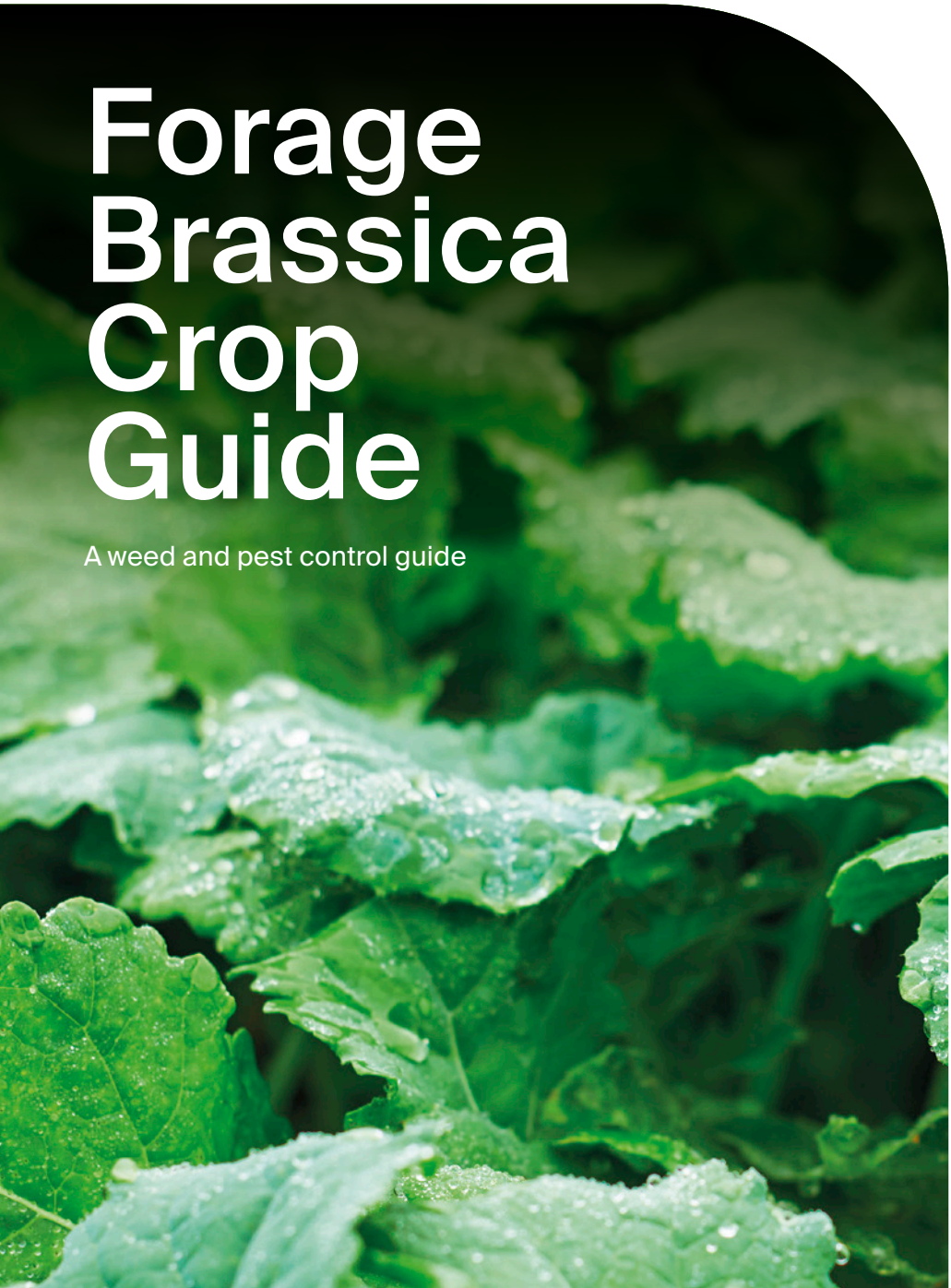
nufarm

# Forage Brassica Crop Guide

A weed and pest control guide



Introduction

# Simple steps to produce a highly effective brassica crop



# Successful brassica production

## Growing a productive brassica crop such as kale, rape, swedes and leaf or bulb turnips can be a great way to increase home-grown feed.

Maximising utilisation of home grown feed is a proven way of lifting on farm performance. This easy to follow guide sets out best practice steps for maximising brassica crop yields.

Both weeds and pests can have an impact on yield from as early as sowing. Timing of corrective measures is as important as choosing the right solution.

Some of these solutions begin long before the crop is sown, so planning is critical to achieving success.

## Good weed and pest control is essential in brassicas

Weeds and pests can very quickly overrun a brassica crop. They are highly competitive and, if left uncontrolled, can devastate yields. Trials investigating weed control options have shown that even moderate weed populations can reduce yields.

### Controlling weeds in the crop will:

- Increase the yield by up to three times, compared to crops grown in the absence of weed control.
- Reduce weeds in subsequent new pasture by stopping weed seed set in the crop.

### Controlling pests will:

- Maximise yields as damage at the crop establishment stage is minimised.
- Reduce economic loss from decreased production.

# Plan early

**Start early where perennial weeds are a problem.**

In autumn, select the paddock early and control hard-to-kill perennial weeds (especially browntop, couch, Californian thistles, Mercer grass, paspalum, kikuyu etc) with CRUCIAL®. Spray in autumn to maximise CRUCIAL's translocation and effectiveness, then sow a short-term crop (ryegrass or cereal) for some high quality grazing or silage.


# A pre-plant clean-up saves time

**Before establishing the crop, spray with CRUCIAL to kill the existing vegetation. This clean-up provides the following benefits:**

- Controls perennial weeds to minimise competition in the brassica crop.
- Quicker turf and root breakdown.
- Allows a shorter fallow period – your crop can be planted earlier.
- Easier tillage – saves time and fuel (up to 10% less fuel used).
- Better seedbed – finer with fewer clods for better seedling establishment, and reduced pests such as slugs.

## CRUCIAL application rates

| Application rates for CRUCIAL | | Pulse® Penetrant rates |
|---|---|---|
| Annual ryegrass, cereals | 1.8–2.4L/ha | 100ml/100L water |
| Browntop, kikuyu, Mercer grass | 3.6L/ha | 100ml/100L water |
| Couch, paspalum | 1.8–3.6L/ha | 100ml/100L water |
| Perennial ryegrass, Californian thistles | 2.4L/ha | 100ml/100L water |
| Red fescue, docks | 5.4L/ha | 100ml/100L water |

***Note:** Many old pastures contain hard-to-kill weeds and will need at least 3.6L/ha CRUCIAL.*

## Tips to maximise CRUCIAL's performance

For maximum absorption, you need at least 5–10cm of actively growing leaf (minimum 10–15 cm if couch is present). Spray first then wait 1 day for annual species and 3 days for perennial species before grazing.

**Add Pulse Penetrant at 100ml/100L water to:**

- Improve CRUCIAL adhesion, penetration and uptake
- Ensure control of perennial ryegrass
- Aid rainfastness of CRUCIAL – 15 minutes* vs. 2 hours without Pulse Penetrant.

# Hard-to-kill weeds

**If necessary, add companion herbicides to control weeds that are not well controlled by CRUCIAL and Pulse Penetrant alone.**


### Nail® 600EC

Add Nail 600EC to improve speed of brownout, and assist control of weeds such as mallows, nettles and polygonum species.
**Use at 20–40ml/ha.**


### Archer® 750

Add Archer to improve control of weeds such as clover, thistles, plantain and yarrow.
**Use at 200–400ml/ha.**


### Sero® 750WG

Add Sero 750WG to improve control of weeds such as clover, sheep's sorrel and yarrow.
**Use at 40g/ha.**


### Kamba® 750

Add Kamba 750 to improve control of weeds such as dandelion, docks and willow weed.
**Use at 400ml/ha.**


### Charter™ 750WDG

Add Charter 750WDG to aid control of weeds such as buttercup and large docks.
**Use at 20g/ha.**

**Observe the relevant plant-back intervals and grazing withholding periods for the above herbicides for forage brassicas. For further advice where these are not known, please contact your local Nufarm Business Development Manager.**

** Performance guarantee.*

# Controlling pests pre-planting

## Springtails

Springtails can be a hugely damaging pest at crop emergence, with numbers present in pasture often 30,000/$m^2$ or more, so early control measures should always be applied.


### Dew™ 600

Active ingredient: 600g/L Diazinon

Add Dew 600 at 400ml/ha at spray-out to control springtails. Dew 600 has a nil stock withholding period. Where a double CRUCIAL spray programme is used, add Dew 600 to the second application.

## Slugs

Slugs feed on seeds and germinating or emerged seedlings, reducing establishment. They are a major problem in no-till situations, therefore SlugOut should be applied as a necessity to minimise damage.


### SlugOut®

Active ingredient: 18g/kg Metaldehyde

SlugOut's unique dust-free granules give excellent coverage per square metre, ensuring effective control of crop-destroying slugs. Broadcast at 10–15kg/ha either in a single application or in a split application, apply half (5–7.5kg/ha) around a week prior to planting, the other half at planting.

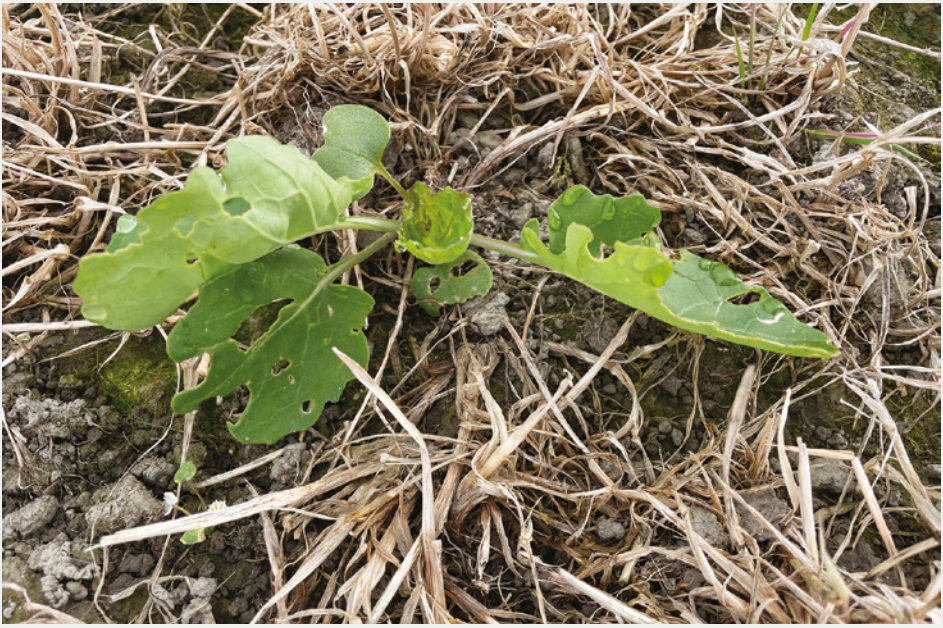
# Pre-emergence weed control

**Pre-emergence weed control is a useful tool for early control of grass and broadleaf weeds. Choose the appropriate herbicide, ensure that correct application techniques are used and that potential soil residues are considered as part of the planned crop rotation.**


## Director® CS

Active ingredient: 360g/L Clomazone

Director CS can be used in a range of forage brassicas offering pre-emergence control of a wide range of broadleaf and some grass weeds. It also reduces the reliance on, or need for, application of post-emergence herbicides. Ensure that label directions are understood and followed. For more information contact your local Nufarm Business Development Manager.



*Slug damage in brassicas – use SlugOut for control.*

# Post-emergence weed control

**Post-emergence herbicides give best results when applied to actively growing small seedling weeds well before crop canopy closure. Typically, application should occur within 3 to 6 weeks after sowing.**

## Broadleaf weed control


### Prestige®

Active ingredient: 150g/L Picloram and 225g/L Clopyralid

Prestige is an option that can be used in all forage brassicas to control a range of broadleaf weeds including black nightshade, fathen, thorn apple and redroot (suppression only).
Add Bonza Gold spraying oil at 500ml/100L water.


### Archer 750

Active ingredient: 750g/L Clopyralid

Archer 750 can be used in all forage brassicas and is particularly useful for controlling yarrow, Californian and other thistles.


### Kamba 750

Active ingredient: 750g/L Dicamba

Kamba 750 is an option for controlling a wide range of broadleaf weeds in kale crops only. Do not use Kamba 750 on rape, turnips, hybrid forage types (Hunter/Pasja) or swedes.

## Adjuvant

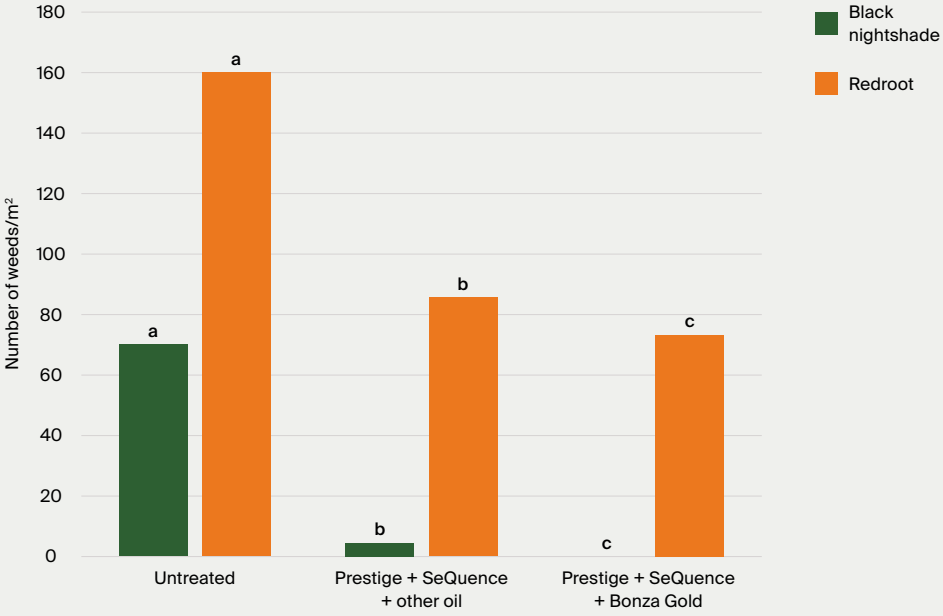

### Bonza® Gold

Active ingredient:
500g/L Ethyl esters of canola oil fatty acid + other surfactants

Bonza Gold is a high-performance canola oil adjuvant. It is made by reacting canola oil with ethanol made from grain. This canola oil ester is then mixed with emulsifiers and other surfactants to produce an esterified canola oil adjuvant. Bonza Gold is used with a range of herbicides to enhance deposition, wetting, spreading and uptake and as an aid for modifying spray droplet quality and to preserve droplet survival.

Bonza Gold has been extensively tested in 17 trials to compare its performance and crop safety with Bonza. In all trials herbicide efficacy with Bonza Gold was equivalent to and in some cases superior to that with Bonza.

### Bonza Gold superior weed control over competitors:




***NUNZ2472:*** *Weed control in turnips using Prestige 350ml/ha, SeQuence 1L/ha and two types of oil in the Waikato.*

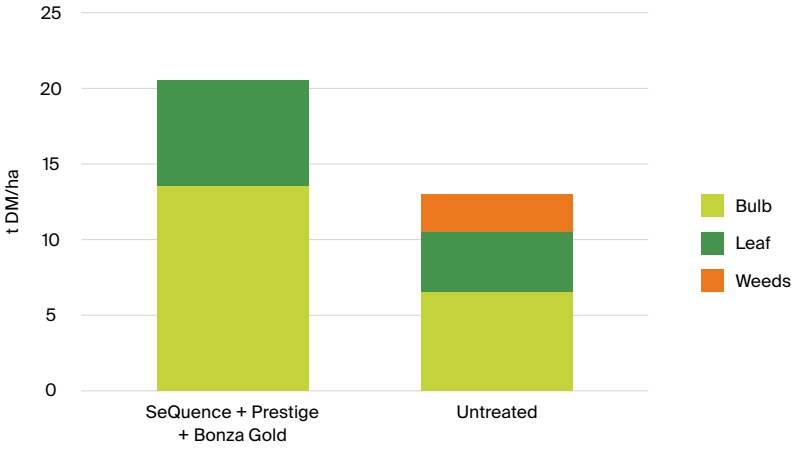
## Grass weed control


### SeQuence®

Active ingredient: 240g/L Clethodim

SeQuence is a selective herbicide for grass weed control in all brassica crops. SeQuence is particularly effective against ryegrasses and annual summer grasses such as barnyard grass, bristle grasses, summer grass and smooth witchgrass.
Add Bonza Gold at 500ml/100L water.

## Don't let grass weeds steal your yield




***NUNZ2464:*** *Weed control in swedes using SeQuence 3L/ha, Prestige 350ml/ha and Bonza Gold 500ml/100L in Mid-Canterbury.*

**Left:** SeQuence + Prestige + Bonza Gold;
**Right:** no treatment

**Main weed present:** Twitch/couch – smothered the swedes when no SeQuence was applied.

Grass weeds are the largest yield robbers. They are NOT free feed.

Swedes grown in Mid-Canterbury, dryland.

*Black nightshade, controlled by Prestige*

## Application rates

| Herbicide | Weeds | Application rate | Application timing |
|---|---|---|---|
| **Prestige** | Broadleaf weeds particularly black nightshade and fathen | 350ml/ha. Add Bonza Gold at 500ml/100L water | Apply to actively growing weed seedlings with 2–8 true leaves |
| **Archer 750** | Broadleaf weeds especially yarrow, Californian thistles and other thistles | 200–400ml/ha | After the 2 true leaf stage of the crop and before crop canopy closure |
| **Kamba 750 (kale only)** | Broadleaf weeds | 190–230ml/ha | Apply at the 4–6 true leaf stage of the crop when weeds are small (3–5 leaves) and actively growing |
| **SeQuence** | Grass weeds including ryegrasses, and 'annual summer grasses' | 0.25–3.0L/ha. Add Bonza Gold at 500ml/100L water | Apply when the grass seedlings are small and before crop canopy closure |

***Note:*** *Check label for weeds controlled and correct rate depending on weed species and size.*

## Mix rates

| Mix | Rate | Notes |
|---|---|---|
| **SeQuence + Archer 750 + Attack + Bonza Gold** | 0.25–3.0L/ha + 0.2–0.4L/ha + 0.5–1.0L/ha + 500ml/100L | Broadleaf weed, grass and pest control.<br>Avoid application in the heat of the day.<br>Max 2L/ha Bonza Gold. |
| **SeQuence + Prestige + Attack + Bonza Gold** | 0.25–3.0L/ha + 350ml/ha + 0.5–1.0L/ha + 500ml/100L | |

# Post-emergence pest control

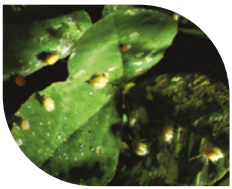
**Slugs and springtails are two of the most common pests to attack forage brassicas at establishment and cause substantial plant and yield losses. To maximise yields a good pest control programme should be implemented.**

Slug damage in young brassicas

## Slugs

Slugs are not usually a problem in brassica crops established via cultivation, although crops should still be monitored for any signs of slug damage. Damage can occur quickly and result in severe economic loss, see image on left.

Broadcast SlugOut at 10–15kg/ha either in a single application at planting, or in a split application.



Springtails in pasture

## Springtails

Springtails will begin to attack as soon as brassica seedlings start to emerge. Feeding can sever the stem, destroy the growing point, or totally defoliate seedlings.

If for any reason springtails become a problem in the crop after seedling emergence, apply Attack® at 100–200ml/ha. Other options for springtail control post-emergence include Dew 600 at the rates listed.

Argentine stem weevil

## Argentine stem weevil

Argentine stem weevil larvae feed by tunnelling into leaf stems and growing points of new seedlings, while the adults are foliar feeders. This damage severely restricts seedling development and growth, causing stunting or plant death.

Apply Attack at 0.5–1.0L/ha as soon as damage becomes evident.

Aphids in brassicas, untreated vs treated

## Aphids

Aphids cause stunting and reduced plant vigour. Aphids are also vectors for several viruses that severely impact brassica growth and bulb development.

Apply Attack at 0.75–1.0L/ha. To ensure complete coverage, add Contact Xcel at 25–50ml/100L water.

Adult Nysius

## Nysius (wheat bug)

Adults and nymphs feed at the base of plant stems causing 'ring barking' and cankerous growths. These can kill young seedlings or lead to brittle stems that break during windy conditions. Increased stem and bulb rotting also occurs as a result of Nysius damage.

In bulb brassicas, such as turnips or swedes, feeding can also occur on the top of the bulb causing withering and reduced growth.

Apply Attack at 0.5–1.0L/ha as soon as damage becomes evident.

Advanced leaf miner damage

## Leaf miner

Larvae live and feed within the leaf and leaf veins creating clearly visible whitish tunnels in the leaf. Damage caused by tunnelling larvae causes premature leaf death, thus reducing crop yields.

Controlling leaf miner with Attack has been shown to increase turnip yields by up to 2,300kg DM/ha. Apply Attack at 0.5–1.0L/ha.

Diamondback moth caterpillar

## Caterpillars (diamondback moth, white butterfly)

Diamondback moth caterpillars grow up to 12mm long and are yellowish green in colour. When disturbed they wriggle backwards quickly and usually drop from the leaf, suspended by a silken thread.

White butterfly caterpillars can grow up to 30mm and are dull green with hairs that give the caterpillar a velvety appearance.

Caterpillars of both species feed on the plant leaves, creating holes between the leaf veins. Severe damage causes a skeletonised leaf with only the ribs remaining.

Apply Attack at 0.75–1.0L/ha when damage is evident and caterpillars are found. If crop has reached canopy closure, use full rate of 1.0L/ha. Other options include Dew 600 at 1.0L/ha or Kaiso® 50WG at 200g/ha. It is critical to ensure complete coverage of foliage. Always use a wetter/spreader such as Contact Xcel at 50ml/100L water and high water rates, preferably 200L/ha or more.

Cutworm damage in brassicas

## Greasy cutworm caterpillars

Greasy cutworm caterpillars are blackish brown to a greasy greyish-green in colour and up to 50mm long. They live in the soil and emerge at night to feed. Newly emerged seedlings can be completely eaten leaving just the stalks, while older seedlings can have the stems cut near ground level, leaves severed off or be completely defoliated.


### Kaiso 50WG

Active ingredient: 50g/kg Lambda-cyhalothrin

Kaiso is a powerful weapon against insects. In the form of unique granules with Sorbie® Technology. Provides easier and safer handling and storage and quick knock-down.

Offers broad spectrum control of insects including:

- Cutworm
- Diamondback moth
- White butterfly caterpillars

Apply Kaiso 50WG at 200g/ha as soon as damage becomes evident.

## Check for pests

Greasy cutworm, slugs, springtails, aphids, caterpillars (diamondback moth and white butterfly), leaf miner, and Nysius (wheat bug) can all cause considerable economic damage in forage brassicas. They are sporadic and unpredictable pests and numbers may reach levels where control is required.

It is important to monitor your crops for these pests:

- Start checking for pests from the first signs of seedling emergence – every one to two days for the first few weeks, then at least once a week from then onwards. It is best to walk through the crop and look for damage and pests on the underside of leaves and in the plant crowns, rather than viewing the crop from a distance.
- Don't delay in controlling pests – ultimately, tonnes of dry matter can be lost. Seek advice if unsure of pest identification.

# Attack is the best form of defence

## Broad spectrum insecticide

Active ingredient:
25g/L Permethrin and 475g/L Pirimiphos-methyl


Attack is an easy to use, broad spectrum insecticide for use in forage crops to control all major pests. Attack works in five different ways to protect crops.

### Pests targeted

- **Leaf miner:** Apply Attack at 0.5–1.0L/ha
- **Nysius (Wheat bug):** Apply Attack at 0.5–1.0L/ha
- **Aphids:** Apply Attack at 0.75–1.0L/ha
- **Argentine stem weevil:** Apply Attack at 0.5–1.0L/ha
- **Springtails:** Apply Attack at 100–200ml/ha
- **Diamondback moth:** Apply Attack at 0.75–1.0L/ha
- **White butterfly:** Apply Attack at 0.5–1.0L/ha

### How it works

- **Contact:** Pests killed by contacting sprayed foliage
- **Ingestion:** Acts as a stomach poison when sprayed foliage is eaten
- **Fumigant:** Vapours kill pests
- **Translaminar:** Moves through leaf to kill pests inside and underneath the leaf
- **Repellency:** Repels pests from the sprayed plant.

## Adjuvant


### Contact™ Xcel

Active ingredient: 980g/L Linear alcohol ethoxylate

Contact Xcel is especially formulated for use as an additive to agricultural and horticultural sprays. It reduces the surface tension of spray droplets, causing them to spread out evenly over sprayed surfaces upon impact. This provides an increase in the number of droplets retained by the target. The spray will better penetrate waxy water repellent cuticles of insects, fungous lesions, disease infection sites and enhance coverage of, and adherence to, waxy and hairy leaf surfaces.

# Application rates and timing

| Pest | Product | Rate | Notes |
|---|---|---|---|
| **Springtails** | Attack | 100–200ml/ha | Apply as soon as damage becomes evident |
| | Dew 600 | 460ml/ha | |
| **Slugs** | SlugOut | 10–15kg/ha | Either in a single application at planting or in a split application – half (5–7.5kg/ha) applied about a week prior to planting, the other half at planting |
| **Aphids** | Attack | 0.75–1.0L/ha | Add Contact Xcel at 25–50ml/100L water to ensure complete coverage of foliage as soon as aphids are detected |
| **Leaf miner** | Attack | 0.5–1.0L/ha | Typically tank mixed with weed spray, then as required depending on pest pressure |
| **Nysius (wheat bug)** | Attack | 0.5–1.0L/ha | As soon as damage becomes evident |
| **Argentine stem weevil** | Attack | 0.5–1.0L/ha | As soon as damage becomes evident |
| **Diamond back moth** | Attack | 0.75–1.0L/ha | As soon as damage becomes evident, use higher rate after canopy closure |
| | Dew 600 | 1.0L/ha | |
| | Kaiso 50WG | 200g/ha | |
| **White butterfly** | Attack | 0.5–1.0L/ha | As soon as damage becomes evident, use higher rate after canopy closure |
| | Dew 600 | 1.0L/ha | |
| | Kaiso 50WG | 200g/ha | |
| **Greasy cutworm** | Kaiso 50WG | 200g/ha | As soon as damage becomes evident |

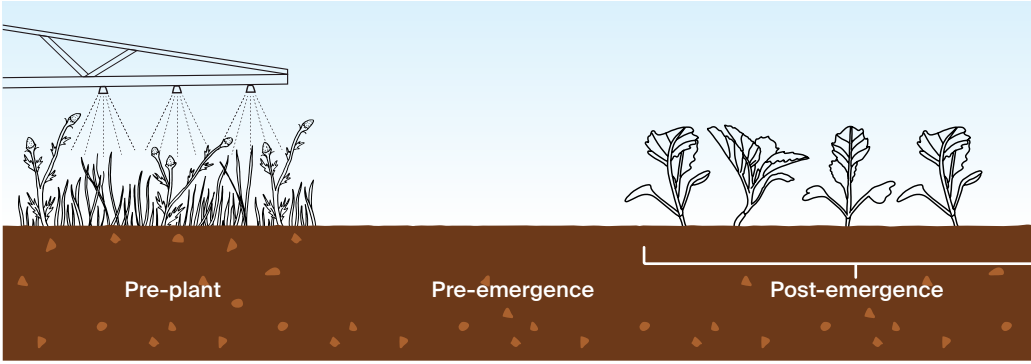
# Working out what you need

| | Application rate per ha | Total ha's required | Amount required |
|---|---|---|---|
| **Sprayout** | | | |
| CRUCIAL | Refer to label | | |
| Pulse Penetrant | 100ml/100L water | | |
| Dew 600 | 400ml/ha | | |
| Sero 750WG | 40g/ha | | |
| Nail 600EC | 20–40ml/ha | | |
| Kamba 750 | 400ml/ha | | |
| Charter 750WDG | 20g/ha | | |
| Archer 750 | 200–400ml/ha | | |
| **Pre-emergence weed control** | | | |
| Director CS | 250–400ml/ha | | |
| **Post-emergence weed control** | | | |
| Prestige | 350ml/ha | | |
| Archer 750 | 200–400ml/ha | | |
| Kamba 750 | 190–230ml/ha | | |
| SeQuence | 0.25–3.0L/ha | | |
| Bonza Gold | 500ml/100L water | | |
| **Pest control** | | | |
| SlugOut | 10–15kg/ha | | |
| Dew 600 | 0.46–1.0L/ha | | |
| Attack | 0.5–1.0L/ha | | |
| Kaiso 50WG | 200g/ha | | |
| Contact Xcel | 25–50ml/100L water | | |

# Brassica crop lifecycle

| Sprayout | | Pre-emergence weed control | | Post-emergence weed control | |
|---|---|---|---|---|---|
| CRUCIAL | 9 | DIRECTOR CS | 13 | PRESTIGE | 4 |
| Dew 600 | 1 | | | ARCHER 750 | 4 |
| ARCHER 750 | 4 | | | Kamba 750 * | 4 |
| NAIL 600 | 14 | | | seQuence | 1 |
| SERO 750WG | 2 | | | BONZA GOLD | |
| Charter 750WDG | 2 | | | | |
| Kamba 750 | 4 | | | | |
| PULSE PENETRANT | | SlugOut | | | |

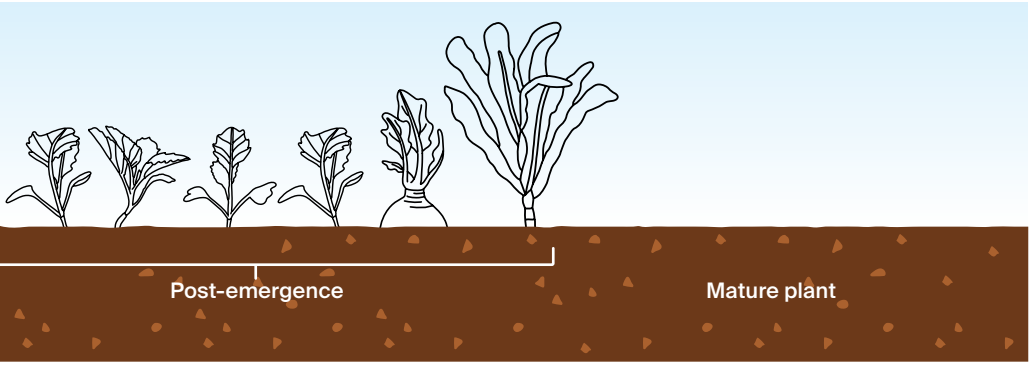
** For kale only*



*Continual use of the same mode of action products can result in resistance development in weed and pest populations. Where possible it is important to rotate modes of action.*

*To aid in this, the modes of action for the herbicides are presented next to the product in green circles. The insecticide modes of action are in orange circles.*

| Post-emergence pest control | | Weed control following grazing | |
|---|---|---|---|
| Attack INSECTICIDE | 1 3 | CRUCIAL ADVANCED TECHNOLOGY HERBICIDE | 9 |
| kaiso 50WG with SORBIE TECHNOLOGY | 3 | ARCHER 750 DUAL SALT LIQUID HERBICIDE | 4 |
| Dew 600 | 1 | NAIL eco | 14 |
| CONTACT XCEL | | SERO 750WG | 2 |
| | | Charter 750WDG | 2 |
| | | PULSE PENETRANT | |
| | | | |
| | | | |



## Notes

Priority Partnership®

Nufarm Priority Partnership® is an exclusive customer loyalty programme that values Nufarm customers for their support.

As a Nufarm Priority Partnership member you will receive a number of exclusive benefits including:

- Purchase incentives on the full range of Nufarm products.
- Information on new products, technology and services.
- Special membership offers and promotions.

Register today at:
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More info – 0800 NUFARM
nzinfo@nufarm.com **nufarm.co.nz**