



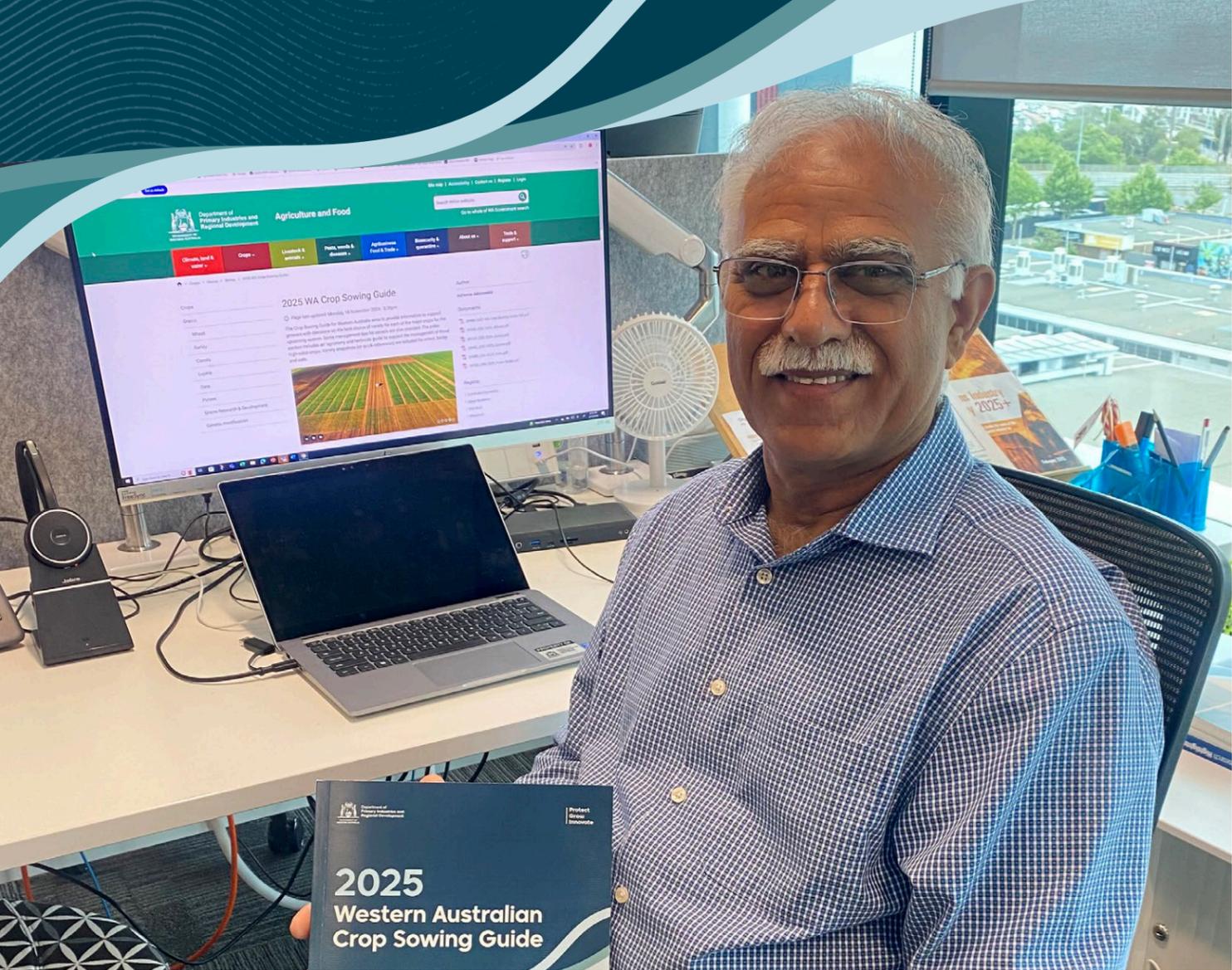
Department of
Primary Industries and
Regional Development

Protect
Grow
Innovate

DPIRD Grains R&D Stakeholder Update

April 2025 Edition





From Acting Director of Grains
Darshan Sharma

Introduction

Hello, research and industry colleagues.

It is my pleasure to welcome you to the latest edition of the Grains R&D Stakeholder Update as we look ahead to the 2025 cropping season.

The GRDC Grains Research Updates, held in Perth at the end of February, were once again a highlight on the industry calendar — bringing together growers, advisers, researchers and policymakers from across the grainbelt to share knowledge, research outcomes and practical innovations. It was fantastic to see strong representation from DPIRD, with more than 15 of our researchers presenting across a wide range of topics, including agronomy, soils, pest and disease management, crop nutrition, climate modelling and decision support tools.

The Updates are not only a platform for knowledge sharing, but also a celebration of the people driving progress in our industry. I'd like to extend a heartfelt congratulations to DPIRD research scientist Svetlana Micic, who was awarded the prestigious Seed of Light Award this year. Svet's long-standing contribution to entomology and extension has made her a trusted source of information for growers and advisers alike. Her work continues to make a genuine impact in the paddock, and this recognition is richly deserved.

Following the recent WA State Election, it's encouraging to see continuity in leadership with the Hon Jackie Jarvis MLA returning as Minister for Agriculture and Food. This consistency provides a strong foundation for ongoing collaboration, and we look forward to continuing to work closely with the Minister and her team to support the grains industry.

While the focus remains on R&D, we acknowledge the early break to the season in parts of the Great Southern and Wheatbelt, with the March rainfall helping to stimulate weed germination and kick off early canola programs in some areas. Soil preparation and amelioration activities continue, with growers across the state laying the groundwork for the season ahead.

As many of you are aware, the Grains Directorate will undergo a structural realignment following the appointment of a new Executive Director to the DPIRD leadership team. This will be an internal reorganisation and will not affect our deliverables or strategic direction.

To address the displacement from South Perth last year, we are putting in place a range of interim solutions. These include the use of field plots, glasshouses, and laboratory facilities to ensure our work continues as planned. These arrangements will support the ongoing delivery of our 2025 project objectives.

As always, I want to thank our growers, industry partners and DPIRD staff for your ongoing support and collaboration. In a time of major global shifts and change, our commitment to delivering practical, trusted science for WA's grains sector remains unwavering.

Warm regards,

Darshan Sharma

Acting Director of Grains

Department of Primary Industries and Regional Development (DPIRD)

✉ darshan.sharma@dpiird.wa.gov.au

🌐 www.agric.wa.gov.au/darshan-sharma

Contents



5 DPIRD powers next-gen crop research



8 Digging deep: reengineering soils for WA grower adoption



10 Svetlana Micic shines with GRDC Seed of Light award win



12 Barley battles back: New herbicide technologies tackle tough weeds



14 WA lupin growers gain edge in sclerotinia fight



16 Journal papers



18 Where to hear about our work

Cover: DPIRD Acting Director of Grains Darshan Sharma, Entomologist Svetlana Micic and Manager Crop Protection Helen Spafford.

Acknowledgment of Country

The Department of Primary Industries and Regional Development (DPIRD) acknowledges the Traditional Custodians of Country, the Aboriginal people of the many lands that we work on and their language groups throughout Western Australia (WA) and recognise their continuing connection to the land and waters. We respect their continuing culture and the contribution they make to the life of our regions, and we pay our respects to their Elders past, present and emerging.

Department of Primary Industries and Regional Development

+61 1300 374 731 | enquiries@dpiird.wa.gov.au | dpiird.wa.gov.au

ABN: 18 951 343 745



DPIRD powers next-gen crop research



Imagine capturing the secrets of plant growth from the sky and testing crop resilience in real time. At the cutting edge of agricultural research, DPIRD is helping bring these ideas to life as a key node in the Australian Plant Phenomics Network (APPN).

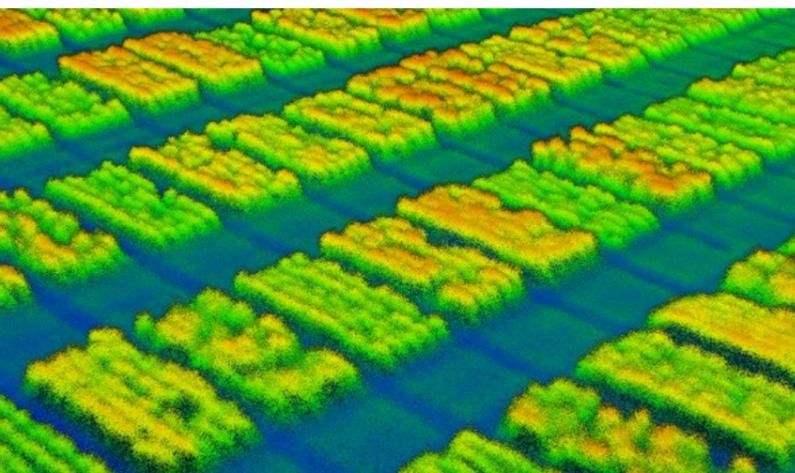
DPIRD will be using airborne and ground-based sensors in the field to generate high quality, field relevant data on plant traits such as water use efficiency, nutrient uptake, and disease tolerance — often termed as high-throughput phenotyping. Phenotyping helps breeders and agronomists identify promising crop varieties faster and with greater confidence. This translates to tangible outcomes for WA growers — supporting the development of more resilient, higher-yielding crops that are better suited to the state's challenging and variable environments.



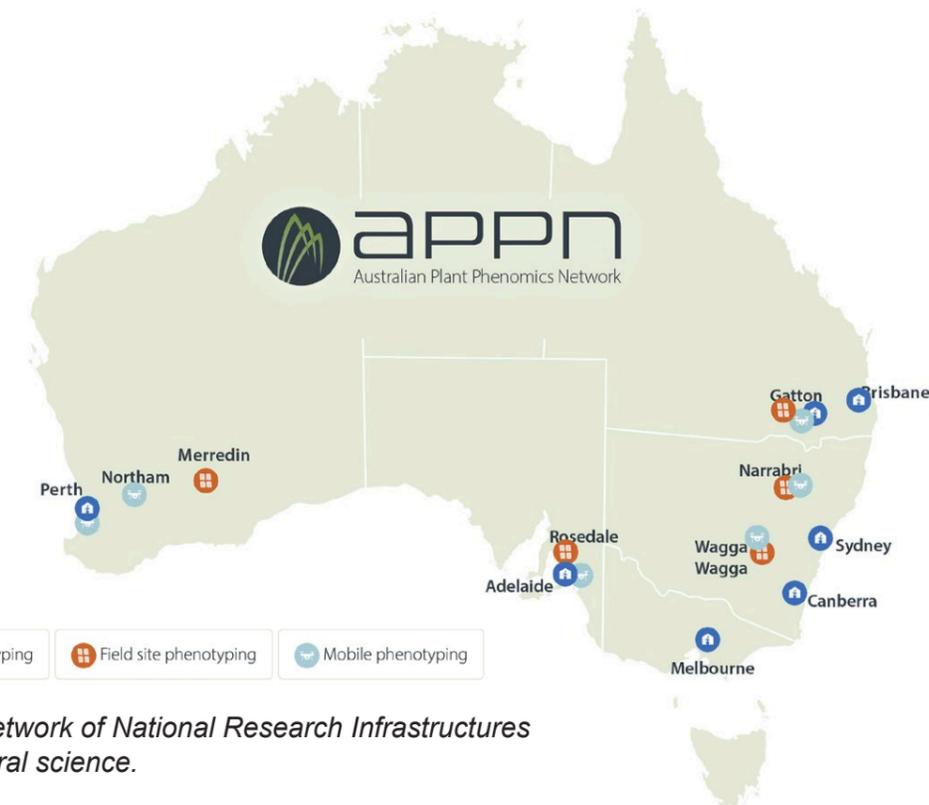
APPN Booth at the 2025 GRDC Research Updates Perth. L-R Trevor Garnett (APPN), Nik Callow (UWA), Tim Scanlon (DPIRD), Richard Dickmann (APPN), Hammad Khan (DPIRD).

Funded through the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS), with co-contributions from the Grains Research and Development Corporation (GRDC) and DPIRD, APPN connects world-class research institutions across the country, accelerating breakthroughs in crop science.

DPIRD hosts the WA node of the APPN in collaboration with the University of Western Australia, with a strong focus on field phenotyping of crops. The WA node, led by DPIRD research scientist Dr Hammad Khan, provides advanced infrastructure and multidisciplinary expertise through its facilities in Northam and Merredin, as well as a mobile phenotyping service that extends research capability to paddocks across the state's grain-growing regions.



DPIRD's unmanned aerial vehicles (UAVs) support high-throughput field phenotyping across WA trial sites. Equipped with RGB, multispectral, hyperspectral and LiDAR sensors, these UAVs enable detailed crop monitoring and are operated by DPIRD's skilled, licensed staff, with full support from in-house data processing and analysis systems.



APPN is Australia's network of National Research Infrastructures for plant and agricultural science.

At Northam, DPIRD's mobile phenotyping facilities consists of airborne and ground-based platforms — equipped with RGB, multispectral, hyperspectral, and LiDAR sensors — that deliver fast, high-resolution insights into crop performance and stress responses. These UAV-based tools are operated by experienced pilots and supported by data analysts, delivering robust, reproducible results that support commercial and academic research.

In Merredin, DPIRD's field research facility focuses on dryland agriculture, offering infrastructure that enables fine control of crop water supply to support long-term systems trials and trait development in real-world conditions.

DPIRD's phenotyping facilities service regional WA and offer unmatched reach and flexibility — empowering researchers and industry to accelerate genetic gain, improve agronomy and develop systems to future proof food production.

By bridging cutting edge science and on farm application, DPIRD's phenotyping capabilities play a critical role in boosting productivity, supporting sustainability and strengthening the competitiveness of WA's grains industry.

DPIRD's infrastructure and expertise are available to support high-impact, collaborative research initiatives.

To explore partnership or project opportunities, please contact Dr Hammad Khan:

 appn@dpiird.wa.gov.au  **0457 008 971**

Or visit: [Australian Plant Phenomics Network](#) 



Digging deep: reengineering soils for WA grower adoption

The next phase of deep soil profile reengineering research is now underway across WA!

Led by DPIRD Senior Research Scientist Dr Gaus Azam, from the Soil Science and Crop Nutrition team — in collaboration with growers and industry partners — has established 8 new research sites across the Wheatbelt. These sites form part of the GRDC–DPIRD Soil Water and Nutrition (SWAN) Strategic Collaboration, which aims to enhance crop productivity through advanced soil management practices.

Building on promising results

Dr Azam said previous GRDC–DPIRD trials delivered impressive results by reengineering soil profiles to depths of up to 80 cm.

“Loosening and liming increased the water use efficiency (WUE) of cereals on sandy and texture-contrast soils by 70 per cent, while adding clay improved WUE by a further 23 per cent on deep sands with low water-holding capacity,” he said.

This next phase will optimise these strategies, demonstrate the yield potential of reengineered soils, and define practical steps for farm-scale implementation to overcome multiple soil constraints.

Integrated research approach

Complementary research within the SWAN program will explore carbon accounting in ameliorated soils, investigate root–soil–microbiome dynamics following deep interventions, and inform the development of next-generation tillage guidelines and equipment tailored for soil improvement.

Field experiments to answer key questions

What are the ideal ameliorant rates and incorporation depths?

Four grower-scale trials are being conducted at Mount Horner, Grass Valley, Wagin and North Stirling. These trials, using existing farm machinery on deep sand and texture-contrast soils, are testing lime rates of 0 or 4 t/ha (depending on paddock acidity) and clay rates from 0 to 1500 t/ha. Soil incorporation and decompaction



Chad Renolds with Carl and Harrison Forward at Mount Horner research site. Photo credit: Gaus Azam



Kanch Wickramarachchi and Md Shahinur Rahman, with MADFIG farmers, reengineering deep acidic sand in Hines Hill. Photo credit: Gaus Azam

depths vary from 0 to 80 cm. The aim is to identify the most cost-effective soil amelioration strategies tailored to soil type and constraint severity.

What is the optimum depth for reengineering poor, acidic sands?

Another 4 ‘blue-sky’ experimental sites at Badgingarra, Latham, Hines Hill and Condingup are assessing more exploratory approaches. Lime is applied at rates between 0 and 14 t/ha, and clay from 0 to 2700 t/ha. The amendments are incorporated to depths of 0, 40, 80 and 120 cm to evaluate how deeper interventions influence soil structure, stability and crop response.

How long do the benefits of reengineering last?

To address this, researchers continue to monitor 9 previously established (2021–2022) ‘blue-sky’ experiments. These trials, which reengineered soils up to 80 cm deep, span a range of soil types including deep sands (Northampton and Bolgart), sandy duplexes (Meenar and Tarin Rock), and heavier textured soils (Carnamah, Bonnie Rock, Holt Rock, Salmon Gums and Toolbrunup).

Towards a blueprint for soil transformation

Together, these new and ongoing trials aim to uncover the maximum achievable yield potential by removing deep-seated soil constraints. They also seek to define the best combinations of amendments and incorporation depths required to deliver long-lasting, scalable, and economically viable solutions for growers across the WA Wheatbelt.

Contact: Dr Gaus Azam for more information on the soil reengineering research program.

✉ gaus.azam@dpiird.wa.gov.au

☎ 0433 883 837

This research is one component of the Soil Water and Nutrition (SWAN): Transforming water and nutrient use efficiency in WA Grain Production (DAW2407-001SPX) 2024-2029 Strategic Collaboration between GRDC and DPIRD. To find out more about SWAN, visit <https://www.agric.wa.gov.au/swan-collaboration>



Svetlana Micic shines with GRDC Seed of Light award win



Trailblazing entomologist Svetlana Micic has taken out the prestigious 2025 GRDC Western Seed of Light award, shining a spotlight not only on her outstanding contribution to grains research — but also on the critical role of women in science.

Based in Albany and a key member of DPIRD’s entomology team, Svetlana has spent over two decades at the forefront of pest management research. She leads statewide efforts to tackle key pest threats to grain crops, including pesticide-resistant redlegged earth mites, aphids in canola, and mollusc pests. Her ability to translate science into clear, practical advice has made her one of WA’s most trusted voices in the paddock.

The Seed of Light award recognises individuals who go above and beyond to communicate research outcomes that help drive productivity and resilience across the grains industry. And Svetlana’s impact speaks volumes — growers, agronomists and researchers alike rely on her insights to manage the ever-evolving challenges posed by crop pests.

Svetlana’s win is a great example of the valuable contribution women continue to make through science. Her leadership, innovation and dedication are helping to advance agricultural research and provide inspiration to others building careers in the field.

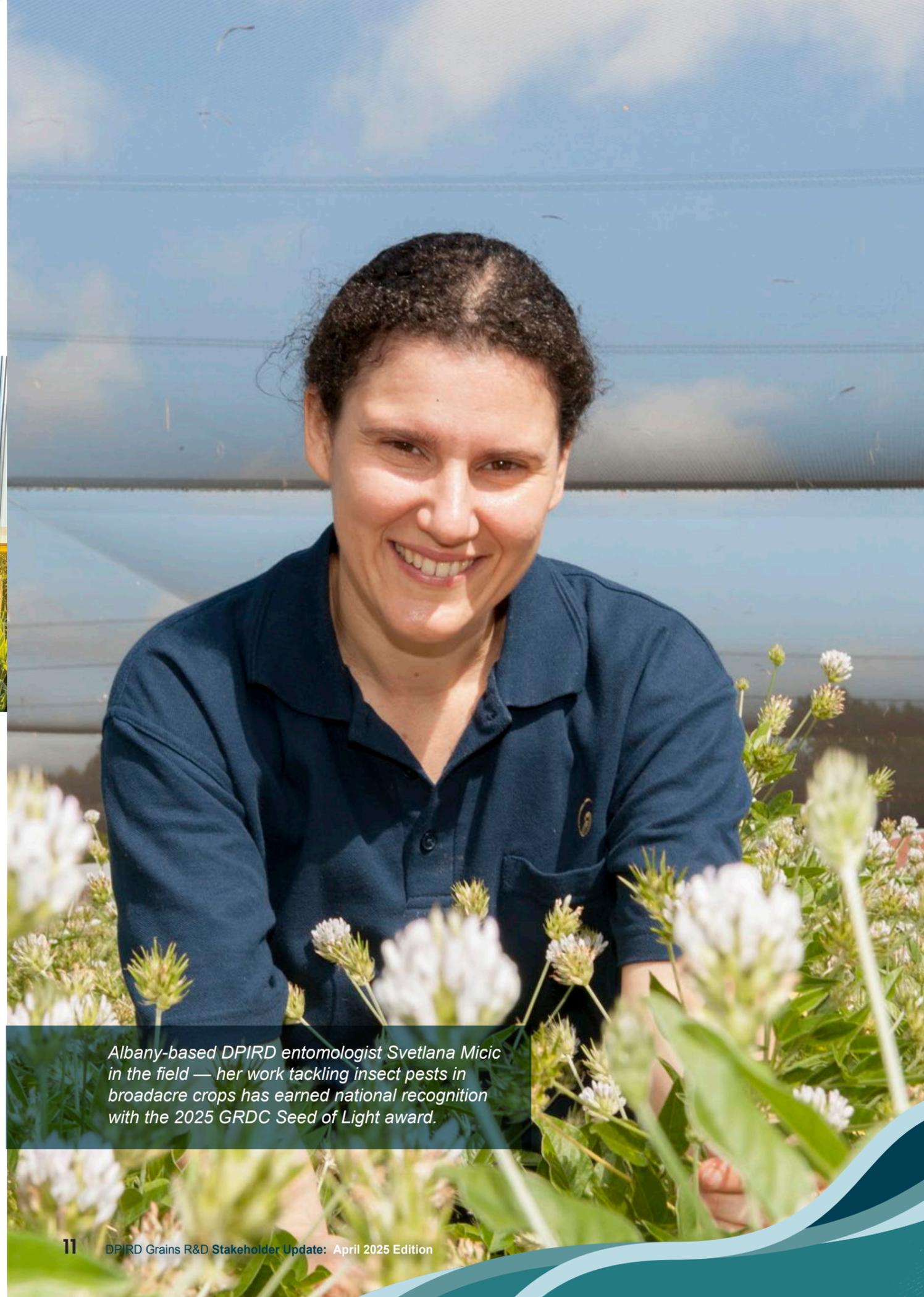
“Working in entomology, especially in a role where I can have a real and lasting impact for Australian grain growers, has always been my key motivator,” she said.

Her work, undertaken through DPIRD and recognised nationally, proves that science — and the scientists behind it — are key to a more sustainable and productive future for agriculture.

Svetlana’s award is a proud moment for DPIRD and the grains industry, and a reminder of the impact dedicated individuals can make.



DPIRD entomologist Svetlana Micic with the 2025 GRDC Seed of Light – West award at the Grains Research Update in Perth.



Albany-based DPIRD entomologist Svetlana Micic in the field — her work tackling insect pests in broadacre crops has earned national recognition with the 2025 GRDC Seed of Light award.



Barley battles back: New herbicide technologies tackle tough weeds

Barley growers could soon have powerful new tools to tackle some of their most frustrating weeds.

New research has revealed exciting progress in the fight against barley grass and brome grass — 2 weeds that continue to cause problems for growers across WA. Trials of emerging herbicide systems have shown they can dramatically improve weed control in barley crops, offering a potential breakthrough for farmers battling these tough and persistent grasses.

The findings highlight the potential of herbicide-tolerant barley varieties, including CoAXium® and Clearfield®, to outperform conventional options.



DPIRD Senior Research Scientist Dr Harmohinder Dhammu presenting the barley grass trial at the FACEY Group Spring Field Walk at East Pingelly.

DPIRD senior research scientist Dr Harmohinder Dhammu said these grass weeds, with their staggered emergence patterns, are difficult to control with traditional pre-emergent herbicides.

“Field trials found that new barley herbicide tolerance technologies — such as CoAXium® and Clearfield® — either used with only the appropriate Group 1 or 2 herbicide registered for that system, or in combination with other pre-emergent herbicides, could offer effective control of these species,” Dr Dhammu said.

With co-investment from GRDC, the DPIRD-led field trials compared the performance of 5 treatment strategies. Trials targeted barley grass in 2023 and brome grass in 2024 at several WA sites.

The results were clear:

- CoAXium® barley system using quizalofop (e.g., Aggressor® AX) on Titan AX barley at the 3–4 leaf stage, delivered 100 per cent control of barley grass and 94 per cent control of brome grass.
- Clearfield® barley system using imazamox + imazapyr on Maximus CL barley at the 5-leaf stage, achieved 92 per cent control of barley grass and 65 per cent control of brome grass. While slightly less effective on brome grass, the remaining weeds were significantly stunted and showed evidence of root pruning.

“In paddocks with mixed populations of brome or barley grass and annual ryegrass, it’s essential to choose herbicides that are effective across all species,” Dr Dhammu said.

“If ryegrass is resistant to Group 1 and 2 herbicides, growers should consider incorporating other herbicide options into their programs.”

These findings could be a game changer for growers battling resistant or hard-to-manage grass weeds in barley.

Contact:

Dr Harmohinder Dhammu

 harmohinder.dhammu@dpird.wa.gov.au

 0403 156 942





WA lupin growers gain edge in sclerotinia fight

WA lupin growers have new, practical tools to reduce yield loss and improve profitability, thanks to major advances in understanding and managing sclerotinia stem rot.

A 4-year research project has delivered clear strategies to help growers identify high-risk paddocks, target control measures more effectively, and avoid unnecessary input costs.

Led by DPIRD, the work was carried out in partnership with the Centre for Crop and Disease Management, Mingenew Irwin Group and local growers, with co-investment from GRDC.

DPIRD research scientist Ciara Beard said the research has deepened understanding of how sclerotinia spreads and how to respond, particularly in narrowleaf lupins.

“There are 2 types of sclerotinia infection — canopy and basal,” Ms Beard said.

“Canopy infection can reduce yields by up to 25 per cent, mainly by infecting the main spike pods. Basal infection, which attacks plants at ground level, can be even more damaging.”

The team conducted laboratory, glasshouse and field trials to develop an integrated disease management strategy for canopy infection.

This includes agronomic, cultural and chemical strategies such as delayed sowing, wider row spacing, lower seed rates, and applying a registered foliar fungicide between full flowering and early pod emergence.

“These strategies are especially valuable in high-risk paddocks,” Ms Beard said.

“The *Lupin sclerotinia disease risk assessment guide* helps growers target management where it’s most likely to pay off.”

Research showed the strategy is most effective in medium-high rainfall areas of the Geraldton and Kwinana north port zones. In contrast, low disease levels in the Albany zone over the 4-year project showed few gains from intervention.



DPIRD principal research scientist Geoff Thomas, technical officers Masood Anwar and Surya Dhakal and research scientist Zia Hoque inspect lupin plants for sclerotinia damage in a field trial.

While canopy infection can now be better managed, Ms Beard said effective options for basal infection remain limited, highlighting the need for continued research.

Contact:

Ciara Beard

 ciara.beard@dpird.wa.gov.au

 0438 468 484

Lupin sclerotinia disease risk assessment guide





Journal papers 2025



Crop Protection

Borger, C. P. D. and M. J. Slaven (2024). Electric inter-row control of lupin plants does not adversely affect the neighbouring non-target lupin plants. <i>Weed Science</i> Published online 2024 early view: 1–32. (DAW2303-002OPX) (C Borger)	
Congdon, B.S., Sharman, M, Kehoe, MA 2024. Genetic diversity of soybean dwarf virus in two regions of mainland Australia. <i>Arch Virol.</i> Oct 8;169(11):216.doi: 10.1007/s00705-024-06142-z.(DAW2305-003RTX)(B Congdon)	
Leon M. Hodgson, Francisco J. Lopez-Ruiz, Mark R. Gibberd, Geoff J. Thomas, and Ayalsew Zerihun (2024). Field-scale gene flow of fungicide resistance in <i>Pyrenophora teres</i> f. <i>teres</i> and the effect of selection pressure on the population structure. <i>Published Online: 2 Oct 2024, (Boosting Grains R&D RfR)</i>	
Seabourn, P. Spafford, H. Medieros, M. and Goff, L. 2024. Elucidating the distribution of mosquitoes (Diptera: Culicidae) on the Island of Maui. <i>Proceedings of the Hawaiian Entomological Society</i> , 56: 13–27	



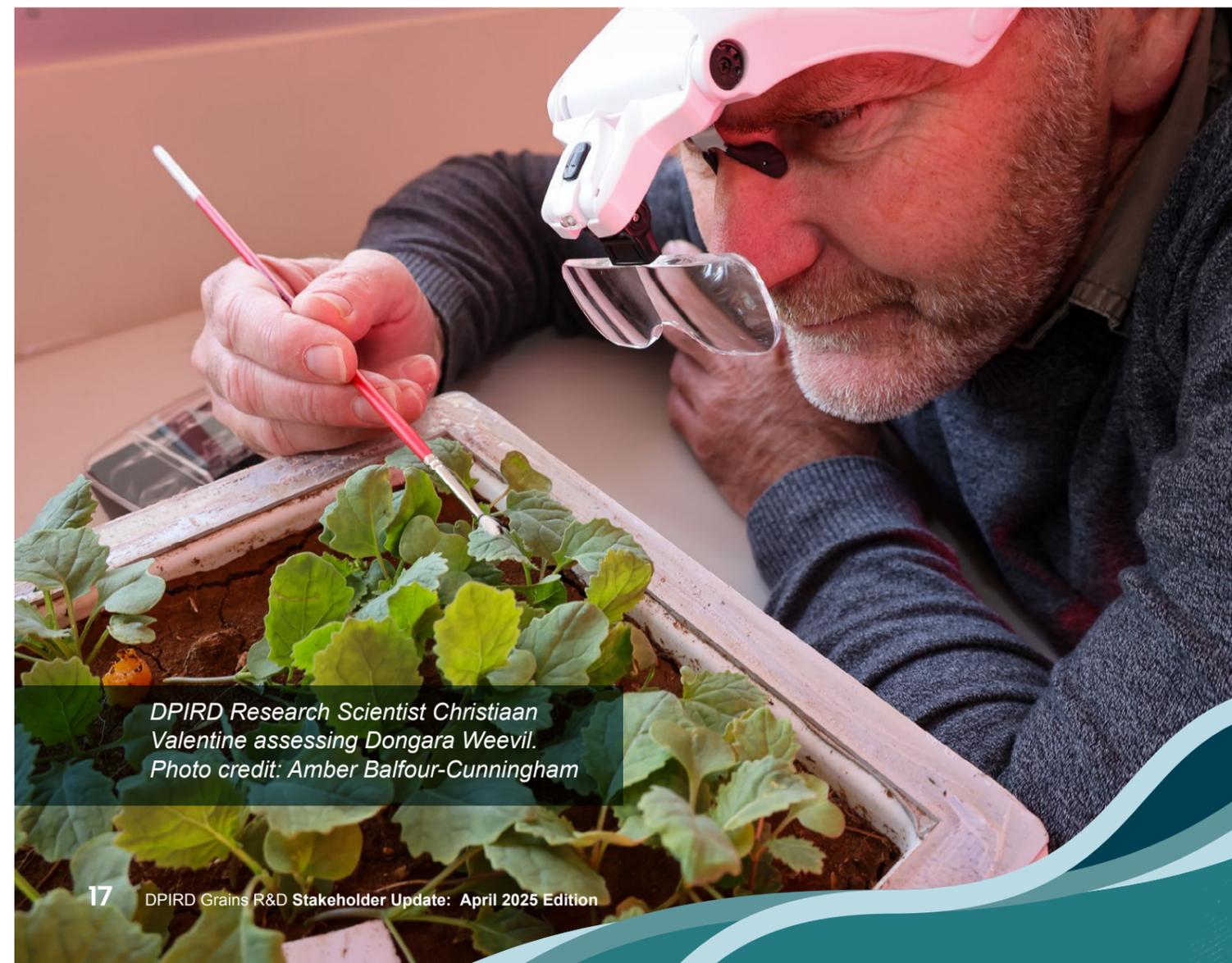
Genetic Improvement

Hill CB, Angessa TT, Westcott S, McFawn LA, Shirdelmoghanloo H, Han Y, Li C. Evaluation of the impact of heat stress at flowering on spikelet fertility and grain quality in barley. <i>Agriculture Communications</i> , 2 (2024) 100066	
Jiang CC, Kan JH, Gao GQ, Dockter C, Li CD, Wu WX, Yang P, Stein N (2024) Barley 2035: A decade vision on barley research and breeding. <i>Molecular Plant</i>	
Murukarthick Jayakodi et al. (2024) Structural variation in the pangenome of wild and domesticated barley. <i>Nature</i> (2024)	
Le Xu, Peng Wang, Xiaoqi Zhang, Qisen Zhang, Penghao Wang, Yanhao Xu, Chengdao Li, Wenyong Zhang (2024) Natural variations in a barley aldehyde oxidase 1 gene affect seed germination and malting quality. <i>The Crop Journal</i>	
Chang, H., Wu, T., Shalmani, A. et al. Heat shock protein HvHSP16.9 from wild barley enhances tolerance to salt stress. <i>Physiol Mol Biol Plants</i> 30, 687–704 (2024)	
Rezaei M, Diepeveen D, Laga H, Gupta S, Jones M, Sohel F (2025) A transformer-based few-shot learning pipeline for barley disease detection from field-collected imagery. <i>Computers and Electronics in Agriculture</i> 229:109751	



Soil Science and Crop Nutrition

Scanlan, CA, Bell, R, Cheng, M, Boyes, T (2024) Subsoil testing required to detect the rundown of soil potassium to deficient levels for wheat production on loam-textured soils. <i>Crop and Pasture Science</i> 75	
Scanlan, CA, Malik, R, Boitt, G, Gherardi, M, Easton, J, Rengel, Z (2024) Phosphorus buffering determines how soil properties and rainfall influence wheat yield response to phosphorus fertiliser. <i>Crop and Pasture Science</i> 75	
Azam G, Wickramarachchi K, Scanlan C, Chen Y (2024) Deep and continuous root development in ameliorated soil improves water and nutrient uptakes and wheat yield in water-limited conditions. <i>Plant and Soil.</i> doi:10.1007/s11104-024-07153	



DPIRD Research Scientist Christiaan Valentine assessing Dongara Weevil. Photo credit: Amber Balfour-Cunningham



Where to hear about our work



26–28 May 2025	Australasian Plant Pathology Society (APPS) conference, Sydney	
21–24 July 2025	The Global Conference on Sandy Soils, Perth	
15–19 September 2025	8th International Food Legume Research Conference and 5th Australian Pulse Conference, Pan Pacific, Perth	
15–19 September 2025	15th International Society for Seed Science Conference, Kings Park, Perth	
December 2025	DPIRD Grains Industry Day, Perth	<i>Details to be announced</i>



Reach out to the Grains team



Grains Research and Industry Development

Acting Director: Dr Darshan Sharma



Crop Protection

Manager: Dr Helen Spafford



Soil Science and Crop Nutrition

Manager: Chris Gazey



Crop Science and Grain Production

Manager: Dr Bob French



Genetic Improvement

Manager: Dr Yong Han



Industry Development

Manager: Alex Edward



Field Research Operations

Manager: Dr Gavin Sarre

