish[®] tetraploid short rotation ryegrass – the hybrid providing the best of both worlds. Not only is it a tasty tetraploid but also an Italian ryegrass crossed with a perennial ryegrass, providing you with the best attributes of each. Rapid, reliable establishment coupled with good early season growth, reduced aftermath heading for good summer feed quality and greater longevity than an Italian ryegrass.

- More rapid, reliable establishment than diploid types
- Improved disease resistance
- Ideal for undersowing
- High palatability
- Excellent summer forage quality (low aftermath heading)
- High dry matter yields throughout the year

Farm type



Sowing rate

STANDARD SOWING RATE
22-28 kg/ha

SECONDARY COMPONENT OF PASTURE MIX
4-7 kg/ha

UNDERSOWING
14 kg/ha

Maverick GII SHORT ROTATION RYEGRASS



THE TOP GUN

Wanting cool season growth but needing a grass that persists longer than Italian ryegrasses? Maverick GII is a diploid, short-rotation ryegrass providing excellent cool season growth. Maverick GII is the perfect grass for high performance stock or for silage cropping.

- Robust, dense sward with exceptional cool season growth
- Excellent summer quality (low aftermath heading)
- Good disease resistance and persistence
- Ideal for undersowing
- High annual yield
- Suitable for high quality silage

Farm type



Without Endophyte

Sowing rate

- STANDARD SOWING RATE
20 kg/ha
- SECONDARY COMPONENT OF PASTURE MIX
4-7 kg/ha
- UNDERSOWING
12 kg/ha

Lush TETRAPLOID ITALIAN RYEGRASS



LUSCIOUS, HIGH YIELDING, PERSISTENT FEED

Lush tetraploid Italian ryegrass – a luscious quality forage. Rarely has a tetraploid Italian ryegrass delivered such outstanding summer feed quality, high yield potential and persistence.

- Quick to establish and short time to first grazing
- Exceptional summer yield and forage quality (low aftermath heading)
- Ideal for undersowing into those opened up and thinned out pastures, as part of a pasture mix or sown as a pure sward
- Strong second year production – better than traditional Italian ryegrasses, offering feed for longer
- Good rust tolerance supports higher dry matter yields and increased palatability for grazing animals
- The first tetraploid Italian ryegrass available with AR37 endophyte*

Farm type



Sowing rate

- STANDARD SOWING RATE
22-28 kg/ha
- SECONDARY COMPONENT OF PASTURE MIX
4-7 kg/ha
- UNDERSOWING
15+ kg/ha

**It should be noted that Lush AR37 may cause ryegrass staggers. For more information on AR37 endophyte visit www.ar37endophyte.com*



The top gun



Luscious, high yielding, persistent feed



A SUPER DIPLOID

Supercruise is a fast-establishing diploid Italian ryegrass for the New Zealand market. Displaying all the required attributes of a high quality diploid Italian ryegrass, Supercruise has the endurance to go the distance. If you are looking for a cost-effective, short-term pasture or a reliable option for undersowing into worn out perennial pastures, Supercruise is the grass for you.

- Robust diploid Italian ryegrass
- Super-fast establishment
- Great late spring/early summer dry matter production
- High yields of quality feed

Farm type



Without Endophyte

Sowing rate

STANDARD SOWING RATE
15-25 kg/ha

UNDERSOWING
10-15 kg/ha

A super diploid



The trusted performer

THE TRUSTED PERFORMER

Feast® II tetraploid Italian ryegrass – trusted name, trusted ryegrass. Feast II is a high yielding ryegrass with strong winter and early spring dry matter production followed by low aftermath heading for outstanding summer quality.

Feast II is suitable as a specialist crop for grazing animals or silage production, while also being ideal for undersowing into existing pastures for a flush of winter growth of high quality feed.

- High dry matter production
- More rapid and reliable establishment than diploid types
- Outstanding summer quality for a high yielding Italian ryegrass (low aftermath heading)
- Superior disease resistance and enhanced persistence
- Enhanced palatability and acceptance by animals
- Ideal for high quality silage

Farm type



Without Endophyte

Sowing rate

STANDARD SOWING RATE
22-28 kg/ha

UNDERSOWING
15+ kg/ha

Winter Star II TETRAPLOID ANNUAL RYEGRASS



MORE FEED FASTER

Winter Star II is suitable for quick winter feed with improved spring quality, making it ideal for silage and hay production. It is high yielding with fast establishment, giving excellent autumn growth. As a tetraploid, Winter Star II also has excellent feed quality.

- Ideal between maize crops
- Fast to establish
- Quick, early feed for grazing animals or silage production
- Autumn sow for high yields of quality autumn, winter and spring feed
- Improved spring production and forage quality
- Ideal for undersowing into existing pastures

Farm type



Sowing rate

- STANDARD SOWING RATE
25+ kg/ha
- UNDERSOWING
15+ kg/ha

More feed faster

Clover overview

Clovers are an important part of pastoral farming in New Zealand, providing a source of nitrogen to support sustainable pasture-based systems. In addition to fixing nitrogen, clovers are a high-quality feed delivering good animal performance and assisting with pasture management.

WHITE CLOVER

White clover is the most important and widely-grown legume in New Zealand pastures, suited to a wide range of soil types and environmental conditions. As a species, white clover has a fibrous root structure that spreads and persists in a pasture by the production, branching and rooting down of stolons that run across the soil surface. White clover offers high feed quality, improved pasture management and the ability to fix nitrogen (N) at rates of 25 kgN per tonne of dry matter grown.

RED CLOVER

Red clover is another important legume in New Zealand farming systems, either in pasture mixes or as a speciality multi-year crop. In comparison to white clover, red clover is taprooted and does not spread via stolons. This deep taproot gives red clover a greater tolerance of summer dry conditions and provides significantly higher dry matter production during these periods than white clover.

CHOOSING THE RIGHT WHITE CLOVER

HILLTOP
White Clover

QUARTZ
White Clover

LEGACY
White Clover

Versatility to cope with mixed management and various stock classes

Increasing grazing tolerance and persistence in hill and high country sheep grazing systems

Increasing dry matter production and suitability for high-performing pasture mixes in rotationally grazed dairy and cattle systems



NEW GENERATION CLOVER

Legacy is a high performing, large leaf white clover well suited to rotational grazing in both dairy and drystock cattle systems. Dry matter yield strengthens over time.

Legacy has a vigorous growth rate that improves its tolerance to Clover Root Weevil. A tall growth habit ensures Legacy can persist and perform in a modern pasture sward, making it easier for animals to graze.

- Latest generation, New Zealand bred white clover
- High performing, large leaf clover
- Dry matter yield strengthens with time
- Increased yield leads to more nitrogen (N) being fixed, reducing the need for N fertiliser application
- Good option for rotational grazing
- Large leaf captures more sunlight, leading to higher yields

Farm type



Sowing rate



4-6 kg/ha

Superstrike® Legacy with grass and herb components



CLOVER PERFORMANCE THAT'S ROCK SOLID

A persistent white clover with broad adaptability across environments and farm systems. Quartz performs well under dairy, sheep and beef grazing management. A high yielding clover with good stolon density that provides excellent persistence.

- Excellent fit across multiple farm systems
- High yielding
- Versatile option that has broad adaptability across a range of conditions
- Used in pasture, specialist and renovating mixes
- Excellent persistence

Farm type



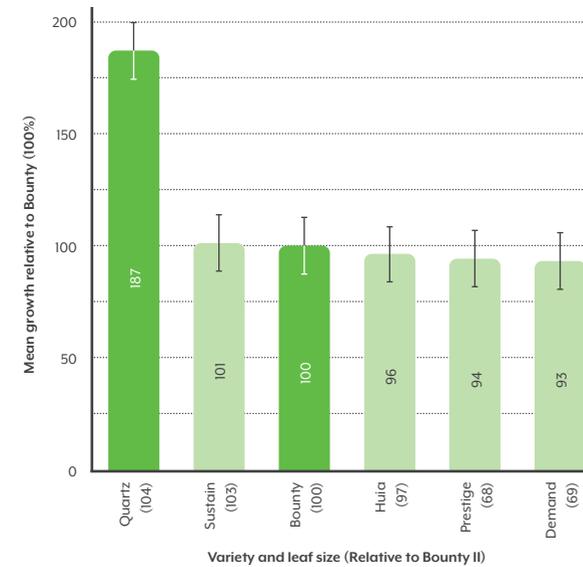
Sowing rate



4-6 kg/ha

Superstrike® Quartz with grass and herb components

Performance of clover cultivars in perennial ryegrass sward under beef cattle grazing, Manawatu



Trial conducted by AgResearch in Manawatu over four years (2011-2015) under rotational grazing. Clovers were grown with diploid perennial ryegrass containing AR37 endophyte.



The hill country constant

THE HILL COUNTRY CONSTANT

Bred to cope with more challenging environments from variable soil fertility to variable moisture availability, Hilltop is a very robust and persistent small-medium leaf white clover.

- Good persistence due to high stolon density, enabling it to tolerate a set stocking grazing system
- New Zealand bred to be competitive against invasive grasses such as browntop
- Good option for low soil fertility and summer dry conditions
- Well suited to wet and dry conditions of hill and high country grazing systems
- Oversewing option with Prillcote® seed treatment

Farm type



Sowing rate

4-6 kg/ha

Superstrike® Hilltop with grass and herb components

LIVEWEIGHT GAIN WITH AMIGAIN

Amigain is the latest generation red clover bred in New Zealand for increased persistence and performance in permanent pastures, high performance short-term pastures and pure sward red clover stands.

In a pasture mixture, Amigain provides spring, summer and autumn productivity ideal for increased animal performance, enhancing pasture management and fixing nitrogen.

As a specialist multi-year crop, Amigain provides high quality feed ideal for liveweight gain and/or improved condition scores of priority stock classes in sheep and deer systems.

- Bred to persist and perform in both pasture mixes and red clover stands
- Semi-prostrate growth habit to enhance persistence
- Excellent quality suitable for driving animal production
- Selected for a more fibrous root system
- Low formononetin (oestrogen) levels
- Increased Clover Root Weevil tolerance compared to white clover

Farm type



Sowing rate

PERENNIAL PASTURE MIX
4-6 kg/ha

Superstrike® Amigain

SHORT TERM PASTURE MIX
6-8 kg/ha

Superstrike Amigain

RED CLOVER STAND
10-12 kg/ha

Superstrike Amigain with
 2-3 kg/ha Superstrike Quartz
 white clover



Live weight gain with Amigain



THE DRYLAND STARTER

Subterranean clover (*Trifolium subterraneum*) is a prostrate annual clover well-suited to true dryland environments where white clover struggles to persist.

Bindoon was bred to replace traditional sub clover varieties and is recognised for its cool season productivity due to its high seed production and dense seedling regeneration.

Bindoon sub clover displays a very prostrate growth habit and produces a low, dense sward. Although relatively soft-seeded, it sets sufficient seed to ensure the reliable regeneration of plant populations.

- Highly productive, early- to mid-season subterranean clover
- Suited to summer dry conditions with well-drained soils
- Resistant to Red Legged Earth Mite
- Excellent seed set for increased persistence

Farm type



Sowing rate

STANDARD PASTURE MIX
4-6 kg/ha

Superstrike® or Prillcote® Bindoon

SPECIALIST STAND
8-12 kg/ha

Superstrike Bindoon



The dryland starter



The resilient performer

THE RESILIENT PERFORMER

Balansa clover (*Trifolium balansae*) is an annual clover offering strong spring production, excellent quality and the ability to tolerate waterlogged soils.

Taipan is a mid-maturing balansa clover with high levels of hard seed, allowing for flexibility when seasons are dry. Taipan can perform in various soil types and can grow in areas of medium rainfall with excellent waterlogging tolerance. With high dry matter production, Taipan can be grown for quality hay or as part of a perennial pasture system.

- Mid-season annual clover providing early spring feed
- Excellent production - Increased winter/early spring production compared to sub clover cultivars
- Good adaptability across a wide range of soil types and pH levels
- Ability to tolerate waterlogged soils
- Suited to pasture mixes with Winter Star II, Feast® II, Lush AR37 and Supercruise ryegrasses

Farm type



Sowing rate

4-6 kg/ha

Superstrike® or Prillcote® Taipan

Limited availability Spring 23



THE MULTI SYSTEM FIT CHICORY

Sika is a New Zealand bred chicory, that has been developed to meet the variety of farm systems this forage is now used in, such as a short-term summer fed crop, a multi-year specialist crop with or without clover and as a component of pasture mixes. Sika is a true perennial chicory with its parentage selected from plants collected out of long-term grazing trials at Ruakura, Hamilton. A core focus in the development programme was improved adaptability and performance over its predecessor Puna II chicory. Characterised by rapid establishment, strong seasonal production and improved disease tolerance and persistence Sika can be used as an annual crop, or as part of a perennial, multi-year sward.

Chicory is well recognised for its high nutritional feed quality, and users of Sika can expect increased yield and disease tolerance relative to Puna II and other commercially available cultivars.

Versatile, high yielding chicory used as both annual and perennial sward situations

- Rapid establishment and high annual production
- Versatile option suitable as an annual crop or true perennial
- Exceptional persistence under grazing
- NZ bred with strong disease tolerance
- Strong cool season activity and outstanding second year production
- Semi-erect for better crop utilisation by grazing animals
- Thick deep taproot offering drought tolerance

Farm type



Sowing rate

- PURE STAND
8 kg/ha
- IN MIXTURE WITH CLOVER
4-6 kg/ha
- STANDARD PASTURE MIX
1-2 kg/ha

The multi system fit chicory



THE PALATABLE, PERSISTENT HERB

Puna II chicory is a high-yielding forage with good nutritional value for grazing animals. It is a high quality feed for spring to late autumn. Puna II is a New Zealand bred, broad-leaved, perennial forage herb with a true perennial chicory parentage. With semi-erect growth Puna II is easy for your stock to harvest meaning more meat, milk or wool for you.

Grasslands Puna II chicory is the palatable persistent perennial chicory for you

- A true perennial chicory that lasts longer than one year
- Thick, deep taproot offering drought tolerance
- Multi-graze option that recovers quickly after grazing
- Strong persistence
- Tolerant to *sclerotinia*
- Excellent first year production
- Semi-erect for better crop utilisation by grazing animals

Farm type



Sowing rate

- PURE STAND
7-8 kg/ha
- STANDARD PASTURE MIX
0.5-2 kg/ha



The palatable, persistent herb

Rocket Fuel[®]

CHICORY AND CLOVER MIX



Fuel your farm

FUEL YOUR FARM

Rocket Fuel[®] – a customised versatile PGG Wrightson Seeds blend to fuel your animals. A combination of chicory, white clover and red clover with excellent animal performance potential. A high proportion of clover assists with the supply of nitrogen into the soil profile, promoting the growth of chicory to provide a dense cover to discourage weeds, including volunteer grass. The red clover component, alongside chicory, will provide high quality feed through a dry season, helping to reduce risk in summer dry areas.

- Highly palatable
- Excellent feed for high liveweight gains
- Provides high quality feed through summer
- High protein option for dairy farmers
- Recovers quickly after grazing
- High mineral content, particularly zinc, potassium and copper



= 13 kgs (1 bag per hectare)

*While stocks last. Components of the mix may change subject to availability.

Farm type



Sowing rate

13 kg/ha
1 bag per hectare

Stamina[™] 5

LUCERNE

STAMINA TO GO THE DISTANCE

Stamina[™] 5 is a grazing-tolerant, semi winter dormant (5) lucerne with excellent yield and forage quality in dryland conditions. High grazing tolerance makes Stamina 5 an ideal choice for grazing systems while offering flexibility in silage stands that are occasionally grazed.

- Grazing-tolerant lucerne that is semi winter dormant
- Highly productive in both grazing and hay/silage systems
- Strong persistence under grazing
- Tolerates periods of set stocking and close grazing
- Produces excellent quality hay
- Good overall resistance to most lucerne diseases

Farm type



Sowing rate

BARE SEED
8-10 kg/ha

SUPERSTRIKE[™] TREATED SEED
10-14 kg/ha



**Stamina to go
the distance**



VERSATILITY WHEN IT'S NEEDED

Grasslands Kaituna lucerne is a New Zealand developed lucerne selected for improved resistance to the range of insect pests and diseases. It is ideal for grazing and mixed regimes and is persistent under grazing and hay/silage production. Kaituna lucerne is highly productive in spring and summer, with later autumn and earlier spring growth than Wairau.

- Fine stemmed for better quality and palatability
- Semi-dormant in winter
- Versatile – persistent under grazing, hay/silage and mixed regimes
- High annual dry matter production
- Excellent pest and disease resistance



Farm type



Sowing rate

- BARE SEED**
8-10 kg/ha
- SUPERSTRIKE® TREATED SEED**
10-14 kg/ha

Sandy has been growing Kaituna for 3 years now and says "We have harvested over 15 tonne of dry matter each year through 3 cuts and a final autumn graze with lambs."

**SANDY URQUHART,
HAWEA**



Versatility when it's needed

Grass seed treatment

Regrassing is important for increasing pasture productivity and farm profitability. It is a process that requires thorough planning to achieve a successful outcome. Seed treatment has an important role to play in this process, helping protect young seedlings against invasive insect pests and diseases when they are at their most vulnerable stage (in the first 4-6 weeks after sowing). The successful establishment of forage grass is the critical first step in achieving a high yielding pasture.

SUPERSTRIKE® GRASS

Superstrike® grass is a filmcote seed treatment that combines insecticide, fungicide and plant nutrition additives.



Additive	Pest and disease protection/ nutrients	Benefit
Systemic insecticide	Argentine Stem Weevil (adults and larvae), Black Beetle (adults), Grass Grub (larvae)	Above and below ground protection against economically damaging insect pests, during the first 6 weeks after planting.
Contact fungicide	'Damping off' (Pythium, Fusarium)	Protects the root zone from 'Damping off' fungal pathogens in the first 3-4 weeks of establishment.
Nutrient	Zinc, Molybdenum, Manganese	Nutrients are distributed evenly around the seed and available for fast uptake by the germinating seedling.
Bird repellent		The green coloured treatment and the fungicide component have properties that help deter birds from eating surface-applied seed.

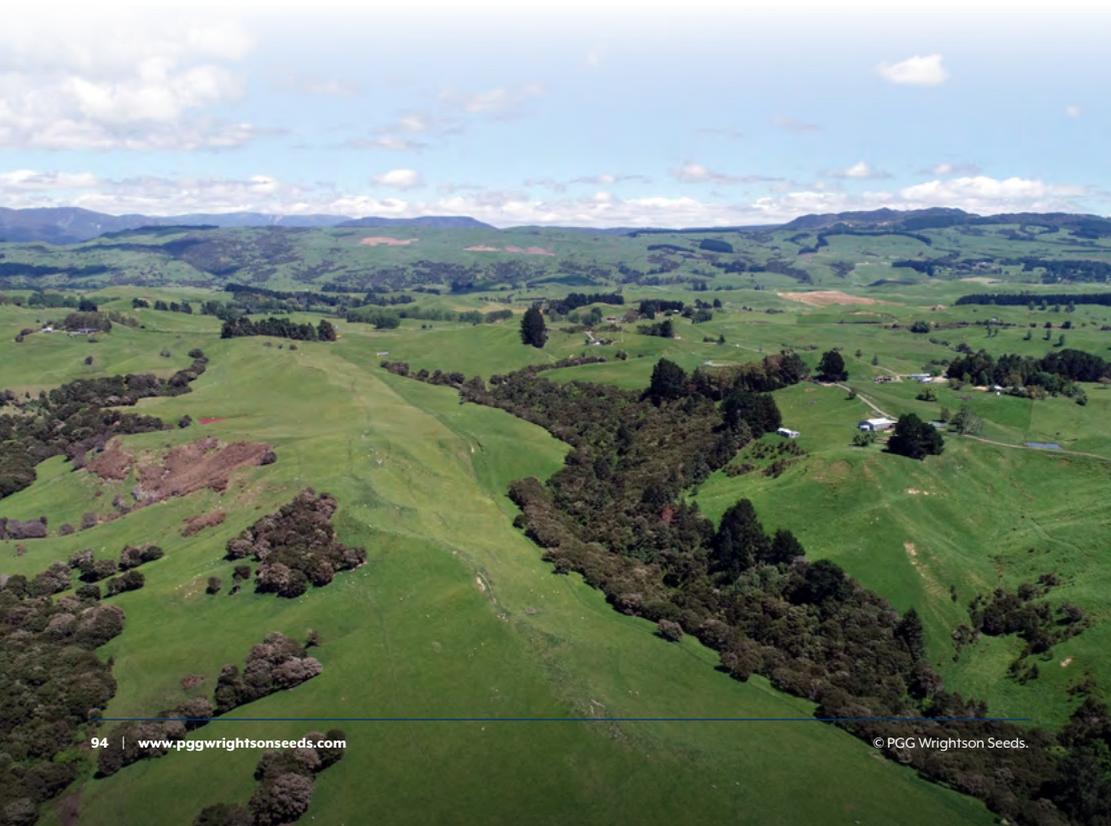


PRILLCOTE® GRASS

Prillcote® grass is a seed treatment developed for oversowing. It provides plant protection, plant nutrition and weight build-up additives formulated to improve the physical application of seed and the subsequent establishment and growth of grass seedlings in hill and high country environments.

**Prillcote®
grass**

Additive	Pest and disease protection/nutrients	Benefit
Contact fungicide	'Damping off' (<i>Pythium, Fusarium</i>)	Protects the root zone from 'Damping off' fungal pathogens in the first 3-4 weeks of establishment.
Nutrient	Lime	Provides the weight increase for improved ballistics, helping ensure more seed reaches its target on the soil surface. Also helps provide a localised pH correction around the seedling.
Bird repellent		The green coloured treatment and the fungicide component have properties that help deter birds from eating surface-applied seed.



Legume seed treatment

The application of plant protection and plant nutrition agents, in addition to rhizobia to clover and lucerne seed, are a very cost-effective means of delivering these additives to the soil to enhance the establishment and growth of seedlings. The successful establishment of clover seed is an important step in setting up a high producing pasture sward.

SUPERSTRIKE® CLOVER

Superstrike® clover is a seed treatment that combines plant protection and plant nutrition additives. The application of pesticide on clover seed is one of the few means by which seedlings can be protected against invasive and costly root-feeding nematodes during early plant development.

**Superstrike®
clover**

Additive	Protection/nutrients	Benefit
Systemic insecticide	Clover Root Nematodes	Protects the root zone during plant establishment.
Nutrient	Lime	Helps provide a localised pH correction around the seedling and assists root development.
Nutrient	Molybdenum	Provides a start-up supply of this important micronutrient, which is required for root nodulation and seedling growth. Molybdenum is distributed evenly around the seed and available for fast uptake by the germinating seedling.
Rhizobia*		Seed inoculated with nitrogen-fixing bacteria specific to clover.

*Continued presence of rhizobia after inoculation and establishment of rhizobia in pasture depends on many things and is not guaranteed.



PRILLCOTE® CLOVER

Prillcote® clover is a seed treatment developed for oversowing. It includes plant nutrition and weight build-up additives formulated to improve the physical application of seed and the subsequent establishment and growth of clover seedlings in hill and high country environments.



Additive	Nutrients	Benefit
Nutrient	Lime	Provides the weight increase for improved ballistics, helping ensure more seed reaches its target on the soil surface. Also helps provide a localised pH correction around the seedling and assists root development.
Nutrient	Molybdenum	Provides a start-up supply of this important micronutrient, which is required for root nodulation and seedling growth. Molybdenum is distributed evenly around the seed and available for fast uptake by the germinating seedling.
Rhizobia*		Seed inoculated with nitrogen-fixing bacteria specific to clover.

*Continued presence of rhizobia after inoculation and establishment of rhizobia in pasture depends on many things and is not guaranteed.



Product profiles for pasture seed treatment

Seed treatment	Used in	Pest protection	Disease protection	Nutrients included	Rhizobia	Weighted build-up	Sowing rates compared to untreated seed	Withholding period
Superstrike® Grass	Drill/broadcast	Argentine Stem Weevil (adults and larvae) Black Beetle (adults) Grass Grub (larvae)	Fusarium Pythium	Manganese Molybdenum Zinc	-	0%	Same as per untreated seed*	6 weeks
Prillcote® Grass	Oversowing	-	Fusarium Pythium	Lime	-	100%	Increase by 100%	-
Superstrike® Clover	Drill/broadcast	Clover Root Nematode	-	Lime Molybdenum	Yes*	75%	Increase by 75%	6 weeks
Prillcote® Clover	Oversowing	-	-	Lime Molybdenum	Yes*	75%	Increase by 75%	-
Superstrike® Lucerne	Drill	-	Pythium	Lime Molybdenum	Yes	25%	Increase by 25%	-
Superstrike® Herb	Drill/broadcast	Springtail	Fusarium Pythium	-	-	0%	Same as per untreated seed	6 weeks
Prillcote® Herb	Oversowing	-	Fusarium Pythium	Lime	-	100%	Increase by 100%	-

*Continued presence of rhizobia after inoculation and establishment of rhizobia in pasture depends on many things and is not guaranteed.
 *For Grass Grub protection, a minimum sowing rate of 15kg/ha is required.
 *For Superstrike® treated grass seed undersown into an existing pasture sward, the livestock withholding period is three 3 from sowing.
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North Island contact details



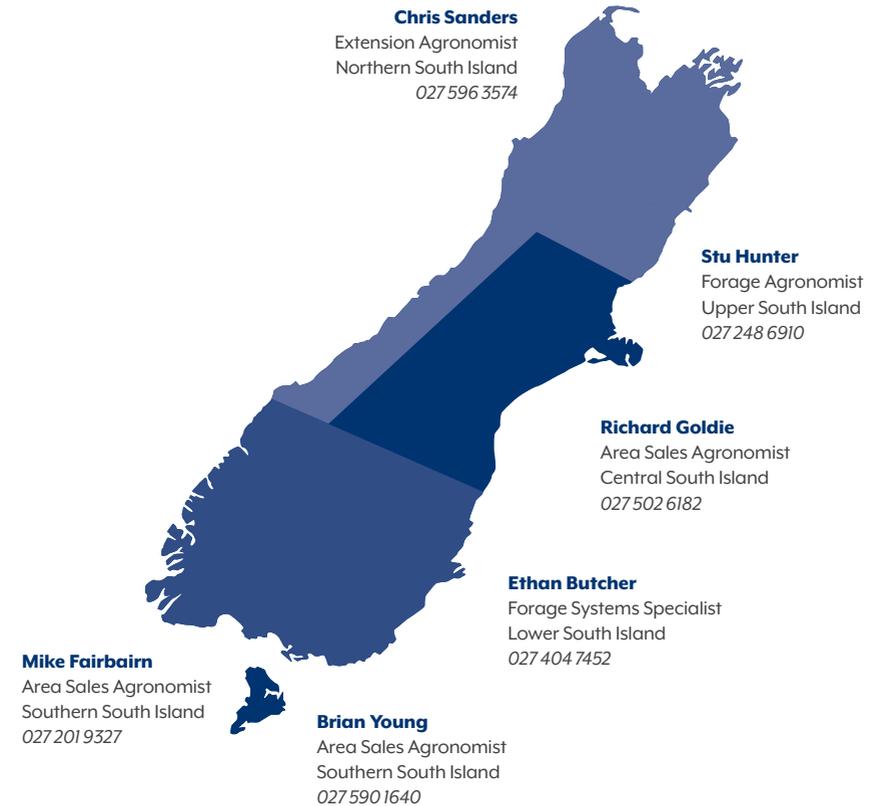
Charlie Longley
Sales and Marketing
Manager
027 569 4229

Emma Wright
Sale Operations
Manager
027 502 6179

Charlotte Westwood
BVSc, MACVSc, PhD
Veterinary Nutritionist
027 554 4541

Wayne Nichol
M.Ag.Sc (Dist)
National Technical
Manager
027 596 3975

South Island contact details



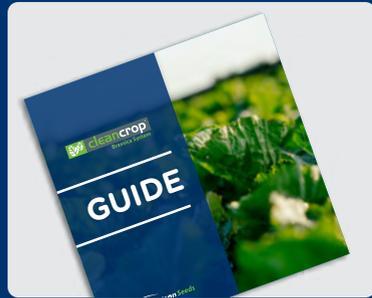
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