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**Brassica Guide**

# SUCCESSFUL FORAGE BRASSICA PRODUCTION

A Weed and Pest Control Guide



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A wide-angle photograph of a lush green field of brassica crops, likely a cover crop, stretching towards a line of trees and a range of mountains under a clear blue sky. The text is overlaid on the left side of the image.

**SIMPLE STEPS  
TO PRODUCE  
A HIGHLY  
EFFECTIVE  
BRASSICA  
CROP**



Growing a productive brassica crop such as kale, rape, swedes and leaf or bulb turnips can take hard work. Obstacles such as weeds and pests can have a huge impact on productivity, not to mention the added complications of soil fertility and the weather. 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 the 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.



# STEP 1

## 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 **WeedMaster® TS540**. Spray in autumn to maximise **WeedMaster TS540** translocation and effectiveness, then sow a short-term crop (ryegrass or cereal) for some high quality grazing or silage.



# STEP 2

## A PRE-PLANT CLEAN-UP SAVES TIME

Before establishing the crop, spray with **WeedMaster TS540** 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 for cultivation.



It is important to apply WeedMaster TS540 prior to planting your crop to minimise weed competition



APPLICATION RATES FOR WEEDMASTER TS540 (see label for more weeds)		PULSE PENETRANT RATES
Annual ryegrass, cereals	2.0-2.7L/ha	100ml/100L water
Browntop, Kikuyu, Mercer grass	4.0L/ha	100ml/100L water
Couch, paspalum	2.7-4.0L/ha	100ml/100L water
Perennial ryegrass, Californian thistles	2.7L/ha	100ml/100L water
Red fescue, docks	6.0L/ha	100ml/100L water

Note: Many old pastures contain hard to kill weeds and will need at least 4.0L/ha WeedMasterTS540.

## TIPS TO MAXIMISE WEEDMASTER PERFORMANCE

- > For maximum absorption you need at least 5-10cm of actively growing leaf (minimum 10-15cm if couch is present)
  - Preferably spray first then graze or cut silage later.
- > Add **Pulse® Penetrant** at 100ml/100L water to
  - Improve penetration and uptake of **WeedMaster TS540**.
  - Ensure control of perennial ryegrass.
  - Aid rainfastness of **WeedMaster TS540** – 20 mins versus two hours without **Pulse Penetrant**.
- > If necessary, add another herbicide to control weeds not well controlled by **WeedMaster TS540**
  - Buttercup, large docks – **Charter® 750WDG** 20g/ha
  - Clovers, sheep's sorrel, yarrow – **Sero® 750WG** 40g/ha
  - Clover, thistles, plantain, yarrow – **Archer®** 0.5-1.0L/ha
  - Mallow, nettles, polygonum species – **Nail® EC** 50-100ml/ha
  - Dandelion, docks, willow weed – **Kamba® 500** 600ml/ha.



Observe relevant plant-back intervals.

## Controlling pests at pre-plant

### Springtails

Springtails are a very common pest in brassicas and control measures should be applied as a matter of course.

As springtails and their eggs can be present in high numbers in pasture (often 30,000/m<sup>2</sup> or more), a two-pronged approach should be used for good control.

1. Add **Dew™ 600** at 460ml/ha to **WeedMaster TS540** at spray-out to kill springtails already present in the pasture. **Dew 600** has a nil stock withholding period. Pasture can be sprayed then safely grazed after one day (annuals) or three days (perennials). Other insecticide options include:
  - **Nufarm Chlorpyrifos 500EC** at 200ml/ha (7 day withholding period).
2. Sow insecticide treated seed or drill insecticide granules (**Counter® 20G** at 3kg/ha) into the seed furrow to protect the seedlings from springtails that hatch from eggs.

This granular insecticide will also control Nysius, weevils and aphids.

### 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 matter of course. **SlugOut's** unique dust-free granules give excellent coverage per square metre, ensuring effective control of crop-destroying slugs.

#### APPLICATION RATE FOR SLUGOUT

Broadcast 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.





# STEP 3

## PRE-EMERGENCE WEED CONTROL IS KEY

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

**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 Territory Manager.



# STEP 4

## 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 three to six weeks after sowing.

### Broadleaf weed control

#### Prestige®

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



#### Archer

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



## Kamba 500

**Kamba 500** is an option for controlling a wide range of broadleaf weeds in kale crops only. Do not use **Kamba 500** on rape, turnips, hybrid forage types (Hunter/Pasja) or swedes. **Kamba 500** will control a wide range of annual, perennial and biennial weeds including mouse-ear chickweed, black nightshade, Californian thistles, dandelions, sheep's sorrel, yarrow and more.



## Grassweed control

### SeQuence®

**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 grass, summer grass and smooth witchgrass. Use **Bonza** at 500ml/100L water.



## Application rate and timing details

HERBICIDE	WEEDS	APPLICATION RATE	APPLICATION TIMING
<b>Prestige</b>	Broadleaf weeds particularly black nightshade and fathen	350ml/ha. Add <b>Bonza</b> ® spray adjuvant at 500ml/100L water	Apply to actively growing weed seedlings with 2-8 true leaves
<b>Archer</b>	Broadleaf weeds especially yarrow, thistles, Californian thistles	0.5-1.0L/ha	After the 2 true leaf stage of the crop and before crop canopy closure
<b>Kamba 500</b> (kale only)	Broadleaf weeds	280-340ml/ha	Apply at the 4-6 true leaf stage of the crop when weeds are small and before crop canopy closure
<b>SeQuence</b>	Grass weeds including ryegrasses, and 'annual summer grasses'	0.25-1.0L/ha. Add <b>Bonza</b> 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.



**Prestige** or **Archer** can be tank-mixed with **SeQuence** for control of both broadleaf and grass weeds. An insecticide can also be added if required. **Prestige**, **Archer** and **Kamba 500** all have plant-back periods for clovers, other legumes and some crops. These plant-back periods will vary depending on use rates and weather – check labels for directions.

## STEP 5

### 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.

#### 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.



Slug feeding damage on young brassicas

#### 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 after emergence include **Dew 600** or **Chlorpyrifos 500EC** at the rates listed.



Springtails in pasture

## ATTACK® IS THE BEST FORM OF DEFENCE

### 7 pests in 1

**Attack** is an easy to use, broad spectrum insecticide for use in forage crops to control all major pests including:

- > Leaf miner
- > Springtails
- > Nysius (wheat bug)
- > Diamondback moth
- > Aphids
- > White butterfly
- > Argentine Stem Weevil

### Two insecticides in one

- > **Attack** contains both permethrin (25g/L) + pirimiphos-methyl (475g/L) for an effective kill.

### How does Attack work?

**Attack works in five different ways to protect your crop:**

- > **Contact** - pests killed by contacting sprayed foliage
- > **Ingestion** - acts as 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



## Check for other 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.

## 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.



Cutworm damage in brassicas

Apply **Kaiso® 50WG** at 200g/ha, as soon as damage becomes evident, preferably in the evening. Another option is Sheriff® 100 at 200ml/ha at the first sign of insect damage.

## KAISO 50WG – A POWERFUL WEAPON IN THE BATTLE AGAINST INSECTS

- > Unique granules with Sorbie® Technology.
- > Easier and safer handling and storage.
- > Quick knock-down.
- > Broad spectrum control of insects including:
  - Cutworm
  - Diamondback moth
  - White butterfly caterpillars



## Aphids

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



Aphids in brassicas, untreated vs treated

Apply **Attack** at 0.75-1.0L/ha. Other options include **Chlorpyrifos 500EC** at 300-400 ml/ha. To ensure complete coverage of the foliage add **Contact™ Xcel** 25-50ml/100 litres of water.



## 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.



Early leaf miner damage



Advanced leaf miner damage

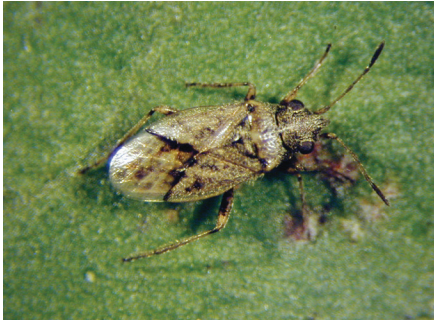
Apply **Attack** at 0.75-1.0L/ha.





## 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.



Nysius - adult



Nysius damage

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



## 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.



## Caterpillars (diamondback moth, white butterfly, army worm)

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 of the leaf remaining.



Diamondback moth caterpillar<sup>1</sup>



White butterfly caterpillar<sup>2</sup>

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, **Sheriff 100** at 200ml/ha, or **Kaiso 50WG** at 200g/ha. It is critical to ensure complete coverage of the foliage. Always use a wetter/spreader such as **Contact Xcel** at 50ml/100 litres water and use high water rates, preferably 200L/ha or more.



## Application rate and timing details

PEST	PRODUCT	RATE	NOTES
<b>Greasy cutworm</b>	Kaiso 50WG	200g/ha	Apply as soon as damage becomes evident, preferably in the evening
	Sheriff 100	200ml/ha	
<b>Springtails</b>	Attack	100-200ml/ha	
	Dew 600	460ml/ha	
<b>Slugs</b>	SlugOut	10-15kg/ha	Either in a single application at planting or in a split application - half (7.5kg/ha) applied about a week prior to planting, the other half at planting
<b>Aphids</b>	Attack	0.75-1.0L/ha	Add <b>Contact Xcel</b> at 25-50ml/100L water to ensure complete coverage of foliage
	Chlorpyrifos 500EC	300-400ml/ha	
<b>Leaf miner</b>	Attack	0.75-1.0L/ha	
<b>Nysius</b>	Attack	0.5-1.0L/ha	As soon as damage becomes evident
<b>Argentine Stem Weevil</b>	Attack	0.5-1.0L/ha	As soon as damage becomes evident

# FINALLY

## RELAX AND REAP THE REWARDS



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# WORKING OUT WHAT YOU NEED

	APPLICATION RATE PER HA*	TOTAL HA'S TREATED	AMOUNT REQUIRED
<b>Step 1 - Perennial Weeds</b>			
WeedMaster TS540	Refer to label for appropriate rate		
<b>Step 2 - Pre-plant clean up</b>			
WeedMaster TS540	Refer to label for appropriate rate		
Pulse Penetrant	100ml/100L water		
Dew 600	460ml/ha		
Sero 750WG	40g/ha		
SlugOut	10-15kg/ha		
Nail EC	50-100ml/ha		
Kamba 500	600ml/ha		
Charter 750WDG	20g/ha		
Archer	0.5-1.0L/ha		
<b>Step 3 - Pre-plant weed control</b>			
Director CS	250-400ml/ha		
<b>Step 4 - Post emergence weed control</b>			
Prestige	350ml/ha		
Bonza	500ml/100L water		
Archer	0.5-1.0L/ha		
Kamba 500	280-340ml/ha		
SeQuence	0.25-1.0L/ha		

	APPLICATION RATE PER HA*	TOTAL HA'S TREATED	AMOUNT REQUIRED
<b>Step 5 - Slug and springtail control</b>			
Dew 600	460ml/ha		
Chlorpyrifos 500EC	200ml/ha		
Counter 20G	3kg/ha		
Attack	100-200ml/ha		
SlugOut	10-15kg/ha		
<b>Step 6 - Check for other pests</b>			
<i>Greasy cutworm caterpillars</i>			
Kaiso 50WG	200g/ha		
Sheriff 100	200ml/ha		
<i>Aphids</i>			
Attack	0.75-1.0L/ha		
Chlorpyrifos 500EC	300-400ml/ha		
<i>Leaf miner</i>			
Attack	0.5-1.0L/ha		
<i>Nysius</i>			
Attack	0.5-1.0L/ha		
<i>Caterpillars (diamondback moth, white butterfly, army worm)</i>			
Attack	0.75-1.0L/ha		
Dew 600	1.0L/ha		
Kaiso 50WG	200g/ha		
Sheriff 100	200ml/ha		
Contact Xcel	50ml/100L water		
<i>Argentine Stem Weevil</i>			
Attack	0.5-1.0L/ha		









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<sup>1</sup>Photo courtesy of Plant and Food. <sup>2</sup>Photo courtesy of W. Cranshaw, CSU, Bugwood.org

NUF0182\_08/17



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