

SECOND  
EDITION



# THE CROP CARE GUIDE TO INTAKE







## **Portfolio Categories**

**What Is Intake**

**History of Intake Development**

**Advantages of Intake**

**Why Use Intake**

**Foliar and root disease**

**Rate ranges**

**Product Label & MSDS**



# What Is Intake

Intake is based on the active ingredient flutriafol, a highly water soluble and highly systemic triazole (GROUP 3) fungicide. These desirable fungicide traits initiated research into alternative methods of fungicide application compared with the traditional foliar approach, with an aim of achieving superior longevity of control of stripe rust and other significant diseases in wheat and barley, and blackleg in canola.

## History of Intake Development

Crop Care first introduced flutriafol as an in-furrow spray in 1987. An extensive trial program was conducted in 5 states between the late 1980's and mid 2000's. The results from 66 trials were published, with trials consistently demonstrating greater yield potential with the application of Intake to solid fertiliser or as an in-furrow treatment.

Crop Care has maintained a focus on further evolving Intake formulations, with a history of innovative product development with respect to the various registrations and unique use patterns.

- 1987** Crop Care launches first flutriafol "in-furrow" fungicide.
- 2004** Crop Care Intake Yellow released- improved formulation.
- 2007** Crop Care Intake Combi released. A unique "BLUE" 250g/L flutriafol formulation developed for professional application to solid fertilisers.
- 2009** Crop Care Intake Combi registration of extended rate ranges for wheat.
- 2011** Crop Care Intake Combi registration of extended rate ranges for barley.
- 2012** Crop Care Intake Combi Sapphire released. A unique highly visible "BLUE" 500g/L flutriafol formulation developed for professional application to solid fertilisers. The higher loading enables fertiliser integrity to be maintained with extended rate ranges for wheat and barley.

## Advantages of Intake

Many of these innovative use patterns are exclusive to the Crop Care registrations, with extended rate ranges providing even greater protection against these diseases than competitor products, and far superior potential protection compared with seed treatments targeting these foliar diseases.

End users enjoy the benefits of these unique Crop Care label features with the assurance that these use patterns are registered for this purpose. Label claims are completely backed with extensive trial work throughout numerous regions and over many seasons.

# Why Use Intake

Intake provides farmers and agronomists with a highly effective management tool for targeting numerous foliar and root diseases in wheat, barley and canola. Intake offers unsurpassed protection against stripe rust, septoria tritici blotch and take-all in wheat, and barley scald and powdery mildew in barley. Intake also offers useful suppression (i.e. up to 110 days) against net form net blotch in barley, and is highly effective against blackleg in canola.

A major benefit of utilising Intake as a disease management tool is that the crop is protected from these diseases immediately from planting. Trials have consistently demonstrated this early protection enhances yield potential, resulting from improved seedling health and early season crop vigour and the fact that Intake is a highly systemic fungicide which translocates to protect new growth

In addition, crop trafficability and actually being able to get on the paddock to apply a foliar fungicide in a timely manner is not an issue, and limited resources such as labour are also more readily available

Crop Care has worked alongside major fertiliser customers to develop Intake Combi in 2007 which was superseded by the development and release of Intake Combi Sapphire in 2012.

## DISEASE TARGETED IN CANOLA WITH INTAKE

Blackleg, caused by the fungus *Leptosphaeria maculans*, is the most serious disease of canola in Australia. The severity of blackleg has risen in recent years due to increased canola acreage arising from favourable returns and the subsequent shortening of rotations. Yield losses of 50 per cent and greater have been recorded in some seasons with up to 90 per cent yield loss occurring in cases where *L. maculans* has overcome major blackleg resistance genes within certain varieties.

Blackleg survives on canola stubble producing dark coloured raised fruiting bodies (pseudothecia) that contain large quantities of airborne spores (capable of travelling several kilometres). The date of spore maturity depends on summer/autumn rainfall and temperature. Higher rainfall results in early spore maturity and may lead to increased disease severity. The release of spores is generally highest between May and August which coincides with the sowing window in Australia. In autumn and winter, rainfall triggers spore release from the fruiting bodies on the stubble. Within two weeks of spores landing on canola cotyledons and young leaves, clearly visible off-white coloured lesions develop. Pycnidial fruiting bodies (dark coloured dots) within these lesions release rain-splashed spores (refer photo 1).



Once a lesion is formed, the fungus grows within the plants vascular system to the crown where it causes the crown of the plant to rot, resulting in a canker. Stem cankers are clearly visible at the crown of the plant (refer photo 2). Stem cankering is the major cause of yield loss associated with blackleg. Severe cankers may cause the plant to die or fall over as they sever the roots

# Why Use Intake

from the stem, whereas less severe infection will result in internal infection of the crown, restricting water and nutrient flow within the plant.

In recent years, blackleg has also been found in the plant roots. This root infection appears to cause the plant to die prematurely in severe cases. The root rot form of the disease is caused by the same blackleg strains as the stem canker and management practices to control the traditional form of blackleg are the same for all forms of the disease.

## MANAGEMENT

Blackleg is potentially the most severe disease in canola, however it can be successfully managed by:

- Growing resistant varieties
- Paddock selection-never sow canola into the previous years' canola crop stubble
- Using fungicides such as Intake®

## SELECT BLACKLEG RESISTANT VARIETIES

The best defence against blackleg is varietal resistance. Blackleg rating data is collected each year from a number of sites in NSW, Vic, SA and WA. **It is important to only consult the current blackleg rating guide as blackleg resistance ratings can change from one year to the next due to changes in the frequency of different blackleg strains** as a result of out-crossing of the fungus. Out-crossing leads to a large number of

ascospores as primary inoculum for the subsequent crop and a high degree of sexual recombination, which may enable the fungus to adapt to selection pressures and eventually overcome disease resistance genes of that variety. If the same cultivar has been used for 3 years or more, and blackleg is now severe, selecting a cultivar from a different resistance group will greatly reduce the ability of the pathogen to overcome resistance. A rating of MS is considered adequate for lower rainfall regions, whereas a minimum of MR is required for medium to high rainfall areas.

## ISOLATE THE PROPOSED CROP FROM THE STUBBLE OF THE PRECEDING CROP

Varietal resistance alone is not sufficient to protect your crop from yield loss caused by blackleg. In most situations over 95 per cent of all blackleg spores in the atmosphere originate from canola stubble from the former canola crop. Disease pressure falls markedly in the first 200 metres away from last years' stubble and continues to decline up to 500 metres. Stubble management such as raking and burning or burial can reduce disease pressure by up to 50 per cent.

## APPLICATION OF INTAKE TO TARGET BLACKLEG

The most effective chemical control for blackleg is achieved with the use of Intake applied to solid fertiliser at planting.

*"Intake provides farmers and agronomists with a highly effective management tool for targeting numerous foliar and root diseases in wheat, barley and canola"*



Photo 2: Stem Cankers

# Foliar & Root Diseases

## Targeted in Wheat with Intake



### SEPTORIA

Septoria tritici blotch is predominantly a stubble-borne disease. Following rains or heavy dew in late autumn and early winter, wind-borne spores (ascospores) are released from fruiting bodies embedded in the stubble of previously infected plants. These spores can be spread over large distances. Early ascospore infections cause blotches on the leaves. Within these blotches a second type of fruiting body, pycnidia, are produced. Spores ooze from pycnidia when the leaf surface is wet and they are dispersed by rain splash to other leaves where they cause new infections. Because this phase of disease development depends on the rain splash of spores, Septoria will be most severe in seasons of above average spring rainfall. A combination of wind and rain provides the most favourable conditions for spread of the disease within crops.

**Intake is highly effective against Septoria tritici blotch, providing robust control of this disease.**



### STRIPE RUST

Stripe rust survives from one season to the next on living plants (predominantly wheat, and to a lesser extent barley, triticale, barley grass, brome grass and phalaris). It does not survive on seed, stubble or soil. The stripe rust fungus is dispersed as wind-blown spores which can repeatedly infect susceptible crops during the growing season, causing epidemics to develop. Stripe rust has the potential to significantly affect the yield and grain quality of susceptible wheat varieties. **Intake is extremely active against stripe rust, offering up to 130 days protection.**



### TAKE-ALL

The take-all fungus invades the centre of the root where it blocks water conducting tissue in the plant and restricts water uptake. This can cause infected plants to ripen prematurely, which often results in dead heads or white heads with little or no filled grain. The most characteristic symptom of take-all is a blackening of the sub-crown internode and roots. In severely infected plants this blackening may also progress to the stem base under the leaf sheath. Take-all can only survive between susceptible crops in the root and tiller bases of previously infected plants. Take-all has a host range that is confined to grass species, including wheat, barley, triticale, barley grass, brome grass, silver grass and ryegrass. Following autumn rains, the take-all fungus grows out of this material and attacks the roots of susceptible plants. Plants affected by take-all usually occur in patches within a crop, but may also be scattered randomly throughout. In a severe outbreak the entire crop may be affected. Above ground, plants appear stunted and yellow green in colour with reduced tillering. Low soil moisture during October and November increases the occurrence of dead heads. **Intake provides excellent control of take-all.**

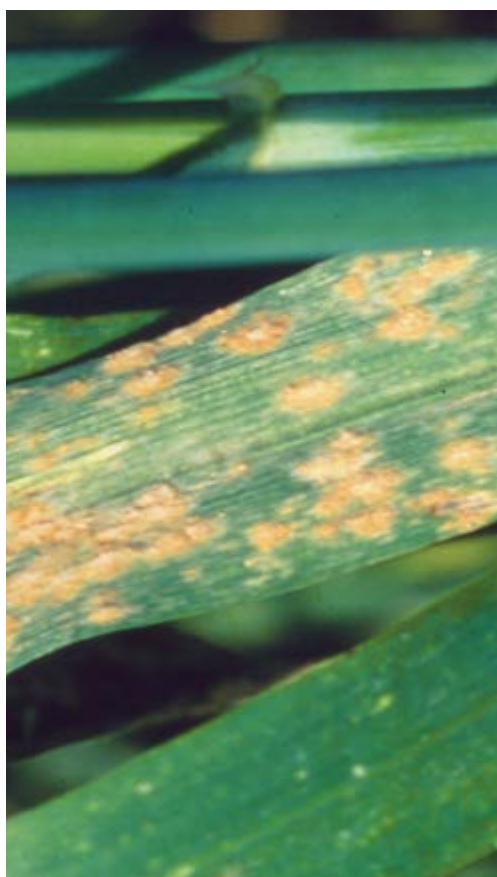
# Foliar & Root Diseases

## Targeted in Barley with Intake



### BARLEY SCALD

The scald fungus (*Rhynchosporium secalis*) survives from one crop to the next predominantly on barley stubble and on barley grass. The fungus can also survive on seed from heavily infected crops. Early in the season, following opening rains, spores are released from the stubble to infect early sown barley crops. The disease is usually first observed in isolated patches when plants are tillering. Further spread of the disease, within the crop, is by rain splash or wind dispersal of the spores from one plant to another, and from old leaves to young leaves moving infection higher up the plant. Serious damage is common in years of frequent rain, especially in the spring. By the end of the growing season the disease is usually evenly distributed within the crop, and has the potential to severely impact yield potential. The scald pathogen is pathogenically highly variable and able to change, which means that it often overcomes (or breaks down) the resistance in commercial varieties. **Intake offers up to 120 days protection against barley scald, almost 6 weeks greater protection than competitor registrations.**



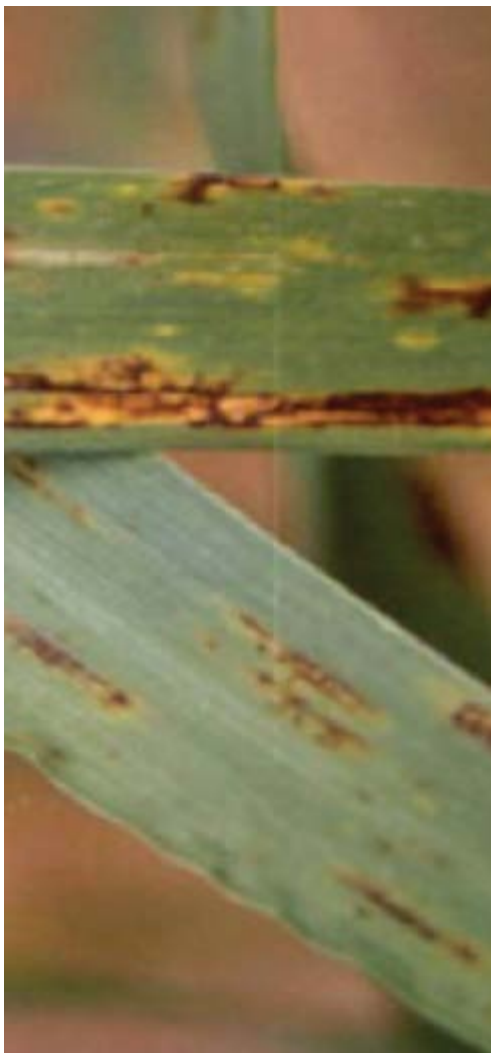
### POWDERY MILDEW

The powdery mildew fungus survives as cleistothecia; 'black bodies' on stubble and plant residues. With autumn rains, spores are released from these bodies and infect volunteer barley and barley grass weeds. Spores produced on these plants can be carried hundreds of kilometres by wind. Airborne spores are likely to be the main source of infection for barley crops. Spores that land on and infect emerging barley plants form the primary infection in the crop and appear as white powdery spores known as conidia. Within the crop canopy, the white fluffy conidia are spread as a secondary infection by wind. The area surrounding the spores turns yellow as the fungus depletes the leaf nutrients. Moderate to severe infection leads to premature yellowing and eventually the death of the entire leaf. Severe infections can occur in winter during early crop growth, affecting the yield potential through tiller abortion. Severe infections late in the season can also adversely affect grain fill and resulting yield potential. Powdery mildew pathogens, like rusts, can readily mutate to overcome specific resistant genes, which will result in the downgrading of cultivar resistance ratings over time. **Intake is highly effective against powdery mildew, offering robust protection for up to 120 days after planting.**

*"A major benefit of utilising Intake as a disease management tool is that the crop is protected from these diseases immediately from planting."*

# Foliar & Root Diseases

## Targeted in Barley with Intake



### NET FORM NET BLOTCH

The net form of net blotch (NFNB) pathogen can survive for up to 3 years on stubble, and can be a severe disease (worse than spot form) where susceptible varieties are grown. NFNB can also be seed-borne following humid conditions while the crop is maturing. NFNB has become more prevalent due to the increased adoption of susceptible varieties and a shortening of barley rotations. Initial crop infection (primary inoculum) occurs with approximately six hours of moist conditions at temperatures between 10°C and 25°C. Primary inoculum is derived from airborne spores, which are ejected up to 40cm from stubble of the previous crop. The formation and dispersal of secondary inoculum (conidia) takes place between 14 to 20 days after primary infection. The spores are derived from these leaf infections and dispersed by wind and usually travel short distances within the crop, but can also be blown into neighbouring crops. Secondary infections can occur repeatedly throughout the growing season whenever conditions are favourable. As the barley plant begins to senesce, the fungus grows into the stem and survives on the stubble. Net blotch can cause a significant increase in screenings leading to downgrading from malting quality as well as reduced yields. High levels of infection will kill leaves prematurely which may cause yield losses in excess of 30%. **Crop Care Intake products are the only registered flutriafol formulations to offer extremely useful suppression of net form blotch (up to 110 days from planting).**



# Rate Ranges

	Intake® Combi Sapphire 500g/L flutriafol				
FORMULATION	f				
COLOUR	Blue (professional application)				
RATE PER 100KG SEED	Rates per Ha (applied to solid fertiliser)				
RATE PER HA	100 - 200mL	200mL	300mL	300 - 400mL	400mL
<b>WHEAT</b>					
Bunt					
Loose smut					
Flag smut					
Septoria tritici blotch		✓			
Stripe rust	✓ (up to 100 days)	heavy pressure		✓ (120 - 130 days)	heavy pressure
Take-all		✓			
Aphids#					
BYDV#					
<b>BARLEY</b>					
Covered smut					
Loose smut					
Barley scald	✓ (up to 80 days)	heavy pressure	✓ (up to 100 days)		✓ (up to 120 days)
Powdery mildew	✓ (up to 80 days)	heavy pressure	✓ (up to 100 days)		✓ (up to 120 days)
Net form net blotch				S (up to 110 days)	
Aphids#					
BYDV#					
<b>OATS</b>					
Covered smut					
Loose smut					
Aphids#					
BYDV#					
<b>TRITICALE</b>					
Loose smut					
Aphids#					
BYDV#					
<b>CANOLA</b>					
Blackleg		✓			
Comparable products	Various. Crop Care only registration with above rate ranges.				

## KEY:

**S:** Suppression

**Formulation:**  
f = flowable

rate range extensions, exclusive to Crop Care registrations

# For a winning performance

The ZincStar logo features the word "ZINCSTAR" in white, uppercase, sans-serif font, with a white five-pointed star replacing the letter "A". A registered trademark symbol (®) is located to the upper right of the star. The logo is set against a blue rectangular background.

**ZINCSTAR®**

The MapStar logo features the word "MAPSTAR" in white, uppercase, sans-serif font, with a white five-pointed star replacing the letter "A". A registered trademark symbol (®) is located to the upper right of the star. The logo is set against an orange rectangular background.

**MAPSTAR®**

Achieve a winning performance in the field with **ZincStar®** and **MAPStar®**.

**Intake® Combi Sapphire** adds to performance by supplying fungicide treatment.

**ZincStar** and **MAPStar** use compound granule technology ensuring even distribution of nutrients in the field.

**Fertiliser Made Easy**

[www.impactfert.com.au](http://www.impactfert.com.au) | Customer Service 1800 88 44 88

ZincStar® and MAPStar® are trademarks of Ameropa Australia Pty Ltd.



Listen to Australian farmers talk about their ZincStar experience  
at [www.impactfert.com.au/videos](http://www.impactfert.com.au/videos)

For further information please contact your Area Sales Manager  
or call Customer Service on 1800 88 44 88.



# Intake Combi Sapphire

## Superior Protection

### BENEFITS

A highly visible blue 500g/L Flutriafol formulation specifically designed for professional application to solid fertilisers.

### PROFESSIONAL APPLICATION

Professional application ensures the desired rate of Intake® is applied to solid fertiliser.

Impact Fertilisers utilise state of the art application equipment to provide optimal coverage of Intake® on solid fertilisers.

Optimal coverage ensures even distribution of the desired rate of Intake® within the plant row, maximising agronomic performance whilst maintaining fertiliser integrity.

### SOLID FERTILISERS

Crop Care has worked alongside major fertiliser customers to develop a superior blue formulation that provides significant benefits over yellow formulations.

### THESE BENEFITS INCLUDE

- Increased visibility of Intake Combi Sapphire application compared with yellow formulations
- Superior application to solid fertilisers
- Quicker drying time, resulting in less transfer to trucks, augers and handling equipment, and less risk of contamination
- Plant and equipment hygiene is improved with ease of cleaning after use
- Reduced odour
- Stronger formulation enables superior disease control at lower application rates
- Lower application rates maintain fertiliser quality and integrity
- Allows for a more prescription approach to disease control with the ability to apply rates specific to anticipated disease pressure, or the ability to maintain the desired active ingredient applied per Hectare, even at reduced solid fertiliser application rates
- Registered rate range extensions for prolonged disease control

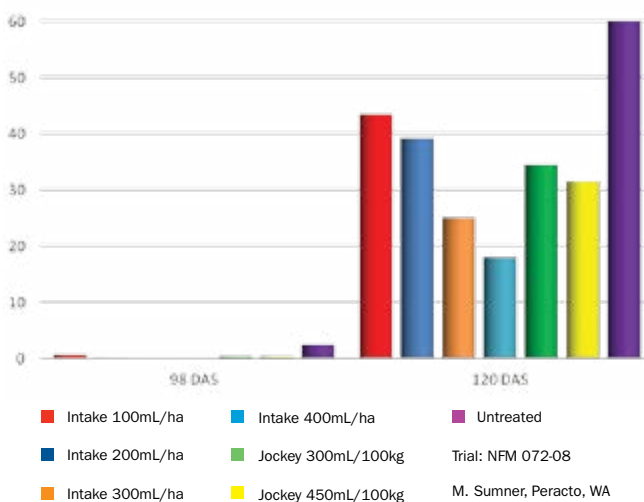
### EXTENDED DISEASE PROTECTION EXCLUSIVE TO CROP CARE

- Stripe rust in wheat: up to 120 - 130 days protection
- Powdery mildew and scald in barley: up to 120 days protection
- Suppression of net form net blotch in barley for up to 110 days

These registered rate range extensions are exclusive to Crop Care and enable end users to customise flutriafol application to target their anticipated disease pressure severity, whilst maintaining fertiliser application rates and fertiliser integrity.

Intake® Combi Sapphire's higher rate ranges offer superior disease protection compared with any other 500g/L flutriafol in-furrow fungicide available on the market, or seed dressings targeting foliar diseases.

**Powdery Mildew in Barley**  
% Leaf Area Infection on Flag -2 Leaf



# Intake Combi Sapphire

## Superior Protection

### DIRECTIONS FOR USE: ALL STATES

Restraints: DO NOT use open loading and mixing for aerial application.

### A. INTAKE COMBI SAPPHIRE APPLIED IN-FURROW AS A FERTILISER TREATMENT

Crop	Disease	Rate per hectare	WHP	Critical Comments				
Canola	Blackleg ( <i>Leptosphaeria maculans</i> )	200mL	4 weeks Grazing	Treatment will reduce blackleg infection in both susceptible and tolerant canola varieties. Application: Spray undiluted product evenly onto granulated fertiliser and immediately mix thoroughly in a mechanical mixer or auger. Apply at a rate which will deposit 200mL of the product on the quantity of fertiliser required to be sown in furrow per hectare, using the table below as a guide.				
				Fertiliser rate per hectare (kg)		Volume of product per 100kg of fertiliser (mL)		
				60	333			
				70	286			
				80	250†			
				100	200†			
				120	167†			
Wheat	Stripe rust ( <i>Puccinia striiformis f.sp. tritici</i> )	100 to 400mL	4 weeks Grazing	For stripe rust control in wheat use 100 to 200mL/ha where up to 100 days protection is required and where heavy stripe rust pressure is expected use 200mL/ha only. Use 300 to 400mL/ha when 120 to 130 days protection is required and where heavy stripe rust pressure is expected, use 400mL/ha only.				
	Septoria tritici blotch ( <i>Mycosphaella graminicola</i> ) Take-all ( <i>Geaumannomyces graminis</i> )	200mL		For control of powdery mildew and scald of barley, use 100 to 200mL/ha where up to 80 days protection is required and where heavy disease pressure is expected use 200mL/ha. Use 300mL/ha when 100 days protection is required and 400mL/ha for up to 120 days protection from powdery mildew and scald. For suppression of net form net blotch for up to 110 days after sowing use 300 to 400mL/ha. Application: Spray product evenly onto granulated fertiliser and immediately mix thoroughly in a mechanical mixer or auger. Apply at a rate which will deposit the specific rate of the product on the quantity of fertiliser required to be sown in-furrow per hectare, using the table below as a guide.				
Barley	Powdery mildew ( <i>Blumeria graminis f.sp. hordei</i> ) Scald ( <i>Rhynchosporium secalis</i> )	100 to 400mL		Fertiliser rate per hectare (kg)	Volume of product per 100kg of fertiliser (mL)			
					100mL rate	200mL rate	300mL rate	400mL rate
				50	200†	400	600	800*
				60	167†	333	500	667*
				70	143†	286	429	571
				80	125†	250†	375	500
				100	100†	200†	300	400
	120	83†	167†	250†	333			
	Net Form Net Blotch ( <i>Pyrenophora teres f.sp. teres</i> ) (Suppression only)	300 to 400mL		* Application volumes over 600mL per 100kg of fertiliser may adversely effect the flow rate and handling characteristics of dusty/poorly granulated fertilisers and some high nitrate fertilisers. † Where application volume is low, product may be diluted with water to improve coverage.				

# Increase Canola Profit

## With Intake

### WHAT IS INTAKE?

Intake is Crop Care's unique flutriafol formulation which, when applied to solid fertilizer at planting, helps control blackleg in canola and provides extended control of foliar diseases in cereals compared with any other flutriafol registration.

Intake® Combi Sapphire has been specifically developed for professional application to solid fertilisers, providing superior benefits such as increased visibility and improved traceability, faster drying, superior application and prolonged disease control compared with other flutriafol formulations.

### WHAT IS BLACKLEG?

Blackleg is caused by a fungus that attacks canola plants. It has the potential to reduce canola yields by more than 50%. Although new varieties have some resistance to the disease, blackleg has the potential to overcome this resistance and cause widespread damage.

Fungal spores are released from canola stubble and spread via wind and rain. The disease is more prevalent in areas of intense canola production.

The estimated annual blackleg cost to the Australian canola industry is \$76.6 million. It is the most serious fungal disease of canola in Australia.

Source: DPI Vic

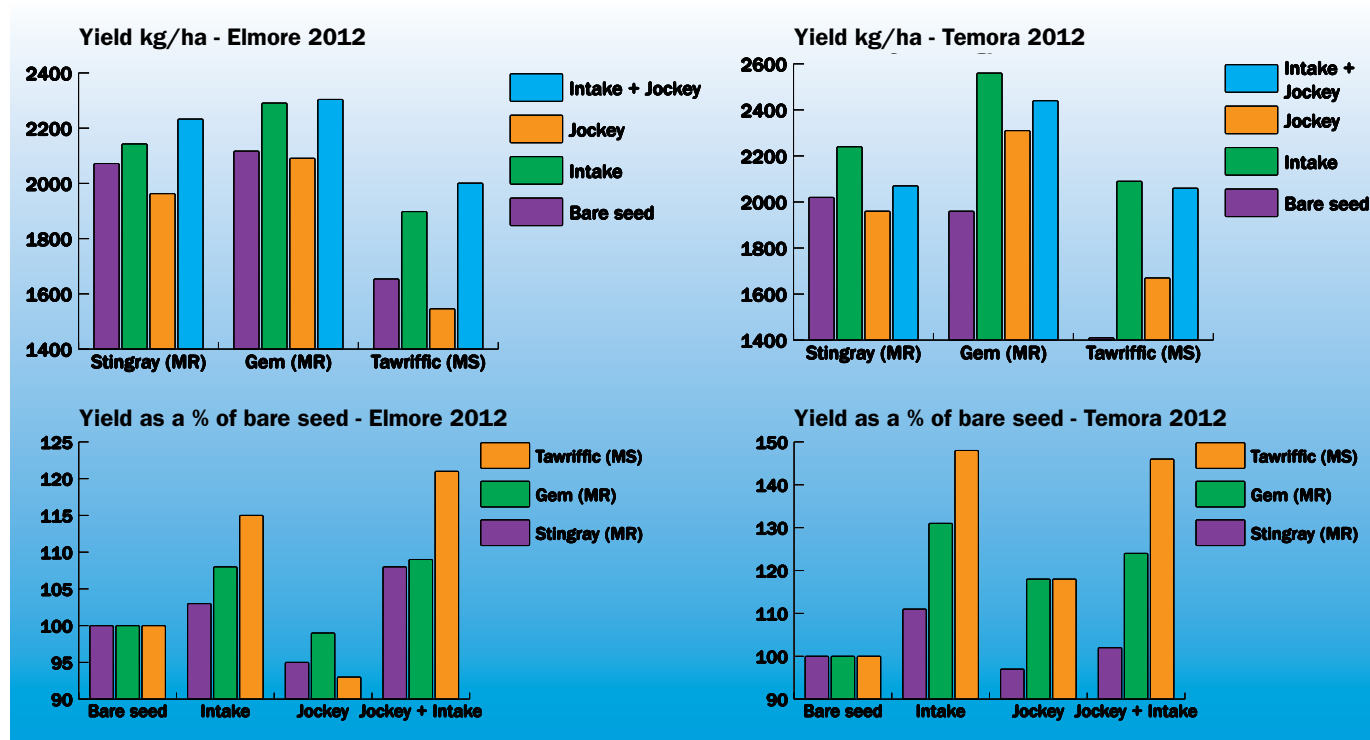
### CANOLA VARIETY BLACKLEG RATINGS

Blackleg ratings data, collected each year from a number of sites in NSW, Vic, SA and WA helps with the management of the disease. It is important to only consult the current blackleg rating guide as blackleg resistance ratings can change from one year to the next due to changes in the frequency of different blackleg strains. A rating of MS is considered adequate for lower rainfall regions, while a minimum of MR is required for medium to high rainfall areas. Source: DPI Vic

### ELMORE AND TEMORA TRIAL SUMMARY

In 2012, Crop Care conducted a series of trials to assess the efficacy of Intake treated fertiliser compared with the industry standard practices of sowing bare or Fluquinconazole treated canola seed. Three canola varieties were chosen for their blackleg rating (MS through to MR) and the results and outcomes collated in Figure 1.

Figure 1: Yield comparison with different treatments.

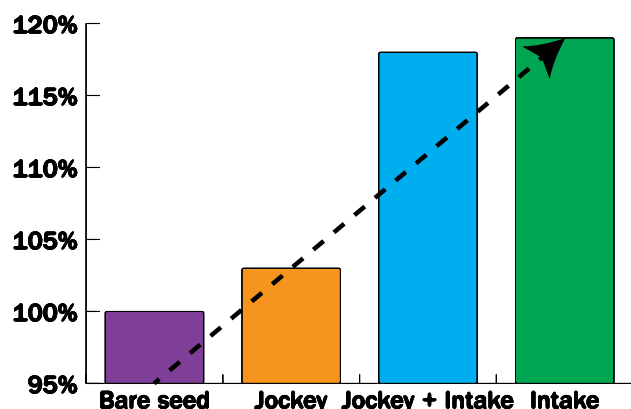


# Increase Canola Profit

## With Intake

Figure 2

### Intake delivers more canola yield



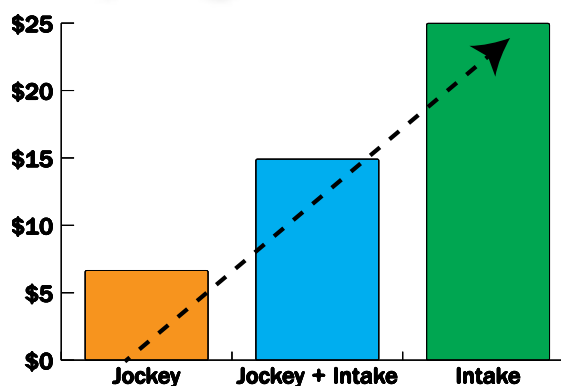
Significant yield responses in canola were achieved at both 2012 trial sites when Intake was applied to fertiliser at planting, irrespective of the blackleg ratings of the varieties trialled.

As expected, the yield responses were most significant in Tawriffic, which is rated Moderately Susceptible (MS) to blackleg. The Temora site achieved a yield of 148% of the bare seed treatment yield, which was 30% above that achieved by Jockey alone compared with the bare seed treatment.

However, even more significant is the yield responses achieved with Intake usage in canola varieties which are considered Moderately Resistant (MR) to blackleg.

Figure 3

### Return on Investment: \$1 spend give \$? return



### Intake is actually further enhancing disease control achieved by plant breeding.

At Temora, for example, yields of Stingray and Gem (both with blackleg ratings of MR) treated with Intake alone far out-performed those achieved with bare seed or Jockey +/- Intake treatments. The yield of Gem treated with Intake alone was 131% of bare seed yield, out-performing the yield increase of Jockey alone of 118% compared with bare seed.

Jockey + Intake was comparable to Intake alone at Elmore although the combined treatment was less responsive at Temora. However when it comes to return on investment, Intake alone was far superior at \$24.98 return for every \$1 spent, compared with \$14.91 return for Jockey + Intake and \$6.65 return for Jockey alone (Figures 2 and 3).



# Increase Canola Profit

## With Intake

### BLACKLEG CANKER ASSESSMENT - RATING

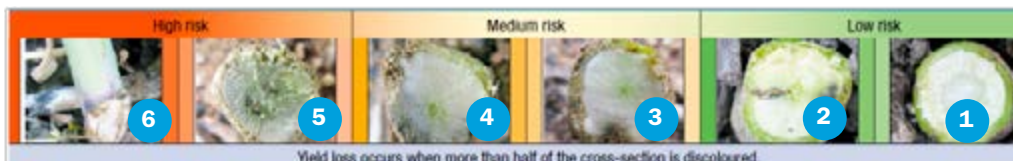
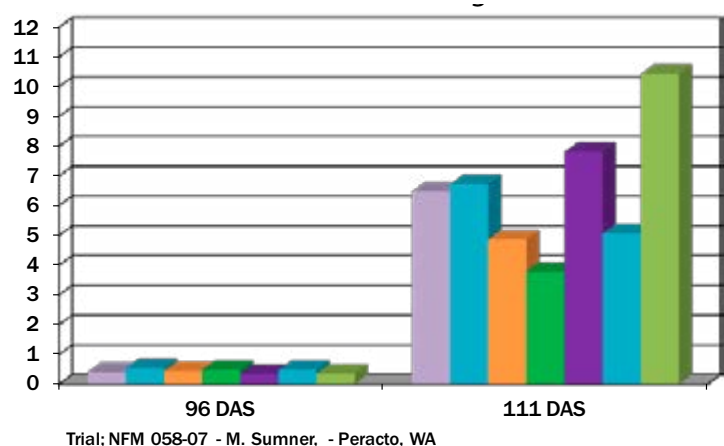
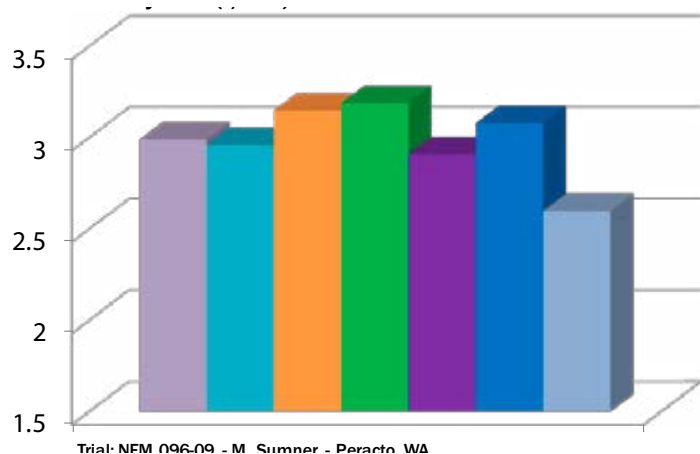
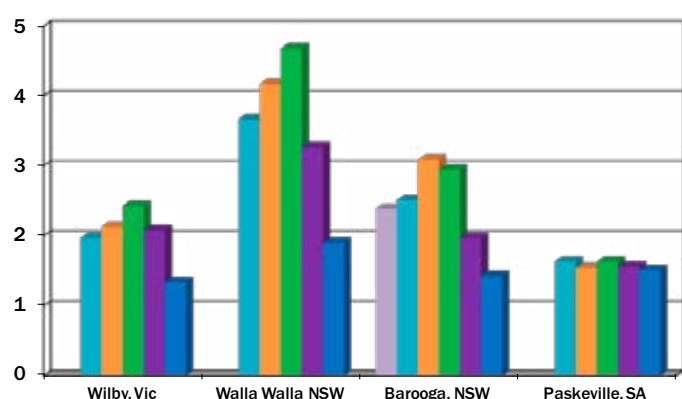
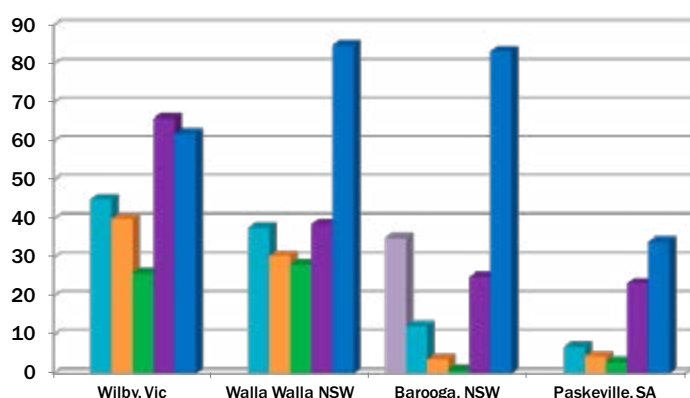


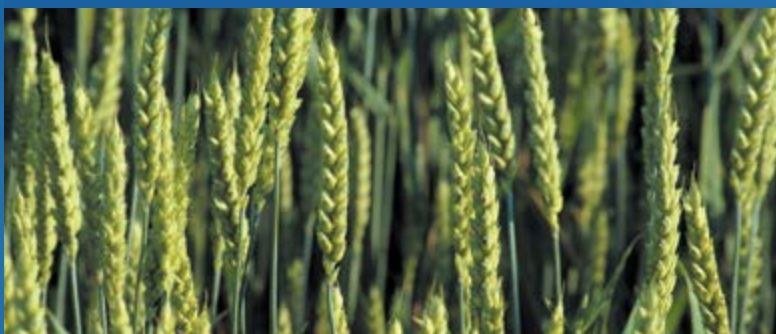
Image courtesy of GRDC Blackleg Management Guide Fact Sheet (July/August 2012)

Below are some cross sections of canola stems, highlighting the reduced blackleg incidence in the varieties treated with Intake, irrespective of their blackleg ratings.



# Trial Results





## **Impact Fertilisers**

**Customer Service: 1800 88 44 88** [www.impactfert.com.au](http://www.impactfert.com.au)

### **Head Office**

Level 8, 5 Queens Road, MELBOURNE VIC 3004

### **Geelong**

55 Heales Rd, CORIO VIC 3214

## **Crop Care Head Office**

**PO Box 84, Morningside QLD 4170**

### **Customer Service**

**P: 1800 111 454 F: 07 3909 2010**

**[www.cropcare.com.au](http://www.cropcare.com.au)**

**The product label should be consulted before use of any of the products referred to in this publication.**

© Copyright 2016

Veteran and Intake are registered trademarks of Nufarm / Jockey is a registered trademark of Bayer.

This publication is a guide only and no substitute for professional or expert advice. Crop Care Australasia Pty Ltd shall not be liable for any results, loss or damage whatsoever, whether consequential or otherwise through the use or application of products and/or materials referred to herein.