

## Kale

**Lime:** A pH of 6.5-7.0 is optimum.

**Fertiliser:** A NPK compound is normally broadcast at sowing and a top-dressing of nitrogen is applied when the crop is emerged. Slurry or FYM pre ploughing will normally provide enough Boron or use a fertiliser with Boron included. Kale is not as sensitive to Boron deficiency as other brassicas.

**Sowing & Yields:** Old (1990's) DAFM variety data for kale gives yield figures of 4 - 6 t DM/ha, however recent trial and survey work done in Moorepark has shown that high yielding (8 -12 t DM/ha) kale crops are achievable. Utilisation in Moorepark experiments is generally taken to be 80%. Kale needs to be sown by mid-June for high yields. Sowing date will also determine maturity. Crops take approx. 150 days to maturity. *Sow rape from July to mid-August.*

A summary of the Moorepark fodder brassica experiments is available at:  
[www.teagasc.ie/publications/2013/2920/TRResearch\\_Autumn2013.pdf](http://www.teagasc.ie/publications/2013/2920/TRResearch_Autumn2013.pdf)

A fine, firm seedbed (like grass) and moisture is essential for rapid emergence as kale & rape have small seeds with low reserves. All brassicas will yield poorly where compaction has occurred. Placing some fertiliser at sowing may aide establishment.

Ploughing and powered cultivation is the surest method of establishment but in well structured soils, direct drilling will also be successful. With direct drilling, it is essential to achieve a good weed kill with glyphosate pre-cultivation.

Kale may be precision drilled at 3kg/ha or direct drilled at 4kg/ha or broadcast usually with the fertiliser at 5-6kg/ha. Some seed merchants are recommending higher seeding rates to promote more leaf growth and less stem. *Rape is sown slightly heavier.*

Forage Crop	Varieties	Sowing Date	Sowing Rate	Fertiliser Requirements at Sowing* kg/ha	Weed Control
<b>Kale</b>	Coleor Grampian Caledonian Keeper Maris Kestrel	Early May To Mid June	4.5 kg / ha	130 Kg/ha N 30 kg/ha P 170 kg/ha K + Boron	Butisan S Pre-em 1.5 l/ha. Follow label.
<b>Forage Rape</b>	Interval Hobson Barcoli Fontan Stego	Mid May to Mid August	6.5 kg / ha	120 kg/ha N 20 kg/ha P 50 kg/ha K + Boron	N/A

\*Assumes soil index 3 for P & K, N Index 2

Redstart and Interval are hybrid crosses between kale and rape. They will be grazed mid-summer or will be used in the autumn.

There is no independent data on frost hardiness but location seems to be more critical than variety based on field experience in 2009 and 2010.

### **Weed Control:**

A well-established crop is critical to weed control and every effort should be made to have an excellent seed bed and vigorous early growth. Weed failures are becoming common in early sown Kale as germination may be slow and weed seeds are more likely to germinate in May than June, thus increasing weed pressure.

Remember if you are replacing silage with main crop kale – be prepared to apply the required inputs. You cannot expect reliable high DM yields from low inputs.

Perennial weeds such as Scutch grass, docks and thistles **must** be controlled by a glyphosate application pre sowing and a 'stale' seedbed may reduce weed burden.

**April/May sowing** - apply 1.5 l/ha Butisan S pre-emergence of the crop (cannot be applied onto broadcast crops). Rainfall and soil cover are critical for safe use – see label for instructions.

**June sowing** - should not need weed control. Butisan S is cleared for use on Kale and Swedes at 1.5 l/ha. Fusilade Max 1-3 l/ha (cleared for Kale and Swedes) offers control of grass weeds. Aramo, Dual Gold & Lentagran have off-label clearance for Kale.

### **Herbicide notes**

The following herbicides are cleared for use on kale.

- **Butisan S** at 1.5 l/ha must be applied pre-emergence and within 48 hours of sowing. Beware of heavy showers after spraying as it can reduce germination and vigour of the seedling. In 2012, the heavy rain in June 'leached' Butisan at a critical time and some crops were severely damaged. The damage was purple kale leaves followed by dead plants.
- **Lentagran** (kale only) @ up to 2.0 kg/ha is applied from the 6 leaf stage of the kale. It can be hard on crops under stress and needs the leaves to be 'hardened-off'. It is useful where broad-leaved weeds are getting ahead of slowly growing kale. It is not label cleared for rape
- **Fusilade Max** (kale only) @ 1-3 l/ha is used post-emergence and are solely for controlling grass weeds.
- **Salsa** is a contact spray cleared for rape only and is good on charlock, Shepherds Purse etc. It is not cleared for kale.

*No weed control should be needed for rape.*

## Pests

Flea beetles can attack at emergence - eat small holes in the leaves. Control is rarely warranted in a fast growing crop. Control is by spraying with contact insecticide e.g. Sumi Alpha 0.20 l/ha in 200 l/ha water. Slugs and leatherjackets can occasionally be problematic and can be controlled with slug pellets or Dursban respectively. Pigeons are attracted to kale but other food sources are usually plentiful so control is rarely warranted.

The most damaging of caterpillar is the Diamond Back Moth which will lay eggs on the underside of each kale leaf. It is particularly damaging in warm weather. Sumi-alpha at 0.20 l/ha in 600 l/ha water will give good control. Use an organo-silicon based wetter e.g. Slippa, SW7, Breakthrough etc. A repeat application may be necessary and high water volumes are needed.

Other caterpillars (e.g. Large White) will concentrate on eating plants in a particular area of a field but control is rarely necessary.

The following products are cleared for Kale

Product Name	PCS No.	Function	Product Name	PCS No.	Function
Aphox	90070	Insecticide	Butisan S	90342	Herbicide
Lepinox Plus	05254	Insecticide	Devrinol	91627	Herbicide
Lepinox Plus	05254	Insecticide	Fusilade Max	01472	Herbicide
Movento	04101	Insecticide			
Pyrethrum 5 EC	92317	Insecticide			

Data taken from [www.pcs.agriculture.gov.ie](http://www.pcs.agriculture.gov.ie) on 30/04/15

The following are amongst products cleared for use off-label on kale: Aramo 03099; CaLypso 02441; Dual Gold 04192; Lentagran WP 03082; Plenum 02238; Score 250 EC 00329; Sumi-Alpha 02334

## Disease:

Club root is the main threat but kale is not as prone as other brassicas. A one in five year rotation for brassicas is suggested to keep Club root levels low. Club root can last 20 years in soils.

Grampian and Caladonian are **tolerant** of Club Root but do not reduce the levels of the pathogen in the soil so another brassica grown in the future will suffer from the disease.



**Redshank taking over kale, July 2011**

No 'late' control options available, apply Butisan S pre-em.



**Creeping Bent taking over kale, July 2010**

Apply Fusilage or Aramo grass herbicide or graze with kale



**Classical feeding (window-pane) damage from Diamond-back moth larvae in kale**

Inspect crops regularly and apply a suitable insecticide as soon as damage is seen



**Club-root symptoms (swollen roots) in fodder rape**

Do not sow brassicas in field for 10 years and widen rotation of brassica crops





**Large White Butterfly** Larvae on kale.  
Damage is normally concentrated to an area of the field and control is rarely warranted.



**Diamond Back Moth** larvae eating kale. This pest can defoliate a crop in a few days and needs to be monitored in warm weather especially.

### Weed Chart for Kale

Weed Name	Butisan S 90342	Lentagran 03082	Fusilade Max 01472	Aramo 03099
Black-bindweed	MS	MS	-	-
Charlock	MR	MS	-	-
Chickweed, Common	S	MS	-	-
Cleavers	MS	S	-	-
Dead-nettle, Red	S	S	-	-
Fat-hen	MS	S	-	-
Fumitory, Common	R	S	-	-
Groundsel	S	S	-	-
Hemp-nettle, Common	MR	-	-	-
Knotgrass	R	R	-	-
Marigold	S	S	-	-
Mayweeds	S	MS	-	-
Meadow-grass, Annual	S	R	MR	S
Nettle, Small	MS	-	-	-
Pansy, Field	MR	R	-	-
Poppy, Common	S	-	-	-
Redshank	MS	MS	-	-
Shepherd's-purse	S	MS	-	-
Speedwells	S	S	-	-
Spurrey, Corn	MS	-	-	-
Thistles	-	-	-	-
Vol barley & wheat	MR	R	S	S
Wild-oat	MR	R	S	S
Rye Grasses	-	R	S	S
Scutch	-	R	S	S
Creeping Bent	-	R	S	S

**S** - Susceptible; **MS** - Moderately Susceptible; **MR** - Moderately Resistant; **R** - Resistant

**Read and follow all labels of plant protection products applied**

**Keep prescribed chemical records of all plant protection products applied**