Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA
Protect Grow Innovate

Grains Convo

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Contents

Collaboration to transform WA grain yields with innovative soil practices

Project name

Soil Water and Nutrition (SWAN) Strategic Collaboration

GRDC code

DAW2407-001SPX

More than 85 per cent of Western Australian (WA) grain growers are actively improving their soils, with about two-thirds utilising deep soil tillage strategies, often in conjunction with application of soil amendments, such as lime or gypsum.

Additionally, around 20 per cent of WA growers regularly apply lime or gypsum or other soil amendments without using deep tillage.

These ongoing efforts reflect a strong commitment to enhancing soil capability and function across the grain-growing region.

Building on these practices, a $55.9-million partnership has been launched to further improve water and nutrient-use efficiency in Western Australia's grain production.

The goal is to help growers achieve crop yield increases exceeding 10 per cent.
The project, named the Soil Water and Nutrition (SWAN) strategic research collaboration, is a 5-year initiative with investment by the Grains Research and Development Corporation (GRDC) and the Department of Primary Industries and Regional Development (DPIRD).

DPIRD Principal Research Scientist, Dr Stephen Davies, who is the SWAN Collaboration Manager, said the aim is to boost WA grain yields by increasing water use efficiency by more than 10 per cent and improving crop nutrient availability by refining soil profile re-engineering and nutrient management practices.

“The focus will be on developing and applying paddock-scale, adoptable machinery and soil improvement strategies that deliver long-term productivity and financial gains for growers,” he said.

There are 3 research Programs with key deliverables managed by senior DPIRD soil scientists:

1. Novel and readily adoptable soil management approaches that overcome soil constraints to increase water use efficiency.

   In this Program, adoptable paddock-scale machinery and soil amendment options will be used to implement soil profile re-engineering to 80 cm deep or more.

   Diagnostics and analyses of long-term productivity gains and financial returns will help to guide implementation of, and investment in, soil profile re-engineering strategies.

   While methods will be developed to improve water capture and reduce water loss on heavy-textured soils in low rainfall cropping regions.

   This Program is led by Principal Research Scientist, Dr Gaus Azam.

2. Cost effective integrated nutrient management strategies that increase Nutrient Use Efficiency (NUE).

   In the second Program, integrated nutrient management approaches will be developed to help to improve long-term nutrient availability and grain production in cropping systems.

   Reducing potassium losses and improved availability of applied potassium in cropping systems for increased grain yield will be a particular focus on sandy soils where potassium regularly leaches beyond crop root zones.

   This Program is led by Principal Research Scientist, Dr Craig Scanlan.

3. New knowledge, resources and adoptable technologies for growers and industry.

Finally in the third Program, growers and industry will be provided with soil management strategies and packages that support industry adoption through investment analysis, implementation guidelines, decision support tools and approaches that improve and sustain soil function and productivity.

This Program is led by Senior Research Scientist, Mr Wayne Parker.
The collaboration will include an industry advisory group comprised of growers, consultants, and researchers, and aim to help the collaboration with research direction and to effectively support growers in implementing the key learnings.

Projects under the collaboration are underway, with existing long-term experiments continuing in the current crop season, and a series of new experiments planned for the 2025 season.

Funding partners / project collaborators

Grains Research and Development Corporation (GRDC)

More information

Click here to read the DPIRD webpage Soil Water and Nutrition (SWAN) Strategic Collaboration

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New project aims to enhance insect pest and disease management in the Australian grains industry

Project name

DPIRD seasonal status of pests and diseases delivered to growers.

GRDC code

DAW2404-005RTX

Safeguarding grain yields

The Australian grains industry faces ongoing challenges from pests and diseases that threaten crop yields and the livelihoods of growers.

To address these issues, a new project from the Department of Primary Industries and Regional Development (DPIRD) with co-investment from the Grains Research and Development Corporation (GRDC), aims to integrate surveillance and diagnostics for established pests and diseases across the grain industry.

It will also play a role in providing evidence of absence of key exotic plant diseases in the WA grainbelt.

The primary goal of the project is to conduct widespread surveillance of insects and plant diseases across the WA grainbelt and alert grain growers, enabling them to respond quickly to emerging pest and disease risks.

Surveillance and diagnostics

DPIRD Research Scientist Cindy Webster said the project builds on the successes of previous surveillance initiatives, including Surveys and associated diagnostics of the

incidence and severity of diseases of cereal, pulses and oilseeds (DAW1907-002RTX) and Disease surveillance and related diagnostics for the Australian grains industry (Western region) (DAW2104-003RTX).

It is also builds upon the surveillance and communication activities of the former national GRDC project “Integrated Pest Management for Grains, delivered by the National Pest Information Network (CES2204-001RTX)” in which DPIRD was a partner and contributor.

“These earlier efforts focused on surveying the incidence and severity of insects and diseases affecting broadacre crops in WA.

This project will utilise and build upon the surveillance datasets and methodologies developed during those former projects to enhance current monitoring and management practices and provide more comprehensive coverage of potential threats,” she said.

This project also provides a free diagnostic service for growers and consultants. They can request a free diagnosis of crop and pasture insects or plant disease by submitting a report via the PestFacts WA Reporter app.

Coordinated communication and response

A key component of the project is the development of a coordinated communication strategy that links specialist expertise with growers and agronomists. The project will deliver regular PestFacts WA newsletters, webinars and an identification training workshop each growing season.

This approach ensures that information on emerging threats and the most relevant and effective tools for management is disseminated quickly and effectively, allowing for rapid response and informed management actions, and more efficient operations.

The state-based approach in this project ensures region-specific knowledge and experience are not only preserved but also enhanced through collaboration and shared resources.

This project will also draw upon the intelligence provided by other active research projects to communicate through this network.

The integration of surveillance and diagnostics, combined with a coordinated communication strategy, will strengthen the Australian grains industry's ability to monitor for, identify and manage insect pests and diseases.

It will also play a role in proving the absence of exotic plant diseases in the WA grainbelt. By building on previous successful initiatives and fostering collaboration between scientists and growers the project will deliver significant benefit to growers each season.

Ultimately, it aims to safeguard crop yields and enhance the sustainability of the grain industry in the face of evolving biotic threats.

Funding partners / project collaborators

Grains Research and Development Corporation

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Enhancing crop protection through genetic insights into Rhizoctonia

Dr Ahmed Saad

Project name

Investigating the Genetic Diversity and Population Structure of Rhizoctonia solani AG8

Accurate identification of plant pathogens

Accurate identification of plant pathogens is crucial for understanding their biology, origin, pathogenicity, distribution, and host range.

This knowledge is essential for managing crop diseases and enforcing biosecurity protocols to prevent the spread of invasive species.

Sometimes there is genetic variation within a species and in populations that can not only contribute to their ability to cause disease, but also impact the effectiveness of management.

New molecular tools enable us to understand the variability in crop pathogens that isn't Rhizoctonia root rot and bare patch disease, caused by Rhizoctonia solani AG8, severely impact cereals and broadleaf crops in the WA and SA grainbelt.

But there are some unexplained patterns in the disease. While barley and wheat are highly susceptible crops, canola can have disease levels but can still be infected.

It may be that there is some variation in the population genetics of the fungus that causes this variation.

Industry benefits

Despite its economic impact, the population structure and genetic diversity of R. solani AG8 are not well understood.

This knowledge is important for revealing disease epidemiology and pathogen survival mechanisms.

The fungus damages roots from seedling to maturity, with colonised plant debris and alternative hosts as primary inoculum sources.

Uneven crop growth (patches) and high grain losses occur, possibly due to variation in R. solani AG8 isolates.

Understanding the genetic structure of R. solani AG8 populations will help to understand more about this pathogen and inform future research into control strategies.

Detection of R.solani AG8 is challenging due to difficulties in extracting it and its slow growth in lab cultures. In addition, it has similar symptoms to other soilborne diseases. Morphological distinction is difficult, and no specific primers and probes for R. solani AG8 currently exist.

This study aims to:

- Investigate the genetic diversity among R. solani AG8 strains within the same paddock and across different paddocks in a similar geographic region.
- Explore the potential for developing specific primers and probes for R. solani AG8.

Outcomes

Dr Ahmed Saad said the outcomes of this study are a collection of genetically characterised R. solani AG8 isolates which can be used for future pathogenicity studies/breeding and improved knowledge of disease epidemiology.

"This will in turn, provide a foundation for exploring improved management of disease incursions and pathogen control.

Whole genome sequence data produced in this work will provide important genomic resources for future studies of pathogenicity factors in the R. solani AG8 group and comparative genomics with other R. solani AG groups," he said.

"With these tools, we can now understand a lot more about plant diseases than we used to be able to."

Funding partners / project collaborators

University of Melbourne (Dr Niloofar Vaghefi)

More information

Click **here** to read Protecting WA Crops article new project to reduce Rhizoctonia impact in low and medium rainfall zones.

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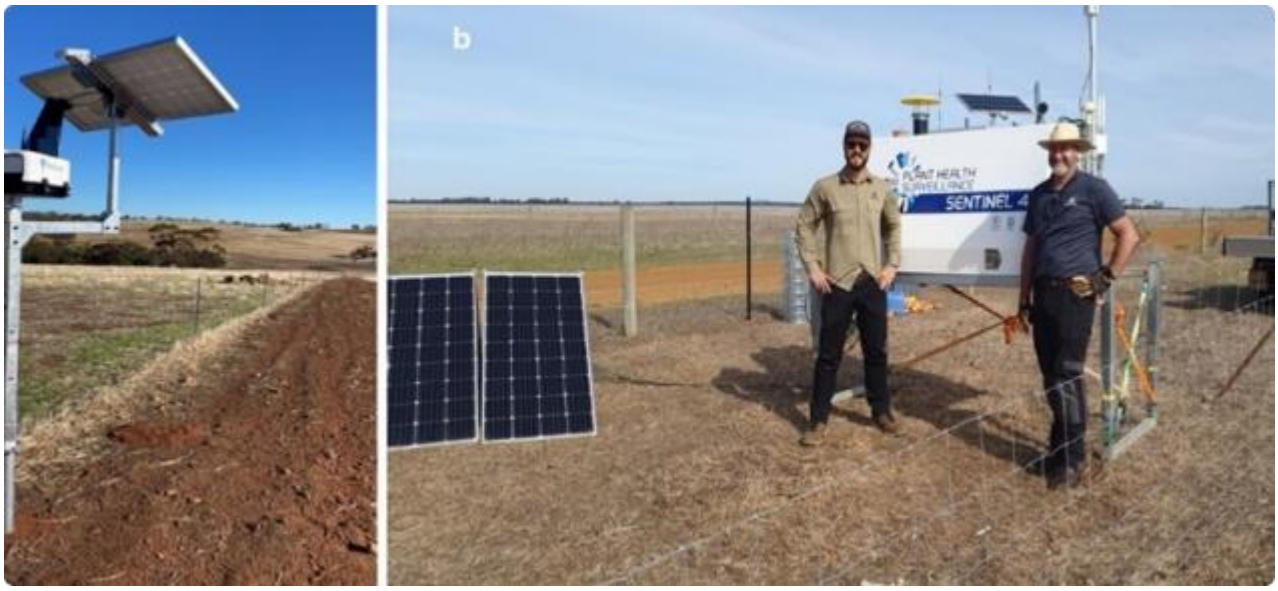

Real time disease monitoring kicks off in WA

Project name
Scaling commercial technology for disease spore trapping

GRDC code
BIS2305-001RTX

Advancing crop disease detection
The Department of Primary Industries and Regional Development (DPIRD), with investment from the Grains Research and Development Corporation (GRDC) have embarked on a project called Scaling commercial technology for disease spore trapping, focusing on evaluating cutting-edge commercial technology for crop disease monitoring, specifically using automated SporeScout units produced and supplied by BioScout. These units are designed for spore trapping, which will form the foundation of a pilot surveillance network.

The primary aim of the project is to enhance disease detection in crops, allowing for timely interventions that could save significant yields and resources.

BioScout has a national network of collaborators in this project.

Each of these collaborators (or subcontractors) contribute their specialised expertise in pathology and agronomy, tailored to the specific needs of their respective regions. Researchers at DPIRD will contribute by validating the data collected by BioScout's technology and evaluating the approach in Western Australia.

Deploying SporeScout units
Over the duration of the project, BioScout is tasked with the operation of 20 SporeScout units strategically installed across the Western Australian grainbelt.

These units have been placed in key locations within the Kwinana, Albany, and Esperance port zones.

These areas are categorised by medium to high rainfall.

The deployment spans from Esperance in the south to north of Northam, ensuring comprehensive coverage of the region's diverse agricultural landscapes.

DPIRD's involvement is critical to enable researchers to ground-truth the data generated by the SporeScout units.

This process involves the physical monitoring of nearby crops to verify the accuracy of the spore trapping result.

The process is vital for ensuring that the surveillance network provides reliable, real-time information about disease threats to growers.

The collaborative nature of this project is key to its success, as the integration of advanced technology with on-the-ground expertise will lead to more effective disease management strategies.

Scientific leadership

The project benefits from the expertise of renowned plant pathologists, including Dr. Kithsiri Jayasena, Dr. Zia Hoque, and Ms. Andrea Hills. Dr. Jayasena, who is highly skilled in the microscopic identification of fungal spores, leads the WA component of the project.

His prior experience with BioScout, where he assisted in the development of spore identification algorithms, positions him as an invaluable asset to the project.

Dr. Jayasena said DPIRD will monitor broadacre crops of wheat, barley and canola for disease occurrence and severity and provide this information to BioScout, while also assisting with identification of fungal spores of diseases which are relevant to WA and helping with the identification of fungal spores for machine learning.

"Collaborators from SARDI have installed an 'iMAP Pests Sentinel' 4 unit at one SporeScout site to complement the visual spore identification system SporeScout uses with molecular testing from trapping airborne fungal spores."

Molecular testing

This 'iMAP Pests Sentinel'4 unit is located at one of the SporeScout sites and adds molecular diagnostics of samples at that location.

It is anticipated that this additional approach will enhance the precision of disease monitoring, making the surveillance network even more robust.

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Meet the new Processed Oat Partnership project lead

Sue Bestow

Sue Bestow has joined the Department of Primary Industries and Regional Development (DPIRD) as the new Project Manager for the Processed Oat Partnership (POP).

The Processed Oat Partnership is an industry-lead program, supported by DPIRD and lead by The Grain Industry Association of WA (GIWA), which will provide a foundation for growth in the oat industry over the next 20 years.

To support this, the POP is co-funding projects including Global standard WA-specific breeding programs that are responsive to market needs, targeted on-farm productivity and capacity research, new product development, and value adding and manufacturing opportunities and development of new export market opportunities to capture a greater share of oat product demand.

Sue is an agronomist with over three decades experience delivering agricultural and sustainability advice, formulating policy and delivering government programs – work that has taken her across all Australian states and territories.

Before this current role, she served the Australian Government by supporting the National Soils Advocate, where she provided technical advice, policy insights, and engaged with various stakeholders.

Her work was forward-thinking, aiming to increase awareness and understanding of the critical need to conserve and enhance soil and landscape conditions.

This effort was crucial in fostering an environment conducive to changing how soils are managed.

Additionally, during her time at the Department of Agriculture, Fisheries and Forestry (DAFF), Sue contributed to the design and implementation of the National Landcare Program and the Carbon Farming Futures Extension and Outreach program.

Her work covered agricultural zones throughout Western Australia, New South Wales, Queensland, and Victoria, giving her a truly national perspective on Australian agricultural industries and the sustainability challenges they face.

Sue holds degrees in climate change (MCC), agriculture (B.Sc Agric (Hons)), and environmental science (Grad Dip Env Sc.).

She is deeply committed to work that benefits the environment, enhances sustainable productivity, supports strong farming communities, and addresses the global challenges of food security and climate change.

Outside of her professional and family responsibilities, Sue is passionate about environmental protection.

She enjoys exploring the great outdoors through activities like hiking, biking, kayaking, and she also enthusiastically participates in dragon boat racing.

More information

Read more about the POP project here.

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Industry News

New noodle labs for AEGIC

New AEGIC laboratories at the state-of-the-art Sustainable Innovative Food Technology (SIFT) facility will allow AEGIC's WA-based noodle and Asian product specialists to continue delivering value to the Australian grains industry.

AEGIC Executive General Manager Courtney Draper said SIFT was a perfect fit for AEGIC.

“As WA’s leading food innovation and technology facility, SIFT is the ideal home for our Asian products and flour quality labs in the medium term as we work towards more permanent arrangements,” she said.

“Our technical experts have been hard at work moving equipment and setting up the new noodle labs at SIFT, which I’m pleased to say are already operating.”

AEGIC is transitioning its WA-based technical functions to alternative locations following the restriction of access to its headquarters at the Department of Primary Industries and Regional Development (DPIRD) site at South Perth.

“Identifying alternative lab facilities has been top priority for us,” Ms Draper said.

“AEGIC’s labs are the crucial link between our market insights and market education services, allowing us to identify opportunities for Australian grains, and develop solutions to benefit both the Australian grains industry and our export markets. Our noodle labs also support Grains Australia’s wheat classification framework through expertise in noodle quality assessment for all types of Asian noodles.

“I’d like to thank the Australian grains industry and our Members DPIRD and Grains Australia for the strong support we have received during this period”.

AEGIC is working closely with DPIRD and Grains Australia and other industry stakeholders to identify medium-term alternative arrangements for all its WA-based technical functions. More information will be communicated to stakeholders as arrangements are finalised.

About SIFT

SIFT is the gateway to innovation in WA’s food production value chain.

Opened in 2024, SIFT provides state-of-the-art facilities to facilitate food and product innovation among startups and established companies alike.

SIFT is an investment of DPIRD and is operated by the Future Food Systems Co-operative Research Centre (FFSCRC) and Murdoch University.

SIFT is located within the Food Innovation Precinct of WA (FIPWA) in the Peel Business Park at Nambeelup.

AEGIC is an initiative of the Western Australian State Government and Grains Australia. AEGIC is delivery partner for Grains Australia’s market insights and market education services.

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