GRAINS RESEARCH UPDATE 2026

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

Kaniva, VIC
Thursday 13 August

GRAINS RESEARCH UPDATE 2026

GRDC GRAINS RESEARCH & DEVELOPMENT CORPORATION

Kaniva

Thursday 13 August

9.00am to 1.00pm

Kaniva Community Hub
132 Budjik Streett

#GRDCUpdates

KANIVA GRDC Grains Research Update
convened by ORM Pty Ltd.

46 Edward Street
PO Box 189
Bendigo VIC 3552

T 03 5441 6176
E admin@orm.com.au
W orm.com.au

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

GRDC Grains Research Update KANIVA

Contents

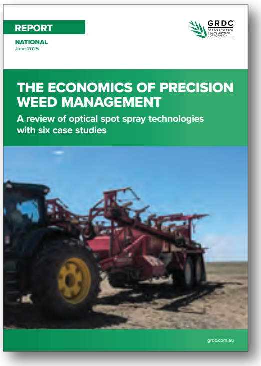
CONNECT WITH US

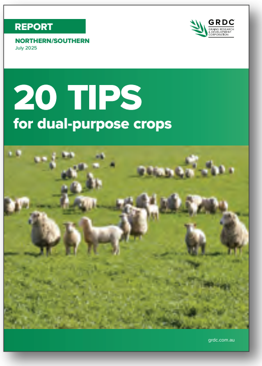
GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

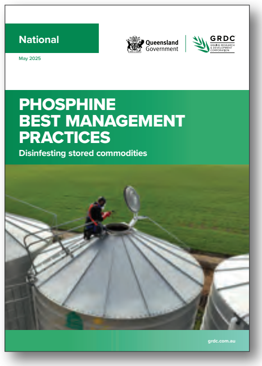
JOIN THE CONVERSATION

VISIT GRDC.COM.AU FOR GROWER RESOURCES

Including NVT Crop Sowing Guides and Harvest Reports, Fact Sheets, GoundCover™, Best Management Practice, GrowNotes, videos, podcasts and more.







FIND GRDC INVESTMENTS

GRDC investments deliver new and improved varieties, farming practices, technologies and capability to the grains industry.

SUBSCRIBE

To subscribe to our newsletters and publications and keep your details up to date visit the GRDC subscription centre: grdc.com.au/subscribe

FOLLOW US ON SOCIALS

X
@theGRDC

Facebook
theGRDC

Instagram
thegrdc

LinkedIn
thegrdc

YouTube
theGRDC

GRAINS RESEARCH UPDATE 2026

Kaniva Town Hall, Thursday 6 August

PROGRAM

9.00am	Announcements and GRDC welcome	*GRDC representative*
9.15am	Industry panel – pushing pulses for better crops	*Audrey Delahunty, Agriculture Victoria* *Jason Brand, GEM Agronomy* *Josh Fanning, Agriculture Victoria* *Ash Wallace, Agriculture Victoria* *Austin Smith, SMS Rural*
9.55am	Managing surface pests: what's working, what's not and what we're learning	*Kate Muirhead and Lucas Hearn, Adelaide University*
10.35am	Morning Tea	
11.05am	Risk and reward of N fertiliser decision-making strategies – insights from a national network of RiskWi$e field experiments	*Yolanda Plowman, BCG*
11.45pm	Get best bang for buck on canola fungicides	*Alec McCallum, University of Melbourne*
12.25pm	Protect your most perishable asset – latest tips on grain storage	*Chris Warrick, Primary Business*
1.10pm	Lunch	

On X? Follow **@GRDCSouth** and use the hashtag **#GRDCUpdates** to share key messages

SOUTHERN PANEL

2025-27 GRDC SOUTHERN REGIONAL PANEL

ANDREW RUSSELL

PANEL CHAIR

Rutherglen, Victoria

Andrew is the director and a shareholder of Lilliput AG, and managing director of Baker Seed Co, a family owned farming and seed-cleaning business. He has served on GRDC's medium rainfall zone Regional Cropping Solutions Network and has held leadership roles with Riverine Plains Inc, Victorian Farmers Federation and the Rutherglen Group of fire brigades.

PRU COOK

DEPUTY CHAIR

Dimboola, Victoria

Raised on a mixed farm in Victoria's Wimmera region, Pru has spent her professional career working in extension for the grains industry. Starting her career at the DPI, she has worked at GRDC and the Birchip Cropping Group, managing a number of extension projects. In recent years she has managed her own business specialising in extension, project development and project management.

TIM MCCLELLAND

Birchip, Victoria

Tim farms with his wife, father and aunt on a 6500-hectare mixed property in the southern Mallee. After completing his Bachelor of Agriculture and Commerce at the University of Melbourne in 2006, he took on work at Advisor Edge, Birchip Cropping Group (BCG) and RMCG. In 2011, he moved back to Birchip to become formally involved in the family farm and continue his role with BCG.

RUTH SOMMERVILLE

Burra, South Australia

Ruth is an agroecologist who runs a consulting business. She has a Bachelor of Science in Ecology and Master of Applied Science in Wildlife Management from the University of Sydney, and has worked in sustainable agriculture research, development and extension and property management since 2002. Ruth has been the Upper North Farming Systems Group Operations Committee Member in recent years.

ANDREW WARE

Port Lincoln, South Australia

Andrew is a research agronomist who started his career with the South Australian Research and Development Institute (SARDI) and then spent time at CSIRO in Adelaide. This was followed by 10 years away from research, managing the family farm on the Lower Eyre Peninsula, before returning to SARDI. In 2019, he started his own research company, EPAG Research, delivering applied research across the Eyre Peninsula.

DR KATHY OPHEL-KELLER

Adelaide, South Australia

Kathy is a strategic science leader with a strong track record in developing and leading national research programs with industry co-investment, including GRDC. Her own research background is in plant biosecurity and molecular detection of plant pathogens and she has a strong interest in capacity building and succession planning. Kathy is a former acting executive director of SARDI and a research director at Crop Sciences, covering applied research on plant biosecurity, crop improvement, climate risk management, water use efficiency and crop agronomy.

WAYNE BURTON

Halls Gap, Victoria

Dr Wayne Burton has worked as an agricultural scientist and oilseeds breeder with over three decades of leadership across public and private sector research and development. Holding a PhD from the University of Melbourne and a Bachelor of Agricultural Sciences (Honours) from the University of Adelaide, he has played a pivotal role in the advancement of canola and mustard breeding and development in Australia.

MAX YOUNG

Ardrossan, South Australia

Max Young farms at Ardrossan on the Yorke Peninsula. He has more than 40 years' experience growing predominately wheat barley and lentils. Max holds a Roseworthy Diploma in Agriculture and is a graduate of the Australian Institute of Company Directors (GAICD). He has served in leadership roles in both the South Australian No Tillage Association SANTFA and South Australian Grains Industry Trust (SAGIT) and is keenly interested in improving sustainable production through research. Max understands the importance of local grower groups as a conduit between researchers and growers.

ADAM HANCOCK

Naracoorte, South Australia

Adam Hancock is a High Rainfall Zone agronomist with Elders, based in south-east South Australia. He has 15 years of experience advising grain growers to improve productivity and profitability through evidence-based agronomy and precision agriculture. He provides agronomic advice across a wide range of farming systems and environments, supporting clients with both in-season decision-making and long-term planning.

GRETA DUFF

Inverleigh, Victoria

Greta Duff graduated from the University of Melbourne with a Bachelor of Agriculture, spending part of her studies at Dookie College. She began her career in the dairy industry before joining Southern Farming Systems (SFS) in 2020. Since then, Greta has led and contributed to a wide range of projects, particularly with GRDC, and is passionate about supporting the next generation of growers. Through her involvement with the Young Agricultural Professionals Network, she actively works to promote and retain young people in the agricultural industry.

RON OSMOND

General Manager of Strategy & Business Development

Prior to joining GRDC in 2013, after completing a PhD in Agricultural Science, Ron worked in scientific and management roles in Intellectual Property Development and Commercialisation in the private sector. Ron's interest and expertise is in the translation of Research and Development into adoptable outcomes for Australian grain growers.

Where to next for pulses in Victorian farming systems

Audrey Delahunty[1], Josh Fanning[1 2], Jason Brand[3], Dale Grey[1] and Ash Wallace[1].

[1]Agriculture Victoria; [2]La Trobe University; [3]GEM Agronomy.

GRDC project code: DJP2105-006RTX

Keywords

- crop expansion, lentils, pulses, Victoria.

Take home messages

- Over the past 15 years, Victorian pulse production has grown substantially. The challenge is to identify the next steps to take this even further.
- Expansion of lentil area has been considerable in the Wimmera and Mallee. Expanding pulses in other regions requires careful consideration of soil type and species.
- Increasing intensity of pulse production has helped reduce certain weed and disease pressures while also introducing new challenges. Integrated combinations of control options continue to be the most robust approach to their management.

Background

Pulses are an integral part of Victorian farming systems, offering a profitable crop choice while delivering multiple system benefits. They contribute nitrogen, rotational diversity, provide disease and weed breaks, and open valuable market options. Since their widespread adoption in the 1990s, pulse yield potential has increased substantially. This shift has been supported by improved varietal adaptation, clearer agronomic guidelines, and practical extension programs, which have strengthened regional understanding of sowing windows and risk management for weeds and disease. Herbicide tolerant lentil varieties, such as PBA Hurricane XT⦇ and GIA Thunder⦇, have further enabled expansion into new soils and regions, while high grower confidence and consistent profitability continue to drive adoption. These gains form a strong base for the next phase of RD&E across Victoria's diverse pulse-producing landscapes. As the 'pulse phase' becomes more embedded and matures within farming systems, the next challenge, and opportunity, is to expand production into new regions and position pulses for greater resilience, productivity, and profitability under challenging climatic and market conditions.

The growing importance of pulses in Victorian cropping systems

Since 2010, the area sown to pulses in Victoria has increased from around 10% to 24% of the cropped area (Figure 1). This expansion has been driven largely by lentils, which increased from 8% to 23% of crop area in the Wimmera and from 1% to 23% in the Mallee. Vetch area in the Wimmera also increased slightly (3.3%).

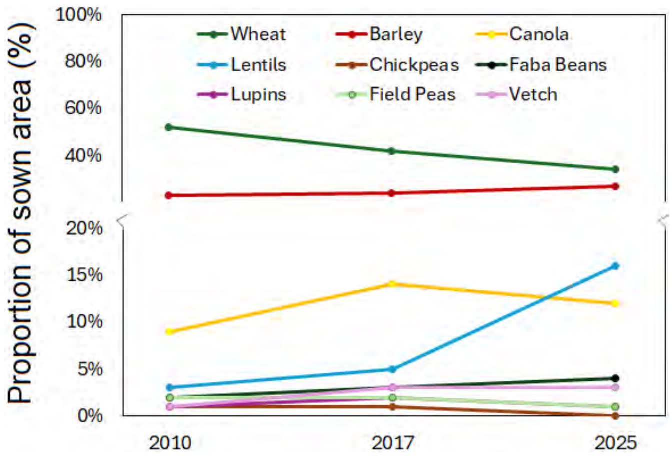


Figure 1. Proportion of area sown to various crop species across Victoria (Data courtesy of Dale Grey, Agriculture Victoria, 2025).

To better understand impediments to greater pulse uptake, evaluation surveys were conducted at pulse field days during 2025. A total of 108 respondents, comprising 64% growers and 23% agronomists, responded to questions on pulse use in local rotations, crop management and production constraints. In each region, responses were generally dominated by one or two key local issues, followed by a broader group of secondary constraints (Figure 2). Examples included problem weeds in the Wimmera and Mallee, and disease management in the Wimmera.

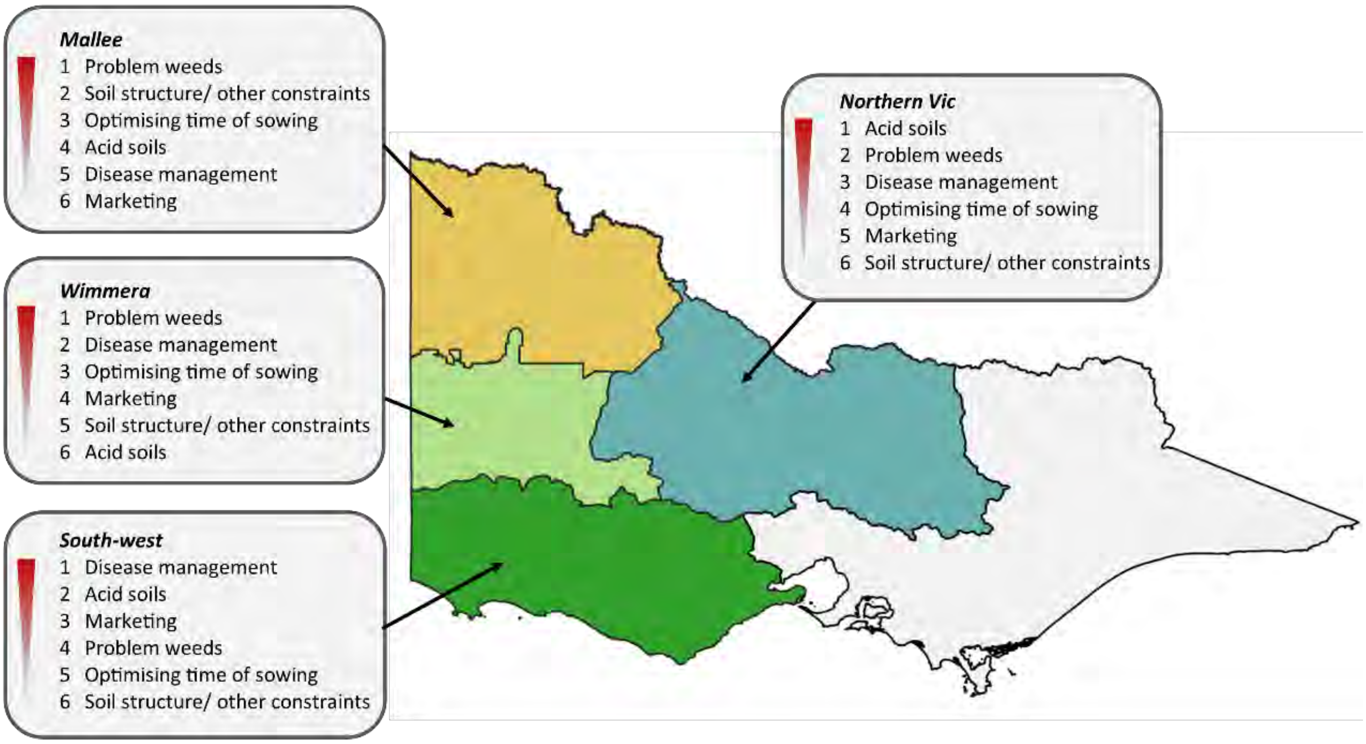


Figure 2. Ranking of issues that challenge pulse production across Victorian grain growing regions. Data are based on evaluation surveys of growers and industry representatives attending pulse field days in 2025.

Opportunities to expand pulse production

Weed management and system integration

One of the key benefits traditionally attributed to pulses is their ability to improve whole-of-system weed control, particularly through the use of selective herbicides for grass weed management. However, as pulse intensity has increased across southern Australia, resistance in grass weeds to several selective herbicide groups has also increased. Broadleaf weed control has historically been more challenging due to limited herbicide options and the relatively poor competitive ability of many pulse crops. More recently, the release of pulse varieties with improved tolerance to imidazolinone (IMI, Group 2) herbicides, together with lentils tolerant to both IMI and in-crop metribuzin applications, and improved tolerance to residual clopyralid, has considerably expanded weed control options. Despite these advances, pre-emergent herbicides remain critical to successful weed management, and achieving consistent crop safety across different soils, environments and varieties continues to present a challenge.

Recent work through the Victorian Pulse Agronomy Project on lentil metribuzin tolerance demonstrates the value of targeted applied RD&E in expanding weed control options, defining safe use patterns across environments, and understanding interactions with other herbicides. For example, a trial conducted at Kulwin in 2024 evaluated the crop safety and weed control efficacy of metribuzin in GIA Metro⏀ lentils (Figure 3). Treatments applied at PSPE and the 4-node stage (the latter under APVMA permit PER92810), either alone or in combination with Intercept®, reduced populations of several key broadleaf weed species while maintaining acceptable crop safety. These results form a component of multi-environment datasets for defining safe use patterns, supporting regulatory approvals and building grower confidence in new management approaches. Note: some use patterns used are not registered and were included for experimental purposes. Always read and follow product labels.

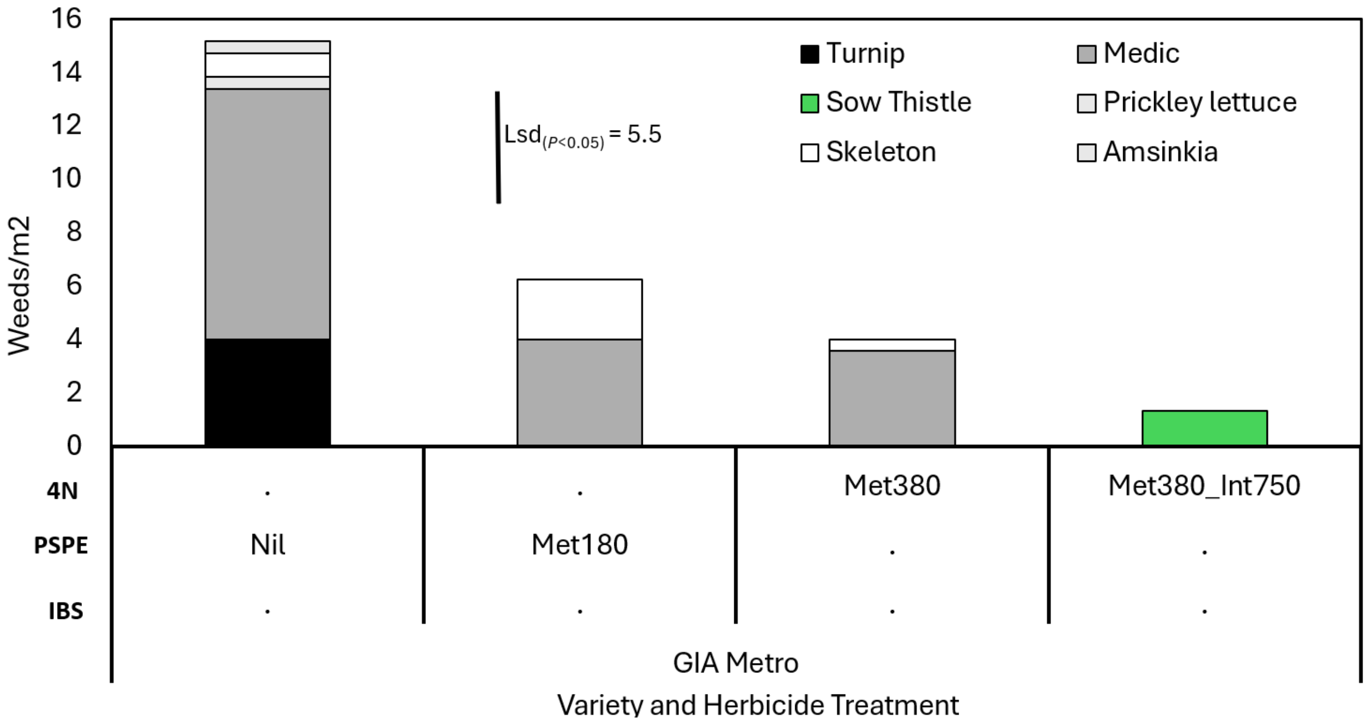


Figure 3. Use of metribuzin (Met) to control broadleaf weeds in GIA Metro⏀ at Kulwin in 2024. Weed populations are presented as weeds/m^2 for six weed species. Metribuzin (750 WG) was applied IBS, PSPE or at 4-node, with treatments including metribuzin alone or in combination with Intercept. Note: some use patterns tested are off label and were for experimental purposes only.

As the pulse industry has expanded, particularly lentils and faba beans, new weed management challenges have emerged. In lentils, the widespread use of IMI technology, combined with tighter rotations, has increased selection pressure for herbicide resistance in several broadleaf weeds, including milk thistle and wild radish. At the same time, weed species that are not adequately controlled by IMI herbicides, such as vetch and tares, have become increasingly problematic in major production zones. As lentils have expanded into more challenging soil types and former pasture-based systems in central and northern Victoria, weeds such as capeweed and medic, including Group 2-tolerant populations, have also become more difficult to manage.

Looking ahead, two challenges are likely to dominate weed management in pulse systems: increasing herbicide resistance and the emergence of weed species that were previously considered minor issues. However, there are also considerable opportunities. Continued breeding efforts are likely to deliver incremental improvements in herbicide tolerance, particularly to registered herbicides from Groups 5, 12 and 14, as well as novel tolerance traits. Advances in precision agriculture, including camera-based green-on-green weed detection systems, also have the potential to transform weed control, although these technologies will require new herbicide registrations, stewardship frameworks and management strategies. Future success will depend on integrating these new technologies with diverse crop rotations, effective herbicide use and regionally adapted agronomic practices. While no single solution is likely to address the evolving weed challenge, a combination of genetic, chemical and agronomic tools provides a pathway to maintain effective weed control and support the ongoing profitability of pulse-based farming systems.

Soil constraints and opportunities to expand into new ground

Soil type has traditionally had a large impact on the footprint of pulses across southern Australia and based on recent grower surveys, continues to influence their adoption in certain regions (Figure 2). Soil acidity, risk of waterlogging and poor soil structure have all impacted growers' willingness to expand pulses into new areas.

Recent pulse expansion has started to challenge some historical assumptions, exposing both new opportunities and production limits. Deep ripping of sands to address compacted layers, along with other amelioration techniques to improve topsoil water-holding capacity, has shown potential to increase system productivity, including pulses (Godwin 2023). While amelioration can be expensive, rising land values have changed the economics of investing in greater productivity on existing land. Importantly, amelioration must be targeted to the specific constraint. The aim may be to break compaction layers, incorporate organic matter, improve topsoil water-holding capacity or manage multiple constraints. Understanding the chemical characteristics of soil brought to the surface is also essential to avoid unintended consequences.

Soil acidity has historically been a major constraint to pulse production and expansion. However, improvements in rhizobia acid tolerance, combined with growers' willingness to adopt new management practices, have enabled pulses to be grown more successfully on soils previously considered unsuitable. Increasingly, growers are implementing soil amelioration strategies that address multiple constraints simultaneously.

In 2025, a trial at Gerang evaluated the impact of spading to 25cm, lime application (3t/ha), and lime incorporation through spading. Results demonstrated that responses varied across paddock zones, with the most responsive areas achieving biomass and yield benefits of up to 460kg/ha from the combined lime and spading treatment. Additional benefits included improved plant establishment, nodulation and weed control, highlighting the value of integrated soil constraint management for expanding pulse production in challenging environments.

As soil constraints are addressed and production potential increases, nutrition becomes an increasingly important component of pulse management. Adequate nutrient supply supports early vigour, biomass production and grain yield, enabling crops to fully capitalise on the benefits of soil amelioration. Pulse agronomy trials across Victoria have consistently demonstrated positive biomass and yield responses to phosphorus (P) application.

At Minyip in 2025, both lentil and faba bean responded to additional phosphorus despite soil test values indicating moderate phosphorus availability (Colwell P = 22mg/kg) and a moderate phosphorus buffering index (PBI) (Figure 4a). Similarly, a phosphorus response was observed at Kiata in 2024, where faba bean grain yield increased in both an acidic rise ($pHCaCl_2$ 5.2; 0–10cm) and an alkaline flat ($pHCaCl_2$ 6.9; 0–10cm), despite a Colwell P of 33.5mg/kg (Figure 4b). These results highlight that phosphorus can remain a production constraint even in soils with moderate soil test values and reinforce the importance of considering crop nutrition alongside physical and chemical soil constraints when seeking to maximise pulse productivity and profitability.

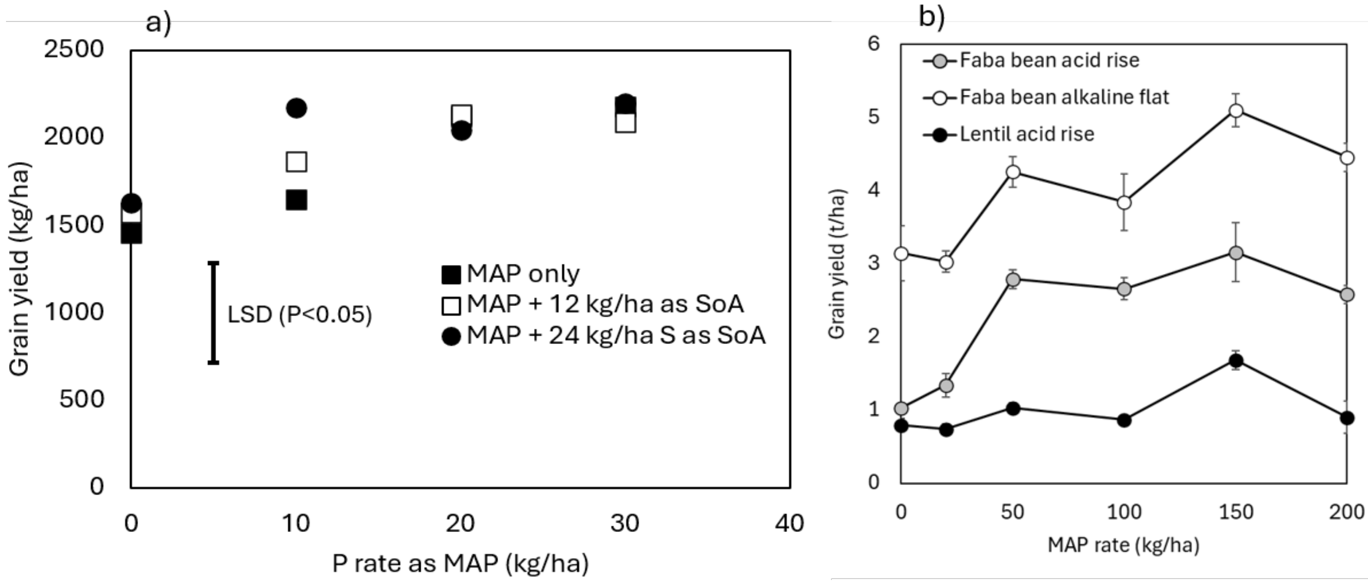


Figure 4. Grain yield responds to phosphorus (P) in lentil response Minyip 2025 (a) and demonstration of P response across acid and alkaline soil at Kiata 2024 (b). Fertiliser placed in-furrow with the seed. P rates applied as MAP. S rates applied as top-dressed SoA (24 July) at Minyip trial.

The rapid expansion of pulses over the past 15 years is unlikely to be repeated at the same scale, but careful soil selection, targeted amelioration and appropriate nutritional management may continue to open new opportunities for pulse production.

Disease management and pathology

Disease pressure in Victorian pulse systems continues to rise as pulses occupy a larger proportion of crop rotations. Key diseases include Ascochyta blight and Botrytis grey mould in lentil, chickpea and vetch; Ascochyta blight and powdery mildew in field pea; and chocolate spot in faba bean. Sclerotinia is also emerging as an important constraint across several pulse crops where management options remain limited. Disease incidence varies by season and region, with generally lower disease risk in the Mallee. This presents growers with a challenging decision-making environment when weighing up fungicide applications against disease risk and economic benefit.

Genetic resistance remains central to integrated disease management and varietal selection, but resistance durability is under increasing pressure. Continued expansion of lentil-dominant systems, often based on a narrow group of high-yielding varieties, has also increased selection pressure on pathogens. Combined with reduced use of complementary integrated disease management practices, this has contributed to resistance breakdowns, including the loss of Ascochyta blight resistance in PBA Hurricane XT⛀, and has increased fungicide resistance risk under tight host-crop sequencing.

Knowledge gaps remain around pathogen population dynamics, including shifts in virulence and fungicide sensitivity across environments and seasons. Pulse root rot pathogens, including *Fusarium*, *Aphanomyces*, *Phoma* and *Rhizoctonia*, have now been confirmed as major yield-limiting constraints, with yield losses of up to 77% identified through the National Soilborne Disease Initiative (Gontar and Tonkin 2026). While rotations with non-host crops can reduce losses, these findings highlight the challenge for intensive pulse systems with limited rotational flexibility.

It is also important to note that resistance ratings alone do not always predict field performance, as sowing time, crop density, canopy structure and biomass can influence crop microclimate, disease development and the level of resistance expressed in the paddock. Resistance ratings need to be interpreted in the context of agronomy-adjusted disease risk and system-based management, while recognising that seasonal conditions remain a major driver of disease risk and are largely beyond grower control.

Better adaptation of pulses to Victorian environments

Grain yield and profitability remain the primary drivers of species and varietal choice and have underpinned recent pulse expansion in Victoria. Further growth will depend on RD&E that sustains yield potential and profitability under increasing climatic variability, higher pulse intensity and expansion into new regions. In both established and emerging production areas, varietal performance also underpins broader farming system benefits through biologically fixed nitrogen.

While faba beans and lentils dominate pulse production in northwest Victoria, opportunities exist with other pulse species, particularly in seasons or soils where production of the dominant crop species is constrained. For example, in seasons where autumn sowing windows are restricted by wet conditions, spring sowing has traditionally been an option. With the continual development of new varieties, there is potential for a springsown pulse window, with chickpea the most promising possibility. Reliable rainfall and the temperate climate may help offset the constraints that limit wintersown pulses in this region. Recent HRZ trials conducted by SFS using CBA Captain⁽ᵈ show yield potential of approximately 1.3–2.0t/ha across a range of plant densities (20, 30 and 40 plants/m^2) and sowing times (mid-Sept and mid-Oct), suggesting good flexibility for opportunistic planting.

For those looking to further widen opportunities in their rotations, there are also two new varieties expected for release in the coming years. For example, FBA Coorong (AF14092) presents an earlyflowering alternative to PBA Samira⁽ᵈ and PBA Amberley⁽ᵈ. This variety sets pods 1–2 weeks earlier, giving it an advantage in drier, shorter seasons, while in favourable years, it converts this headstart into larger seed size. Disease resistance is comparable to current standards, and it maintains strong lodging tolerance, making it a versatile option for both tough and soft finishing environments. Secondly, FBA Barmah⁽ᵈ (AF15283) adds a Group 2 imidazolinone tolerant choice suited for the southwest. It carries MR Ascochyta resistance and an MS rating for chocolate spot, representing an improvement over Bendoc⁽ᵈ, alongside excellent lodging and necking tolerance.

These combined opportunities highlight a gradual broadening of pulse choices for southwest Victoria, with winter, spring and potentially summersown options each offering different pathways to diversify rotations, improve system resilience and enhance wholefarm profitability.

Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the authors would like to thank them for their continued support.

References

Godwin S (2023) Deep ripping provides strong yield response. *GRDC Groundcover* **163**, March–April (https://groundcover.grdc.com.au/grower-stories/southern/deep-ripping-provides-strong-yield-response?_gl=1*x2vkq4*_ga*MTE4MTE1MzgxMC4xNzA4MzIyMTIy*_ga_ZTGWWXHVRC*czE3NjkxMzY1OTEkbzgwJGcxJHQxNzY5MTM2OTgwJGo1MiRsMCRoMA)

Gontar B, Tonkin R (2026) Pulse root disease: what are the issues and what are our options? Grains Research and Development Corporation (https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2026/02/pulse-root-disease-what-are-the-issues-and-what-are-our-options)

Contact details

Audrey Delahunty
Agriculture Victoria

audrey.j.delahunty@agriculture.vic.gov.au

Notes

Notes

GRDC
NATIONAL VARIETY TRIALS™

NVT tools

Trial results

Long term yield reporter

NVT disease ratings

Harvest Report

NVT HARVEST REPORT

NVT Trial Notification Service

nvt.grdc.com.au

Subscribe to NVT notifications that are sent the moment results for your local NVT trials are available.

Subscribe to receive the latest NVT publications (Harvest Reports and Crop Sowing Guides), and other NVT communications.

@GRDC_NVT

KNOW BEFORE YOU SOW

PREDICTA® B and PREDICTA® rNod

PREDICTA B DNA Soilborne disease tests

PREDICTA rNod Rhizobia test

Cereal root diseases and poor rhizobia inoculation decisions in grain legumes cost grain growers in excess of $300 million annually in lost production.

PREDICTA® B and PREDICTA® rNod soil testing services and your accredited agronomist can help you to identify before seeding, the soil borne disease risk in cereals, and whether an appropriate rhizobium inoculant should be applied to grain legume crops.

PREDICTA® B has tests for most soil-borne diseases of cereals and some pulse crops:

- Crown rot (cereals)
- Rhizoctonia root rot
- Take-all (including oat strain)
- Root lesion nematodes
- Cereal cyst nematode
- Stem nematode
- Blackspot (field peas)
- Yellow leaf spot
- Common root rot
- Pythium clade f
- Charcoal rot
- Ascochyta blight of chickpea
- White grain disorder
- Sclerotinia stem rot
- Eyespot.

PREDICTA® rNod has tests for rhizobia:

- Group E and F (lentil, faba bean, pea and vetch)
- Group N (chickpea)
- Groups G and S (lupin and serradella).

Enquire with your local agronomist or visit:

PREDICTA® B
http://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_b

PREDICTA® rNod
https://pir.sa.gov.au/research/services/molecular_diagnostics/predicta_rnod

Government of South Australia
Primary Industries and Regions SA

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

Contact - Southern region

Russell Burns - 0401 122 115, russell.burns@sa.gov.au

Matthew Rowe - 0491 933 041, matthew.rowe2@sa.gov.au

Earwigs, millipedes and slaters as crop pests – towards better understanding and managing their impacts

Kate Muirhead, Lucas Hearn and Kym Perry.

School of Agriculture, Food and Wine, Adelaide University

GRDC project code: UOA2505-009RTX

Keywords

- establishment pests, grain crops, IPM, pest monitoring.

Take home messages

- GRDC has invested in new research to better understand and manage the threat to establishing crops from earwigs, millipedes and slaters in modern high-residue farming systems of southern Australia.
- New laboratory feeding trials suggest two species of slaters are potentially damaging, especially in canola and lentils.
- For the first time, pest feeding behaviour on canola and lentil crops is being directly observed using 50 surveillance cameras in five crop fields in SA and VIC, to determine which pests are most damaging.
- A national roadshow survey of 142 agronomists found a perception of widespread damage, but some regional variation in which pests were considered responsible.
- New management tools are required for these pests based on a sound knowledge base of their biology and impacts.

Background

Over the past 15–20 years, the European earwig (*Forficula auricularia*), black Portuguese millipede (*Ommatoiulus moreletii*), and the pill bug (*Armadillidium vulgare*) have emerged as important pests of broadacre grain crops in southern Australia (Kirkland et al. 2020, Umina 2019). Growers and agronomists are increasingly attributing seedling losses to these pests in the same paddocks year on year, yet reliable management options remain limited.

The spread of these soil-dwelling invertebrates has been linked to modern conservation farming practices that retain high stubble loads, which create the humid, residue-rich microhabitats that these species need to thrive (Micic et al. 2008). While these practices provide important benefits for soil health and erosion control, they have inadvertently increased pest pressure at a time when growers have few effective tools to respond.

A new GRDC project (UOA2505-009RTX), led by Adelaide University, is taking a phased, integrated approach to address these challenges. In this paper, we outline the current research on this project that combines lab and field experiments, economic modelling, agronomist surveys, and new monitoring technology to build the knowledge and tools growers need to manage earwigs, millipedes and slaters (including pill bugs) more effectively.

Benchmarking current impacts: national roadshow surveys

To understand the scale of the problem, the project team conducted ten regional roadshows across Western Australia, South Australia and western Victoria, spanning 19 GRDC sub-regions. A total of 142 agronomists, growers and researchers completed standardised surveys covering the extent of perceived pest damage levels across crop types, patterns of infestation, current management practices and estimates of economic loss.

Consistent observations were reported across all regions surveyed.

- Damage was strongly associated with heavy residue loads and stubble retention, with the most severe losses occurring in paddocks with high organic matter and good soil moisture retention.
- Slaters were most often encountered on heavier soil types, particularly cracking clays and loams, and damage tended to be patchy and recurring in the same paddock locations across seasons.
- Earwig populations increased following legume crops and were most common in gravelly loam soils with high organic matter accumulation.
- Risk was elevated in coastal environments, waterlogged paddocks, and situations where the germinating crop represented the only available green plant material.
- Millipede damage was frequently misattributed to other causes, highlighting a need for improved identification and decision-support tools.

Survey data are being integrated directly into the project's economic modelling framework (see below), with questions designed in collaboration with the economics team to capture the key inputs needed for Economic Injury Level and benefit-cost analyses.

How much do these pests cost

Dr Akwasi Ampofo and Professor Patrick O'Connor (Adelaide University) are using roadshow survey data alongside national canola production statistics to estimate the economic impact of earwigs, millipedes and slaters on Australian grain production.

Preliminary modelling using survey data from canola rotations only (to date) found that management was economically justified in 97% of simulated scenarios, with a base-case benefit-cost ratio of approximately \$1.90 returned per \$1.00 spent on management. The wide range of outcomes reflects genuine uncertainty in yield loss rates and the proportion of area affected, underscoring the need for more precise, regionally specific data (Table 1).

Table 1: Preliminary economic model results at baseline assumptions (all figures in AUD, canola price \$700–760/t, national canola area ~3.6 million ha, yield 2t/ha). All estimates are indicative and subject to revision.

Unmanaged yield loss (base estimate)	Damage avoided by management	Total intervention cost	Benefit–cost ratio
\$143 million	\$84.6 million	\$44.4 million	1.9:1

Monitoring pest activity: camera surveillance technology

Detecting and quantifying earwig, millipede and slater activity in the field is challenging because these pests are cryptic, often feeding at night and retreating under residue during daylight hours (Binns et al. 2022). Current monitoring often relies on grower observation and anecdotal reports, which are unreliable for timing management decisions (Umina 2019).

The project has partnered with Data Effects to develop and deploy a field-ready camera monitoring system across five experimental sites: Tumby Bay, Curramulka, Saddleworth and Bordertown in South Australia, and Horsham in Victoria. An array of 10 cameras was deployed per site along with environmental sensors.

Each night, approximately 40 000 images were processed into stop-motion style footage, generating 50 x 40-second videos per night. AI-based image analysis is in development for the target species, enabling researchers to efficiently identify high-value training images for ongoing model development. The camera system is capturing pest activity for assessment of feeding damage to lentil and canola crops under field conditions over the full crop establishment period.

Investigating slater biology and crop susceptibility

Lifecycle monitoring in the field

Although the lifecycles of millipedes and earwigs in grain production is well-known, this is not the case for slaters and pill bugs. Monthly pitfall and roll-trap sampling has commenced at five sites — Bordertown, Tarlee, Yankalilla and Tumby Bay in South Australia, and Horsham in Victoria — within lentil and canola paddocks. The sampling program captures slater population numbers, life-stage composition, sex ratio, body size, and the presence of brooding females across the season. This will provide the first comprehensive picture of slater population dynamics within Australian grain cropping systems.

Understanding the feeding behaviour of pest slaters

We conducted a two-phase feeding experiment to investigate the feeding behaviour of two economically important pest slater species. In the first phase of this trial, we exposed the slater species *Armadillidium vulgare* (pill bug) and *Porcellio scaber* (common slater) to seedlings of eight different grain crops commonly grown throughout southeastern Australia (canola, wheat, oat, barley, lentil, chickpea, faba bean and lucerne) at different plant growth stages (early and late). Six individuals were placed in each microcosm setup, with five replicates per crop variety x slater species. The trial was carried out in a temperature-controlled room under full spectrum grow lights.

In the first phase of this trial, we found that lucerne was by far the most susceptible crop to feeding damage from both slater species. After 14 days, both slater species consumed on average over 80% of leaf material and killed most seedlings in both early and late-stage plant growth treatments (Figure 2). We found small amounts of leaf and stem damage to most crop varieties by both slater species (Figure 3). No damage was found in faba bean across all treatments. Interestingly, only the pill bug (*A. vulgare*) fed on lentils and, in some instances, consumed the entire plant above the soil, leading to re-shooting after day 4 (Figure 3).

Our results provide the first evidence of feeding behaviour on crop seedlings by the slater species *P. scaber* and corroborate grower reports of feeding damage by pill bugs on certain crop varieties, such as canola and lentil (Douglas et al. 2017).

To further investigate the feeding behaviour of these slater species, we will use a crossed treatment design to better reflect field conditions and realistic crop rotations. This will involve a choice component, offering slaters simultaneous access to live seedlings and stubble chaff (as potential food sources) from the same or another susceptible crop.

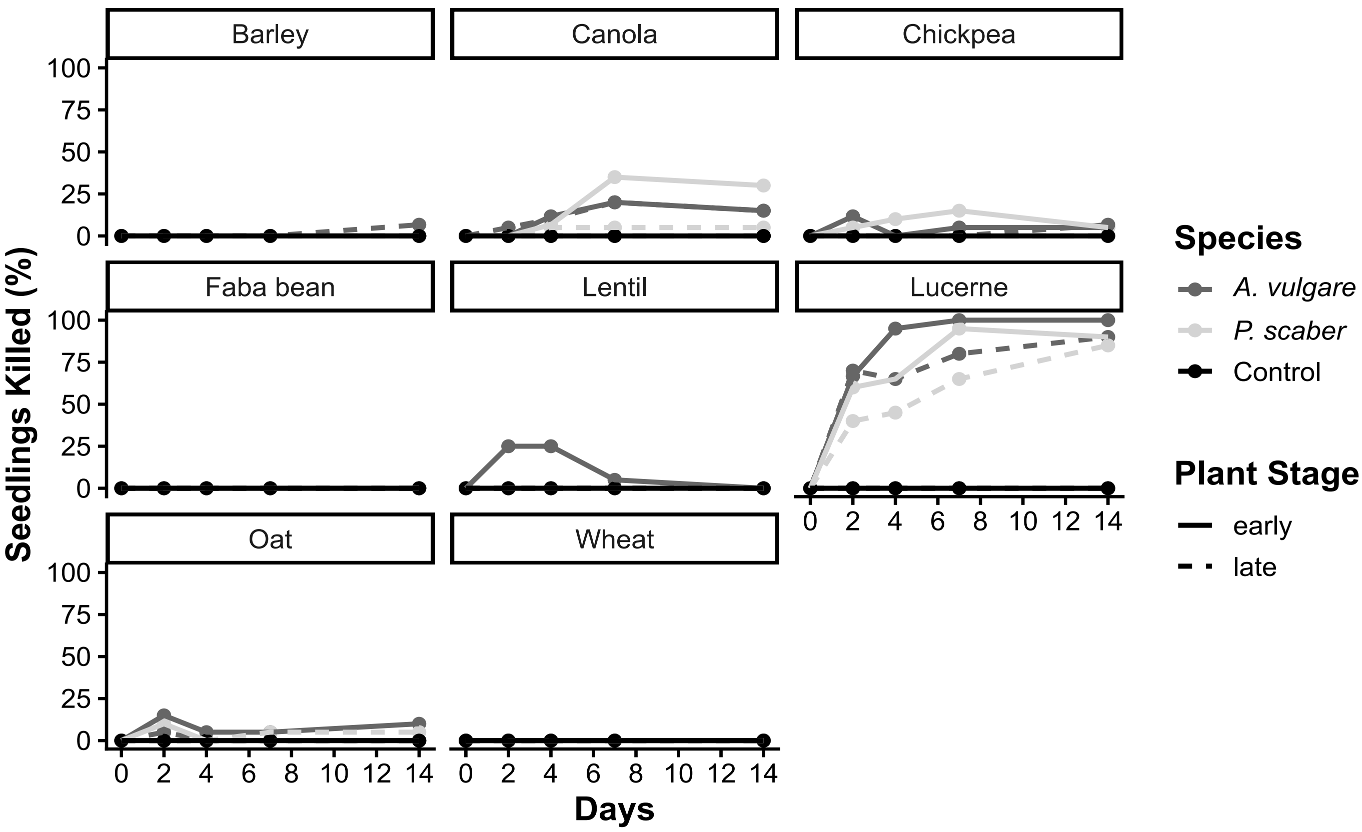


Figure 2. Percentage of seedlings killed by both slater species at early and late plant growth stages.

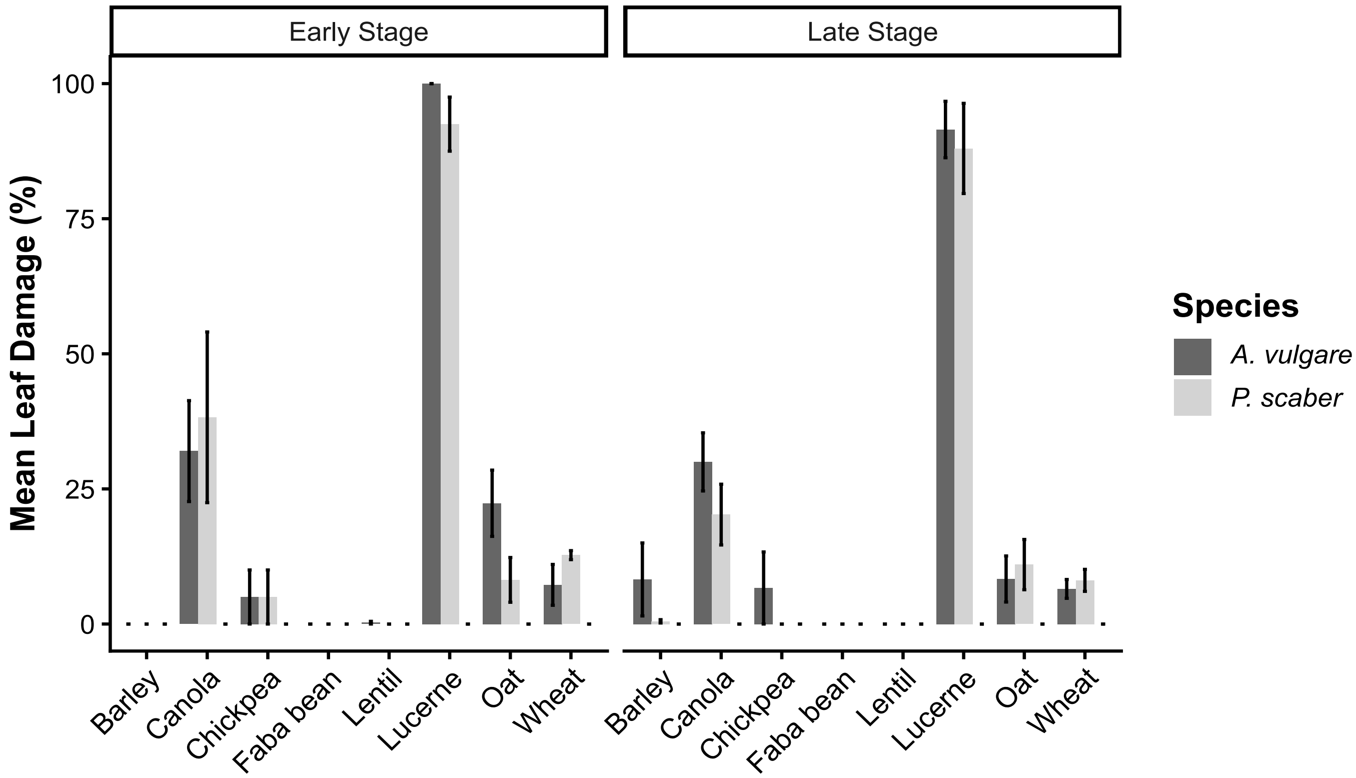


Figure 3. Mean percentage of total leaf damage to eight crop seedlings (±SE) caused by the slater species *Armadillidium vulgare* and *Porcellio scaber* after 14 days when introduced at early and late plant growth stages.

Developing integrated pest management strategies

Effective management of earwigs, millipedes and slaters requires a suite of approaches, as no single tactic provides reliable control. The loss of chlorpyrifos, previously a widely used chemical tool for these pests, has reduced available control options for growers (Erickson 2020).

It is likely that the current suite of registered products in broadacre crops provides insufficient protection of seedlings from chewing damage and crop losses from these pests (Johnson et al. 2013). Therefore, new chemical tools may be required within an integrated management framework for higher risk scenarios.

As part of this project, a comprehensive technical review of chemical and biorational control options for these target pests has been commissioned, covering potential insecticidal control options from Australia and internationally with potential future applicability to Australian conditions.

The data generated from feeding trials, field sites and surveys will build the evidence base needed to support future development of decision-support tools and IPM guidelines tailored to the grain cropping context. This applied translation work is anticipated as a focus of a potential second phase of investment.

What's next

- Completion of slater feeding trials, with data analysis and results expected in the second half of 2026.
- Ongoing monthly sampling at five lifecycle monitoring sites through the 2026 growing season.
- Finalisation of the chemical and biorational options review (July 2026).
- Refinement of economic models with complete roadshow survey data and disaggregation of results by pest type and production region.
- Ongoing AI model training for automated pest detection using camera footage.
- Additional roadshow surveys to expand geographic coverage and survey sample size.

Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the authors would like to thank them for their continued support. The project team thanks all agronomists, growers and researchers who participated in roadshow surveys. Camera systems were designed and deployed by Data Effects. Economic modelling is led by Dr Akwasi Ampofo and Professor Patrick O'Connor (Adelaide University). The chemical options review was prepared by Dr Michael Nash.

References

Binns MR, Macfadyen S, Umina PA (2022) The dual role of earwigs (Dermaptera) in winter grain crops in Australia. *Journal of Applied Entomology* **146(3)**, 272–283.

Douglas J, Macfadyen S, Hoffmann A, Umina P (2017) Crop seedling susceptibility to *Armadillidium vulgare* (Isopoda: Armadillidiidae) and *Ommattoiulus moreletii* (Diplopoda: Iulidae). *Journal of Economic Entomology* **110(6)**, 2679–2685.

Erickson BE (2020) Life after chlorpyrifos. *Chemical & Engineering News* **98(40)**, 20–23.

Johnson WA, Alfaress S, Whitworth RJ, McCornack BP (2013) Integrated pest management strategies for pillbug (Isopoda: Armadillidiidae) in soybean. *Crop Management* **12(1)**, 1–10.

Kirkland LS, Maino J, Stuart O, Umina PA (2020) Ontogeny in the European earwig (*Forficula auricularia*) and grain crops interact to exacerbate feeding damage risk. *Journal of Applied Entomology* **144(7)**, 605–615.

Micic S, Hoffmann AA, Strickland G, Weeks AR, Bellati J, Henry K, Nash MA, Umina PA (2008) Pests of germinating grain crops in southern Australia: an overview of their biology and management options. *Australian Journal of Experimental Agriculture* **48(12)**, 1560–1573. https://doi.org/10.1071/EA08153

Umina PA (2019) Potential role of seed treatments in the management of emerging arthropod pests of canola. *Crop & Pasture Science* **70(10)**, 890–898.

Contact details

Lucas Hearn

School of Agriculture, Food and Wine, Adelaide University

Waite Campus, Urrbrae SA 5064

lucas.hearn@adelaide.edu.au

Kate Muirhead

School of Agriculture, Food and Wine, Adelaide University

Waite Campus, Urrbrae SA 5064

katherine.muirhead@adelaide.edu.au

Kym Perry

School of Agriculture, Food and Wine, Adelaide University

Waite Campus, Urrbrae SA 5064

kym.perry@adelaide.edu.au

Notes

Notes

Response to nitrogen fertiliser rate decisions at sites with high and low soil organic carbon

Yolanda Plowman[1], James Hunt[2 3], Corinne Celestina[2], Matthew Lade[1] and Arjun Pandey[2].

[1]Birchip Cropping Group; [2]University of Melbourne; [3]CSIRO.

GRDC project code: BWD2303-004BGX

Keywords

- fertiliser, nitrogen, risk, RiskWi$e.

Take home messages

- Nitrogen decisions are more likely to be profitable when they follow a consistent, evidence-based framework rather than seasonal guesswork.
- Soil organic carbon is a key driver of crop responsiveness to nitrogen and should influence fertiliser decisions.
- Assess nitrogen performance over multiple seasons using both gross margin and nitrogen balance to support long-term productivity and soil health.
- At the low organic carbon Curyo site, Yield Profit targeting a median (decile 5) season and nitrogen banking to 125kg/ha N delivered the best balance of profit, risk and long-term nitrogen sustainability.

Background

Nitrogen (N) supply is the primary limitation for achieving wheat water-limited potential yield in Australia (Hochman and Horan 2018). Nationally, addressing N deficiency in wheat could increase yield by 40% (Hochman and Horan 2018, Hunt et al. 2021). A recent survey of wheat growers and advisers conducted through RiskWi$e revealed a high proportion of growers experience low comfort when making N fertiliser decisions (Brown et al. 2026).

Decision Support Systems (DSS) such as Yield Prophet and N Banks support growers from a range of management styles to make evidence-based N fertiliser rate decisions. For growers who are more 'active' in their N management, Yield Prophet (and Yield Prophet Lite) help match N input to the water-limited potential yield for a given season. Yield Prophet is considered a better match for more 'active' N managers as there is a requirement for quality input data and set-up to ensure the accuracy of yield predictions. However, some growers may be uninterested, or unable, to collect the necessary data to ensure the quality of the tool's output. In these instances, a more 'passive' approach to N management can be employed, such as through the use of N Banks, a simpler, more 'passive' way of supporting N fertiliser rate decisions that capitalises on year-to-year soil N carry-over to support crop growth.

These decision systems, along with other N management strategies, are being studied intensively as part of the GRDC RiskWi$e project. The goal is to establish the risk and reward profiles of each strategy under a variety of environments, for example, sites with varying soil types, rainfall, and levels of soil organic carbon (SOC). BCG is currently conducting multiple multi-year experiments across western Victoria to compare long-term agronomic and financial performance of different N management strategies, including Yield Prophet and N banks. Findings for several of the N management strategies from 2018 to 2025 are summarised here for an experiment at Curyo in the southern Mallee, and Longerenong in the Wimmera.

Method

N management strategy set up

The methods of these trials are consistent with, and a continuation of, the trial outlined in Plowman et al. (2024a) with the following additional treatments described in Table 1 for the inclusion of treatments present at the Longerenong trial.

Table 1: Nitrogen management systems and treatments used in the experiments.

System	Treatment	Description
Nil	Nil	No N applied other than in starter fertiliser
Replacement (**Curyo**)	R	Amount of N removed in grain applied as fertiliser N
Yield Prophet Lite BOM (**Longerenong**)	YP_BOM	Matches the decile outlook for the season
National average	NA	National average N fertiliser (45kg/ha N) applied each season
Nitrogen banks	NB_CON	Soil mineral N + fertiliser = 100kg/ha N
(kg/ha N) (**Curyo**)	NB_PRF	Soil mineral N + fertiliser = 125kg/ha N
	NB_YLD	Soil mineral N + fertiliser = 150kg/ha N
Nitrogen banks	NB_CON	Soil mineral N + fertiliser = 150kg/ha N
(kg/ha N) (**Longerenong**)	NB_PRF	Soil mineral N + fertiliser = 175kg/ha N
	NB_YLD	Soil mineral N + fertiliser = 200kg/ha N
Yield Prophet probabilities based on seasonal finish	YP_D1	Lowest yielding finish on record (decile 1 in Yield Prophet Lite)
	YP_D3	Lower yielding quartile finish (decile 2–3 in Yield Prophet Lite)
	YP_D5	Median finish (decile 4–7 in Yield Prophet Lite)
	YP_D7	Higher yielding quartile finish (decile 8–9 in Yield Prophet Lite)

Table 2: Crop type and variety grown each year, alongside annual and growing season rainfall recorded for both trial sites.

Site, crop and rainfall	2018	2019	2020	2021	2022	2023	2024	2025
Annual rainfall mm Curyo (BOM station: 077008)	330	217	370	290	530	273	280	210
GSR (Apr–Oct) mm Curyo (BOM station: 077008)	107	181	240	196	406	187	139	162
Crop type, variety Curyo	Wheat, Scepter[PBR]	Canola, Hyola 350TT	Wheat, Scepter[PBR]	Barley, Spartacus CL[PBR]	Wheat, Razor CL Plus	Lentil, GIA Thunder	Barley, Maximus CL	Wheat, Shotgun[PBR]
Annual rainfall mm Longerenong (BOM station: 079028)					647	455	250[*]	340
GSR (Apr–Oct) mm Longerenong (BOM station: 079028)					467	264	149	238
Crop type, variety Longerenong					Wheat, Scepter[PBR]	Barley, Maximus CL	Lentil, GIA Thunder	Barley, Maximus CL

[*]Data unavailable for February and March.

Table 3: Soil type and soil organic carbon at both trial sites.

Soil type/organic carbon	Curyo	Longerenong
Soil type	Sandy clay loam	Grey cracking clay[^]
Organic carbon %	0.61%[*]	1.3%[^]

[*]Data are presented as the mean value averaged across multiple treatment plots.

[^]Data sourced from the APSoil database for the Horsham 1008 soil characterisation site.

Results and discussion

Average grain yvield over the long term

On average across the eight years at Curyo, the YP_D5 and YP_D7 treatments achieved the highest grain yields (3.67t/ha and 3.66t/ha, respectively), and both treatments were significantly higher than all others ($p<0.001$, Lsd = 0.26) (Figure 1). In contrast, yield data averaged over four trial years at Longerenong showed that this site is less responsive to N inputs as most treatments produced statistically equivalent yields: YP_D7 produced the highest average yield (4.1t/ha) but was not significantly different from YP_D5, NB_CON, YP_BOM, NB_PRF, NB_YLD, or NAT, with the only two exceptions being YP_D3 and NIL ($p<0.005$, Lsd = 0.22) (Figure 2).

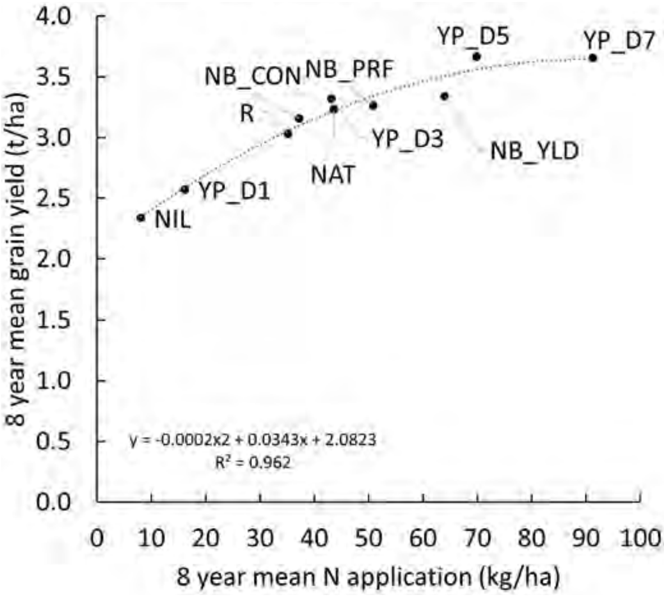


Figure 1. The relationship between mean eightyear fertiliser application and mean eight-year grain yield for the different treatments at the Curyo trial. The quadratic function fitted by least-squares regression is of the form y = -0.0002x2 + 0.0343x + 2.0823, R^2 = 0.962.

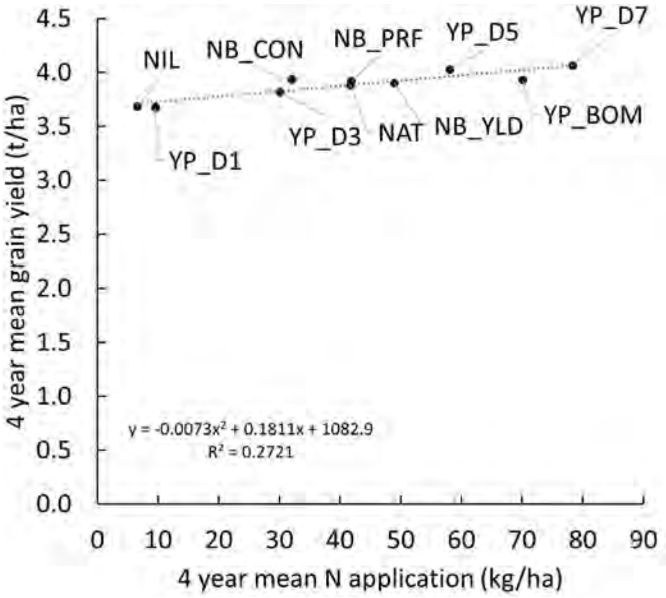


Figure 2. The relationship between mean four-year fertiliser application and mean four-year grain yield for the different treatments at the Longerenong trial. The linear function fitted by least-squares regression is of the form y = -0.0073x2 + 0.1811x + 1082.9, R^2 = 0.2721.

Average gross margin over the long term

At Curyo, the highest average gross margin across the eight years was achieved by YP_D5 ($883) which was significantly higher than all other treatments. The following treatments also achieved high margins, however were not significantly different from each other: YP_D7 ($836), YP_D3 ($817), NB_CON ($765), NB_PRF ($763), NAT ($756), and NB_YLD ($742) ($p<0.001$, Lsd $118), with no statistically significant differences between them. This is illustrated in Figure 3, where the relationship between mean N application and gross margin flattens out for this significance group. No significant differences were detected between gross margins for treatment alone at the Longerenong trial ($p=0.957$), however the interaction between year and treatment was significant ($p<0.05$, Lsd $197), and a weak relationship between long-term gross margin and mean N application rate was observed at this trial (Figure 4). Longerenong showed a yield to N rate in 2022 and 2023 (individual year data not shown). The lack of response observed in 2025 is possibly explained by soil water availability in 2025 following the lentil crop sown in 2024 for which a number of N treatments yielded higher than expected, and this is probably due to higher soil water availability in lower N treatments following the 2023 barley crop. Given the dry conditions in 2025 (Table 2), the higher N rate treatments in the 2025 barley crop may not have had the opportunity to respond to the higher N inputs, particularly following higher-than-expected lentil yields in 2024 which may have impacted soil available water.

Importantly, the percentage of SOC varies substantially at each site, as shown in Table 3. SOC and N are stored in consistent ratios (10–12 C to 1 N) in soil organic matter. Soils with lower SOC therefore have less organic N reserves and thus are more dependent on fertiliser N to achieve water-limited potential yields (Farrell et al. 2021). This was demonstrated as part of a recent sub-experiment conducted at the Curyo site by Plowman et al. (2024b) who reported that soil mineral N can be depleted in the short term (five years), negatively impacting yield, however it was possible to compensate for the impact on yield through the application of substantial rates of fertiliser N. Therefore, it is plausible to assume that the performance of N rate treatments varies depending on the growing environment, particularly soil organic carbon (SOC).

Nevertheless, the four highest average gross margins at the Longerenong trial were returned by NB_CON ($1108), NB_PRF ($1094), NIL ($1087), and NAT ($1087). The N rate for each treatment was 7kg/ha (NIL), 32kg/ha (NB_PRF), and 42kg/ha (NB_CON and NAT).

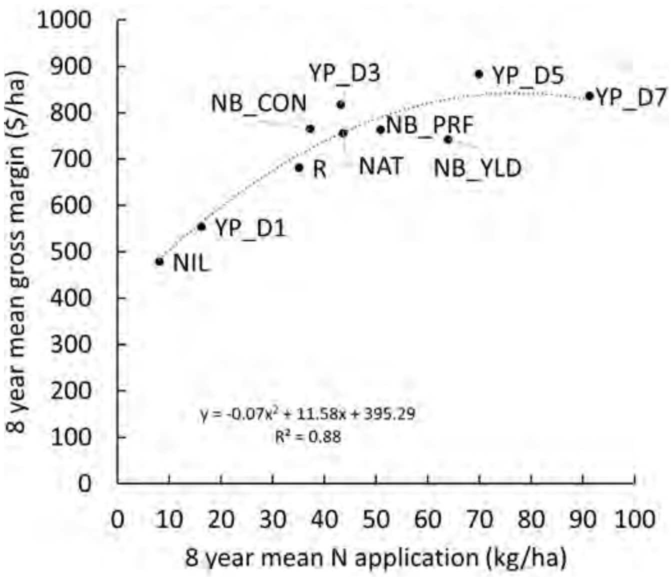


Figure 3. The relationship between mean eight-year fertiliser application and mean eight-year gross margin for the different treatments at the Curyo trial. The quadratic function fitted by least-squares regression is of the form y = -0.07x2 + 11.58x + 359.29, R^2 = 0.88.

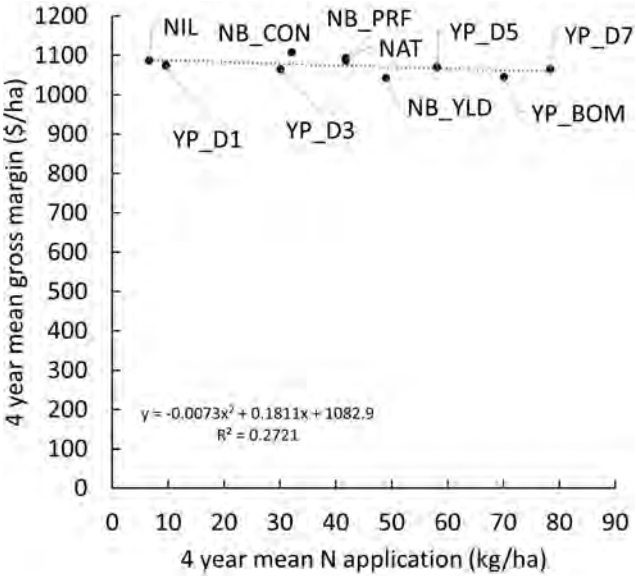


Figure 4. The relationship between mean four-year fertiliser application and mean four-year gross margin for the different treatments at the Longerenong trial. The linear function fitted by least-squares regression is of the form y = -0.073x2 + 0.1811x + 1082.9, R^2 = 0.2721.

Impacts on N carry-over and risks associated with different strategies

At the Curyo trial, negative gross margins were avoided by YP_D5, YP_D3, NB_CON, and NB_PRF over the eight-year period, illustrating a lower level of risk over the longer term, contrary to YP_D7 which recorded a negative gross margin, and thus demonstrates higher volatility (individual year data not shown). In comparison, the Longerenong trial showed there were no treatments which experienced a negative gross margin in any year, suggesting that N management in the lower rainfall Curyo environment is inherently riskier.

Regarding the assessment of risk in decision-making, growers should also consider the partial N balance, which is the relationship between N leaving a system through grain and environmental losses and N being replenished by fertiliser and legumes. Although a number of treatments achieved significantly higher gross margins over the eight-year average at Curyo, despite varying levels of volatility, YP_D5 was the optimal choice for growers choosing an 'active' style of N management, as its cumulative partial N balance sat at the low but positive value of 23kg/ha (Figure 5). For growers who prefer a more 'passive' style of N management, the NB_PRF management strategy achieved a cumulative partial N balance which was positive but still close to neutral (33kg/ha). At Longerenong, where treatment effects were weaker for gross margin, growers can be guided by the cumulative partial N balance where the NB_PRF strategy returned the lowest positive cumulative partial N balance (8kg/ha), whilst still achieving a higher average gross margin, albeit not significantly different from other treatments (Figure 6).

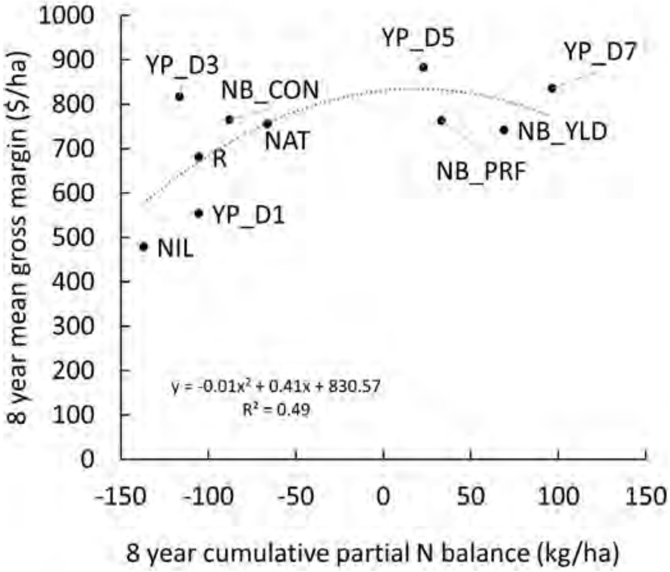


Figure 5. The relationship between eight-year nitrogen balance and eight-year mean gross margin for the different treatments. The quadratic function fitted by least-squares regression is of the form y = -0.01x2 + 0.41x + 830.57, R^2 = 0.49.

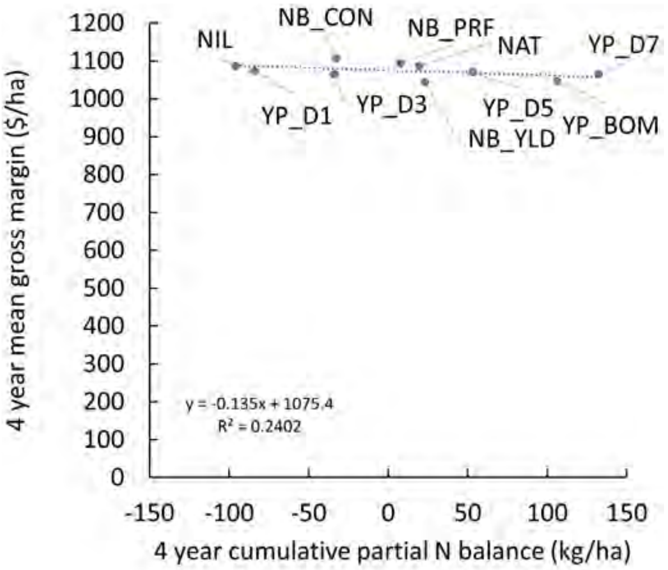


Figure 6. The relationship between four-year nitrogen balance and four-year mean gross margin for the different N management treatments at Longerenong. The linear function fitted by least-squares regression is of the form y = -0.135x + 1075.4, R^2 = 0.2402.

Conclusion

The difference in responsiveness between the Curyo and Longerenong trials is likely mostly driven by the SOC at each site. At the Curyo site, with lower overall rainfall and SOC, a clear advantage was illustrated through the employment of YP_D5 and NB_PRF – two different management strategies that resulted in good returns (though YP_D5 was significantly higher than NB_PRF) and N carry-over, whilst safeguarding N losses to the environment. At sites that are more responsive to N inputs, Yield Prophet® and N bank approaches are reliable decision-making systems to maximise returns on a short- and longer-term basis. The choice between a particular strategy is likely to be driven by grower preference for simplicity versus complexity in N management.

However, sites with higher SOC are less responsive to N fertiliser, and therefore growers are encouraged to be guided by a strategy that maximises profit whilst maintaining a low but positive partial N status, as well as one which suits their management style.

Acknowledgements

From 2018 to 2019, the research was funded by La Trobe University funded through the Securing Food, Water and the Environment Research Focus Area. Funding was subsequently provided by the Mallee Catchment Management Authority from 2019 to 2022, through the Australian Government's National Landcare Program and GRDC, through National Grower Network under the project *N banking strategies to manage variable and unpredictable nitrogen demand in the MRZ of the Southern Region* (BWD2204-002RTX). Since 2023, the research has been funded through the GRDC's National RiskWi$e project (BWD2303-004BGX). We thank Paul Barclay for hosting the experiment.

From 2018 to 2019, the research was funded by La Trobe University funded through the Securing Food, Water and the Environment Research Focus Area. Funding was subsequently provided by the Mallee Catchment Management Authority from 2019 to 2022, through the Australian Government's National Landcare Program and GRDC, through the National Grower Network. We thank Paul Barclay for hosting the experiment.

References

Brown, B, Azeem, M, Llewellyn, R (2026) Benchmarking 'good' farm decision-making. GRDC Available at https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2026/02/benchmarking-good-farm-decision-making.

Farrell M, Gupta VVSR, Macdonald LM (2021) Addressing the rundown of nitrogen and soil organic carbon (https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2021/02/addressing-the-rundown-of-nitrogen-and-soil-organic-carbon)

Hochman Z, Horan H (2018) Causes of wheat yield gaps and opportunities to advance the water-limited yield frontier in Australia. *Field Crops Research* **228**, 20-30.

Hunt J, Kirkegaard J, Maddern K, Murray J (2021) Strategies for long term management of N across farming systems (https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2021/02/strategies-for-long-term-management-of-n-across-farming-systems)

Plowman Y, Finger K, Hunt J, Pandey A, Farrell M (2024a) Nitrogen strategies for N banking (https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2024/07/nitrogen-strategies-for-n-banking)

Plowman Y, Hunt J, Finger K, Pandey A, Wang J, Farrell M (2024b) Nitrogen fertiliser can directly compensate for the negative impacts of reduced soil organic matter on yield (https://www.agronomyaustraliaproceedings.org/images/sampledata/2024/2024_ASA_Plowman_Y_001-211-1013-Plowman-Yolanda.pdf)

Contact details

Yolanda Plowman
Birchip Cropping Group

73 Cumming Avenue, Birchip VIC 3487

0447 755 312
Yolanda.plowman@bcg.org.au

@YolandaPlowman

Notes


YOU'RE INVITED!
BCG MAIN FIELD DAY
WEDNESDAY 9 SEPTEMBER 2026 | 8:45AM START
LEHMANN & CURYO WEST RD INTERSECTION, CURYO
BCG
SHARED SOLUTIONS
REGISTER TODAY!
MAIN FIELD DAY


BCG
SHARED SOLUTIONS
BCG UPCOMING EVENTS
These events offer growers and advisors the latest in local agronomic research
8 SEP
GRDC harvester set up workshop
Kadina | 9am - 3pm
9 SEP
BCG Main Field Day 2026
Curyo | 8:30am - 4pm
16 SEP
GRDC harvester set up workshop
Terrick Terrick | 9am - 3pm
17 SEP
GRDC harvester set up workshop
Ultima | 9am - 3pm
17 SEP
GRDC harvester set up workshop
Bridgewater | 9am - 3pm
For more information please visit bcg.org.au/events


GRDC
GROUNDCOVER
The latest grains industry research, development and extension news from GRDC.
To read GroundCover online, visit groundcover.grdc.com.au
GRDC GROUNDCOVER
Subscribe to receive the hard copy GroundCover magazine or other GRDC communications at grdc.com.au/subscribe
GRDC
GroundCover is brought to you by Australian grain growers and the Australian Government through the publisher, the Grains Research and Development Corporation (GRDC).

Getting the best bang for buck on canola fungicides

Alec McCallum[1], Steve Marcroft[2] and Angela Van de Wouw[1].

[1]*School of BioSciences, University of Melbourne, Parkville;* [2]*Marcroft Grains Pathology, Horsham.*

GRDC project codes: MGP2504-002RTX, MGP2504-0022RTX

Keywords

- blackleg, canola, disease management, fungicides.

Take home messages

- Increased canola intensity will result in higher disease levels.
- Use non-fungicide disease control strategies where possible.
- Applications at 30% bloom are likely needed in 2026 to control upper canopy infection.
- Blackleg can be successfully managed but it requires a combination of crop management, cultivar resistance and strategic use of fungicides.
- Resistance to DMI fungicides (Group 3) has been detected across all canola growing regions in Australia whilst resistance to the SDHI fungicides (Group 7) has been detected only on the Eyre Peninsula to date. No resistance has been detected to the QoI fungicides (Group 11).

Background

Blackleg disease is controlled through a combination of cultural practices, genetic resistance and fungicides. The main cultural practice is isolation from previous years' canola stubble by at least 500m to reduce inoculum and disease pressure, but infections will still occur outside of this distance.

Good genetic cultivar resistance (high blackleg rating) is the most effective way of controlling blackleg disease. However, blackleg populations overcome genetic cultivar resistance and blackleg populations are different in different regions and on individual farms. Simply put, blackleg populations will evolve in response to the resistance of the cultivar growing on your farm. If you sow a new cultivar, its blackleg rating will likely be as reported in the blackleg management guide. If you have sown the same cultivar for more than three years, then the rating of your cultivar may be reduced, that is, if the cultivar was MR when first grown, three years later it may behave as a MRMS on your farm. This blackleg evolution is highly driven by disease pressure. Regions that grow two crops of canola over three years with high rainfall will result in blackleg populations evolving quickly. Moderate rainfall regions with less intensive canola tend to maintain their genetic resistance ratings for longer.

Reliance on fungicides to control blackleg disease has increased substantially over the past five years, with an average of 2.5 applications a season in 2024 compared to only 1.5 applications in 2018. Fungicides are used at three different growth stages to control the various forms of blackleg disease (Figure 1). Seed-dressing and fungicide-amended fertiliser are used to control crown canker, as infection at the seedling stage leads to the development of crown canker. Foliar applications at the 4–8 leaf stage are also aimed at controlling crown canker. Lastly, 30% bloom foliar applications are used to control upper canopy infection (UCI).

Increased use of fungicides increases the probability of the pathogen evolving causing fungicide resistance. When fungicide resistance evolves in the field, it can lead to either reduced or complete loss of efficacy of the corresponding fungicide actives. From 2018 to present, we have monitored the frequency of fungicide resistance across Australian blackleg populations. We have also investigated which specific on-farm practices may be potentially driving selection of fungicide resistance.

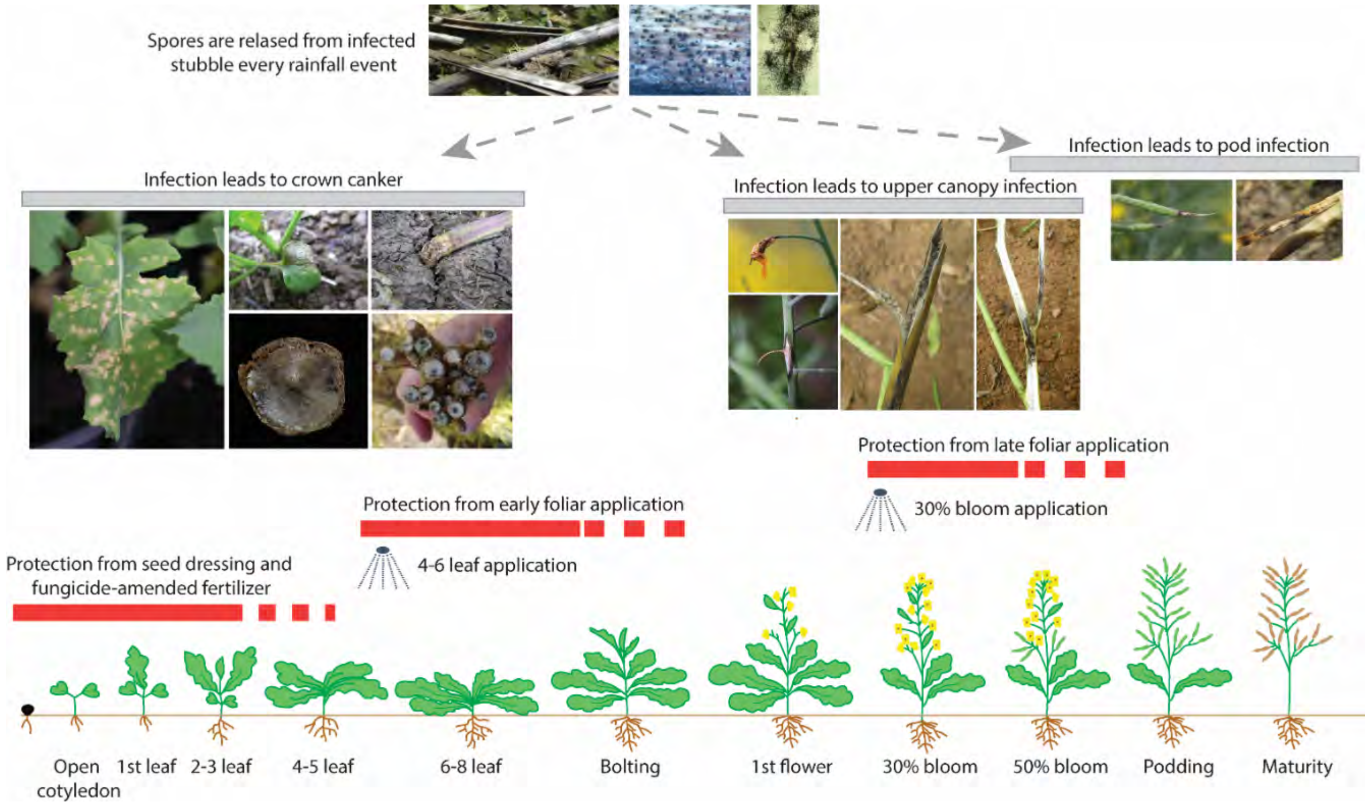


Figure 1. Epidemiology of blackleg disease of canola. Spores are released from infected stubble with each rainfall event during the growing season. If spores land on cotyledons and true leaves, the fungus grows down into the crown and causes crown cankers. However, if spores land on and infect flowers, upper canopy infection may result. Lastly, if spores land on pods, they may infect the pods and underlying seeds. Fungicides are used to control the various forms of blackleg disease, with seed-dressings, fungicide-amended fertilisers and early foliar applications designed to control crown canker, whereas 30% bloom applications are targeted to control upper canopy infection. No chemical control option is available for pod infection.

Results and discussion

Current scenario in 2026

The 2026 season began with good rainfall in early March and then consistent rainfall events from March–June, allowing good opportunities for early sowing and crop establishment. The early, consistent rainfall also matured canola stubble early, resulting in release of ascospores in May (much earlier than typical). Coupled with warmer than average temperatures, many canola crops matured quickly through the vegetative phases to begin flowering in June, putting them at high risk of both crown canker and upper canopy infection.

Genetic resistance

The best way to determine loss of resistance is to monitor the amount of crown canker and UCI at the end of year. In the current blackleg management guide for the latest WA regional resistance group, if the resistance group is coloured green, it should be effective in your region (Table 1). However, you can also check the resistance status on-farm by looking for leaf lesions. If the major gene resistance is effective (has not been overcome) there will be few, if any, blackleg leaf lesions (plants are immune). If you do not have effective major gene resistance in your cultivar (most cultivars), simply use the blackleg rating.

To confirm that resistance has not eroded in your cultivar, it is highly advised to cut and inspect the plant crown (see the blackleg management guide for details). If blackleg levels are low, then continue current practices. However, if blackleg is increasing over time, changing cultivars is recommended.

The rule of thumb is that if there is 30% or more of the crown discoloured when the stem is cut open, it is likely to cause yield loss. UCI levels can also be determined at plant maturity (commencement of seed colour change) by observing darkened branches and darkened pith (see the blackleg management guide for photos of crown canker and UCI).

Table 1: Status of canola resistance groups in selected NSW and Vic sites (2025 data). Cultivars with effective major gene resistance groups (green) are immune to blackleg.* Resistance Group letters refers to the cultivar major gene resistance, see GRDC Blackleg Management Guide for more information.

2025 site	Resistance Group						
NSW	A	B	C	D	F	H	S
Gerogery*	Red	Red	Red	Green	Yellow	Green	Green
Lockhart	Red	Red	Red	Green	Yellow	Green	Yellow
Vic	A	B	C	D	F	H	S
Charlton	Red	Red	Red	Yellow	Yellow	Green	Green
Diggora	Red	Red	Red	Green	Green	Green	Green
Hamilton	Red	Red	Yellow	Green	Green	Yellow	Green
Horsham*	Red	Red	Red	Red	Yellow	Green	Yellow
Streatham	Red	Red	Red	Green	Red	Green	Yellow
Wunghnu	Red	Red	Red	Yellow	Yellow	Green	Green
Yarrawonga	Red	Red	Red	Yellow	Yellow	Green	Yellow

**Green = effective; Yellow = partially effective; Red = ineffective. Note: in 2025 some sites had low blackleg severity, insufficient disease to make recommendations.*

The GRDC/DPIRD apps BlacklegCM and UCI BlacklegCM are very useful aids to determine if fungicide application is likely to provide an economic return. Low disease levels will not cause yield loss and will reduce the likelihood of fungicide resistance occurring – the aim is to increase yield, not to grow the cleanest crop.

Fungicide applications

Fungicides are going to be profitable in 2026. With the consistent rainfall and warmer conditions, blackleg disease is extremely severe across Victoria and South Australia. Consider applications of fungicides for both control of crown canker and upper canopy infection. The fungicide application will depend on the growth stage of your crop. If crops are still less than 8-leaf, then a foliar fungicide should be used to protect against crown canker. If crops are past this stage, then foliar fungicides will be required for upper canopy infection. It is years like 2026 when fungicides are necessary to help keep blackleg at bay. When choosing fungicides, consider rotating actives to reduce the risk of fungicide resistance.

Fungicide resistance

In 2025, 249 stubble populations of the causal fungus of blackleg disease were collected from the field and used to inoculate seedlings treated with nine commercial fungicides. Ten days post-inoculation, disease was measured, and a none/low, moderate or high resistance score (RS) determined for each chemistry for each blackleg stubble population (Figure2). Isolates were also collected from representative samples to confirm the detection of resistance. No resistance was detected towards the QoI (Group 11) fungicides in any region (data not shown).

For Victoria, 56 stubble populations were screened which represented the Wimmera, Western District and Northeast regions (Figure 2). High levels of resistance were detected for the DMI (Group 3) chemistries, suggesting that field failure is possible if using these chemistries. No resistance was detected to the SDHI (Group 7) chemistries, although moderate levels of resistance were detected in a small number of samples which will be worth monitoring in 2026.

Isolates were collected from infected leaf tissue from SDHI-treated plants and confirmed to have resistance to these chemistries. Three different mutations were detected and varied in their efficacy towards each of the SDHI actives. For the DMI-resistant isolates, no cross resistance was detected for mefentrifluconazole.

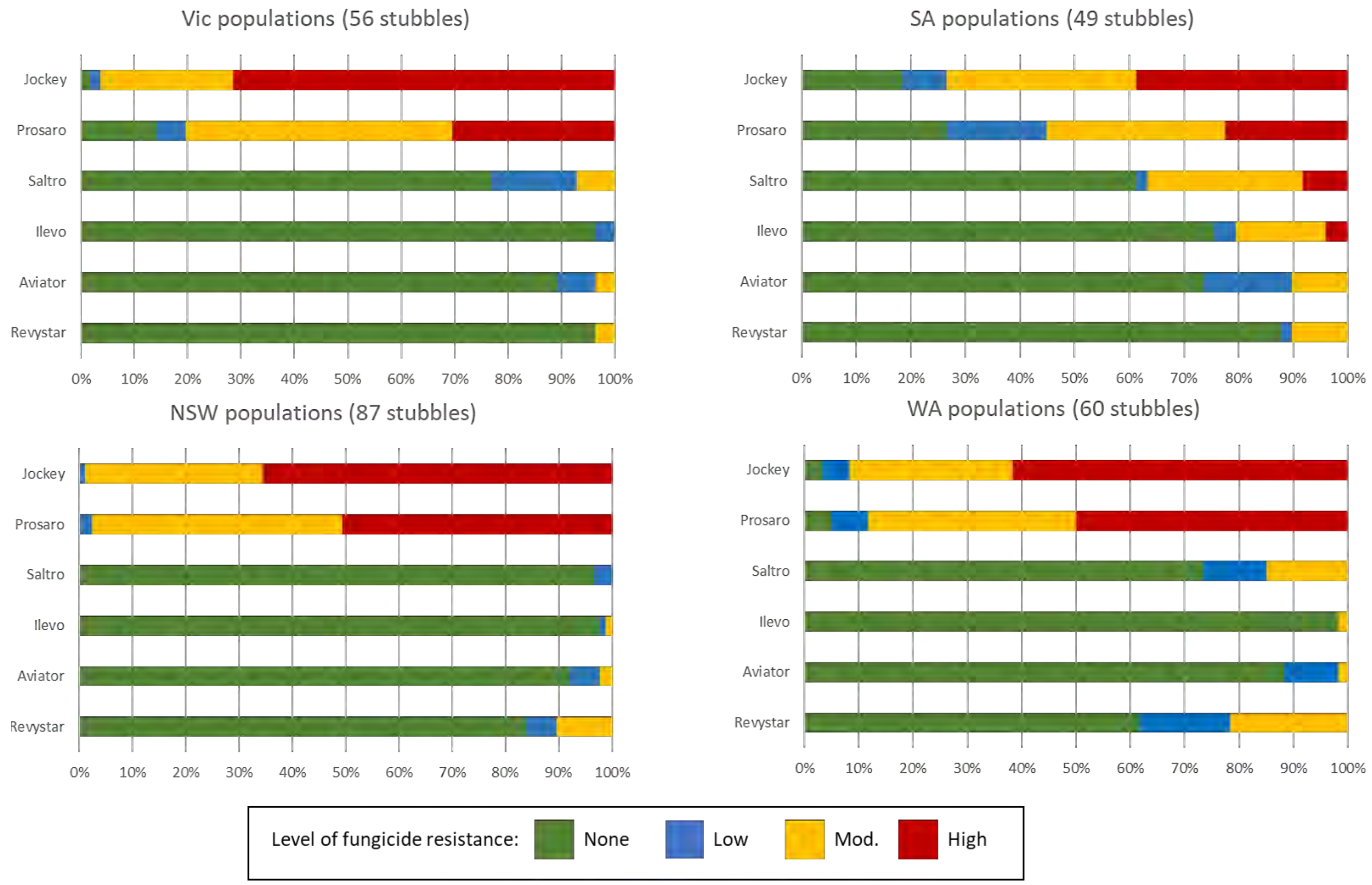


Figure 2. Percentage of stubble populations with varying levels of fungicide resistance towards each of the fungicides: Jockey® (Group 3, Fluquinconazole), Prosaro® (Group 3+3, Tebuconazole + Prothioconazole), Saltro® (Group 7, Pydiflumetofen), ILeVo® (Group 7, Fluopyram), Aviator® XPro (Group 7+3, Bixafen + Prothioconazole) and Revystar® (Group 7 + 3, Fluxapyroxad + Mefentrifluconazole). Resistance to the Group 3 chemistries has been detected in all regions whilst resistance to the SDHI chemistries is currently restricted to South Australia. These fungicides have been used as representatives of the various actives that are available for blackleg control. Note Jockey is no longer registered but fluquinconazole is available as FMC Rider®.

Controlled environment experiments were conducted to test different fungicide application strategies and their impact on selection of fungicide resistance. Populations of fungicide-resistant and fungicide-susceptible isolates were generated and used to inoculate plants with different fungicide applications. Disease severity was measured to determine the impact of the different fungicide applications on a selection of fungicide-resistant isolates. Population changes will be measured in 2026.

On-farm data for the past six years were collected from growers where SDHI resistance has or has not been detected. Different farming practices were compared to detection of resistance to determine whether there were any correlations between specific practices and selection of fungicide resistance.

Glasshouse experiments, using fungicide-resistant and fungicide-susceptible populations, indicated that the 4–8 leaf foliar application is driving selection of fungicide resistance. This result was supported by analysis of the on-farm fungicide use data from 25 growers, whereby there was a significant (correlation 0.505, p=0.036) correlation with the use of the 4–6 leaf foliar application and the detection of fungicide resistance. The data suggest that, in the absence of the 4–8 leaf foliar application, susceptible isolates can enter the plant and dilute the effect of the resistant isolates, therefore slowing selection of fungicide resistance.

The plant can tolerate around 30% internal infection before any yield loss occurs and therefore, by allowing infection to occur between the 4 leaf and 30% bloom growth stages, it is unlikely to get yield loss but will maintain the efficacy of the fungicides.

Sclerotinia

Sclerotinia is a complex disease, and is almost impossible to predict when it will occur and how much yield loss it will cause. Sclerotinia across a region will be more severe in years with wet springs, tight canola rotations, rotations with double broadleaf crops and early flowering. Many crops will fit this description in 2026. However, individual crops within the same region and seemingly identical conditions will get very different levels of disease severity.

Within the same region, some crops should be sprayed with a fungicide, and some should not – but it may be impossible to determine at the time of fungicide application. Consequently, the best determination is for the grower to know the history of individual paddocks.

If yearly scouting identifies paddocks that have a past history of sclerotinia and the same paddock has the high-risk indicators as described above, a fungicide should be applied. The SclerotiniaCM app is an excellent spray decision tool.

Recommendations

- Where possible, use other management strategies to minimise disease pressure, such as selecting cultivars with high blackleg disease rating or isolation of 500m from last year's stubble.
- Plants can tolerate up to 30% infection before yield loss. Remember that fungicides always control disease, but disease doesn't always cause yield loss.
- Applications at 30–50% bloom are likely needed due to early flowering
- Cannot apply fungicides past 50% bloom due to MRLs.
- If fungicides are required, minimise the number of applications. For example, if sowing early, avoid using a 4–6 leaf foliar spray for crown canker. If sowing late, the crop may require a 4–8 leaf foliar spray for crown canker but may not require a 30% bloom foliar spray for upper canopy infection.
- If applying multiple fungicides in a season, rotate chemical groups as well as specific actives, where possible.
- Avoid 4–8 leaf early foliar applications where possible to reduce risk of fungicide resistance.

Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the authors would like to thank them for their continued support. We also thank the Australian Research Council and industry partner Syngenta, for part of the funding for this work. Lastly, we thank all the agronomists that have provided stubble and other associated data for use in this project.

Useful resources

For more information on managing blackleg disease:

Blackleg management guide (https://grdc.com.au/resources-and-publications/all-publications/factsheets/2026/blackleg-management-guide)

BlacklegCM – Blackleg management app (https://www.agric.wa.gov.au/apps/blacklegcm-blackleg-management-app)

UCI BlacklegCM – Blackleg upper canopy infection management app (https://www.agric.wa.gov.au/apps/uci-blacklegcm-blackleg-upper-canopy-infection-management-app)

SclerotiniaCM – Sclerotinia management app (https://www.dpird.wa.gov.au/online-tools/sclerotinia-cm--sclerotinia-management-app)

CropLife Australia resistance management (https://www.croplife.org.au/resources/programs/resistance-management/)

Contact details

Angela Van de Wouw
apvdw2@unimelb.edu.au
0439 900 919

Alec McCallum
alec.mccallum@student.unimelb.edu.au
0497 373 672

Notes

Notes


MyGRDC
is here!
MyGRDC is a new way for grain growers like you to find information you can trust. Search, save and share GRDC news, events and publications through a personalised portal that you customise according to your region, crops and interests.
"I used to Google what I needed. I don't need to do that any more. MyGRDC gives me everything I am looking for."
Grain grower, GRDC Southern region
Latest news
Now available on your desktop or mobile
9:41
MyGRDC
Search, save and share
Search resources, news, events...
Latest news
19 Aug 2025 | West
GRDC infrastructure investments to build research capacity across southern Australia
Read more
grdc.com.au/mygrdc
Download MyGRDC now from the App store or Google Play
GRDC

Protecting your most perishable asset – latest understanding on grain storage

Chris Warrick.

Primary Business

GRDC project code: PRB2412-001SAX

Keywords

- fumigant, grain storage, phosphine, silo.

Take home messages

- A storage must be gas-tight sealed to achieve a high enough concentration of fumigant for a long enough period to kill pests at all life cycle stages.
- Pressure test silos, and when buying a new silo, buy a quality, gas-tight sealable silo fitted with aeration and check it meets the Australian Standard.
- Phosphine is a highly toxic gas, so follow all product label statements when applying and venting.
- Phosphine gas concentration needs to reach 550 parts per million (ppm) and remain above this level for 7–10 days. Exposure periods vary with temperature and storage capacity.
- Powered air recirculation systems distribute the phosphine gas to achieve lethal concentration in all areas of the storage - particularly helpful in large silos.
- Fumigation meters are an essential part of best practice use of phosphine for measuring concentration during fumigation and post-venting.

Fumigation fundamentals

Poor fumigation techniques fail to kill pests at all life cycle stages, so while some adults may die, grain will soon be reinfested again as soon as larvae and eggs develop. What's worse, every time a poor fumigation is carried out, insects with some resistance survive, making the chemical less effective in the future.

The second challenge with fumigating is venting the gas to ensure it is safe and meets the delivery site requirements, with some delivery sites using 0.3 parts per million via a spear test as a clearance limit. New lower worker exposure limits, which come into effect in December 2026, could make venting prior to delivery even more challenging.

Gas-tight

Research shows that fumigating a storage that is anything less than gas-tight sealed doesn't achieve a high enough concentration of fumigant for a long enough period to kill pests at all life cycle stages. Pressure testing a silo ensures it can hold gas concentrations sufficient to kill all insects at all life stages. Just because a silo is sold as a sealed silo does not automatically mean it's suitable for fumigation. Even if a silo is sold as 'sealed', it is not sealed until it is proven gas-tight with a pressure test.

When a pressure test is undertaken, oil levels in the pressure relief valve must take a minimum of five minutes to fall from 25mm to a 12.5mm difference if the silo is sufficiently gas-tight. When buying a new silo, buy a quality, gas-tight sealable silo fitted with aeration and check with the manufacturer that it meets the Australian Standard for sealable silos (AS2628–2010).

Safety

Phosphine is a highly toxic gas with potentially fatal consequences if handled incorrectly. As a minimum requirement, product labels direct the use of elbow-length PVC gloves and a full-face breathing respirator with combined dust and gas cartridge, suitable for inorganic gas. Be aware that cartridges have a limited lifespan as they contain activated carbon. After use, store cartridges in a sealed container and follow manufacturer directions for replacement.

Working with phosphine in an open, well-ventilated area with the wind coming from the side will help carry the gas away from the body. When opening containers, take care and point container lids away from the face and body. When opened, use the entire contents — do not reseal left-over tablets.

Safe Work Australia has announced a change to worker exposure limits for phosphine. Affective from December 2026, the peak exposure limit will be 0.15 Parts per million (ppm) and the Time Weighted Average will be 0.05ppm.

Exposure period

To control pests at all life stages and prevent insect resistance, phosphine gas concentration needs to reach 550 parts per million (ppm) and remain above this level for 7–10 days. At this concentration, an exposure period of seven days is required when grain is above 25°C or 10 days if at 15–25°C. Insect activity and development slow down in cooler grain temperatures, which means a longer exposure time to fumigants is required to deliver a lethal dose to all life stages.

In gas-tight sealed silos larger than 300t capacity that don't have powered recirculation, the exposure period is extended to 20 days regardless of grain temperature. If the silo has powered recirculation, the exposure period can be shortened to 10 days. When grain temperatures fall below 15°C, insect pests become inactive and phosphine fumigation is no longer reliably effective.

Recirculation systems

Some silos are fitted with purpose-built chambers for applying phosphine from the bottom. This method of application carries a safety advantage, as the operator doesn't have to leave the ground to apply the phosphine.

Bottom-application chambers must have a passive or powered air recirculation system to carry the phosphine gas out of the confined space as it evolves. Without air movement, phosphine can reach explosive levels if it's left to evolve in a confined space.

Silos larger than 150t will benefit from a sealed, powered recirculation system to distribute gas throughout the storage and achieve consistent gas concentration sooner. Trials have found that, without powered recirculation, phosphine travels at approximately 6m per day through grain, in any direction.

In silos larger than 300t without powered recirculation, the phosphine label stipulates an extended exposure period of 20 days, referenced as 'surface only application'. Using powered recirculation enables the fumigation period to be shortened to 10 days.

An alternative to a dedicated, powered recirculation box with a phosphine chamber is to connect a small fan between the pluming from the silo headspace to the base and place the phosphine in the headspace and/or aeration ducts at the base. This option has two main advantages – it avoids the risk of explosion if the fans stops as the phosphine can safely continue liberating in the silo, and, being lower cost, there is also the option to buy multiple fans so more than one silo can be fumigated at a time.

Venting

Following fumigation, ventilate silos to allow phosphine gas to escape into the atmosphere, so grain can be delivered free of harmful gas residues. The same PPE required for applying the phosphine is required again to open the silo and remove the phosphine residue. After the removal of tablet residue or bag chains, the labels state that a silo without aeration fans fitted must be left open to ventilate for no less than five days. Silos with aeration fans fitted must be opened to ventilate with fans operating for no less than one day. Larger flat bottom silos, cool grain or extended fumigations are likely to require additional time to vent as the grain desorbs the phosphine.

A low-level phosphine meter is the safest way to ensure the grain is vented to the delivery limit set at the receival point. Grain should be spear tested at least a few hours after fans have been switched off and prior to moving in order to sample the air gaps into which grain may have been desorbing gas. The labels state that grain treated with phosphine should not be used for human consumption or for stock food for a minimum of two days after the ventilation period has finished.

Monitoring gas concentrations

Fumigation meters are an essential part of best practice use of phosphine, especially when fumigating storages that cannot be pressure tested, such as bunkers and bags. Meters are available in high range (0 to 2000ppm) for measuring concentration during fumigation, and low range (0 to 20ppm) for measuring concentration post-venting for clearance and safety.

Acknowledgements

The research undertaken as part of this project is made possible by the significant contributions of growers through both trial cooperation and the support of the GRDC, the author would like to thank them for their continued support.

Contact details

Chris Warrick
Grian Storage Extension Team

1800 WEEVIL (1800 933 845)

info@storedgrain.com.au
www.storedgrain.com.au

Notes

Notes

Acknowledgements

We would like to thank those who have contributed to the successful staging of the Kaniva GRDC Grains Research Update:

- The local GRDC Grains Research Update planning committee that includes growers, advisers and GRDC representatives.

- Partnering organisation: Birchip Cropping Group

- Trade display supported by: Polytex

GRDC
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

Prefer to leave your feedback online? Scan the QR with your phone camera.

OR use the form on the next page – tear it out and drop at the registration desk as you leave. Thank you!

2026 Kaniva GRDC Grains Research Update Feedback

1. How would you describe your <u>main</u> role? *(choose one only)*

- ❑ Grower
- ❑ Agronomic adviser
- ❑ Farm business adviser
- ❑ Financial adviser
- ❑ Communications/extension
- ❑ Grain marketing
- ❑ Farm input/service provider
- ❑ Banking
- ❑ Accountant
- ❑ Researcher
- ❑ Student
- ❑ Other* (please specify)

Your feedback on the presentations

For each presentation you attended, please rate the content relevance and presentation quality on a scale of 0 to 10 by placing a number in the box (**10 = totally satisfactory, 0 = totally unsatisfactory**).

2. Industry panel – pushing pulses for better crops
Audrey Delahunty (Agriculture Victoria), Jason Brand (GEM Agronomy), Josh Fanning (Agriculture) Victoria, Ash Wallace (Agriculture Victoria), Austin Smith (SMS Rural)

Content relevance ☐ /10 Presentation quality ☐ /10

Have you got any comments on the content or quality of the presentation?

3. Managing surface pests: what's working, what's not and what we're learning
Kate Muirhead and Lucas Hearn, Adelaide University

Content relevance ☐ /10 Presentation quality ☐ /10

Have you got any comments on the content or quality of the presentation?

4. Risk and reward of N fertiliser decision-making strategies – insights from a national network of RiskWi$e field experiments
Yolanda Plowman, BCG

Content relevance ☐ /10 Presentation quality ☐ /10

Have you got any comments on the content or quality of the presentation?

5. Get best bang for buck on canola fungicides
Alec McCallum, University of Melbourne

Content relevance [ ] /10 Presentation quality [ ] /10

Have you got any comments on the content or quality of the presentation?

[ ]

6. Protect your most perishable asset - latest tips on grain storage
Chris Warrick, Primary Business

Content relevance [ ] /10 Presentation quality [ ] /10

Have you got any comments on the content or quality of the presentation?

[ ]

Your next steps

7. Please describe at least one new strategy you will undertake as a result of attending this Update event

[ ]

8. What are the first steps you will take?
e.g. seek further information from a presenter, consider a new resource, talk to my network, start a trial in my business

[ ]

Your feedback on the Update

9. This Update has increased my awareness and knowledge of the latest in grains research

Strongly agree	Agree	Neither agree nor Disagree	Disagree	Strongly disagree
❑	❑	❑	❑	❑

10. Do you have any comments or suggestions to improve the GRDC Update events?

[ ]

Thank you for your feedback.

KEY CONTACTS

SOUTHERN REGION

ADELAIDE
187 Fullarton Road
DULWICH SA 5065

08 8198 8401
southern@grdc.com.au

HORSHAM
Grains Innovation Park
110 Natimuk Road
HORSHAM VIC 3400

0428 274 018
southern@grdc.com.au

APPLIED RESEARCH, DEVELOPMENT AND EXTENSION

SENIOR REGIONAL MANAGER
Courtney Ramsey
courtney.ramsey@grdc.com.au
0428 274 018
Based in Horsham

GROWER RELATIONS MANAGER
Rebekah Starick
rebekah.starick@grdc.com.au
0458 441 278

GROWER RELATIONS MANAGER
Tim Bateman
tim.bateman@grdc.com.au
0447 526 191
Based in Melbourne

GROWER RELATIONS MANAGER
Mitchell Fromm
mitchell.fromm@grdc.com.au
0498 230 877
Based in Horsham

SENIOR MANAGER ENABLING TECH (NATIONAL)
Tom Giles
tom.giles@grdc.com.au
0417 889 860

MANAGER AGTECH (NATIONAL)
Peter Thompson
peter.thompson@grdc.com.au
0417 245 802

MANAGER SUSTAINABILITY AND PLATFORM TECH (NATIONAL)
Brooke Bruning
brooke.bruning@grdc.com.au
0417 915 477

MANAGER SUSTAINABLE CROPPING SYSTEMS
Giacomo Betti
giacomo.betti@grdc.com.au
0499 976 242

MANAGER SUSTAINABLE CROPPING SYSTEMS
Courtney Peirce
courtney.peirce@grdc.com.au
0487 423 471

CROP PROTECTION AND IMPROVEMENT

MANAGER WEEDS (NATIONAL)
Sarah Morran
sarah.morran@grdc.com.au
0447 158 908

MANAGER DISEASES (NATIONAL)
Alan Little
alan.little@grdc.com.au
0439 321 392

CROP PROTECTION MANAGER
Ruth Peek
ruth.peek@grdc.com.au
0455 534 040

MANAGER OILSEEDS (NATIONAL)
Allison Pearson
allison.pearson@grdc.com.au
0418 874 748

SENIOR MANAGER NVT (NATIONAL)
Sean Coffey
sean.coffey@grdc.com.au
0428 652 226

MANAGER NVT OPERATIONS
Sara Blake
sara.blake@grdc.com.au
0472 782 389

MANAGER NVT SOUTH
Brooke Bennett
brooke.bennett@grdc.com.au
0437 421 887
Based in Horsham

MANAGER WHEAT (DISEASE AND QUALITY)
Shiwangni Rao
shiwangni.rao@grdc.com.au
0476 304 976
Based in Horsham

MANAGER BIOSECURITY (NATIONAL)
Amy Koschella
amy.koschella@grdc.com.au
0488 106 256

COMMUNICATIONS

COMMUNICATIONS MANAGER
Sophie Clayton
sophie.clayton@grdc.com.au
0478 029 040
Based in Canberra

CONTENT MANAGER
Melanie Hunter
melanie.hunter@grdc.com.au
0427 189 827

ENQUIRIES
comms@grdc.com.au