



PROSARO[®]

Prosaro[®] 420 SC Fungicide

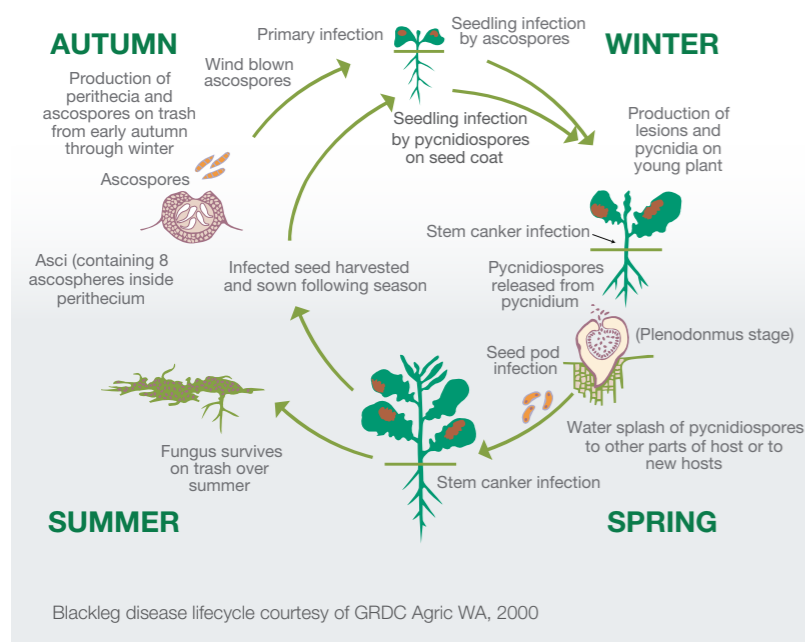
2014 Canola Product Guide



Bayer CropScience

Key diseases in Canola

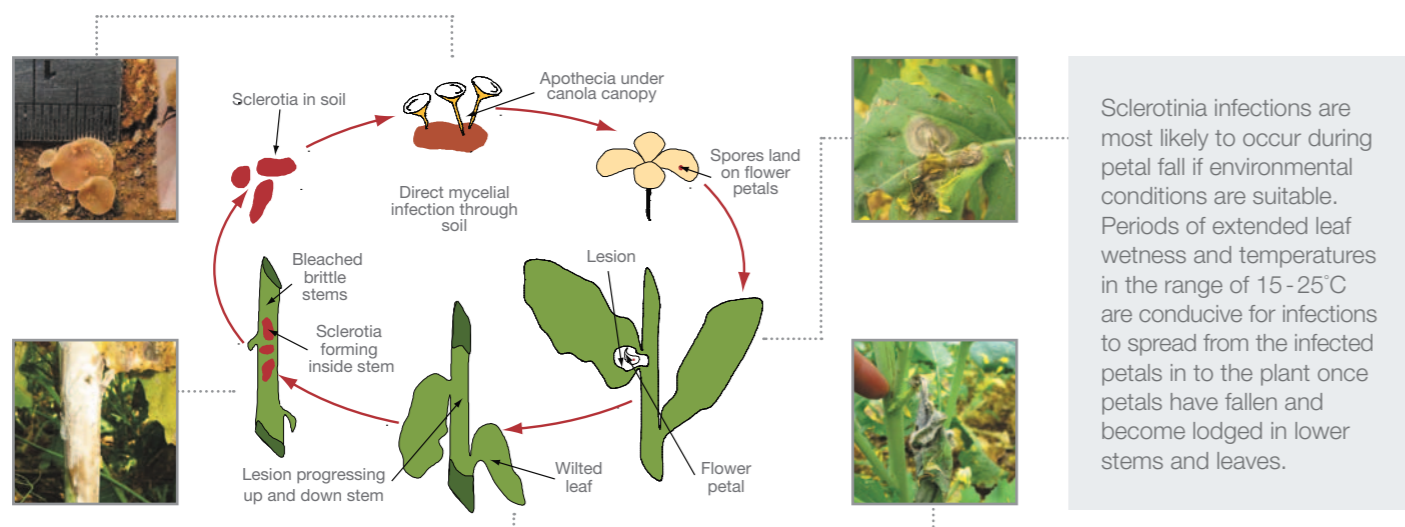
Blackleg (*Leptosphaeria maculans*) disease cycle



Blackleg epidemics are primarily initiated by airborne ascospores originating from matured pseudothecia (fruiting bodies) of the fungus on previous years infected stubble and crop residues. Higher temperatures and lower moisture conditions during summer and autumn, favour the maturity of pseudothecia. Once matured, pseudothecia are triggered to release ascospores by rainfall or even heavy dews and high humidity.

Early seedling infections are the most critical as they are most likely to produce severe stem cankers and yield loss. The two most important blackleg risk factors are the proximity to infected canola crop residue and the timing of the first major ascospore release from old canola crop residues that synchronise with the seedling susceptible stage of this year's crop. Spore maturity and disease risk in Western Australia can be assessed by checking the canola blackleg sporacle model at www.agric.wa.gov.au/cropdisease (courtesy Department of Agriculture and Food Western Australia).

Sclerotinia stem rot (*Sclerotinia sclerotiorum*) and Sclerotinia (*Sclerotinia minor*) disease cycle



Sclerotinia infections are most likely to occur during petal fall if environmental conditions are suitable. Periods of extended leaf wetness and temperatures in the range of 15-25°C are conducive for infections to spread from the infected petals in to the plant once petals have fallen and become lodged in lower stems and leaves.

The disease is favoured by warm, wet conditions and humid crop canopies, and tends to be more severe on heavier soil types. Infected plants produce small black fruiting bodies called sclerotia which survive between seasons. When conditions are favourable they emerge as very small (less than 1 cm) mushroom-like fungi called apothecia which release millions of spores into the crop canopy which then land on the plant's

flowers. When the petals drop onto the wet plants, generally in the leaf apex or on the larger older leaves, it forms an infection. If conditions are conducive, then the disease will develop and the mould will take over the plants causing lodging and plant death. Affected crops should not be retained for seed the following year as they can directly transfer the sclerotia to new paddocks and spread the disease.

Canola disease risk assessment

Assessing the risk of blackleg in your canola

REGIONAL BLACKLEG FACTORS

Environmental factors that determine risk of severe blackleg infection	Blackleg severity risk factor								
	High risk			Medium risk			Low risk		
Regional canola intensity (% area sown to canola)	Above 20	16-20	15	11-14	11-14	10	6-9	5	Below 5
Annual rainfall (mm)	Above 600	551-600	501-550	451-500	401-450	351-400	301-350	251-300	Below 250
Total rainfall received Mar-May prior to sowing (mm)	Above 100	Above 100	Above 100	Above 100	91-100	81-90	71-80	61-70	Below 60

Combined high canola intensity and adequate rainfall increases the probability of severe blackleg infection.

Courtesy: GRDC 2013 Blackleg Management Guide

Assessing the risk of sclerotinia in your canola

The attached risk assessor tool is widely used in Canada and the USA to determine whether a fungicide spray for sclerotinia will deliver an economic return. In the absence of any locally validated disease warning tool, it is included to highlight the risk factors that directly influence the incidence and severity of sclerotinia stem rot in canola and therefore guide you in your decision making – whether to spray or not.

RISK FACTOR	POSSIBLE ANSWERS	RISK POINTS
Number of years since last canola crop	More than six years	0
	Three to six years	5
	One to two years	10
Disease incidence in last host crop	None	0
	Low (1-10%)	5
	Moderate (11-30%)	10
Crop density	Low	0
	Normal	5
	High	10
Rain in the last two weeks	Less than 10 mm (40 points)	0
	10-30 mm (40-120 points)	5
	More than 30 mm (120 points)	10
Weather forecast	High pressure	0
	Variable	10
	Low pressure	15
Regional risk for apothecia development	None found	0
	Low numbers	10
	High numbers	15
Total risk points for all risk factors =		

Sclerotinia Stem Rot Checklist

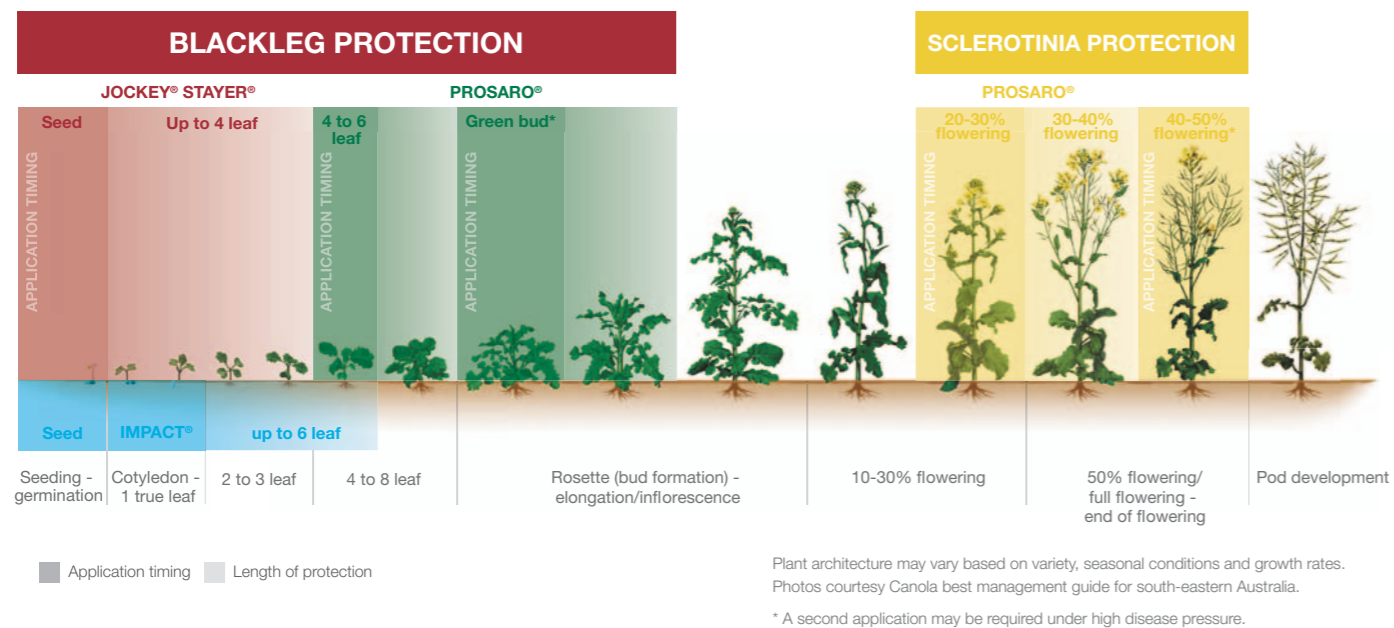
A risk score of 40+ should deliver an economic return from the application of a fungicide.

Possible high risk factors:

- Full soil moisture profile
- Heavier soil type
- History of broadleaf crops (canola, lupins), pasture, or fallow
- Big full canopy
- Number of rain days in the month
- My neighbour has had sclerotinia

Canola disease protection plan

Canola protection plan



Canola growth stages - Blackleg

Stages 1-3 Blackleg

For blackleg control, it is recommended to apply Prosaro at 4 to 6 leaf stage (stage 1).

In situations of high blackleg risk or where an effective seed or in-furrow treatment has not been used, a follow up application of Prosaro may be required at green bud stage (stage 3).

1 Leaf production

2 Stem elongation

3 Flower bud development

Optimising fungicide application for management of blackleg

Prosaro should not take the place of Jockey Stayer or flutriafol in-furrow but be used in combination with one or both for the best economic return. MS and MS-MR blackleg disease-rated canola, blackleg disease-rated canola varieties are most likely to return an economic response. However, canola varieties with higher blackleg resistance levels, that have been grown continually in a region, and where genetic resistance has broken down, can also show an economic response.

An early (4 to 6 leaf) foliar spray application provides more consistent disease control and better protection of crop yield than the later (green bud) timing. Furthermore the earlier (4 to 6 leaf) timing sprays with Prosaro have excellent compatibility with a range of herbicides and foliar nutrients.

The higher Prosaro 450 mL/ha rate is generally more effective than 375 mL/ha, particularly under high disease pressure. When blackleg infection is high an application of two Prosaro sprays will improve disease control and maintain yield potential.

Canola plants that have been sprayed with Prosaro will often appear greener and retain older leaves for longer.

Canola growth stages - Sclerotinia

Stage 4 Sclerotinia

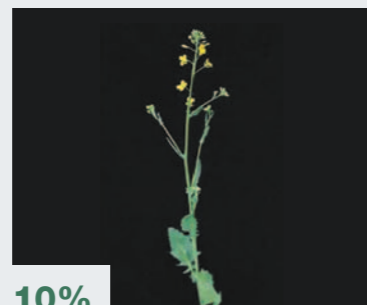
To achieve the best control of sclerotinia infection and protect the crops' yield potential, it is recommended that Prosaro is applied before the disease symptoms become visible. Prosaro applications should be made between 20-50% (full bloom) flowering. Applying Prosaro too early can reduce the economic benefits from the fungicide application by not protecting the most critical stages of canopy development and petal fall.

4

Flowering

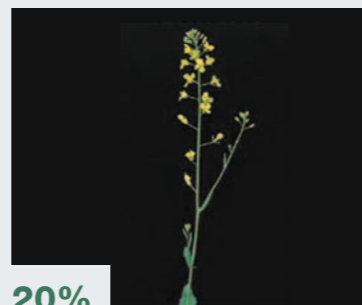
Flowering stages:

In order to ensure the crop growth stage is accurately determined it is recommended that growers and advisors assess a minimum of 20 plants across a paddock to make sure the application timing is correct.



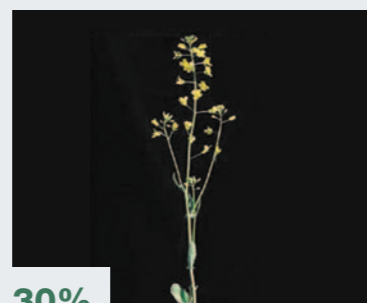
10%

10 flowers open on main stem



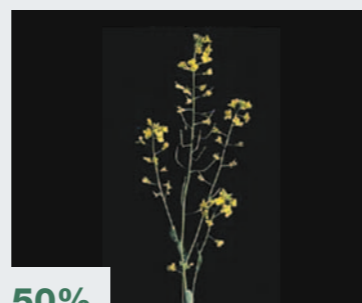
20%

14-16 flowers open on main stem



30%

20 or more flowers open on main stem



50%

All flowers are open or have opened on the main stem, crop is at its most intense yellow



60%

Flowering intensity is beginning to decline

Optimising fungicide application for management of sclerotinia

Spray timing:

- Sclerotinia infection won't develop or increase in severity when the canopy is dry.
- To achieve the maximum benefit from the application of Prosaro for sclerotinia control it is recommended that upcoming weather conditions that are conducive to sclerotinia infection should be taken into account along with the flowering stage.
- Apply Prosaro within the recommended crop stage closer to periods of higher infection risk where leaf wetness and soil moisture are high and favour disease development. This should ensure that Prosaro is offering protection for as long as possible under disease conducive conditions.
- Trials have consistently shown the best results are recorded from early applications of Prosaro made at 20-30% flowering. If you are opting for a single spray, don't apply Prosaro prior to 20% flowering.
- Under high disease pressure Prosaro applications made at 40-50% flowering may be too late and crop yield loss may have already occurred. However, in longer seasons or in cool areas where disease pressure comes in later spray applications made at 40-50% flowering can still provide excellent protection of crop yield.

Spray application:

- To maximise the coverage of Prosaro throughout the canopy high water rates i.e. 100 L/ha applied by ground rig are highly recommended. If an application has to be made by aircraft, use water rates in excess of 30 L/ha.
- Faster growing crops may have a shorter window of fungicide protection i.e. Prosaro application made at 20% flower may provide a shorter period of protection due to new unprotected growth than at 40-50% flowering.

Multiple sprays:

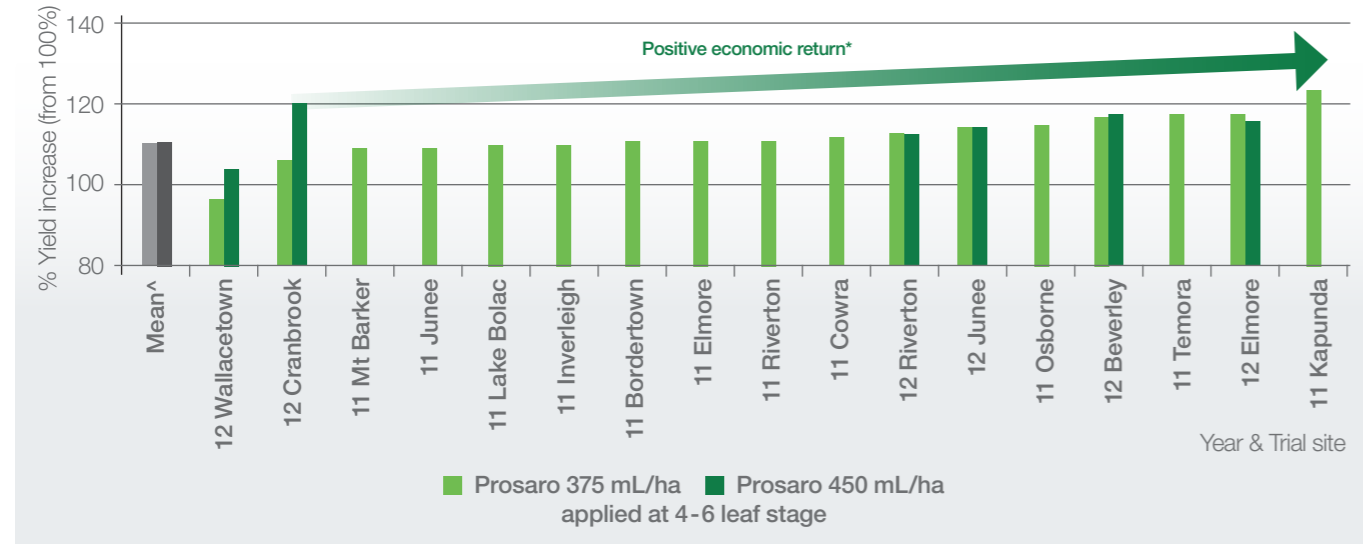
- Long-flowering varieties, staggered germinations or off types may require 2 applications under high disease pressure.
- It is important to monitor crops where Prosaro is applied early and disease pressure is high to ensure late infection doesn't become severe and impact yield after the period of fungicide protection is finished.

Trial work has consistently shown that canola treated with Prosaro is visibly greener with delayed canopy senescence.



Canola % yield increase & ROI - Blackleg

Prosaro control of blackleg in canola – MS varieties 2011-2012



*Economic return from an average of 2.0 t/ha yield based on canola at \$500/tonne and an average application cost of \$6/ha.

Jockey Stayer or Intake® yield average (applied alone): 2.0 t/ha

^Mean yield increase from Prosaro 375 mL/ha over seed treatment or in-furrow treatment alone: 10% (17 trials)

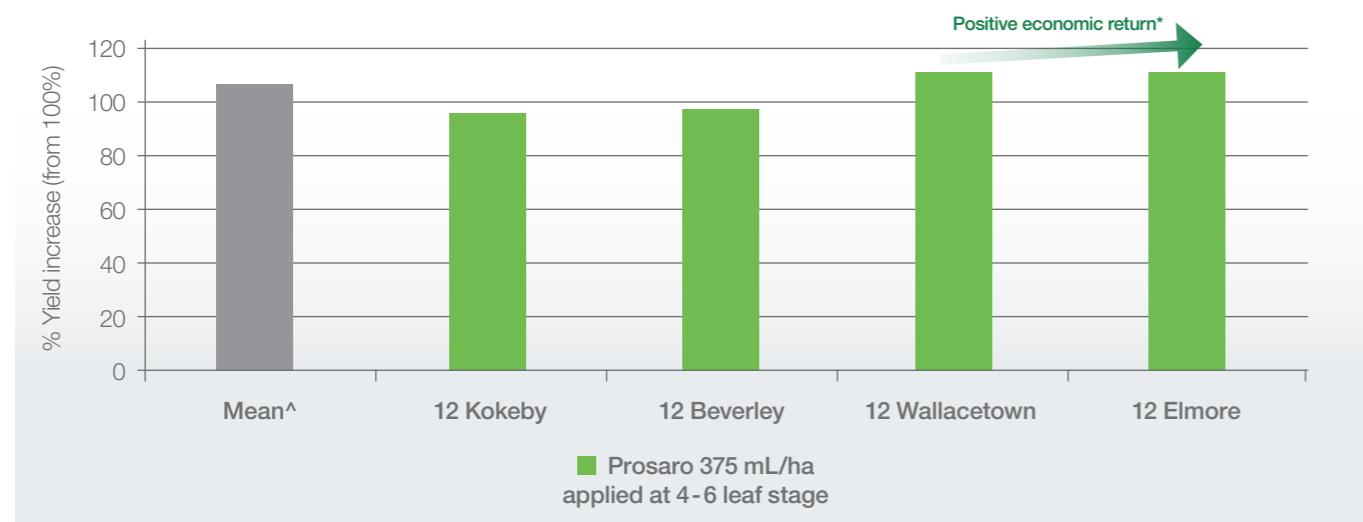
Mean yield increase from Prosaro 450 mL/ha over seed treatment or in-furrow treatment alone: 13% (6 trials)

Trial ID: 2011: NA20, NA21, NW03, SA03, SB12, VA01, VA02, VA21, VD10, WA02

2012: NW03, NW04, NW22, SA02a, SA04b, VB04, WA03, WA04, WA31, WA32

Varieties: Cobbler (MS-S), Crusher (MS), Tawriffic (MS)

Prosaro control of blackleg in canola – MR and R varieties 2012



*Economic return from an average of 1.58 t/ha yield based on canola at \$500/tonne and an average application cost of \$6/ha.

Jockey Stayer or Intake® yield average (applied alone): 1.58 t/ha

^Mean yield increase from Prosaro 375 mL/ha over seed treatment or in-furrow treatment alone: 6% (4 trials)

Trial ID: NW23, VB07, WA25, WA26

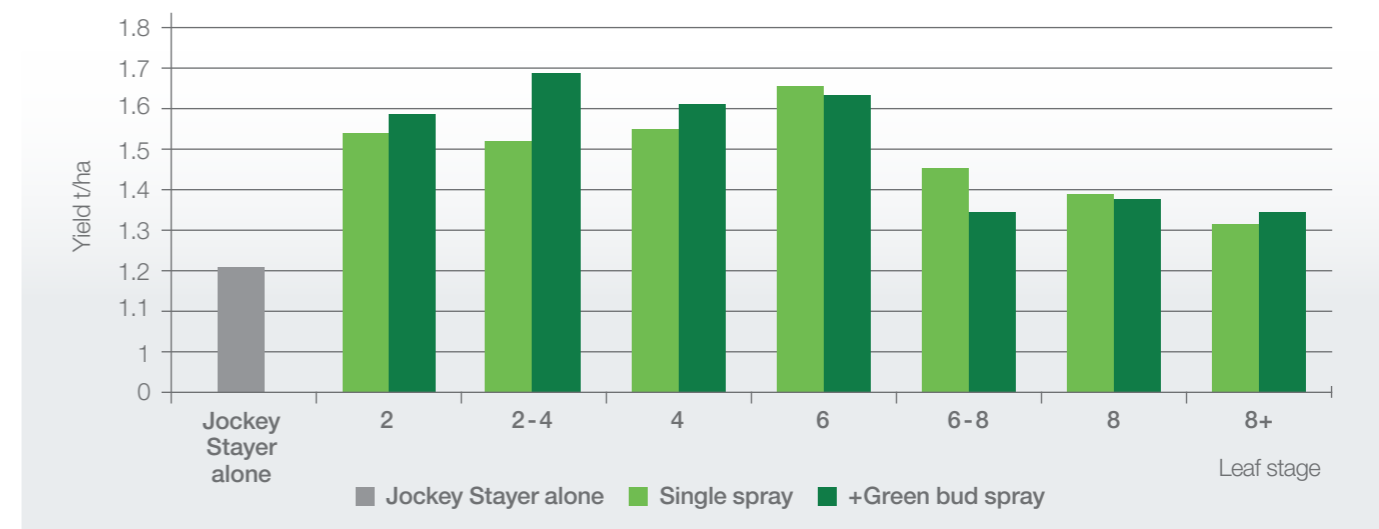
Varieties: IH50RR, AN11R5231, 45Y22

Canola % yield increase & ROI - Blackleg

Prosaro two spray strategy - yield comparison per leaf stage

Variety: Henty TT **BL rating:** MS-MR **Seed treatment:** Jockey Stayer **Trial site:** Gibson (WA) **Sowing date:** 10/05/2013

The aim of the trial was to investigate which sequence of Prosaro application provides the highest increase in yield in a high risk blackleg rotation situation.



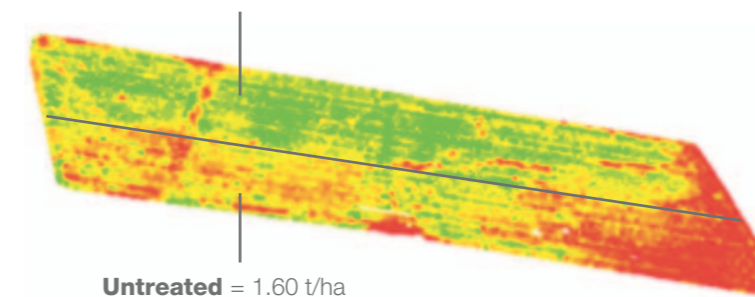
Jockey Stayer yield result (applied alone): 1.22 t/ha

Key observations from the 2013 Gibson trial:

- Prosaro provides the best performance on blackleg control until the 6 leaf stage is passed.
- An early Prosaro application combined with a spray at green bud timing showed the most consistent yield results.
- All applications visually reduced blackleg and increased green leaf.
- The best single spray yield response over Jockey Stayer alone was achieved by applying Prosaro at leaf stage 6 (+35% yield increase), whereas the best 2 spray yield response over Jockey Stayer alone was achieved by applying the first spray between leaf stage 2-4, followed by a spray at the green bud timing (+38% yield increase).

Prosaro: 2012 large scale evaluation/mapping for blackleg control

Prosaro 450 mL/ha at 6 leaf = 1.85 t/ha



Untreated = 1.60 t/ha

Location: Downside, NSW

Variety: Jackpot (MR)

Treatment: Jockey/Cosmos® + Impact®

Disease pressure: Blackleg/Moderate

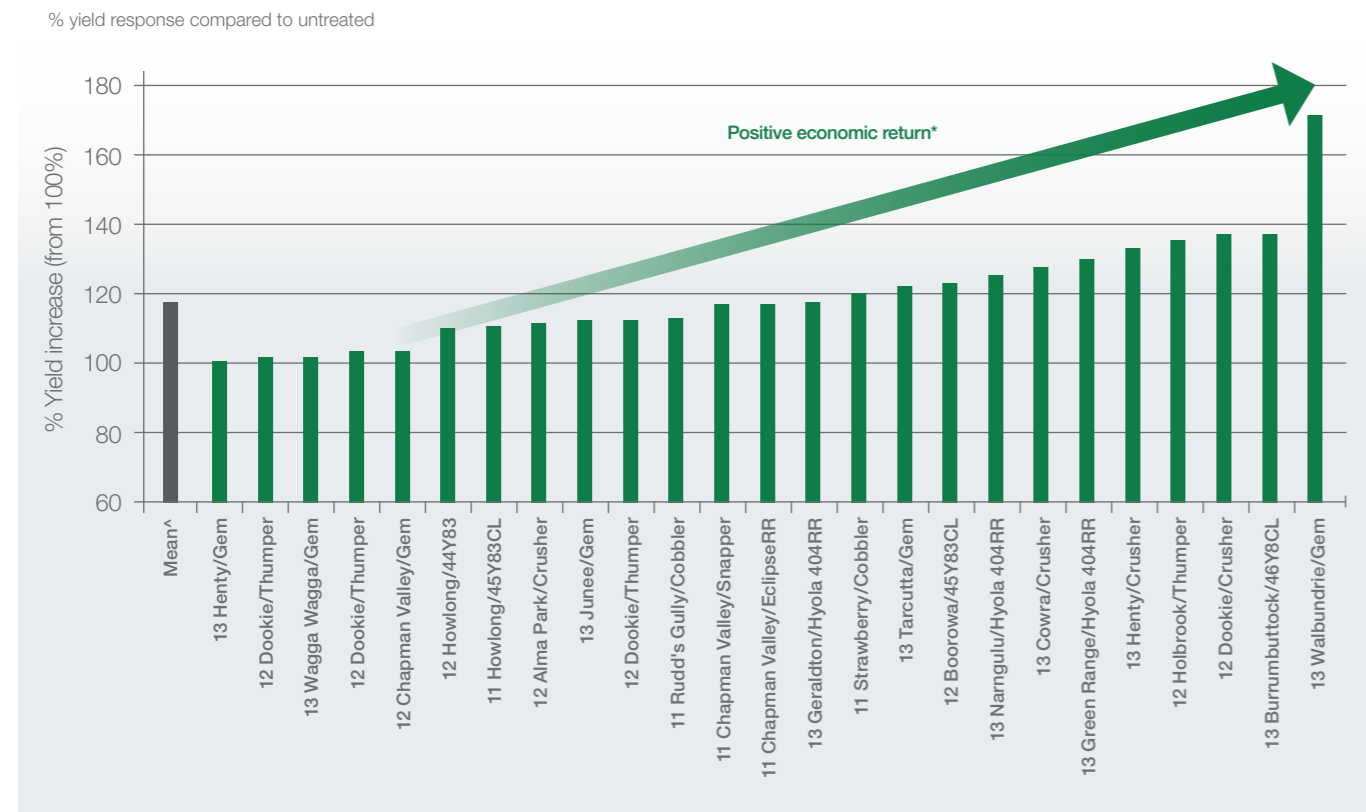
Average ROI: \$95/ha (15.6% yield increase)

Overall key observations for blackleg control:

- Prosaro should be used in conjunction with Jockey Stayer seed treatment or an in-furrow treatment registered for blackleg control
- Under high blackleg pressure, a higher application rate up to 450 mL/ha has proven beneficial in trials.
- Under high blackleg pressure, two applications of Prosaro may be required.
- A 4 to 6 leaf spray offers the most consistent reduction of leaf infection and positive yield response.
- Positive yield responses from Prosaro were consistently recorded on blackleg susceptible varieties under high blackleg pressure
- Blackleg variety disease ratings MS and MS-MR are seen as the best varieties for an economical return.
- Largest and most consistent yield responses are obtained when an effective seed/sowing treatment (Jockey Stayer) is used as well as a foliar application of Prosaro.
- Economic responses can also be achieved on MR varieties.

Canola yield & ROI - Sclerotinia

Prosaro control of sclerotinia in canola – 2011-2013 trial work



*Economic return from an average of 1.9 t/ha yield from 100% based on canola at \$500/tonne and an average application cost of \$6/ha.

Jockey Stayer or Intake® yield average (applied alone): 1.90 t/ha

^Mean yield increase from Prosaro 375 mL/ha over untreated: 20% (25 trials)

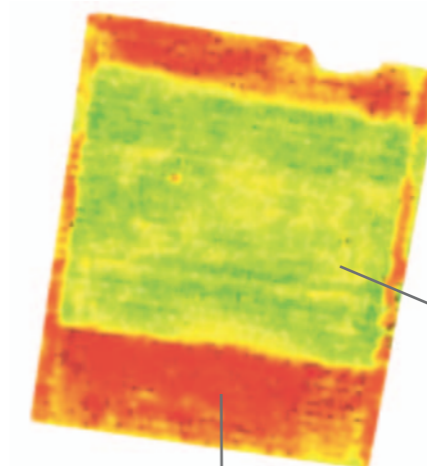
Trial ID: Data generated from commercial applications

Key observations from the 2011 - 2013 trial work:

- Across 25 trials over three seasons a mean yield increase of 20% over the untreated was recorded.
- The range of responses highlights the importance of spray timing, disease levels and weather conditions. Higher yield increases were recorded when conducive conditions coincided with high incidence of infection and severity with application of Prosaro made prior to significant infection in the crop.
- A maximum of two applications of Prosaro per crop and season is allowed. Dependent on whether Prosaro is applied just for sclerotinia control or also for blackleg, a two-spray strategy will differ in the timings to protect the crop's yield potential.
- Sclerotinia – high pressure scenarios: If multiple spray applications are made for sclerotinia it is recommended that an early application around 20% flowering be made with a follow up application between 40-50% flowering in seasons with extended flowering or infection events.
- Blackleg with sclerotinia: the first application should be applied at the 4-6 leaf stage with a second application for sclerotinia at flowering generally between 20-30% flowering.

Field results - Sclerotinia

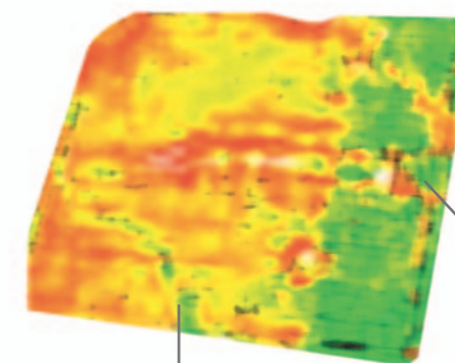
Prosaro: 2013 large scale evaluation and mapping for sclerotinia control



Location: Walbundrie, NSW
Spraying method: ground rig 100 L/ha
Variety: ATR-Gem
Sclerotinia disease pressure: High
Average ROI: \$289/ha*

* Based on canola at \$500/tonne and an application cost of \$6/ha.

Untreated = 0.9 t/ha



Location: Cowra, NSW
Spraying method: aeroplane 35 L/ha
Variety: Crusher
Sclerotinia disease pressure: High
Average ROI: \$245/ha*

* Based on canola at \$500/tonne and an application cost of \$13/ha.

Untreated = 2.18 t/ha

Overall key observations for sclerotinia control:

- Generally there is better control from Prosaro at 450 mL/ha compared to 375 mL/ha.
- Prosaro exhibits protectant and curative characteristics but is always best used as a protectant.
- Time of application will depend on seasonal conditions (which will vary from year to year and across regions).
- Time of sowing can have a significant impact on the length and timing of flowering and in some cases increase the risk of damage from sclerotinia.
- Application prior to petal fall is generally a reliable timing, but in some instances leaf infection can occur well before any petal fall – so an earlier spray may provide better results. In late districts, a spray after first petal fall (or a second application) may be justified.
- Prosaro supported the highest yield of all foliar fungicides evaluated in the trials and provided the best return on investment.
- Application before 30% flowering preserved yield potential.
- Applications of Prosaro after 30% can still be beneficial depending on conditions.
- Plants treated with Prosaro are visibly greener with delayed canopy senescence.

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Bayer CropScience

Bayer CropScience Pty Ltd
ABN 87 000 226 022.
391-393 Tooronga Road, Hawthorn East, Vic 3123.
Technical enquiries 1800 804 479
enquiries.australia@bayercropscience.com
Ph 03 9248 6888 Fax 03 9248 6800
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