



# **BRASSICA** CULTIVARS

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# BRASSICA MATURITIES & FEED VALUE

Days from sowing to grazing for brassica cultivars\*

Kale		Summer turnips	
<i>Sovereign</i>	130-170	<i>Marco</i>	55-60
<b><i>Caledonian</i></b>	<b>150-220</b>	<b><i>Dynamo</i></b>	<b>60-90</b>
<i>Coleor</i>	150-220	<i>Barkant</i>	60-90
<i>Gruner</i>	150-220	<i>E Max</i>	60-90
<i>Fuel</i>	150-220	<i>Envy</i>	60-90
<i>Kestrel</i>	150-220	<i>Rival</i>	85-100
<i>Rawara</i>	150-220	Winter turnips	
<i>Regal</i>	150-220	<i>York Globe</i>	60-80
<i>Inka</i>	150-220	<i>Appin</i>	60-100
<i>Voltage</i>	150-220	<i>White Star</i>	90-110
Swedes		<i>HT Bulb Turnip</i>	90-110
<i>Major Plus</i>	150-230	<i>G2</i>	110+
<i>Winton</i>	170-210	<i>Green Globe</i>	90-120
<i>Dominion</i>	170-250	<i>New York</i>	125-140
<i>Aparima Gold</i>	170-250	Rape	
<b><i>Invitation</i></b>	<b>170-250</b>	<i>Leafmore</i>	45-60
<i>Keystone</i>	170-250	<i>Greenland</i>	70-85
<i>HT Swede</i>	170-250	<i>Winfred</i>	70-85
Leafy turnip		<i>Titan</i>	70-90
<i>Hunter</i>	40-70	<i>Spitfire</i>	90-100
<i>Pasja</i>	40-70	<b><i>Interval</i></b>	<b>90-110</b>
<i>Pacer</i>	40-70	<i>Goliath</i>	90-110
<i>HT Leafy Turnip</i>	50-70	<i>HT Rape</i>	90-110

\* These are expected values, which vary from year to year. Cool, wet conditions slow maturity, hot conditions can speed it up.

Typical feed value

Kale	ME (MJ ME/kg DM)	Protein (%)
Whole plant	11-13	14-18
Leaf	12-13	19-21
Top third of stem	12-13	15-17
Middle third of stem	11-12	12-14
Bottom third of stem	10-11	8-10
Swedes		
Whole plant	12-13	12-14
Bulb	13-14	10-12
Leaf	11-13	18-20
Turnips		
Whole plant	12-13	14-16
Bulb	13-14	12-14
Leaf	11-13	18-20
Rape		
Whole plant	11-13	17-20
Leaf	11-13	18-20
Stem	11-13	15-17
Leafy turnips		
Leaf	12-13	18-20

# KALE CULTIVARS

135

PASTURE  
CULTIVARSRYEGRASS  
TRIALSRYEGRASS  
ENDOPHYTEPASTURE  
RENEWALPASTURE  
MANAGEMENTPASTURE PESTS  
& DISEASESBRASSICA  
CULTIVARSBRASSICA  
MANAGEMENTBRASSICA PESTS  
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## Introduction

Kale (*Brassica oleracea*) is typically sown in spring for a high yielding, single graze winter crop, grazed between June and August. The best yields are achieved when it is sown in highly fertile soils with reasonable summer moisture levels. It is popular as winter grazing for dairy cows because of its high yields (15-20 t DM/ha in summer wet conditions; 9-10 t DM/ha in dryland) and good ME value (11-12). Kale is deeper rooting and more tolerant of dry conditions than swedes.

Taller, higher yielding cultivars of kale are more suited to cattle grazing, while the shorter, leafier cultivars are more suited to sheep and deer. Kale is mostly tolerant of club root and dry rot, so it can be used as a second crop option.

### *Caledonian*

*Caledonian* kale is an excellent cultivar as it combines very high yield with softer stems, for improved feed quality and utilisation. It is a tall, marrow stem cultivar that provides excellent winter feed for cattle. (Refer also to the *Caledonian* sheet on page 136).

### *Coleor*

A short-medium height cultivar with a good leaf to stem ratio and winter hardiness. It has distinctive purple leaves and low SMCO levels.

### *SF Inka*

High yielding giant type kale with moderate leaf to stem ratio. Stems can be thick and fibrous.

### *SF Fuel*

An intermediate height cultivar with good leaf to stem ratio and disease tolerance.

### *Gruner*

Tall cultivar, with moderate leaf to stem ratio and very high yield. Stems can be thick and fibrous which reduces either stock performance or crop utilisation.

### *Kestrel*

*Kestrel* is a medium height cultivar with digestible thick stems, high leaf to stem ratio and low SMCO levels.

### *Regal*

An intermediate height, low yielding cultivar bred for a high leaf percentage. Has a high total yield and winter hardiness.

### *Ceres Sovereign*

*Sovereign* is an intermediate height cultivar, with a high leaf to stem ratio and high yield potential.

### *SF Voltage*

A marrow-stem, medium sized cultivar that is suitable for all stock classes.

# CALEDONIAN KALE

Stock Type

Dairy, Beef

*Caledonian* is a tall, high yielding kale with softer stems that provides excellent winter feed for cattle. Its higher stem quality increases animal performance (or crop utilisation) over older tall cultivars. It has good winter hardiness and, like all kales, has good club root tolerance.

## High yield

In trials *Caledonian* has shown excellent yield for a high ME kale.

### Total DM yield\*

Cultivar	Mean = 100%	t DM/ha
<i>Gruner</i>	112 a	15.4 a
<b><i>Caledonian</i></b>	<b>101 b</b>	<b>13.9 b</b>
<i>Fuel</i> ◇	99 bc	13.6 bc
<i>Regal</i>	95 bc	13.0 bc
<i>Sovereign</i>	94 c	12.8 c
<i>Voltage</i> ◇	89 cd	12.1 cd
<i>Kestrel</i>	85 d	11.6 d
Trial mean (t DM/ha)	13.7	13.7

\*From 7 trials in Southland (3), South Otago (1) & Canterbury (3) from 2006/07 to 2008/09. ◇ = Provisional result: Fuel & Voltage were in 2 of the 7 trials. Statistical significance lettering given for 5% LSD level, cultivars with the same letter are not significantly different.

## High utilisation

The results below are from a trial run by Lincoln University. Cows grazing *Caledonian* had the same crop utilisation (88-91%) and achieved the same body condition score (BCS) gain as the intermediate height kale *Regal*. However, the 1.5 - 1.6 t DM/ha higher yield of *Caledonian* allowed more cow grazing days i.e. a 12% higher stocking rate.

Measurement	1 November		15 November	
	<i>Caledonian</i>	<i>Regal</i>	<i>Caledonian</i>	<i>Regal</i>
Yield (t DM/ha)	<b>17.3</b>	15.8	<b>14.4</b>	12.8
Utilisation (%)	<b>88</b>	88	<b>91</b>	89
Intake (kg DM/cow/day)	<b>9.4</b>	9.4	<b>9.7</b>	9.5
Cow grazing days (days/ha)	<b>1620</b>	1479	<b>1351</b>	1199
BCS* gain of cows	<b>0.45</b>	0.47	<b>0.48</b>	0.47

Cows were grazed for a 6 week period during winter 2008. \*BSC = Body condition score.

We recommend sowing *Caledonian* at 5 kg/ha (in good conditions where a yield of greater than 10 t DM/ha is expected). Trials show an increased yield of 1.3 t DM/ha (or 9%) over a 4 kg/ha sowing rate\*.

### DM yield of *Caledonian* at two sowing rates

Sowing rate	DM Yield (t DM/ha)
<i>Caledonian</i> @ 5 kg/ha	15.7
<i>Caledonian</i> @ 4 kg/ha	14.4

\*Based on REML analysis of 3 trials (Winton, Telford & Darfield) in 2006/07 over 3 cultivars (*Gruner*, *Caledonian* & a breeding line).

## Sowing rate 5 kg/ha

## Quality stems

*Caledonian* is a marrow stem cultivar with significantly better ME in the basal stems than traditional tall cultivars *Gruner* or *Rawera*. The main difference in feed quality is in the bottom third of stems - this is important as they make up 30% of total yield, and under cattle grazing a significant amount of leaf is knocked to the ground and wasted.

Crops with poor stem quality create a dilemma. Grazing well, to get higher crop utilisation, will reduce weight gain, while achieving good liveweight gain means accepting poorer utilisation.

### Leaf and stem ME of medium - tall cultivars\*

Plant part	Cultivar					
	<i>Kestrel</i>	<i>Caledonian</i>	<i>Sovereign</i>	<i>Regal</i>	<i>Gruner</i>	<i>Rawera</i>
Leaf	12.9 a	<b>12.7 ac</b>	12.9 a	12.8 ac	12.8 ab	12.5 c
Top third of stem	13.6 a	<b>13.4 ab</b>	13.0 c	13.3 ab	13.2 bc	13.4 ab
Middle third of stem	12.9 a	<b>12.0 bc</b>	12.2 ab	11.6 c	11.8 c	11.8 bc
Bottom third of stem	12.5 a	<b>10.6 b</b>	10.5 bc	10.4 bc	9.9 c	9.8 c

\*From 3 trials in Southland (1) & Canterbury (2) from 2006/07 & 2007/08. Average yield from these trials was 13.1 t DM/ha. Statistical significance lettering given for 5% LSD level, cultivars with the same letter are not significantly different.

## Using *Caledonian*

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Sow						Graze			
Maturity date:			150-220 days						
Typical yield:			15-20 t DM/ha summer moist; 9-12 t DM/ha dryland						
ME:			11-12 MJ/kg DM						
Sowing rate:			4-5 kg/ha						

# SWEDE CULTIVARS

## Introduction

Swedes (*Brassica napus* var. *napobrassica*) are a high yielding, slow maturing winter crop, used as a single graze option typically between June and August. They are normally sown in late spring or summer in cool, summer moist climates, and are widely used in southern and inland areas of New Zealand.

They typically yield 10-18 t DM/ha with higher feed quality than kales; typical ME values are 12+. Swedes maintain their bulb quality better than turnips, especially in frosty conditions. They are most often strip-grazed and cultivars have a range of maturity dates. They can be grazed by a variety of stock types in a range of farming systems.

Swedes are generally not recommended for double cropping because of the risk of disease.

### *Invitation*

*Invitation* is a late maturing, high yielding, leafy, yellow-fleshed swede with good dry rot tolerance, and club root and powdery mildew resistance. *Invitation* has shown high bulb keeping and leaf retention ability, and its late flowering makes it a good option where grazing into early spring. (Refer also to the *Invitation* sheet on page 139).

### *Aparima Gold*

Medium maturing yellow-fleshed cultivar with club root and dry rot tolerance. Offers a high proportion of top with high overall yield.

### *Ceres Dominion*

*Dominion* is an early maturing high yielding yellow-fleshed main crop cultivar. *Dominion* has average leaf retention and is susceptible to dry rot.

### *Highlander*

Later maturing cultivar with white flesh and high proportion of leaf. Offers good overall yield, but is susceptible to dry rot and club root.

### *Keystone*

A medium maturing white-fleshed swede that offers high dry rot tolerance but is susceptible to clubroot.

### *Major Plus*

*Major Plus* is a yellow-fleshed cultivar with good overall yield. It is early maturing and produces an average proportion of top. Susceptible to dry rot and club root.

### *Winton*

Medium maturity white-fleshed cultivar with good overall yield. Produces a high proportion of top with good disease resistance.

### *HT Swede*

Herbicide tolerant (HT) swede sold with *Telar*® herbicide. High yielding, white fleshed, purple skin, medium maturity swede with similar clubroot and dryrot tolerance to *Aparima Gold* and better tolerance to powdery mildew.



# INVITATION

## SWEDE

### High yield & disease tolerance

*Invitation* is a late maturing, yellow-fleshed swede, with high bulb and leaf yield. It provides excellent winter feed for sheep, cattle and deer.

*Invitation* produces excellent total DM yields with good dry rot tolerance and resistance to club root and powdery mildew. *Invitation* is not recommended as a second crop.

#### Total DM yield, dry rot tolerance and club root infection level.

Cultivar	Total DM yield*		Dry rot tolerance**				Clubroot***	
	(Trial mean =100)		% of bulbs not infected		% bulbs badly infected		% of bulbs not infected	
<b>Invitation</b>	<b>113</b>	<b>a</b>	<b>57</b>	<b>a</b>	<b>5</b>	<b>a</b>	<b>97</b>	<b>a</b>
<i>Winton</i>	105	b	49	a	21	a	100	a
<i>Aparima Gold</i>	104	b	36	ab	11	a	100	a
<i>Keystone</i>	102	bc	NT		NT		17	bc
<i>Highlander</i>	100	bc	7	c	58	b	7	c
<i>Major Plus</i>	96	cd	10	bc	56	b	18	bc
<i>Dominion</i>	92	d	6	c	71	b	23	b
Trial mean	12.2 t DM/ha		21%		41%		60%	

\*From 7 Southland trials, from 2006/07 to 2011/12. \*\*From a Southland trial in 2008/09 under moderate to high dry rot pressure in a 2<sup>nd</sup> crop paddock. \*\*\* From a Southland trial in 2010/11 under moderate to high club root pressure in a 2<sup>nd</sup> crop paddock. NT = Not tested. Statistical significance lettering given for 5% LSD level, cultivars with same letter are not significantly different.

### Good leaf yield

*Invitation* produces high leaf yields showing a significantly higher leaf percentage than other cultivars in trials. This lifts the overall protein level of the crop and is helpful when introducing swedes into an animal's diet, particularly for younger stock.

### Bulb & leaf keeping

*Invitation* has shown high bulb keeping ability and leaf retention in trials, helping maintain its feed quality and quantity through to the end of winter.

### Late flowering

*Invitation* is late flowering, making it a good option for feeding into spring (due to reduced risk of SMCO poisoning).

### Using *Invitation*

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Sow						Graze			
Maturity date:			170-250 days						
Typical yield:			10-18 t DM/ha (depending on season)						
ME:			12-14 MJ/kg DM						
Sowing rate:			0.5-0.8 kg/ha ridged						
			0.8-1.5 kg/ha drilled						

# SUMMER TURNIP CULTIVARS

## Introduction

Summer turnips (*Brassica rapa*) offer nutritious, highly palatable feed. They are fast maturing, can be grazed 60-100 days after sowing and typically yield 8-12 t DM/ha, for a single grazing.

They are mainly used for dairy cows as a high quality summer feed to maintain milk production in situations where pasture growth and quality is typically poor. Summer turnips have high ME (typically 12+) so they complement the feeding of pasture or maize silage during this time. They should comprise no more than a third of a milking cow's diet.

Summer turnips are also useful for pasture renewal, providing a good break crop and seedbed for autumn sown pasture.

### *Dynamo*

*Dynamo* is an early maturing, high yielding cultivar that offers quality summer feed. It produces a good level of bulb, giving it an advantage in seasons when high levels of leaf diseases or pests are present. (Refer also to the *Dynamo* sheet on page 141).

### *Barkant*

An early maturing high yielding cultivar with soft bulbs and a lower proportion of bulb than *Dynamo*.

### *SF Envy*

Early maturing cultivar with high leaf yields.

### *Marco*

*Marco* is a very early maturing, high yielding tetraploid cultivar.

### *Ceres Rival*

Early maturing cultivar with good leaf production and leaf holding ability.



*Dynamo* turnips help maintain milk production through summer.



# DYNAMO

## TURNIP

Stock Type

Dairy

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PASTURE  
CULTIVARSRYEGRASS  
TRIALSRYEGRASS  
ENDOPHYTEPASTURE  
RENEWALPASTURE  
MANAGEMENTPASTURE PESTS  
& DISEASESBRASSICA  
CULTIVARSBRASSICA  
MANAGEMENTBRASSICA PESTS  
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*Dynamo* turnip is a high yielding summer crop which is ideal for dairy cows. It provides large volumes of low cost quality feed to help maintain milk production when pasture quality and quantity declines.

### DM yield

In trials *Dynamo* has shown high yield, not significantly different from the other top cultivars.

#### Total DM yield\*

Cultivar	Trial mean = 100%	
<i>Barkant</i>	110	a
<b><i>Dynamo</i></b>	<b>103</b>	<b>ab</b>
<i>Marco</i>	102	ab
<i>Rival</i>	102	ab
<i>Envy</i> ◇	101	ac
<i>White Star</i>	98	bc
<i>Green Globe</i>	93	c
Trial mean (t DM/ha)	8.2	

\* From 10 trials in Waikato (7), Taranaki (2) & Canterbury (1) from 2006/07 to 2008/09. ◇ = Provisional result: *Envy* was only in 2 of the 10 trials. Statistical significance lettering given for 5% LSD level, cultivars with the same letter are not significantly different.

### Low cost summer feed

Sowing a poor performing pasture in *Dynamo* makes sense - it can provide feed for around 13c/kg DM\*.

#### \*Turnips for 13c/kg DM - assumptions:

- Turnip crop yields 10 t DM/ha, less opportunity cost of production from poor pasture while crop is in ground of 3.5 t DM/ha = net gain of 6.5 t DM/ha.
- Cost of growing crop = \$855/ha or 13c/kg DM
- \$855 = spray out & cultivation \$320, seed & sowing \$150, fertiliser \$330, pest control \$55.

### High bulb percentage

Summer turnips produce their yield in different ways. *Dynamo* produces a good level of bulb (around 48% of total yield), giving it an advantage in seasons when high levels of leaf diseases or pests are present.

#### Using *Dynamo*

Oct	Nov	Dec	Jan	Feb	Mar
Sow			Graze		
Maturity date:	60-90 days				
Typical yield:	8-16 t DM/ha (depending on season)				
ME:	12-14 MJ/kg DM				
Sowing rate:	2-3 kg/ha				

# RAPE CULTIVARS

## Introduction

Rape (*Brassica napus*) is a fast maturing single or multi-graze crop that can be sown for summer, autumn or winter feed. It can be sown from early spring to late summer depending on when the crop is required.

As a summer crop, rape is sown in September-November, to first graze around 70-110 days after sowing. It provides quality summer and autumn feed in dry areas, to maintain animal growth when pasture yield is typically poor.

Winter rape is sown from November-February, depending on feed requirements. It is typically ready to graze 80-120 days after sowing. An autumn grazing is possible from early sowings.

Rape's feed value is high, but the crop must be mature before grazing during spring, summer and autumn to avoid rape scald. (For more information refer to page 150.)

### *Interval*

*Interval* is a tall, late maturing cultivar with high DM yields. It has good tolerance to dry conditions and frost, and is suitable for summer, autumn and winter feed (Refer also to the *Interval* sheet on page 143).

### *Goliath*

*Goliath* is a late maturing tall cultivar with high yield and regrowth potential.

### *Leafmore*

Early maturing cultivar with a high leaf to stem ratio and good regrowth potential.

### *SF Greenland*

Early maturing cultivar with intermediate growth habit. Good aphid tolerance and suitable for a range of environments.

### *Spitfire*

Multi-purpose late maturing, intermediate height rape. Suitable for summer, autumn and early winter feeding. Excellent aphid tolerance.

### *Titan*

Early maturing, high yielding cultivar with intermediate height. It has good aphid tolerance and is well suited to summer and autumn grazing.

### *Winfred*

Early maturing leafy cultivar with good regrowth potential.

### *HT Rape*

Herbicide tolerant (HT) rape sold with *Telar*® herbicide. High yielding Goliath type rape with improved leaf percentage. It has good regrowth and winter keeping ability.

# INTERVAL RAPE

*Interval* is a rape-kale cross, giving high yield with regrowth ability.

*Interval* has performed well in trials, providing excellent DM yield.

Cultivar	Trial mean = 100%	
<i>Interval</i>	126	a
<i>Goliath</i>	125	a
<i>Greenland</i>	118	a
<i>Winfred</i>	92	b
<i>Titan</i>	88	b
Trial mean (t DM/ha)	5.3	

Cultivar	Trial mean = 100%	
<i>Interval</i>	108	a
<i>Goliath</i>	104	ab
<i>Titan</i>	103	ab
<i>Greenland</i>	103	ab
<i>Winfred</i> <sup>◇</sup>	93	b
Trial mean (t DM/ha)	7.7	

Compared to kale, rape typically has higher feed quality, and is better utilised by stock.

Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
	Sow										
				Graze							
Maturity Date:			90-110 days								
Typical yield:			5-8 t DM/ha (depends on sowing time & no. of grazings)								
Typical ME:			12 MJ/kg DM								
Sowing rate:			4 kg/ha								

## Background

## Flexible sowing date

## High yield

## Excellent winter utilisation

## Other characteristics

## Using *Interval*

# LEAFY TURNIP CULTIVARS

## Introduction

Leafy turnips (*Brassica rapa*), also sometimes called 'forage brassicas', are produced from crossing turnips with other brassicas to develop cultivars with differing characteristics, depending on their parentage.

They are usually used for summer-autumn lamb finishing, as an alternative to rape, with better regrowth, but they are not as tolerant of dry conditions.

Leafy turnips establish quickly and are ready to graze 40-60 days after sowing. They can yield 6-12 t DM/ha, with regrowth greatly influenced by climate and grazing management.

### *Hunter*

Cultivar with fast establishment for stock finishing in fertile, summer moist areas. Good plant survival through multiple grazings.

### *Pasja II*

Early maturing leafy cultivar producing little bulb. It offers high yields from multiple grazings, but with less bolters (yellow flowers that adversely affects plant population and regrowth).

### *SF Pacer*

Fast growing leafy turnip that is suited to medium-high fertility soils with summer moisture or irrigation, offering multiple grazings.

### *HT Leafy Turnip*

Herbicide tolerant (HT) leafy turnip sold with *Telar*® herbicide. Multiple graze *Pasja* type provides a flexible grazing option for summer, autumn and early winter.



# WINTER TURNIP CULTIVARS

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PASTURE  
CULTIVARSRYEGRASS  
TRIALSRYEGRASS  
ENDOPHYTEPASTURE  
RENEWALPASTURE  
MANAGEMENTPASTURE PESTS  
& DISEASESBRASSICA  
CULTIVARSBRASSICA  
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## Introduction

Winter turnips (*Brassica rapa*) are mainly used in drier regions of the South Island as a single graze winter crop. They are typically sown in January - February to be ready for grazing in 2-4 months, depending on the cultivar sown.

Winter turnips have better tolerance of lighter soils and lower soil fertility than summer turnips. They can also be used as late maturing summer turnips.

## Appin

Smaller multi-crowned bulb with leaf regrowth potential.

## Green Globe

Traditional late maturing cultivar. Can complement an earlier maturing cultivar to provide later grazing. Green-skinned, white fleshed bulbs.

## Ceres New York

A late maturing, green-skinned, white-fleshed turnip with good disease tolerance.

## SF White Star

Early to medium maturing purple skinned and white fleshed cultivar. Good leaf to bulb ratio. Improved tolerance to turnip mosaic virus.

## York Globe

Medium to late maturing turnip with a white-skinned and white fleshed bulb.

## HT Bulb Turnip

Herbicide tolerant (HT) bulb turnip sold with *Telar*® herbicide. Is a *Green Globe* type.

