



GOLIATH®

BRASSICA OPTIONS

2009

Premium quality cultivars
for optimum performance.

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BENEFITS OF BRASSICAS

WHY SOW BRASSICAS?

Brassica forage crops provide farmers with a large amount of high quality feed (high in energy and protein) for their stock and should be considered in any situation where pasture quantity or quality is limiting the potential of livestock.

WHEN TO USE BRASSICAS

- Periods of feed shortage through the summer, autumn and winter
- To supplement periods of low pasture quality
- To finish stock
- When a summer safe feed is required
- Prior to pasture renewal

WHY CHOOSE PGG WRIGHTSON SEEDS BRASSICAS?

- We are New Zealand's market leading supplier of forage crop seed
- Our joint forage brassica programme combines our expertise with Plant & Food Research, NZ
- The result is a range of class-leading brassicas

We are committed to providing forage crop seed that not only produce high quantities of feed, but also lead to improved animal performance through feed quality, thereby providing positive benefits to the New Zealand farmer.

ANIMAL FRIENDLY™



PGG Wrightson Seeds pioneered the technique of using animal productivity as the best measure of a forage's performance. Our ANIMAL FRIENDLY™ certification is applied to our cultivars with the following characteristics:

Forages with yield and persistence, that have produced improved animal performance in a scientific trial(s) and/or shown improved physical attribute(s) linked to animal performance.

FACT FILE

Brassicas provide a bulk amount of high quality feed to maximise growth rates and increase the number of stock finished or maintained per hectare.

A brassica crop provides a break from pasture, decreasing pest levels, eliminating weed problems and with fertiliser helps correct soil fertility problems, resulting in cleaner, higher producing pasture.

Using brassicas helps avoid parasites and pathogens that cause animal health problems such as facial eczema and ryegrass staggers.

Brassica crops can increase stock productivity and therefore increase farm profitability.

RESEARCH &
DEVELOPMENT



CULTIVAR
SELECTION



OPTIMUM
PERFORMANCE

PASTURE RENEWAL

PGG WRIGHTSON SEEDS PROGRAMMED APPROACH™ TO PASTURE RENEWAL

The PROGRAMMED APPROACH™ is about implementing a plan that will maximise the potential of both a pasture and a forage crop. Done well, farmers will ensure they have a good supply of quality feed all year round.

IMPORTANT BENEFITS

- High quality feed when required
- Opportunity to break the perennial weed cycle using Glyphosate, leading to weed-free pastures
- Opportunity to break the clover pest cycle (e.g. Clover Root Weevil and Nematodes), leading to better clover establishment and production
- Opportunity to break the wild endophyte cycle to allow summer-safe grazing and successful introduction of novel endophytes
- No significant increase in labour requirements
- Encourages forward planning and the opportunity to address fertility and drainage issues earlier, which will ultimately result in more productive pastures and crops
- Increases the success of no-tillage cropping and pasture renewal systems

A PROGRAMME THAT SUITS YOUR SITUATION

The programme helps farmers by assisting them in identifying what species to grow and when to plant them for optimum production, therefore providing them with a better return from their investment in pasture renewal.

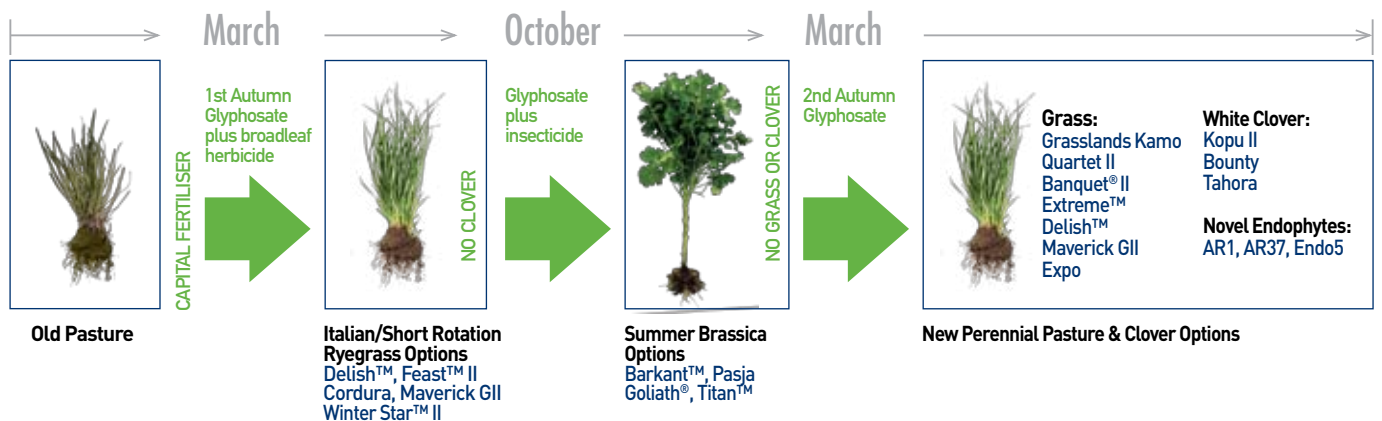
It has long been recognised that due to the diversity of New Zealand farming systems, there is unlikely to be one programme that is applicable to all farmers' needs. Two examples of the PGG Wrightson Seeds PROGRAMMED APPROACH™ are detailed here.

BOTH PROGRAMMES USE

- Multiple sprays of Glyphosate to knock out weeds
- A short-term endophyte-free ryegrass like FEAST™ II or DELISH™ or Maverick GII to produce high quality winter feed
- A brassica crop to provide feed for key "pinch" periods (summer and winter)
- A new permanent pasture mix containing high performing ryegrass cultivars with novel endophytes like EXTREME™, EXPO, BANQUET® II, Quartet II, DELISH™ and high performing clovers like Grasslands Kopu II or Bounty.

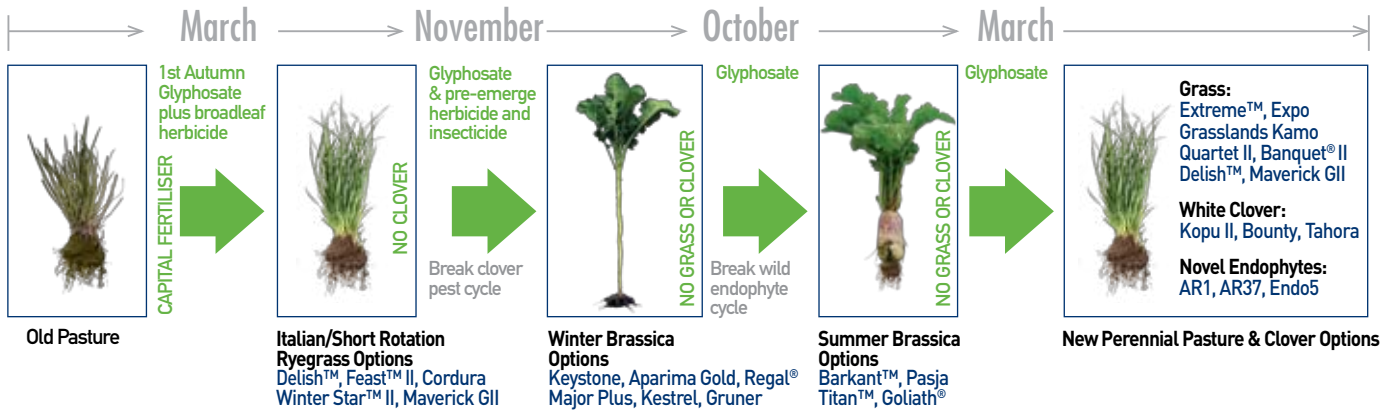
PROGRAMMED APPROACH™

EXAMPLE 1: SHORTER TERM SUMMER BRASSICA SYSTEM



PROGRAMMED APPROACH™

EXAMPLE 2: 24 MONTH PASTURE RENEWAL PLAN



SUMMARY

Regardless of what system you use, a key benefit of the PGG Wrightson Seeds PROGRAMMED APPROACH™ is the opportunity to maximise the productivity of the farm, through maximising the amount of dry matter (DM) and metabolisable energy (ME) produced.

The PGG Wrightson Seeds PROGRAMMED APPROACH™ to pasture renewal helps a farmer capture the full value of improved pasture genetics available in today's new grass and clover varieties.

For more information on how the PGG Wrightson Seeds PROGRAMMED APPROACH™ could work for you, contact us on 0800 805 505.

HOW IS ME MEASURED?

To determine the ME of a feed, the total (gross) energy of the feed is measured in a laboratory. Any energy that is lost in the dung, urine or gas (methane) is also measured, and subtracted from total (gross) energy. What is left is metabolisable energy, or ME, available to the animal.

By reducing the amount of energy lost from the animal via dung, urine and gas, the ME of feed is improved. By improving the digestibility of a feed, or selecting feeds with high digestibility, the amount of energy lost via these waste products is reduced, and therefore ME increases.

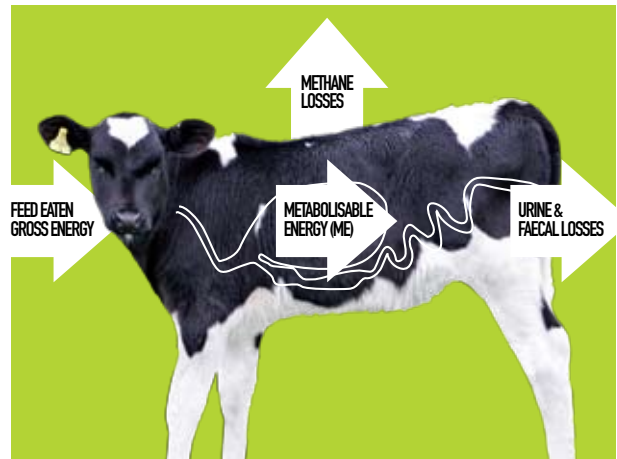
WHAT IS METABOLISABLE ENERGY (ME)?

Metabolisable energy (ME) is the energy available to stock from a particular feed source, measured as megajoules of metabolisable energy per kilogram of dry matter (MJME/kg DM). For every kilogram of feed there is a given amount of energy available. A key driver of animal production (milk, meat or wool) is a pasture or crop that delivers both feed quantity (dry matter production) and quality (ME).

THE KEY TO HIGH ME PRODUCTION SYSTEMS

- Grazing management
- Use a range of ryegrass cultivars that have different heading dates
- Use ryegrass cultivars with reduced aftermath heading

THE ME EQUATION



Brassic	ME	Grass, Clover, Pasture	ME	Pasture Components	ME
Forage brassica	12.8-13.6	Spring – immature	12.0	Ryegrass – green leaf	12.0-13.0
Forage rape	12.8	Late spring – leafy	11.0	Ryegrass – green stem	11.0
Summer turnips	13.6	Summer – leafy	10.0	Ryegrass – mature stem	8.0
Winter turnips	12.8-13.6	Summer – dry & stalky	9.0	Ryegrass – mature leaf	7.0-8.0
Kale	12.8	Autumn	11.8	White clover	12.0
Swedes	13.9	Winter	11.0	Chicory - leafy	11.7

GROSS ENERGY (FEED EATEN)



ENERGY LOST AS DUNG, URINE OR GAS



METABOLISABLE ENERGY (ME)

THE BRASSICA BREEDING PROCESS

The creation of a new brassica cultivar is like putting together a large and complex jigsaw puzzle. Over a number of years single pieces are fitted together until the puzzle is distinctly different, uniform and stable.

PGG Wrightson Seeds has a joint forage brassica breeding programme with Plant and Food Research, NZ and is the only programme in the world with a primary focus on forage crops for the grazing animal.

The breeding programme is innovative and combines modern scientific techniques with traditional field breeding, selection and animal performance assessment.

Kale and rape plants are not compatible and pollinations between these two species result in the death of the embryo. If this embryo can be 'rescued' early in the development it can be cultured into fertile and healthy plants.

Plant and Food scientists start the breeding process by embryo rescue to produce interspecific hybrid brassicas.



Kale and rape plants cross pollinated and seedlings developed by 'embryo rescue'.

These fertile and healthy plants can then be used in a traditional breeding programme to introduce genetic traits from kale into rape, as was done during the development of PGG Wrightson Seeds forage rape cultivars GOLIATH® and TITAN™.

THE BREEDING PROCESS

Individual seedlings are planted in the field and successful plants are selected with desirable agronomic traits and these become parents for new crosses.

All crossing is undertaken in a glasshouse as this excludes possible contamination from external sources throughout the pollination process.



Individual plants are crossed by hand and bagged with tissue paper to exclude foreign pollen from neighbouring plants.

Seed is taken from each cross and sown in the field and plants with desirable traits are selected for further selection and seed production.



Single row plantings of hand-crossed kale material for further field selection.

The effect of natural selection in the environment in which the cultivar will be grown is so simple in its application, yet so successful in its results.

The glasshouse crossing and field selection is repeated multiple times throughout the development of a new cultivar and is used to capture multiple desirable agronomic traits in a single new cultivar.

CONTROL OF BRASSICA DISEASE THROUGH PLANT BREEDING

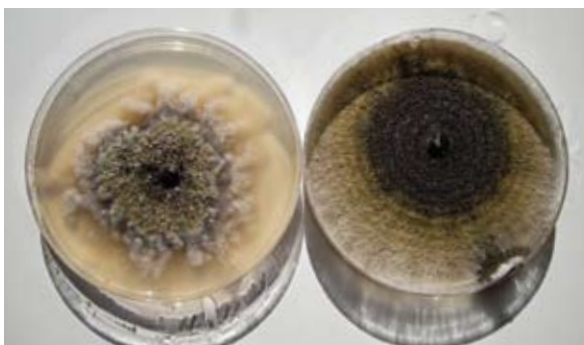
The control of disease through host resistance is an important part of the brassica breeding programme.

A difficulty of breeding for disease resistance is providing a constant disease environment in which to grow the crop so that tolerant plants are identified and selected from susceptible plants.

Natural disease epidemics do not occur in the field every year; disease screening is carried out in special infected field plots or by artificial inoculation in the glasshouse. Tolerant plants are identified and selected for further breeding.



Swede bulbs are selected from each breeding line and inoculated with two strains of dry rot fungus (*Phoma lingam*).



Two strains of dry rot fungus (*Phoma lingam*) cultured in the laboratory for inoculation into the swede breeding programme.



Single rows of breeding lines planted in the Gore clubroot infection paddock and tolerant lines identified (rows bordering the middle row).

FORAGE YIELD & ANIMAL PALATABILITY



Breeding lines are planted in trials and herbage yield and quality factors are measured against commercial cultivars.



Total forage yield of each breeding line is mechanically harvested and individual plant measurements like plant height and leaf to stem ratio is recorded.

To measure grazing-animal palatability each breeding line is sown and at crop maturity grazing animals are released onto the site and animal grazing behaviour is measured for each line with the most palatable lines being identified.



Animal palatability trial.

Both the agronomic and palatability results are used to make the final commercial decision on which breeding line will be released as a new and improved cultivar.

New cultivars can have improved agronomic yields, multiple grazing potential, disease tolerance traits and high grazing-animal palatability.

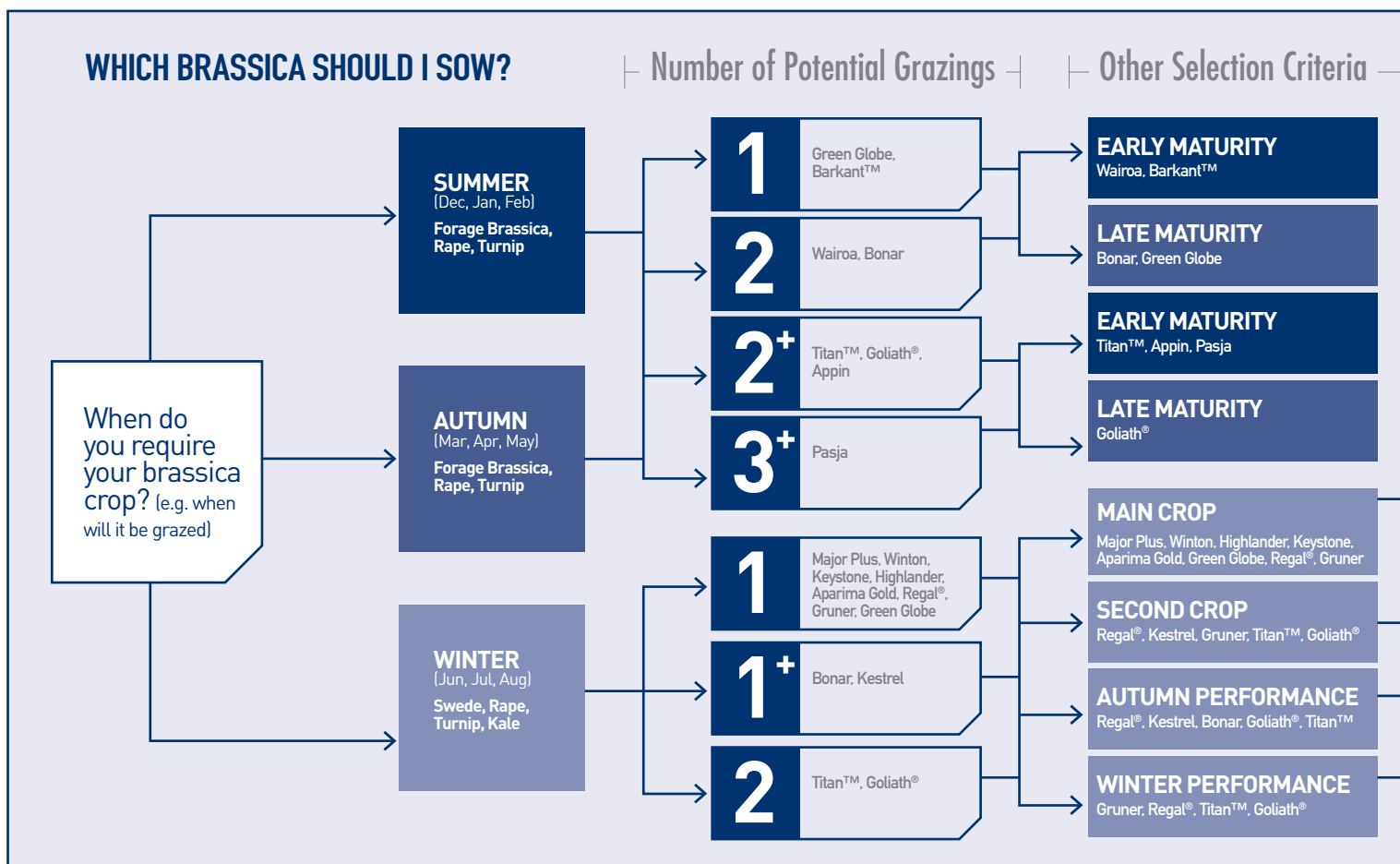
BRASSICA PLANNING

1. Soil test poor producing paddocks 6-8 weeks prior to sowing
2. Apply fertiliser and lime as per specific soil test recommendations
3. Aim to control all weeds prior to sowing
4. Sow the most suitable brassica crop for your needs at approx 1cm deep with a soil temperature of around 10°C and rising
5. Use ULTRA STRIKE®/SUPER STRIKE® treated brassica seed. This is recommended in both cultivated and direct drilling situations to enhance crop establishment and performance

FACT FILE: CROP HUSBANDRY

If brassicas are sown following a crop, consideration should be given to the previous crop's herbicides when making the brassica selection.

Ideally brassicas should not be planted more than once in a five-year rotation where clubroot or dry rot is a problem, even when using clubroot or dry rot tolerant varieties.



BRASSICA SOWING

1. Allow the paddock to get a pasture or weed cover of 2000kg DM/ha
2. Spray out with Glyphosate at the correct label rate
3. Three days later, hard graze to remove vegetation prior to cultivation or drilling
4. If cultivating, use conventional farm practises that result in a fine, firm, residual free seedbed
5. In cultivated situations, seed can be broadcast, then harrowed and rolled
6. If direct drilling or drilling into cultivated soil, seed should be sown at approximately 1cm and then rolled
7. Once the crop is sown, it is important to monitor the crop and apply the appropriate herbicides and insecticides to remove any weed or insect problems

FACT FILE: FERTILISERS

The soil pH level should be at least 5.6 and ideally between 5.8 and 6.2 for most brassicas. Crops should have at least 40-60kg phosphate/ha available at sowing.

Paddocks should have low soil sulphate levels. After grazing, a light application of nitrogen will greatly increase yields of subsequent growth. Avoid high nitrate levels in the crop.

WHITE FLESH

Winton, Highlander, Keystone

YELLOW FLESH

Aparima Gold, Major Plus

SHORT PLANT HEIGHT

Kestrel, Bonar

INTERMEDIATE PLANT HEIGHT

Titan™, Regal®

TALL PLANT HEIGHT

Gruener, Goliath®





Doug Turner - Rakaia Island Dairies

Swedes are the mainstay winter forage crop on the Turner family's large-scale once-a-day milking operation, Rakaia Island Dairies in mid-Canterbury.

Of the 110 hectares planted in winter brassicas, only about 15ha is kale this year, with the remainder in swedes.

"The good thing about swedes is you get very good feed utilisation, as you can't lose a swede's bulb. Swedes are also very high energy, so it's good quality feed," says Dave Turner, who with brother Doug farm Rakaia Island Dairies.

This season they are growing new release Keystone swede, a high yielding white-fleshed swede that offers high quality feed that can be fed throughout winter to all main stock classes. A key factor in deciding to sow Keystone was that it was trialled two years ago on their property and was noticed for its palatability. "We had two varieties in the paddock and the deer went to the new variety (Keystone) before they ate the other one."



NEW!

WHITE-FLESHED SWEDE

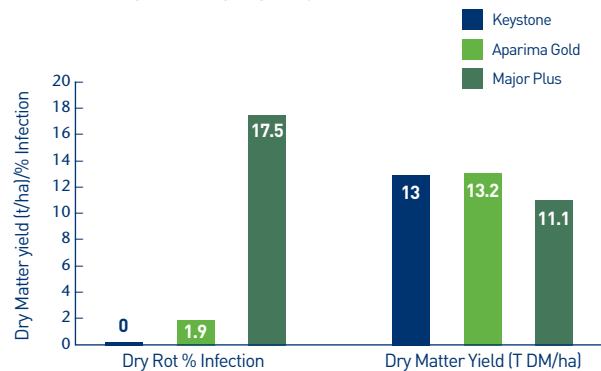
- Highest dry-rot tolerance of all commercially available swedes
- Bred and trialed by Plant and Food Research for NZ grazing systems
- High yielding, main crop swede, potential yield of 18,000kg DM/ha
- White-fleshed with medium maturity
- Excellent keeping qualities with high bulb percentage

AGRONOMIC SUMMARY

Keystone has been released following extensive trialling by Plant and Food Research, PGG Wrightson Seeds Research and a MAF funded Sustainable Farming Fund (SFF) project looking into dry rot prevention in swedes.

The main outcome being that the dry matter yield of Keystone is comparable to other leading white fleshed swedes including Highlander and Winton, but with a higher level of dry rot tolerance than any other commercially available swede.

SWEDE DRY MATTER YIELD (TDM/HA) AND DRY ROT INFECTION %



Trial results from 2007/08 Plant and Food Research, in Gore (Sustainable Farming Fund Project - Mitigation of Dry Rot in Swedes).

SWEDE SOWING RECOMMENDATIONS

Swedes, including Keystone, should only be used in a first crop situation to prevent dry-rot infection. In second crop situations alternatives include kale and forage rape.

If clubroot is likely to occur, Aparima Gold and Winton swede are better alternatives to other swede cultivars, including Keystone. Under high pressure from clubroot, kale should be used.

If there is a high risk of either dry rot or clubroot infection in the second year it is recommended to sow the paddock in either a pasture or cereal crop.

In environments where brassica crops can be exposed to very cold conditions post sowing followed by increasing temperatures (Southland/Otago), swedes should be sown no earlier than the 20th of November.

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



Robert and Stacey Young - Eastern Southland

Eastern Southland farmers Robert and Stacey Young are achieving yields of up to 20 tonne/ha with Aparima Gold swedes on their sheep, cattle and dairy support property near Gore.

Swedes are grown for their own sheep and cattle, as well as dairy grazing, with 40ha planted for this winter.

“We are getting good yields off Aparima Gold and it seems to be reasonably disease resistant. We grow one-year crops of swedes and then go back into grass and it is working well for us.”

Aparima Gold consistently yields higher than older varieties, last year averaging 16 tonnes DM/ha, with the best crop at 20 tonnes DM/ha. These are grazed from late May through to September, depending on the class of the stock. “Most of our stock are on swedes at some stage of the winter.”

“We have tried different varieties over the years and measured yields to find one that works for us. So far, Aparima Gold is the best we have had.”



YELLOW-FLESHED SWEDES

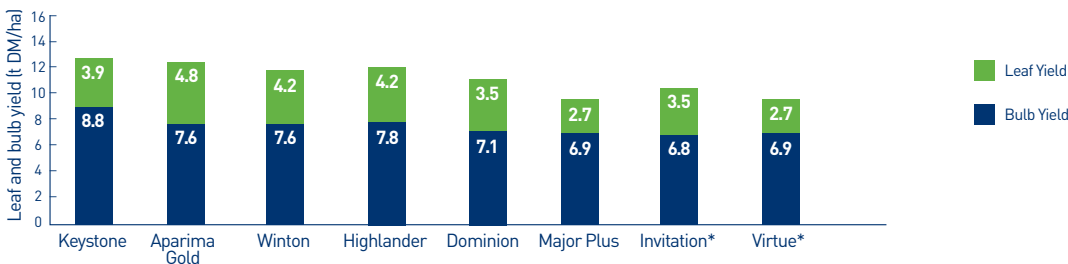
- High yielding main crop swede, potential yield 18,000kg DM/ha
- Bred and trialed by Plant and Food Research for New Zealand grazing systems
- Yellow-fleshed bulb with medium maturity
- Clubroot and dry rot tolerant
- Excellent keeping qualities with high leaf percentage
- A main crop, early maturing, soft bulbed swede
- Bred and trialed by Plant and Food Research for New Zealand grazing systems
- Good yielding swede with a potential of 16,000kg DM/ha
- Yellow-fleshed, light purple skinned bulb



WHITE-FLESHED SWEDES

- Main crop, medium maturing, white-fleshed swede
- Bred and trialed by Plant and Food Research for NZ grazing systems
- Clubroot and dry rot tolerant
- Disease resistance of Tina but yield potential of Highlander
- Main crop swede
- White-fleshed bulb
- Later maturing

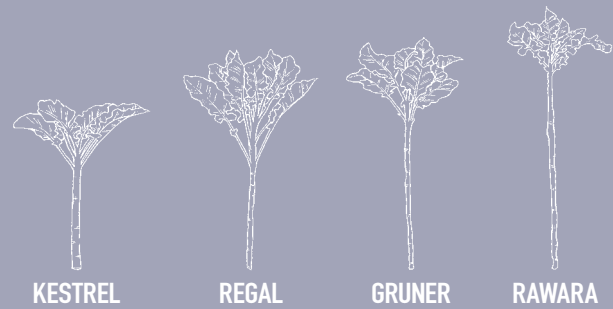
DRY MATTER PRODUCTION (T/HA) OF SWEDE CULTIVARS



Combined average results from trial site at Winton, results averaged from two years 2006/07 and 2007/08.
 * Indicates trial data only available for one year.

KALE OPTIONS

LEAF AND STEM CHARACTERISTICS OF FOUR KALE CULTIVARS



FEED VALUE OF KALE

In deciding which kale cultivar to use in a particular situation farmers should consider dry matter yield potential and differences between cultivars in nutritional value if the aim is to maximise animal performance and productivity.

DRY MATTER PRODUCTION

To drive productivity, the focus should be on maximising dry matter intake of individual animals (and the quality of that dry matter) and also on stocking rate. Therefore, as Figure 2 shows, cultivars such as Gruner and REGAL® offer key benefits, being high yielding whilst maintaining a high proportion of the dry matter as leaf relative to stem, the implications of which are outlined below.

NUTRITIVE VALUE

When feeding a kale crop there is always going to be a compromise between high animal performance and crop utilisation. To achieve both, a key focus in the development of cultivars such as REGAL®, Gruner and Kestrel has been maintaining a high leaf to stem ratio. As shown in Figure 1, leaf dry matter has a much higher nutritive value than stem material due to higher crude protein and soluble carbohydrate concentrations and lower fibre concentrations. Furthermore, because leaf is easier to harvest than stem material, dry matter intake will be higher on cultivars with high leaf to stem ratios and this should also lead to improved crop utilisation.

WHICH CULTIVARS DO I CHOOSE?

For sheep, young cattle and weaner deer the obvious choices are Kestrel and REGAL®. As the class of livestock gets bigger REGAL® and Gruner will be more suitable options.

FIGURE 1: KALE CULTIVAR FEED QUALITY INFORMATION

	REGAL	GRUNER	KESTREL	RAWARA	
LEAF	Leaflet				
	ME (MJ/kg DM)	13.7	13.8	13.7	13.7
	CP %	21	22	21	25
	NDF %	13	13	15	12
	Petiole				
	ME (MJ/kg DM)	13.6	13.7	13.7	13.5
CP %	8	9	8	11	
NDF %	20	19	20	20	
STEM	Upper stem				
	ME (MJ/kg DM)	13.7	13.7	13.9	13.3
	CP %	10	12	12	10
	NDF %	20	19	17	23
	Mid stem				
	ME (MJ/kg DM)	12.5	12.3	13.6	11.9
	CP %	6	6	10	5
	NDF %	32	33	23	37
	Lower stem				
ME (MJ/kg DM)	11.1	10.3	12.7	9.6	
CP %	3	4	6	2	
NDF %	45	48	30	53	

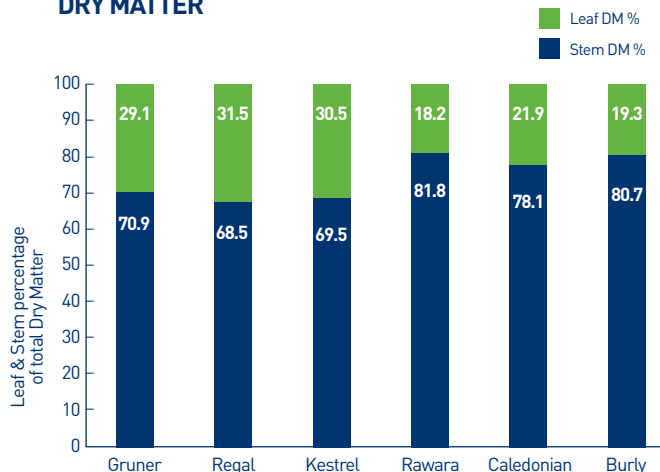
ME – Metabolisable energy (MJ/kg DM)

CP% – Crude protein as % of dry matter

NDF% – Neutral detergent fibre as % of dry matter

Data collected from Plant and Food Research Trial, Gore.

FIGURE 2: LEAF AND STEM PERCENTAGE OF TOTAL DRY MATTER



Combined average results from two Plant and Food Research trial sites 2007/08 in Gore and Lincoln.



Gareth Parkes - Longbush Farms, Nelson

Kestrel kale has quickly filled the role of providing the winter feed boost needed to get dairy cows in good condition for spring calving on a Nelson dairy support block.

Gareth Parkes manages the support farm for the Golden Bay dairy operation, Longbush Farms, milking 1400 cows.

Cows responded well to the Kestrel kale, putting on a 1-1.5 condition score.

Planted in mid-December, the crop yielded 15 to 18 tonnes of drymatter/ha. "Considering the season we had, with no rain to start with and quite a dry autumn, it did really well."

"Just to have a concentrated bulk feed in one area, frees up the rest of the farm for grazing other stock. We have increased our stock numbers with the kale."

The kale crop is also great for renovating under-performing paddocks as it gets rid of weeds and gives it time to fallow, before resowing in permanent pasture in spring, he says.

KALES

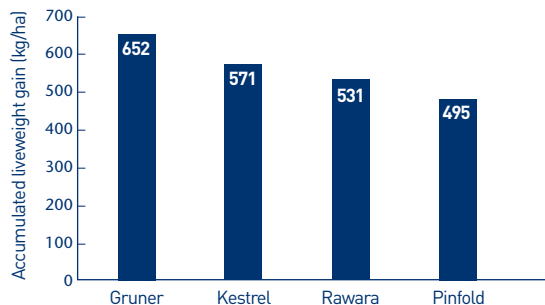


- Medium height kale with excellent leaf to stem ratio
- Excellent crop utilisation due to highly digestible stem
- Superior animal production due to enhanced forage quality
- Bred for low levels of SMC0 (S-methyl cysteine sulphoxide)
- Good regrowth if lightly grazed during late summer
- First and second crop option

- Very high yielding giant type kale with potential yield of 17,000kg DM/ha
- Highest leaf percentage of all giant kales available
- Excellent tolerance to frost and good leaf holding capability
- Good aphid tolerance
- A proven and reliable kale for NZ grazing systems
- First and second crop option



LIVEWEIGHT GAIN TRIAL (KG/HA) OF 1YR FRIESIAN BULLS GRAZING KALE



Adapted from Garrett, B.C.; Westwood, C.T.; Nichol, W.W. Nutritive value of optimising animal production from forage brassicas. Proceedings of the New Zealand Institute of Primary Industry Management 2000: 61-73.

For further kale trial results refer to pages 12 and 14.



Ken Harding - Woodville, Tararua

Sheep and beef farmer Ken Harding, who farms near Woodville, Tararua district, grew Regal kale for the first time last winter and says it is a noticeable improvement on other varieties.

"It was grown with three other kale varieties beside it as an on-farm comparison and it was ahead all the way, right from germination onwards." Sown on December 30, the crop was break-fed to rising two-year-old cattle for three months, from June 1 to the end of August, with the cattle also fed hay and baleage.

Ken says Regal kale was a heavy crop, yielding at the top end of expectations at around 18,000kg of drymatter/ha. "It had a massive stem and leaf and the cattle ate it well down."

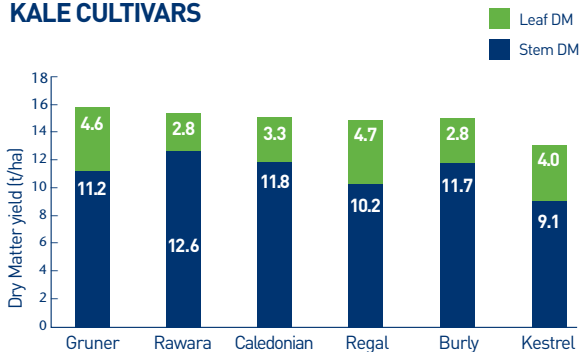
He would definitely grow Regal kale again. "I've been growing kale all my life and this is one of the best I've grown, because of the amount of growth and extra leaf and stalk. It's an improvement on other kales."



- High yielding intermediate height kale with a potential yield of 18,000kg DM/ha
- Bred and trialed by Plant and Food Research for New Zealand grazing systems
- High leaf to stem ratio
- Excellent crop utilisation due to selection for low stem fibre
- Very good winter hardiness and excellent pest and disease tolerance
- First and second crop option

REGAL[®] is an intermediate height kale which has been bred for a high leaf percentage for better utilisation, in conjunction with a high total yield in order to maximise stock productivity. Extensively trialed prior to commercial release, REGAL[®] has been proven to perform well against other kales in the market. In addition to this, field trials have shown REGAL[®] to be a very winter hardy kale with proven yield potential and feed value.

DRY MATTER PRODUCTION (T/HA) OF KALE CULTIVARS



Combined average results from two Plant and Food trial sites 2007/08 in Gore and Lincoln.

For further trial results refer to page 12.





Doug Taylor - Northland

A switch from cattle breeding to finishing prompted Northland farmer Doug Taylor to grow Titan forage rape for the first time this season, providing a bulk of feed to tide him through summer dry spells.

The property has 950 steers and 100 to 140 heifers on farm for finishing.

Previously all-grass farming, Titan rape has certainly done the job of providing a bulk of feed for the farm's biggest steers, he says. "The main idea is to have them on a crop so I can lighten up the stocking rate on the rest of the farm. It has worked well, holding them in a small area and letting the rest of the farm grow, even through dry weather."

Sown in the first week of November and grazed from the first week of February, he chose to graze it hard, even though it has excellent regrowth potential. "Cattle ate the stalk along with the leaf right down to the ground."



NEW!

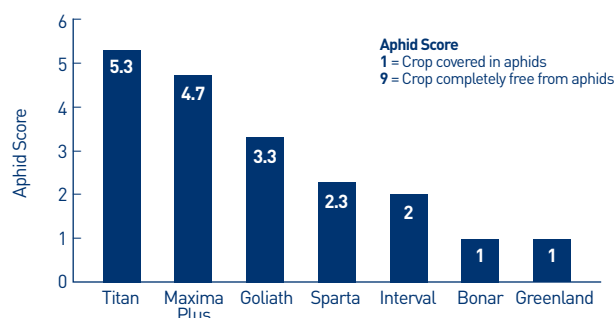


- A new generation rape x kale interspecies cross
- Bred and trialed by Plant and Food Research for New Zealand grazing systems
- Highest yielding multi-graze, intermediate height rape available with a potential yield of 10,000kg DM/ha
- Highest animal preference cultivar available (see page 16)
- Excellent regrowth potential
- Early maturing (70-90 days) similar to Rangi rape
- Suitable for summer, autumn and winter feed
- Excellent aphid and virus tolerance (see below)

TITAN™ forage rape is a high yielding, intermediate height rape which has been bred to replace Maxima Plus. TITAN™ has high aphid and virus tolerance and has shown excellent palatability against other commercially available rapes.

TITAN™ is an early maturing forage rape and can be used for summer, autumn and early winter feed. Suitable for all stock classes.

APHID SCORE OF DIFFERENT FORAGE RAPE (The higher the score the better)



Trial was conducted at the Plant and Food Research Centre, Canterbury, sown on the 28 November, 2007 and visual aphid scores taken after the first harvest on the 6 March 2008.

For further trial results for TITAN™ forage rape, refer to page 16.



Warwick Clausen - Feilding

Farming a sheep, beef and arable property on rolling country near Feilding, Warwick Clausen has grown Titan forage rape for the last two years.

Titan is used as lamb feed through late summer and autumn before its final grazing by rising one-year-old steers in winter. "We let it grow three times. I am very impressed with it."

Sown in early December, it is first grazed in February. "The biggest plus is its palatability. It can be hard to bring lambs off the hills and put them straight onto a greenfeed crop and get them to eat it. But stock take to Titan rape straight away, and there are no problems with rape scald."

"It's way better than grass for putting weight on lambs. We had reasonable grass this year with a good autumn, but the greenfeed-fed lambs were miles ahead."

"We've tried lots of other kales and rape, but you only get 1 1/2 grazings, while Titan keeps regrowing."

APHID TOLERANCE

Aphid tolerance is an important part of the breeding programme; aphid tolerant rape cultivars are developed by plant breeding and then selected under aphid pressure in the field with European bred rapes as the comparison (Sparta, Interval, Bonar and Greenland).



Gus Spence - Farm Manager, Dawson Downs, South Otago

Gus Spence manages Dawson Downs, a 920 hectare finishing farm in South Otago, finishing 30,000 lambs, 2400 deer and 1100 cattle each year.

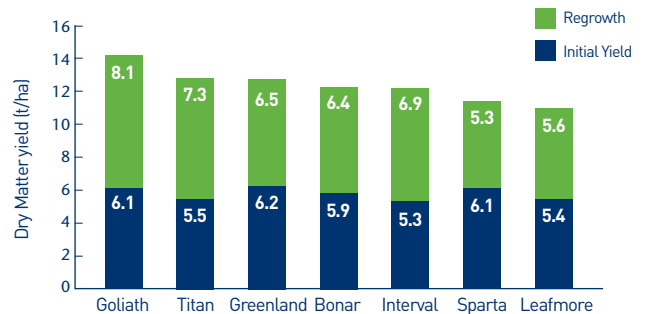
Goliath rape is an integral part of the finishing system with Goliath sown in October and then summer-grazed with lambs. This past season Gus has managed three grazings on Goliath with lambs being introduced at 34-36 kgLW. All lambs have hit target carcass weights of 17.5-18 kgCW after 5 weeks with an average weight gain of 250-300 gms/day during this period.

"We have found that rape-finished lambs in comparison to grass-finished lambs have yielded 2-4% higher at the works. Off a 25 ha Goliath crop in our deer block this season we have been able to polish off 6000 lambs so far, this will then be shut-up and break-fed in winter to maintain 1500 weaner deer for 6 weeks." As Gus said – "You can never have too much forage rape".



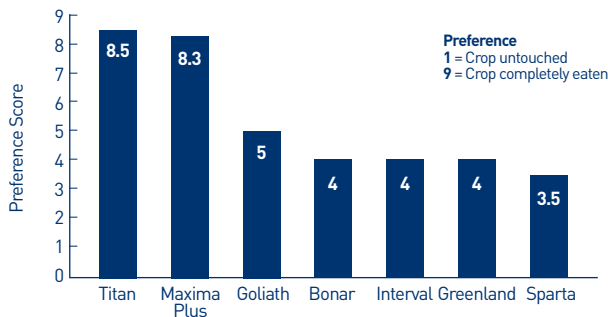
- A new generation rape x kale interspecies cross
- Bred and trialed by Plant and Food Research NZ for New Zealand grazing systems
- Highest yielding multi-graze giant rape available, a potential yield of 10,500kg DM/ha
- Multi-purpose forage rape with excellent summer/autumn/early winter feed
- Superior regrowth potential with excellent winter keeping properties
- Maturity of 90-110 days
- Good aphid tolerance (see page 15)

DRY MATTER PRODUCTION (T/HA) OF FORAGE RAPES



Trial was conducted at the Kimihia Research Centre, Canterbury sown on the 25 November, 2007 and harvested on the 11 January 2008 and 1 April 2008.

STOCK GRAZING PREFERENCE OF DIFFERENT FORAGE RAPES (The higher the score the better)



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

STOCK GRAZING PREFERENCE

Good animal-grazing palatability is an important aspect of developing a new forage rape. The PGG Wrightson Seeds brassica breeding programme develops new cultivars with increased palatability by conducting animal-grazing preference trials comparing a new breeding line's palatability against commercially available cultivars.



Goliath crop break-fenced showing residuals to encourage regrowth.



Colin White & Kirsten Kiernan - Hawera, Taranaki

Colin and Kirsten milk 195 cows on the property at Hawera in Taranaki.

"Barkant turnips have been an important component of our production curve for the last four or five seasons. I just wish we had got onto them earlier," commented Colin.

"This year the turnips were planted into one of our more fertile paddocks by direct drill. Almost unbelievably our crop yield was measured at 19 tonnes DM/ha. I believe we made two key decisions affecting yield, spraying for leaf miner early and the application of nitrogen at ground cover.

We had two separate planting dates which enabled us to start feeding earlier and finish later. Unless it is an unusually dry season we can maintain good production (410kg ms per head) with just good pasture and Barkants. We've found other supplements time consuming and expensive, turnips are so easy. I'm not keen on spending all day on the tractor and we have the added benefit of new pasture."

"How would we describe our success with Barkant turnips?"

"Quite easily," say Colin and Kirsten – "just brilliant."

TURNIPS

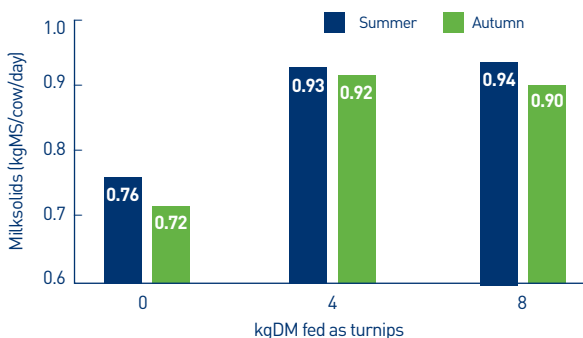


SUMMER TURNIPS

- Highest yielding summer bulb turnip available, a potential yield 15,000kg DM/ha
- High leaf to bulb ratio resulting in high levels of protein
- Shown in an independent animal trial to increase summer/autumn milksolids production by 25%
- Tankard bulb shape to enhance utilisation and reduce risk of choke associated with round bulbs
- Early maturing (60-90 days) for excellent summer feed

Barkant™ turnips produce high quality feed with a high metabolisable energy (ME) value, meaning greater animal performance can be achieved. It is a high performance feed for lactating dairy cows supplying the energy required to boost milk production.

EFFECT OF INCREASING ALLOWANCE OF TURNIPS ON MILKSOLIDS YIELD



(All cows given supplementary pasture at 25kgDM/cow/day)
 Harris, S.L., Clark, D.A. Waugh, C.D., Copeman, P.J.A. and Napper, A.R. 1998.
 Use of Barkant turnips and Superchow sorghum to increase summer-autumn milk production.
 Proceedings of the New Zealand Society of Animal Production 58: 121-124.

HOW PROFITABLE ARE TURNIPS IN A DAIRY SYSTEM?

Profitability of turnips in a dairy system depends on:

- Value of milksolids
- Milksolid response
- Level of pasture substitution

COSTS & RETURNS (\$ PER HA) OF ESTABLISHING A CULTIVATED BARKANT TURNIP CROP FOR DAIRY GRAZING

AVERAGE COSTS		YOUR WORKING
Average Establishment Costs	\$1,399	
GROSS RETURNS		
Average yield (kg DM/ha)	13,000	
80% Utilised yield (kg DM/ha) (assuming 20% wastage) (13,000 x 80%)	10,400	
Milksolids/ha response (80g MS/kg turnip eaten) (10,400kg DM/ha x 0.08)	832 kg MS	
Gross returns (@ \$4.55/kgMS) (832 x 4.55)	\$3,785.60	
NET RETURN		
Gross Returns - Average Costs (\$3,785.60) - (\$1,399) =	\$2,386.60	

Developed from the Forage Brassica Development Group, "Best Management Practices for Forage Brassica, May 2008 Workshop Handout".



Murray Eason - Waikouaiti, East Otago

Sheep and cattle farmer Murray Eason uses Green Globe turnips to winter cattle on a hill country block inland from Waikouaiti in East Otago.

Although the block is reasonably high altitude at 700m, winter-hardy Green Globe handles the cold conditions and occasional snow. "It is easy to grow."

Two paddocks totalling 80 hectares are grazed by 350 head of cattle over winter. "As it is too far away (30km) from the home block to visit regularly, we don't break-feed, instead giving cattle the whole paddock."

"We put the cattle on in late May/early June and aim to get a good 2 ½ months out of it."

The property has its own breeding cows, with calves and some of the 18-month cattle grazed on Green Globe. "As most of these will be sold in spring, winter feed is important to have these in good condition and Green Globe fills this role."

Green Globe TURNIP

SUMMER/WINTER TURNIPS

- Multi-purpose product can be sown for grazing in summer, autumn and winter
- Most winter hardy bulb turnip available
- Good yield potential (10,000kg DM/ha)
- Late maturing (90 – 120 days)

SUGGESTED CROP

This crop can be used as a summer dairy option. Given the different maturity dates of summer turnips the following practice may help in maximising summer milk production. Planting 2/3 of the crop area in BARKANT™ and 1/3 in Green Globe turnips at the same time, **in different paddocks**, provides farmers with a summer feed that can be grazed from 60–120 days. This is because the early maturing BARKANT™ can be grazed from 60–90 days and the later maturing Green Globe grazed from 90–120 days after planting. Using this system, farmers don't have to worry about the quality of their turnip crop declining because they are trying to maintain an early maturing cultivar for too long, and they don't need to worry about reduced yields by having to graze a later maturing crop too early.

Green Globe and BARKANT™ complement each other very well and provide a better option than planting turnips with a medium maturity date, as they don't get the benefits of early or late feed quality and quantity.

TIME OF FEEDING

BARKANT™	Early – mid summer
Green Globe	Late summer/autumn



WINTER TURNIPS

- High leaf yields from multi-crowned bulbs
- Excellent regrowth potential
- Firmly anchored for minimum wastage
- Particularly useful for late sowing
- Clubroot tolerant



Tim Armstrong - Ora Station, Dannevirke

Ora Station is situated near Akitio on the coast east of Dannevirke. In recent years forage crop has been an integral part of the farm programme. Summer crops in particular have made a real difference to productivity. This year there is a 50-50 split of Pasja leafy turnip and Goliath rape, each around 60 hectares.

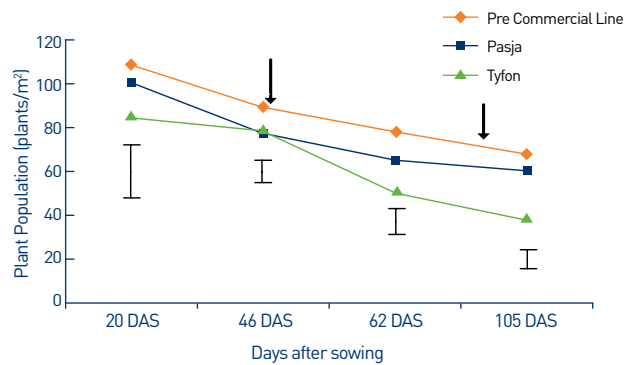
"In better rainfall summers we rotationally graze the Pasja in sequence with approximately 100 lambs/hectare. This year being quite a lot drier we have had to set-stock at a lower rate of 50 lambs/hectare. We prefer the rotational system because we can optimise grazing height much better.

Our good lambs can grow at 350gms a day and the telling factor is yield which improves from 38% on grass to 44-46% off the Pasja. We anticipate our first grazing before Christmas after weaning lambs onto grass for a week or so first. Having quality summer crop has made a real difference at Ora Station. Quite honestly without them, we would be back to sending all our lambs away as stores and giving away that margin". was Tim's summary of the programme.



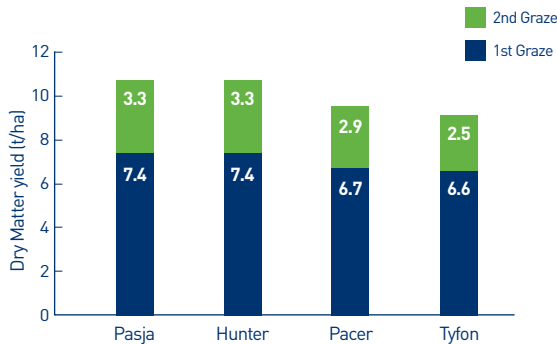
- High yields from successive grazings (potential yield of 12,000kg DM/ha over multiple grazings)
- Fast establishing, high quality feed ready for grazing within 42-70 days of sowing
- Excellent plant persistence after multiple grazings
- Provides a flexible grazing option for all stock classes over summer and autumn
- Minimal ripening requirement

PLANT PERSISTENCE OF MULTI-GRAZE LEAFY TURNIPS



Trial conducted at Kimihia Research Centre, Canterbury. Plant number reductions over two regrowth periods over the summer, trial was sown 2 November 2006. Arrows indicate the time of grazing (47 DAS) and (99 DAS). Bar=LSD 5%.

DRY MATTER PRODUCTION (T/HA) OF MULTI-GRAZE LEAFY TURNIPS



Trial conducted at Aorangi Research Farm, Palmerston North by Plant and Food Research. Trial was sown on 5 December 2007 and harvested on 5 February 2008 and 14 March 2008.



Pasja (foreground) and Tyfon (background) on 1 February 2007 (105 DAS) on the second regrowth period. Photo shows the improved persistence of Pasja relative to Tyfon.



- High forage yields
- Highly palatable
- Rapid maturing
- Provides a flexible grazing option

BRASSICA CROPS

FEEDING RECOMMENDATIONS FOR BRASSICA CROPS

The following basic feeding guidelines have been developed from many years of trialling and monitoring brassica crops, and are designed to help maximise animal production from brassicas.

1. DON'T ALLOW STOCK SUDDEN UNRESTRICTED ACCESS TO A BRASSICA CROP.

Sudden access can upset the balance of rumen microbes, resulting in poor animal performance, scouring and acidosis. Start by grazing the crop for no more than 1-2 hours per day, building up to a maximum allowance over at least 7-10 days. Allow rumen microbes time to adjust to the high quality forage.

2. FEED EXTRA FIBRE PRIOR TO AND WHILE GRAZING BRASSICA CROPS.

Forage crops are highly digestible, and don't contain much 'effective fibre', the sort of fibre that makes animals chew.

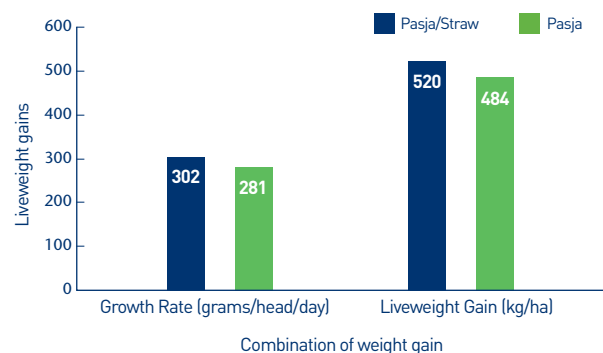
Feeding extra effective fibre means:

- More chewing and increased salivation, which helps maintain rumen pH and as a result there will be fewer digestive upsets.
- Slower flow of feed through the rumen and gut, with a more effective rumen fermentation.
- Increased cud chewing and more effective digestion. Extra fibre should be given prior to and throughout the brassica feeding period, through access to pasture, hay or straw. This will help to prevent gorging, help rumen microbes adjust to the feed and help to maintain normal rumen function. It is suggested that 20-30% of the diet is fed as hay, straw, or runoff pasture.



FEEDING A SOURCE OF FIBRE WITH PASJA

LAMB GROWTH RATES AND PER HECTARE PRODUCTION RESULTS



Lambs supplemented with ryegrass straw grew at faster rates than lambs fed no fibre.

3. FEED BRASSICAS AS PART OF A BALANCED DIET.

Animal performance on brassicas is best when crops are fed strategically as part of a balanced diet. For example, the high protein and energy of brassicas complements stalky summer ryegrasses which can be deficient in energy and protein, or whole-crop cereal and maize silages which are low in protein. Feed dry stock no more than 70-80% of the diet as brassica, and feed dairy cows no more than 33% of their diet as brassicas if milk is being sent to the factory.

4. AT ALL TIMES GIVE ANIMALS ACCESS TO WATER WHEN GRAZING A BRASSICA CROP.

Although the water content of brassicas is high, it is recommended that animals have access to fresh water at all times as a limited water intake will cause an animal's dry matter intake to decline.

5. RECOGNISE POTENTIAL FOR STOCK HEALTH PROBLEMS.

Feeding brassicas can sometimes be associated with animal health problems. Risk can often be avoided by good agronomic and grazing management.

For more information call 0800 805 505.

GRAZING WINTER FORAGE CROPS

BEST MANAGEMENT PRACTICES

Water quality is an environmental issue receiving more attention in our overseas markets and at home.

Break feeding stock on a winter crop can result in bare, often pugged soil, with concentrated amounts of effluent on the soil surface. Rainfall and the resultant overland flow can transport sediment and effluent into drains and waterways. This results in the loss of valuable topsoil which can silt-up drains and affect tile outfalls as well as increasing nutrients (N and P) in the water as well as bugs and pathogens.

Outlined below are practical tips in the preparation and grazing of brassica crops to reduce the impact on water quality. The suggestions are based on outcomes from a MAF Sustainable Farming Fund project supported by the Otago Regional council conducted on grazed crop ground in Otago and recommended guidelines by Environment Southland.

PLANNING (PRE CULTIVATION)

- Consider where overland flow can enter waterways during winter grazing and commence cultivation so that a grass margin (filtering buffer zone) is in place adjacent to these areas. A minimum buffer zone of 3-4m adjacent to the edge of drains and water courses is recommended, this may need to be wider on steep country or where natural dips in the landscape occur. In Southland this 3-4m buffer zone is enforced for all stock classes. The filtering buffer zone of long grasses is left ungrazed by fencing off with electric fences, providing a sediment and nutrient trap within the paddock that will maintain water quality and save farmers money in the long run.
- Ensure trough water is available so stock can be fenced out of stream margins.

GRAZING

- Periods during significant rainfalls are high risk for water quality; consider moving stock away from areas adjacent to waterways or sensitive water shed areas.
- Adjust feed intake to weather conditions. In cold wet conditions feed demand is higher and utilisation is lower. Underfed stock wandering in search of feed adds to the potential soil loss through physical damage

and sediment entering waterways.

- Where practical, begin grazing paddocks at the point furthest from the waterway.
- Look to graze potentially sensitive zones during periods when weather is settled and predicted rainfall is low.

The photographs below (taken July 2005) illustrate good and poor wintering management practices. The first picture shows good management practices including a wide buffer zone protected by electric fencing. The second photo could easily have been improved by the use of fencing and grass buffer strips.

GOOD MANAGEMENT



3-4 m stock buffer zone

BAD MANAGEMENT



Stock allowed free access to water course

Photos courtesy of Environment Southland.
Regional councils differ in their regulations relating to riparian areas, check your local regional council rules with respect to grazed crops.

PESTS & DISEASES

PEST		PREVENTION/CONTROL
Aphids		<ul style="list-style-type: none"> ULTRASTRIKE® seed treatment Aphid tolerant varieties Contact insecticide Recognise flight periods and control infestations early
Grass Grub		<ul style="list-style-type: none"> Heavy grazing (March-June) to reduce Grass Grubs' feed supply Thorough cultivation in spring Granular insecticide
Leaf Miner		<ul style="list-style-type: none"> Removal of alternative hosts (e.g. Fathen, Sowthistle etc.) to prevent build-up of numbers
Diamond Back Moth		<ul style="list-style-type: none"> Removal of old brassica plants which may act as carry over hosts Application of contact insecticide
White Butterfly		<ul style="list-style-type: none"> Natural predators (e.g. hoverfly, harvestman and parasitic wasps) Removal of old brassica crop, debris and weeds to prevent overwintering and localised build-up Contact insecticide
Wheat Bug (Nysius)		<ul style="list-style-type: none"> ULTRASTRIKE® seed treatment Control of weeds around crop borders will help reduce localised numbers Contact insecticide
Springtail		<ul style="list-style-type: none"> ULTRASTRIKE® or SUPERSTRIKE® seed treatment Contact insecticide
White Fringed Weevil		<ul style="list-style-type: none"> Thorough cultivation should be carried out through late spring and summer prior to sowing in infested areas, clean fallow reduces numbers Granular insecticide sown with seed
Greasy Cutworm		<ul style="list-style-type: none"> Good seed bed cultivation and compaction Granular insecticide sown with seed or worked into the top 15cm of soil
Slugs		<ul style="list-style-type: none"> Slug bait should be applied when extreme slug numbers are present or in direct drilling situations slug bait should be applied in two half applications
Argentine Stem Weevil		<ul style="list-style-type: none"> ULTRASTRIKE® seed treatment Removal of host ryegrass plants Recognise flight periods and control infestations early Contact insecticide
DISEASE		PREVENTION/CONTROL
Dry Rot		<ul style="list-style-type: none"> Use rape or kale Crop rotation and minimise crop residual in second year crops
Black Rot		<ul style="list-style-type: none"> Bury previous crop debris Crop rotation
Leaf Spot		<ul style="list-style-type: none"> Insecticide
Ring Spot		<ul style="list-style-type: none"> Crop rotation
Clubroot		<ul style="list-style-type: none"> Crop rotation Use kale
Wirestem/Damping Off seedling diseases		<ul style="list-style-type: none"> ULTRASTRIKE®/SUPERSTRIKE® seed treatment

SEED TREATMENT

ULTRASTRIKE®

SUPERSTRIKE®

ULTRASTRIKE® Brassica is a broad-spectrum seed treatment that combines highly advanced protective additives which have been specifically formulated to enhance the establishment and performance of brassica crops. ULTRASTRIKE® with its additional insect protection, in conjunction with fungicide protection, provides the most comprehensive level of pest protection in the brassica seed treatment market.

ULTRASTRIKE® BRASSICA SEED TREATMENT INCLUDES:

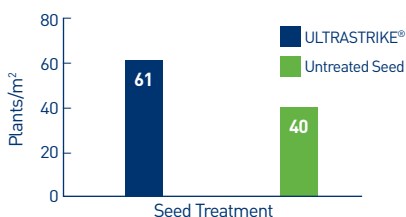
1. A systemic insecticide to control Springtail, Aphids, *Nysius* (Wheat Bug) and Argentine Stem Weevil during plant establishment. Springtail and Aphids are the pests most frequently responsible for brassica crop failures during establishment. Under good growing conditions ULTRASTRIKE® will provide 10 weeks protection against Aphids.
2. Two contact fungicides effective against the 'Damping Off' diseases *Pythium*, *Fusarium* and *Rhizoctonia solani* (Wirestem).
3. Molybdenum, an essential trace element for general brassica growth and to reduce the risk of 'Whiptail', which causes a reduction in leaf size and irregularities in leaf formation.
4. Bird repellent, important for broadcast sowing.

RECOMMENDED USE

ULTRASTRIKE® Brassica seed treatment is recommended for all winter brassica crops such as kale and swedes. These crops require protection over an extended period from pests such as Aphids. Autumn sown crops and no-tillage sowings should also be protected with ULTRASTRIKE® because of the increased threat of insect pressure.

PLANT ESTABLISHMENT

Number of Bonar rape plants/m², establishing three weeks after sowing (Amberley, North Canterbury), under Springtail pressure.



SUPERSTRIKE® Brassica is a broad-spectrum seed treatment which combines highly advanced protective additives which have been specifically formulated to enhance the establishment and performance of brassica crops.

SUPERSTRIKE® BRASSICA SEED TREATMENT INCLUDES:

1. A systemic insecticide to control Springtail during plant establishment. Springtail is the pest most frequently responsible for brassica crop failures, destroying unprotected seedlings at emergence.
2. Two contact fungicides effective against the 'Damping Off' diseases *Pythium*, *Fusarium* and *Rhizoctonia solani* (Wirestem).
3. Molybdenum, an essential trace element for general brassica growth and to reduce the risk of 'Whiptail', which causes a reduction in leaf size and irregularities in leaf formation.
4. Bird repellent, important for broadcast sowing.

RECOMMENDED USE

SUPERSTRIKE® Brassica seed treatment is recommended for spring-sown summer brassica crops such as rape or turnips where Springtail is generally the major insect pest that affects plant establishment. In regions where Aphids, Argentine Stem Weevil and *Nysius* (Wheat Bug) pressure is likely to be low during the establishment period, SUPERSTRIKE® will provide very cost effective protection for winter crops such as kale and swedes.

BRASSICA ESTABLISHMENT UNDER SPRINGTAIL PRESSURE

UNTREATED BRASSICA

SUPERSTRIKE® TREATED BRASSICA

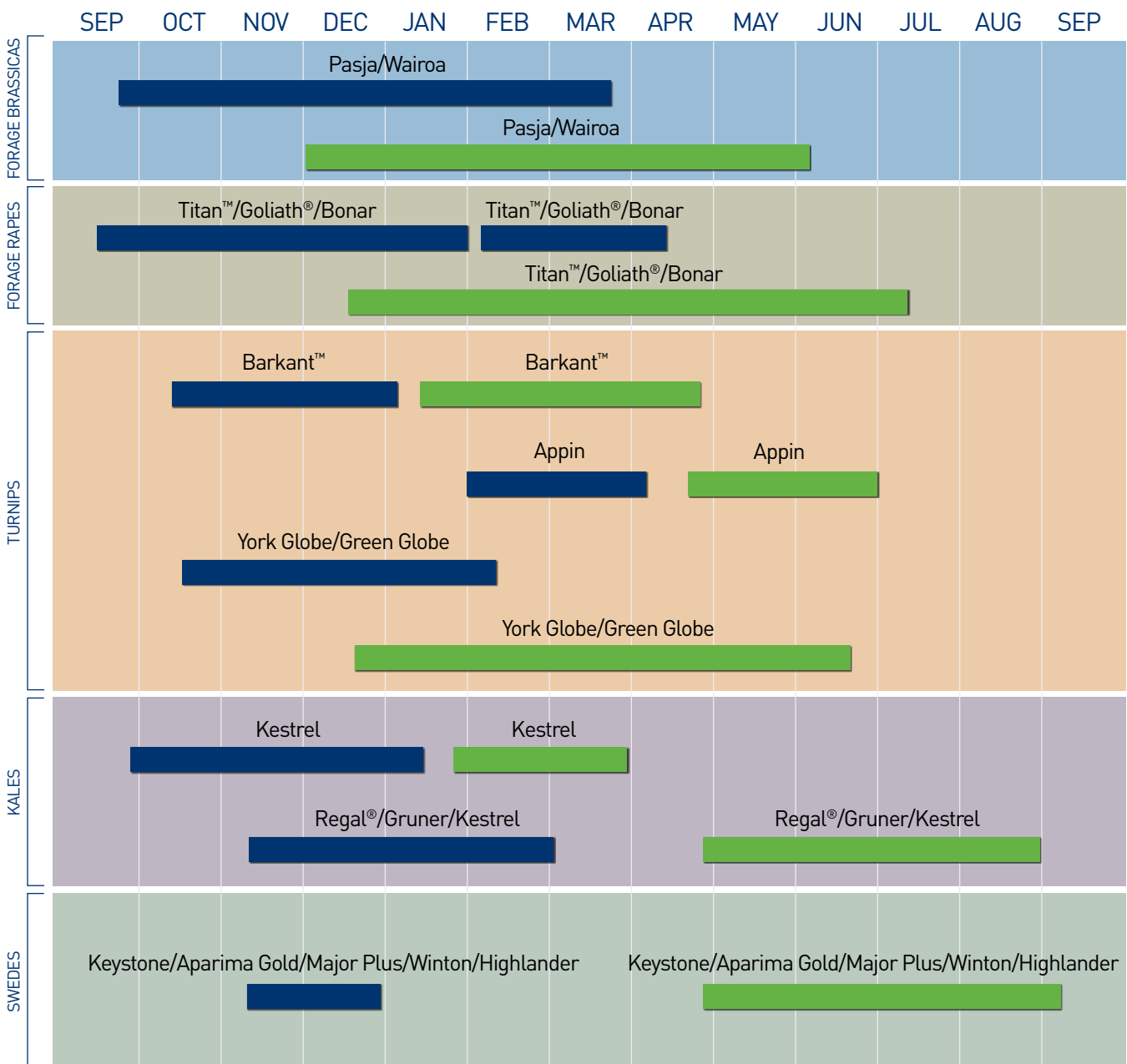


For ULTRASTRIKE® and SUPERSTRIKE® seed treatment trial results visit www.seedtreatment.co.nz

GROWING & GRAZING

GROWING AND GRAZING GUIDE

Sow* **Graze**



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.

BRASSICA FORAGE SELECTION AND PRODUCTION GUIDE

SUMMER/ AUTUMN FEED	Sowing Rate (kg/ha)	Days to Grazing	Regrowth Ability		Crude Protein%*		Potential Yield (kgDM/ha)	Metabolisable Energy (MJ/kgDM)	Average Yield (kgDM/ha)	Digestibility	% Utilisation	Average Feed Available (kgDM/ha)	COWS - Number of cows (450kg) in mid lactation fed at 1/3 daily ration on brassica per hectare for 30 days	SHEEP - Number of lambs (28kg LW, growing at 200g/day) able to be fed on one hectare for 30 days
			Regrowth	No. of grazings	Stem/ Bulb	Tops								
Forage Brassicac	PASJIA **	3-4	V. High	3+	-	13-22	12,000	13.6	9,000	85	75	6,750	45	150
	WAIROA	3-4	Mod	2	10-14	15-24	10,000	12.8	7,000	80	75	5,250	35	117
Forage Rapesc	TITANTM	3-4	High	2	10-14	15-24	10,000	12.8	9,000	80	90	8,100	54	180
	GOLIATH™	3-4	High	2	10-14	15-24	10,500	12.8	9,500	80	80	7,600	51	169
	BONAR	3-4	Mod	2	10-14	15-24	10,000	12.8	9,000	80	80	7,200	48	160
Turnip	BARKANT™	1-3	Nil	1	10-16	12-22	15,000	13.6	10,000	85	90	9,000	60	n/r

Assumptions: Cows intake 16kg DM/hd/day = 5kg DM/hd/day as brassica Lamb intake = 1.5kg DM/hd/day as brassica

BRASSICA FORAGE SELECTION AND PRODUCTION GUIDE

WINTER FEED	Sowing Rate (kg/ha)	Days to Grazing	Regrowth Ability		Crude Protein%*		Potential Yield (kgDM/ha)	Metabolisable Energy (MJ/kgDM)	Average Yield (kgDM/ha)	Digestibility	% Utilisation	Average Feed Available (kgDM/ha)	COWS - Number of cows (450kg) able to be fed at maintenance on one hectare for 30 days	SHEEP - Number of ewes (55kg) able to be fed at maintenance on one hectare for 30 days
			Regrowth	No. of grazings	Stem/ Bulb	Tops								
Winter Feed Turnips	YORK GLOBE	0.8-1.5	Nil	1	10-16	13-22	8,000	13.6	6,000	85	80	4,800	20	160
	APPIN	1-3	High	2+	-	13-22	8,500	12.8	7,500	80	80	6,000	25	200
	GREEN GLOBE	0.8-2.0	Nil	1	10-16	13-22	10,000	13.6	8,000	85	80	6,400	27	213
Kales	REGAL®	3-4	Low	1	8-12	15-20	18,000	12.8	12,000	80	70	8,400	35	280
	KESTREL	3-4	Low	1	8-12	15-20	12,000	12.8	9,500	80	70	6,650	28	222
	GRUNER	3-4	Low	1	8-12	15-20	17,000	12.8	13,000	80	70	9,100	38	303
Swedes	MAJOR PLUS	0.8-1.5	Nil	1	8-12	15-24	16,000	13.9	13,000	87	80	10,400	43	347
	APARIMA GOLD	0.8-1.5	Nil	1	8-12	15-24	18,000	13.9	14,000	87	80	11,200	47	373
	KEYSTONE	0.8-1.5	Nil	1	8-12	15-24	18,000	13.9	14,000	87	80	11,200	47	373
	WINTON	0.8-1.5	Nil	1	8-12	15-24	18,000	13.9	14,000	87	80	11,200	47	373
HIGHLANDER	0.8-1.5	170-250	Nil	1	8-12	15-24	18,000	13.9	14,000	87	80	11,200	47	373

Assumptions: Cows intake 10kg DM/hd/day for maintenance = 8kg DM/hd/day as brassica

Ewes intake 1.25kg DM/hd/day for maintenance = 1kg DM/hd/day as brassica

NB: For optimum productivity, stock wintered on brassicas should be offered a proportion of their daily intake as hay or straw in addition to brassica.

Key: * = Protein range sourced from several trials over several years, ** = Average yield of Pasija based on 3+ grazings, n/r = not recommended. These figures are indications which allow you to compare animal production achievable on the various brassica options. Remember, many factors other than yield should be considered when choosing your brassica option.

FORAGE OPTIONS LUCERNE



Tom Moore - Tarras

For five years Tom Moore has managed a 3756 hectare fine wool and hogget fattening farm at Tarras.

Kaituna lucerne is persistent enough to survive the dry weather the farm is prone to. "We get an average rainfall of 25 inches," says Tom. "The lucerne doesn't die."

FORAGE OPTIONS CHICORY



Greg Boswell - Horsham Downs, Hamilton

Greg Boswell is into his first position as contract milker, milking 680 cows on a 225 hectare Hamilton farm that has for the last two years incorporated Puna II chicory as part of the rotational dairy grazing.

The long tap root made it an ideal "nutrient puller" on the farm's effluent blocks, says Greg, and it winters well.



- 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

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

SOWING AND ESTABLISHMENT

Lucerne should be sown in spring, preferably late September to early November at 12-14 kg/ha SUPERSTRIKE® treated seed. The use of treated seed is strongly recommended, as lucerne seed requires inoculation with specific rhizobia for root nodule development. Soils should be of high fertility and free draining. Seed should be sown 5-15mm deep, but when soil moisture stress is likely, sowing depth may be up to 25mm. The seed bed should be fine, firm and weed free and rolled for compaction post sowing.



- High dry matter production
- A true perennial with good persistence
- Fast regrowth after grazing or cutting
- Semi-erect for better utilisation than Puna

Grasslands Puna II is a New Zealand bred broad-leaved, perennial forage herb bred from true perennial chicory parents. Puna II has high nutritional quality, producing high yields from spring to late autumn. Extensive animal data has been generated on chicory (much of it on Puna II's predecessor Grasslands Puna). Grazing evaluations and trials have confirmed Grasslands Puna II's high dry matter production, improved regrowth after grazing and good persistence.

SOWING AND ESTABLISHMENT

Chicory should be sown no deeper than 10mm. Seed may be broadcast or direct drilled under favourable conditions. Spring sowings are recommended, however, early autumn sowing is possible, as long as the chicory has established before going dormant in the cool season.

Chicory combines well with most grasses and clovers and can be added to a pasture mix at 0.5-2 kg/ha. Chicory stands are established at 4-6 kg/ha (SUPERSTRIKE® treated seed), with white and/or red clovers at 6-10 kg/ha. SUPERSTRIKE® seed treatment is recommended to improve establishment.

GRAZING MANAGEMENT

Grasslands Puna II chicory is cool season dormant, but with high growth rates over spring, summer and autumn. Chicory should be rotationally grazed for best performance and persistence. Hard grazing, particularly after flowering or damage to the crown in wet conditions, will affect production and persistence.

STOCK SUITABILITY FOR BOTH LUCERNE AND CHICORY



For more information refer to the Lucerne or Chicory Forage Focus. Available at www.pggwrightsonseeds.com or by calling 0800 805 505.

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For over 50 years PGG Wrightson Seeds have invested in forage brassica research that ultimately is geared towards the New Zealand farmer. Our field team is confident when they recommend a brassica crop into a farm system as they have often worked with our research team in the development of these products for future traits and requirements.

I have confidence that we are developing the best product fit for the New Zealand market and will continue to challenge ourselves in our research and development.

I know that our proven market cultivars and this 2009 Brassica Option brochure will help you make the right choices to achieve your targeted farming goals.

PAUL KENNY
National Sales and Marketing Manager 027 380 6668



Andy Dumbleton (Brassica Product Development Manager) and Paul Kenny (National Sales and Marketing Manager).

CONTACT DETAILS

For more information on forage brassicas or the information contained within this brochure, contact your local seed retailer, talk to one of our representatives above or phone 0800 805 505.

www.pggwrightsonseeds.com

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NOTES:

RECOMMENDATION ORDER FORM: TO BE COMPLETED IN CONSULTATION WITH YOUR LOCAL SEED RETAILER

Paddock ID	Ha	Variety	Sowing Rate	Agronomic Recommendation prior to sowing
TOTAL				

Name: _____
Address: _____

Contact Phone No: _____
Fax No: _____
E-mail: _____



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