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# THE AUSTRALIAN AGRONOMIST MAGAZINE

$5 million to improve Northern Rivers drainage systems p11

**Salty and sustainable a bush food with business potential p24**

Introducing Lawler – the go-to lupin variety for the Eastern states. p25

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# CONTENTS


## $5 MILLION TO IMPROVE NORTHERN RIVERS DRAINAGE SYSTEMS


## SALTY AND SUSTAINABLE – A BUSH FOOD WITH BUSINESS POTENTIAL


## INTRODUCING LAWLER – THE GO-TO LUPIN VARIETY FOR THE EASTERN STATES.




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## 2023 GRAINS RESEARCH UPDATE:

# GENETIC BREAKTHROUGH ON SOIL SODICITY CONSTRAINT TO DELIVER SUPERIOR WHEAT VARIETIES

**A breakthrough in grains genetic plant research has unlocked the door to overcoming multiple constraints associated with sodic soils, paving the way to more resilient, high yielding wheat varieties.**

The research by the Department of Primary Industries and Regional Development (DPIRD) with co-investment from the Grains Research and Development Corporation (GRDC) will be detailed at the upcoming 2023 Grains Research Update in Perth.

Soil sodicity – a high sodium concentration often combined with high soil pH that disrupts soil structure and integrity via several constraints – costs Australian grain growers $1.3 billion per annum in lost yield potential.

DPIRD research scientist Roopali Bhoite said an integrated pre-breeding strategy had been developed using new sequencing technology that targeted gene-rich regions directly linked to traits.

Dr Bhoite said the advance in marker design for new sequencing technology and rapid gene validation tool could be widely used in any applied trait research.

“Soil sodicity has long been a challenge for genetic mapping as it is linked to multiple, complex quantitative constraints, including sodium toxicity, waterlogging and drought at the reproductive stage,” she said.

“Our research identified new single nucleotide polymorphisms, known as SNP or ‘snips’, within the diverse wheat population tagging genes for yield and yield components.

“The discovery provides eight new molecular markers that can be used to develop more tolerant and high yielding stable lines.

“The research also identified several haplotypes – snips that tend to be inherited together – providing more reliable genetic variation that supports yield stability, underpinning more resilient varieties suited to soil and climate variability.

“This integrated approach to plant pre-breeding can be used across a range of crop breeding methods, including genomic selection, haplotype/molecular breeding and/or genome editing to improve crop tolerances and yields.”

The research breakthrough could lead to new wheat varieties with improved tolerance to soil sodicity, which affects an estimated 68 per cent of the Western Australian wheat crop.

Dr Bhoite said there was great excitement about the new pre-breeding research approach as it could be applied across other grains crops to address complex traits and/or soil constraints, such as acidity, salinity and metal toxicities.

“The result could be more tolerant, stable and higher yielding grains varieties that support grower profitability, farm sustainability and global food security,” she said.

The research findings will eventually be shared with the commercial sector to be integrated into plant breeding strategies.

The 2023 GRDC Grains Research Update will be held in Perth on Monday 27 and Tuesday 28 February at Crown Perth. For more information and to register visit the Grain Industry Association of WA website. **https://www.agric.wa.gov.au/**

***Source: Deptartment of Primary industries & Regional Development (Goverment of Western Australia)***

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# INDUSTRY RESEARCH TO TACKLE OAT RUST

**The University of Sydney will lead an industry study that aims to reduce the impact of damaging crown rust, a fungal pathogen affecting Australian oat production.World-renowned crop disease expert Professor Robert Park will lead the research team, working with two Australian oat-breeding companies, Intergrain, with a focus on hay and milling oats, and S&W Seed Australia, which has a focus on grazing oats for livestock.**

The Australian oat industry has been plagued by recurring epidemics of the destructive disease crown rust ever since oat cultivation began here. It occurs globally and is considered the most important disease limiting oat production worldwide.

Professor Park said: “Crown rust causes severe damage to oat crops in Australia and, due to ongoing losses of important resistance genes since the early 1990s, it has become an intractable constraint to oat production. Loss in grain yield can be as high as 50 percent in susceptible varieties. ”Australia produces three oat types: grazing for the meat and livestock industries; hay for animal consumption; and milling for human or animal consumption.

Many grazing oat varieties with genetic resistance to crown rust were released in Australia from 1990-2020. Although resistant when first deployed, new rust strains emerged soon after rendering all these varieties highly susceptible to the fungal disease.

Professor Park said: “Our project aims to reduce the impact of crown rust in Australian oat production. It will deliver robust genetic resistance to crown rust to all Australian oat growers.”The University of Sydney team will work with researchers at Murdoch University and the Leibniz Institute of Plant Genetics & Crop Plant Research in Germany.

“The work with these colleagues will provide vital genetic expertise,” Professor Park said.“The Leibniz Institute and Murdoch University are part of a global effort that is sequencing and characterising the oat genome.

This work will accelerate our efforts to deliver oats with improved rust resistance to oat growers.“We expect the project will also lead to responsible stewardship of broadly effective crown rust resistance in all types of oat production in Australia, increasing grower profitability, reducing reliance on fungicides and underpinning planned growth in our export oat market.”The team was awarded an Australian Research Council Linkage Grant to the value of $928,845.

Professor Robert Park will lead the research to address fungal rust disease in oats.

# CANEGROWERS CALLING FOR ANSWERS

**Peak sugarcane industry body CANEGROWERS is calling on Sugar Terminals Limited (STL) to explain the reasoning behind its decision to abandon a long and successful commercial partnership with Queensland Sugar Limited (QSL) for the operation of the state's bulk sugar terminals.**

CANEGROWERS Chairman Owen Menkens said the bulk sugar terminals, which give Australian sugar a competitive edge over other sugar exporting nations, were built on the back of investment by growers, but STL had failed to consult growers before announcing its decision.

"These terminals are industry assets, and they remain one of our main competitive advantages, allowing Australian sugar to be traded as a reliable, high quality, sustainable product into our most valuable markets in a timely manner," Mr Menkens said.

"There seems little justification for this change and it appears to be more about corporate manoeuvring."

Mr Menkens also questioned why STL had not made clear in its public statements that the current operating agreement with QSL requires a three-year notice period.

"STL have not consulted with anyone in industry about this matter and they have chosen to not make it clear that their agreement with QSL has a three-year notice period," he said.

"While technically CANEGROWERS has no say in this agreement, given their stated intent, we call on STL to clearly explain to growers why they are determined to take this course of action."

There is no disputing that QSL has operated the terminals safely and efficiently, and its performance has been highly scrutinized.

CANEGROWERS is now calling on STL to make clear:

- how they intend to operate the terminals to deliver lower operating costs and an improvement in efficiency
- how these cost savings will flow through to growers
- what the forward operating strategy is for the terminals
- how STL will ensure this strategy is used to benefit the Australian sugarcane industry and not be distracted seeking alternative business models driven by a focus on shareholder returns.

"The successful operation of these terminals is vital to the overall success of Australia's sugarcane industry," Mr Menkens said.

"QSL's smooth and efficient operation of our terminals has ensured the industry maintained a competitive edge. This move by STL is threatening that competitive advantage and growers are rightly concerned. They deserve an explanation."

# WEEDSMART 'ASK AN EXPERT'

## 'HOW CAN I STRENGTHEN THE PULSE PHASE TO COMBAT WEEDS?' WITH DR JASON BRAND, AGRICULTURE VICTORIA RESEARCH, HORSHAM

**Pulses are increasingly important in farming systems around Australia, boosting profits and playing an essential role in improving soil health and managing weeds.**

Dr Jason Brand, senior research agronomist with Agriculture Victoria Research, says that pulses can either break or make an effective crop rotation when it comes to weed management.

"In the Mallee, lentils now account for 20 to 30 per cent of the rotation. We see a similar percentage in other areas where different pulses, have a good fit," Jason says. "The release of herbicide-tolerant pulses has played a pivotal role in expanding pulse production and widened the herbicide options available to growers."

For pulses to be effective in a weed management program, they need as much attention as other major crops. Without attention to detail, the pulse phase can result in a weed blowout.

"For long-term weed control success with pulses, it is necessary to maximise above-ground and below-ground productivity," he says. "And understand the sensitivities each crop and variety has to different herbicide actives. Many pulse varieties are very specific in their tolerance to different active ingredients, even from the same mode of action group."

The WeedSmart Big 6 is built on robust and diverse crop rotations where each crop provides opportunities to drive down the weed seed bank. In the pulse phase, the main target is grass weeds while ensuring broadleaf weeds do not proliferate.

### What are the essential practices that underpin a competitive pulse crop?

**In brief:** Standing stubble, proper nutrition to support the crop and rhizobia, and optimal crop agronomy.

**The details:** Standing stubble aids moisture infiltration and provides trellising support for pulses – particularly lentil and field pea.

Inoculate the seed with rhizobia and support nodule development with adequate phosphorus, molybdenum and zinc. Feed the crop well with phosphorus, zinc, potassium and sulfur, and address any


Kate Wilson Dr Jason Brand, senior research agronomist with Agriculture Victoria Research, says that pulses can either break or make an effective crop rotation when it comes to weed management.

soil constraints that suppress crop growth or result in gaps within the crop. Manage crop diseases to avoid gaps opening up that allow weeds to grow unhindered and set seed.

Be aware of the suppressive effects of herbicide residues in the soil. Pulses are sensitive to residues of many standard Group 5 [C], Group 4 [I] and Group 2 [B] herbicides. Suppression in plant growth, reduced vigour and reduced yield may not be obvious as it is usually evenly spread across the field. Suppression is clearly seen in trials comparing nil herbicide residues, standard Group 5 [C] herbicide residues e.g. metribuzin and Group 2 [B] e.g. sulfonylureas (SU) residues.

### What are the benefits and risks associated with herbicide-tolerant pulse varieties?

**In brief:** Plant breeding in pulses utilising mutation techniques has developed novel tolerances to some herbicides.

**The details:** Always focus on the herbicide active ingredient, not the mode of action (MOA) group. Pulses are often quite specific in their tolerance to different actives within a MOA group. For example, imi-tolerant lentils are only safe with imazamox and imazapyr (registered product Intercept) and not with other Group 2 actives such as florasulam or chlorsulfuron.

The initial focus has been on breeding for imi-tolerance, and there are now imi-tolerant lentil, faba bean and field pea varieties, with other crops under development. Around 80 per cent of Australia's lentil crop is the herbicide-tolerant varieties, despite grain yields often being slightly lower than conventional varieties.

The herbicide-tolerant varieties released recently have provided growers with new use patterns to control difficult weeds in pulse crops, particularly broadleaf weeds and grasses such as brome grass.

Whether the use is in-crop or to allow planting pulses into otherwise problematic herbicide residues, the new technology has underpinned the expansion of pulse crops in many areas. The risk is that an over-reliance on this technology can develop that can potentially allow herbicide resistant weeds to establish, rendering the tolerant varieties useless.

### What is in the herbicide-tolerant pulse breeding pipeline?

**In brief:** The next phase of plant breeding will move onto sulfonylurea (SU), metribuzin and clopyralid tolerance, bringing varieties with combined tolerance traits in the next 5 to 10 years.

**The details:** Pulse breeders are now honing in on improved tolerance to a range of actives such as diflufenican (Group 12 [F]), various Group 5 [C] actives e.g. metribuzin and simazine, other Group 2 [B] actives such as the sulfonylureas (SU), clopyralid (Group 4 [I]) and isoxaflutole (Group 27 [H]) (in chickpea).

Grains Innovation Australia has released two multi-tolerant lentil varieties for 2023 – GIA Sire (imi plus clopyralid), which is safe to plant in soils with Lontrel® residues, and GIA Metro (imi plus metribuzin), which potentially adds the option for in-crop metribuzin application against broadleaf weeds.

There is much more to learn about using these varieties to help manage weeds throughout the crop rotation. One area of current research is to assess the risks involved with applying multiple actives that may suppress pulse crop growth and nodule activity.

Once again, keep in mind that a herbicide-tolerant variety can be susceptible to other herbicides, even within the same MOA group. For example, terbuthylazine (Group 5 [C]) can cause severe crop damage and grain yield loss in GIA Metro even though this variety is tolerant to metribuzin, also a Group 5 herbicide.

### How to ask a WeedSmart question

Ask your questions about herbicide-tolerant pulses on the WeedSmart Innovations Facebook page WeedSmartAU or Twitter @WeedSmartAU

'WeedSmart' is the industry voice delivering science-backed weed control solutions to enhance on-farm practices and promote the long term, sustainable use of herbicides in Australian agriculture.

WeedSmart has support from the Grains Research and Development Corporation (GRDC), major herbicide, machinery and seed companies, and university and government research partners, all of whom have a stake in sustainable farming systems.

The GRDC is a Platinum investor in WeedSmart to ensure Australian grain growers have access to world class research in strategies to mitigate weeds and control herbicide resistance.

**Source*: Weedsmart***

Two new multi-tolerant lentil varieties available in 2023 (GIA Metro and GIA Sire) will increase the options for planting lentils into paddocks with herbicide residues and for alternative in-crop treatment of broadleaf weeds such as medic

# TRACTOR NAVIGATION - HOW IS IT HELPING TO IMPROVE CROP PRODUCTION?

**When driving, you might be familiar with using a navigation app to get you to your destination. Often, you can choose the fastest route or the most gas-efficient route.**

Farmers also can use navigation apps called “tractor guidance systems.” Like your car navigation, these systems use GPS, or global positioning satellite systems. GPS can help farmers to optimize their use of fertilizer, seed, and even herbicides (often referred to collectively as “inputs”).

The tractor guidance system includes a satellite signal receiver, antennae, controller, and display that is mounted inside the tractor. This farm machinery helps with two production input-related questions: where and how much to apply?

Using tractor guidance allows growers to not overapply or underapply the inputs. And using GPS makes the tractor follow more precise routes over the field, creating more even applications within a field. When fertilizer or other inputs are applied more evenly, this helps crops and results in greater crop yields. It can also reduce the amount of fertilizers leaving the field and entering waterbodies.

Smaller farmers often associate the costs of installing tractor guidance system as too high, creating obstacles to their adoption. However, researchers at USDA-ARS identified these systems can be economical, even for small farms. They also found that tractor guidance improves farm operation efficiencies by up to 20%.

Just like your car must deal with potholes and other issues with the road surface, farm fields have irregularities. Farmers using tractors even have to navigate obstacles like trees, and ponds. And, farm fields have various slopes as well. All of these issues have been found to impact the gains from tractor guidance.

Just like your car must deal with potholes and other issues with the road surface, farm fields have irregularities. Farmers using tractors even have to navigate obstacles like trees, and ponds. And, farm fields have various slopes as well. Using tractor guidance with GPS can help decrease variability of fertilizer application from these irregularities. Credit: Canva Pro

One of the studies I was recently involved with researched the impact that operator experience had on tractor efficiencies – without using a navigation system! So, could humans beat the machine? We looked at groups of tractor drivers who had 0-1 year of experience, two years, three years, and then six-plus years’ experience.

Our findings? As experience level of drivers increases, so do the efficiency gains during field operations. Operators with six-plus years of tractor driving experience reduced overlap in their driving passes across the field by more than 20% compared with drivers who had 0–1-year experience. Compared to drivers who had 2-3 years’ experience, the more experienced drivers improved efficiencies by almost 8%.

This tells us that when studies are done to evaluate environmental and economic gains of tractor guidance systems, for the non-automated comparison, the experience level of the driver should be considered.

Our work indicates that there are even more savings when tractor guidance is used – depending on operator experience. These higher efficiency gains mean:

- less labor,
- fewer greenhouse gas emissions,
- reduced non-point source pollution, and
- greater cost savings per unit area.

Considering that in the United States, 82% of total farms are small farms, tractor guidance adoption could result in vast environmental and economic savings. However, in addition to installation cost, small scale growers are not comfortable with these new set of precision agriculture tools and technologies. University extension programs can be developed to train growers on precision agriculture tools and realize these benefits.

*Answered by Tulsi Kharel, United States Department of Agriculture (USDA)*

# $5 MILLION TO IMPROVE NORTHERN RIVERS DRAINAGE SYSTEMS

Damaged drainage systems will be cleaned out, repaired and fitted with mechanisms that will reduce the impacts of future flooding, thanks to the Albanese Labor and NSW Liberal and Nationals Governments' $5 million Northern Rivers Drainage Reset Program.

The program is part of the $150 million Primary Industry Support Package, co-funded under the Commonwealth-State Disaster Recovery Funding Arrangements.

Federal Minister for Emergency Management Murray Watt, said the program will support the recovery of Northern Rivers primary producers in the sugarcane, horticulture, rice, soybeans, beef and dairy industries who continue to be impacted by flood-damaged drainage systems.

"This program will provide an injection of funds to improve priority drainage channels, reducing the immediate risks to agricultural assets and surrounding communities in future flood events," Minister Watt said.

"The funding will focus on the cleaning and treatment of sediment in drains to assist in the movement of water through these river systems.

"This represents the practical and tangible ways we're improving the longer-term flood resilience of this region."

Deputy Premier and Minister for Regional NSW Paul Toole said the Northern Rivers Drainage Reset Program is a direct response to findings and recommendations from the NSW Liberal and Nationals Government's Independent Flood Inquiry.

"We want to continue to support our communities on the North Coast and Northern Rivers, as they recover from the floods last year," Mr Toole said.

"Addressing directly the drainage recommendation from the inquiry will allow our communities to support their primary producers and the wider region during future flooding events."

NSW Minister for Agriculture Dugald Saunders said an immediate solution was required to address this longstanding issue.

"Having a clean and healthy drainage system in our Northern Rivers is critical to running productive farms and mitigating future flooding events," Mr Saunders said.

"The Northern Rivers community can take another big step forward in the rebuilding and recovery process and our farmers can get back to growing productive and profitable crops.

"I want to thank everyone involved in this journey so far, including farmers, the Drainage Union, local and NSW Government agencies and the Northern Rivers Drainage Coordinator for getting these vital drainage channels back on track."

The $5 million Northern Rivers Drainage Reset Program is being administered by the Department of Regional NSW in partnership with the Northern Rivers Reconstruction Corporation, and will be rolled-out by local councils.

# BASF LAUNCHES AXALION™ ACTIVE IN AUSTRALIA, WITH OTHER MARKETS TO FOLLOW

- **Novel insecticide active ingredient unveils a new class of chemistry with a new mode of action discovered by BASF**
- **Delivers quick control of piercing and sucking pests, including superior whitefly control**
- **Favorable ecotoxicological profile and targeted approach designed to prevent harm to beneficials and pollinator insects**

Australia will be the first global market for the launch of BASF's Axalion™ Active, a novel insecticide active ingredient that controls harmful piercing and sucking insect pests. Uses for Axalion-containing products include fruits, vegetables, cotton and beets.

Australian farmers will have first access to Axalion with the launch of Efficon™ insecticide in April, with additional launches planned in Asia, Europe, and South America in the coming years.

Through its novel mode of action and its ability to spread within the plant, farmers can use Axalion to control many piercing and sucking insect pests, including whiteflies and aphids, that can cause devastating yield damage and subsequent revenue loss.

Axalion has no known cross resistance, which makes it effective against pests that have developed resistance to existing chemistries and can no longer be controlled with current market standards. Axalion is an excellent partner for insect resistance management programs and will become an essential part of a farmers' toolbox for Integrated Pest Management (IPM).

"With Axalion, BASF is redefining modern pest control, supporting farmers by helping them protect their hard-earned harvests and legacies," said Stephanie Jensen, Vice President Global Strategic Marketing Insecticides & Seed Treatment at BASF's Agricultural Solutions division. "Axalion offers farmers a much-needed new and robust tool to safeguard their crops while helping ease the mounting resistance pressure on older products."

While highly effective against target pests, Axalion has proven to be highly compatible with non-target organisms, including beneficial insects, when applied according to label instructions.

## Australian farmers are the first growers in the world with access to Axalion

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has approved the use of Efficon insecticide, powered by Axalion Active, for use on a wide variety of vegetable crops. Efficon, containing the active ingredient Axalion, controls silverleaf and greenhouse whiteflies in cotton, cucurbit, and fruiting vegetable crops; green peach aphids and cabbage aphids in brassica and leafy vegetable crops and cotton (or melon) aphids in cotton and cucurbit crops.

"Efficon is a valuable addition to Australian farmers' crop protection rotation, as it provides a superior level of whitefly control, and excellent control of aphids. It is effective at multiple stages of the target pests' life cycles, so it quickly inhibits whitefly infestations more effectively than the previous industry standards," said Gavin Jackson, Head of Agricultural Solutions for BASF in Australia and New Zealand. "The systemic properties offer growers a wide window of application timing during multiple growth stages, which allows Efficon to be used in combination with other BASF solutions, such as Versys® Insecticide. When used together, Efficon and Versys offer unrivaled control of devastating piercing and sucking pests."

### About BASF's Agricultural Solutions division

Farming is fundamental to provide enough healthy and affordable food for a rapidly growing population while reducing environmental impacts. Working with partners and agricultural experts and by integrating sustainability criteria into all business decisions, we help farmers to create a positive impact on sustainable agriculture. That's why we invest in a strong R&D pipeline, connecting innovative thinking with practical action in the field.

Our portfolio comprises seeds and specifically selected plant traits, chemical and biological crop protection, solutions for soil management, plant health, pest control and digital farming. With expert teams in the lab, field, office and in production, we strive to find the right balance for success – for farmers, agriculture and future generations. In 2021, our division generated sales of €8.2 billion. For more information, please visit **www.agriculture.basf.com** or any of our social media channels.

### About BASF in Australia and New Zealand

BASF serves key industries in the agriculture, coatings, manufacturing and mining sectors, and posted sales of about €415 million in Australia and New Zealand in 2021. As of the end of 2021, the company had 380 employees and operated 6 production sites across Agricultural Solutions, performance products and functional materials and solutions. BASF has been active in Australia for 100 years, and about 60 years in New Zealand. Further information is available on **www.basf.com/au.**

### About BASF

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. Around 111,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €78.6 billion in 2021. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the U.S. Further information at www.basf.com.

# SCIENCE IS A BIG PART OF THE SOLUTION TO FOOD SECURITY AND COST OF LIVING PRESSURES

**At a time where Australia is experiencing wild weather, regional centres and rural communities are being cut off from major arterial highways and families struggle to put food on the table, Bayer says science needs to be part of the solution to address food security, access and affordability of food.**

Over the past decade, Bayer has invested 20 billion euro globally to help protect crops and modify seeds to grow faster, longer lasting, and tastier fruit and vegetables. The global organisation's Australian arm has been working with farmers across the country to find ways that science can help build resilient crops against climate change, particularly amid a third consecutive La Niña.

Warren Inwood, Managing Director of the Crop Science division of Bayer in Australia and New Zealand said that Australia needs to think differently about how food is grown as weather events become more and more common, and that begins with science.

"By using science to better inform decisions about how, when and where we grow our foods, we reduce the impact of adverse weather, thereby making food supply more consistent and more reliable. If we can protect our crops from the impacts of climate change, we can minimise fluctuations in cost at the supermarket and the growing cost of living."

Bayer recently made a submission to the House of Representatives Standing Committee on Agriculture Inquiry into food security in Australia and has outlined key recommendations to the Albanese-led government.

Mr Inwood said that Bayer's submission has highlighted the role that science has played in establishing Australian food security today, as well as its importance in our continued ability to feed ourselves and the world.

"Securing food supply will not get any easier – there is no new land to open up to cultivation, water resources are under continued pressure, and new pests and diseases will threaten our biosecurity as a result of climate change and international trade.

"Innovation will pave the way forward, but we must ensure that everyone has access. We offer recommendations to both modernise and harmonise our local regulatory and policy settings in gene technology and biosecurity, which would allow Australian growers access to world-class innovation while protecting our unique natural resources.

**"Securing food supply will not get any easier – there is no new land to open up to cultivation, water resources are under continued pressure, and new pests and diseases will threaten our biosecurity as a result of climate change and international trade.**

"In terms of strengthening local supply chains for critical inputs, Bayer's unique role in onshore formulation of breakthrough crop protection products helps mitigate the impacts of global disruption, and investment in local skills could build industry resilience and help farmers get what they need from a trusted source," he said.

Bayer's full submission to the House of Representatives Standing Committee on Agriculture Inquiry into food security in Australia is available on the Crop Science Australia website.

**Source:** ***crop.bayer.com.au***

# VICTORIA'S FIRST REGIONAL PLANS FOR A THRIVING CIRCULAR ECONOMY

## REGIONAL VICTORIA'S CIRCULAR ECONOMY ASPIRATIONS FOR 2030 AND HOW TO WORK TOGETHER TO ACHIEVE THEM

**Victoria's regions are at the forefront of the transition to a circular economy. They have unique capabilities and opportunities and so for the first time, regional communities have come together to shape how their region takes advantage of the transition to a circular economy.**

Regional Circular Economy Plans set out the aspirations of communities for a sustainable and thriving circular economy in regional Victoria.

These plans, developed by regional communities for regional communities, will help us work together to get more value from waste by turning it into a resource.

Regional Circular Economy Plans identify a series of priorities for each region, including local investment such as new or upgraded recycling infrastructure, behaviour change and education programs, and growing local markets for recycled materials and products.

The plans were developed with input from councils, businesses, social enterprises and industry groups, with over 125 organisations across Victoria participating. They can be used by councils, businesses and governments to guide their decision-making in developing local and regional circular economies.

The plans will support Victoria's circular economy policy, Recycling Victoria: A new economy, to deliver a cleaner, greener Victoria with less waste and pollution, better recycling, more jobs and a stronger economy.

**Source:** ***(DEECA) Department of Energy, Environment & Climate Action***

# ORCHARD ESTIMATES OF BLUSH COVERAGE IN PEARS

## CROP MAPPING TECHNOLOGY CAN SCAN, ESTIMATE AND FORECAST RED-COLOUR COVERAGE IN BLUSH PEAR CULTIVARS.

**Blush pear cultivars have been the focus of several international breeding programs because of export demand for high-quality red-colour peel coverage. It is one of the most important fruit quality features of red-coloured pears – the attractive appearance being associated with health benefits by overseas consumers.**

Blush pear cultivars ANP-0118 and ANP-0131 originate from a large Victorian breeding program that produced 143 pear selections from thousands of cultivar crosses. In these two cultivars, commercially available as LanyaTM and RicóTM, blush coverage (percentage) is the key quality attribute in achieving a premium market price.

As a component of the PIPS3 Program's Developing smarter and sustainable pear orchards to maximise fruit quality, yield and labour efficiency (AP19005) project, Agriculture Victoria has been working closely with Australian agtech company Green Atlas to estimate crop parameters such as fruit number, fruit size and fruit skin colour by scanning orchards with the commercially available mobile platform Cartographer. Recent research has demonstrated the ability to use the Green Atlas technology to accurately measure colour development in peach and nectarine orchards with a colour development index (CDI) ranging from 0 (green) to 1 (red). The accuracy of CDI maps to describe and track redness development was further validated with apple cultivar Ruby Matilda.

In 2021 and 2022, the Agriculture Victoria Research team at the Tatura SmartFarm studied the relationship between CDI and percentage of blush coverage in ANP-0118 and ANP-0131 pears. CDI was measured using the Cartographer in January 2021 and 2022, i.e. at harvest in ANP-0118 and a month prior to harvest in ANP-0131 pears. Blush coverage was assessed at harvest using an inline commercial grader (Compac InVision 9000). Figure 1 shows that the relationship between CDI and grader measures of blush coverage was robust and the prediction error was below 5 per cent.

**Figure 1:** Relationship between percentage of blush coverage measured with a commercial grader and colour development index (CDI) measured with Cartographer. Results are from a pooled sample of ANP-0118 and ANP-0131 pears in 2021 and 2022. Points represent averages of experimental plots.

The relationship shown in Figure 1 was used to model blush coverage in a commercial ANP-0131 orchard (Calimna Orchard, Ardmona) before the 2022 harvest. The map in Figure 2 shows the spatial variability of blush coverage in the commercial orchard, with a few hotspots with higher blush development that were correlated with relatively lower leaf area.

**Figure 2:** Block map of percentage of blush coverage obtained in a commercial ANP-0131 block (Calimna Orchard, Ardmona) in 2022.

Additionally, the predicted distribution of percentage of blush coverage was compared with the distribution of blush coverage obtained at harvest with the commercial grader. The distributions were compared using five-class (bin) histograms for the 0–20, 21–40, 41–60, 61–80 and 81–100 per cent blush coverage ranges. Our findings suggest that the prediction of blush coverage classes showed errors consistently lower than 5 per cent for each blush coverage class in both 2021 and 2022 harvests. The highest error (4.9 per cent) was obtained in 2021 for the 40–60 per cent blush coverage class.

**Figure 3:** Five-class histograms showing distributions of blush coverage estimated with an inline grader (blue bars) and predicted using Green Atlas Cartographer (red bars).

Accurate predictions of blush coverage pre-harvest provides improved information to growers, allowing them to confidently make appropriate management strategy decisions (e.g. summer pruning, defoliation) in a timely manner for optimal red-colour development and blush coverage. In addition, early data on the expected blush coverage at harvest has the potential to inform the supply chain and direct the produce to the most profitable market.

Figure 1

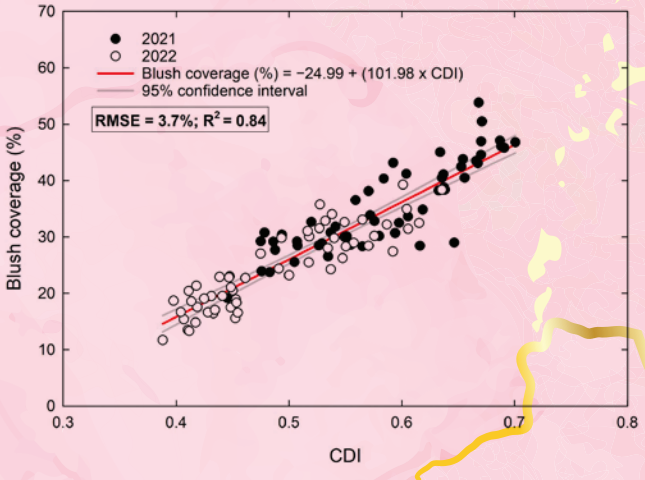



Figure 2

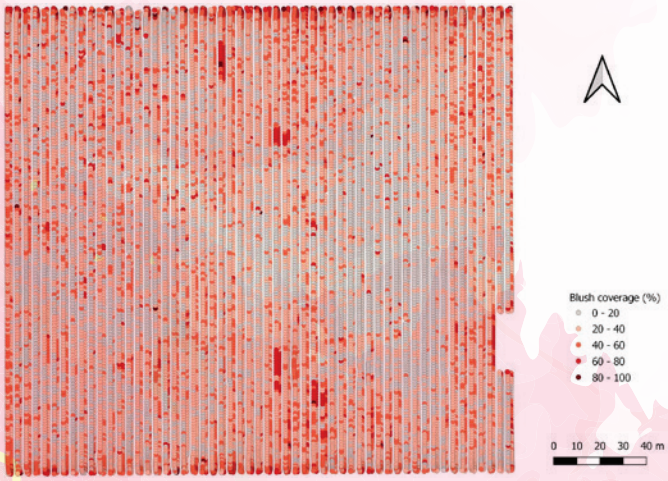
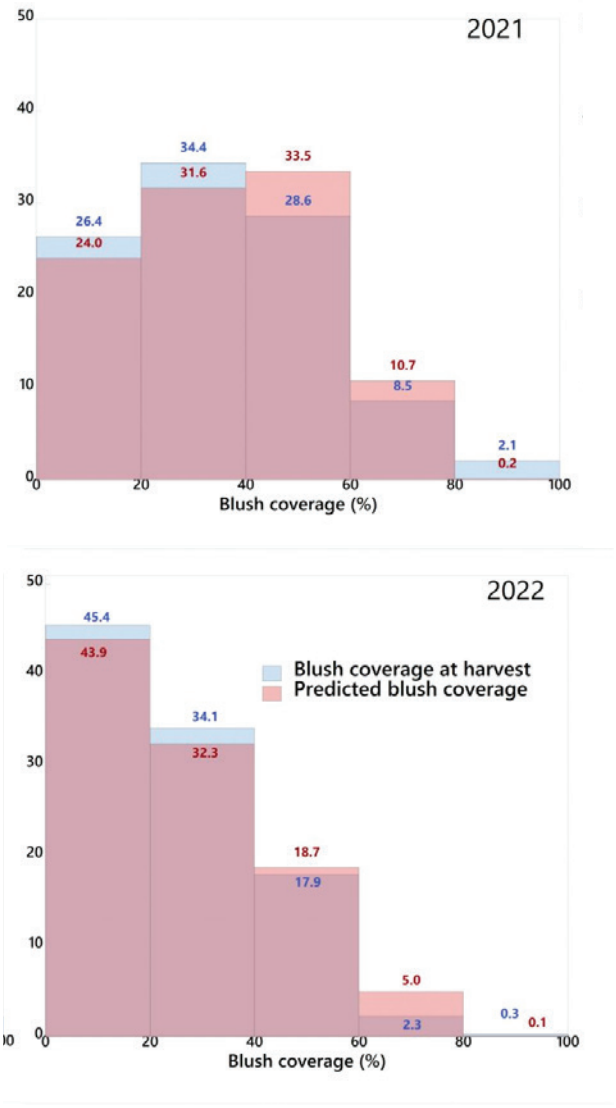


Figure 3




To the best of the research team's knowledge, this work is the first to estimate and forecast blush coverage in modern pear cultivars. Agriculture Victoria is currently conducting research on determining relationships between yield, fruit quality and tree geometry parameters that can drive precision management strategies through the PIPS3 Program's AP19005 project.

***This article was written by Alessio Scalisi, Lexie McClymont and Ian Goodwin from Agriculture Victoria. It was first published in the Autumn 2023 edition of AFG.***

## Further information

For videos on the Green Atlas Cartographer calibration and validation research and outcomes undertaken both through the AP19005 and AP19003 projects, head to the PIPS3 Program resources webpage.

## Acknowledgements

The PIPS3 Program's Developing smarter and sustainable pear orchards to maximise fruit quality, yield and labour efficiency (AP19005) project is funded by Hort Innovation, using the apple and pear research and development levy, contributions from the Australian Government and co-investment from Agriculture Victoria. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

We gratefully acknowledge Matthew Lenne for granting access to Calimna Orchard, Ardmona, Victoria.

Ricó pears growing at Seeka in the Goulburn Valley. Photo: Abram Rasmussen Photography

# PACIFIC SEEDS APPOINTS NEW MANAGING DIRECTOR

**Advanta Seeds is pleased to announce the appointment of Andrew Short as Managing Director of Advanta's Australian arm, Pacific Seeds. This appointment took effect from 2 January 2023.**

Andrew has been with Pacific Seeds for 12 years, most recently as Marketing Manager where he oversaw business development and technical development functions of the business. Since September 2022 he has also been acting as Interim Managing Director of Pacific Seeds.Global CEO of Advanta Seeds Bhupen Dubey said, "Over this period, Andrew has clearly demonstrated his leadership qualities, an understanding and appreciation of the wider Advanta business as well as his vision for the Australian business unit. We wish him well with this new opportunity".

Regarding his appointment, Andrew said "It's an honour to be appointed as Managing Director; I'm excited by the future of Australian agriculture and Pacific Seeds' place in it. Since 1962 Pacific Seeds has had a proud history of serving Australian farmers and I look forward to leading our team as we continue to invest in crop research and operational innovation that benefits Australian growers for decades to come."

Andrew holds a Bachelor of Applied Science (Agronomy) from the University of Queensland, a Diploma of Business from Monash University and is a Graduate of the Australian Institute of Company Directors. He is also a director of Australian Crop Breeders Limited and a member of the Queensland Alliance for Agriculture and Food Innovation (QAAFI) Advisory Board.

# AUSTRALIAN CANOLA HARVEST DELIVERS ANOTHER RECORD

Despite one of the most challenging canola harvests the East Coast has ever seen, the national canola crop this year will year deliver another record, potentially exceeding 7.5 million tonnes.

Despite one of the most challenging canola harvests the East Coast has ever seen, the national canola crop this year will year deliver another record, potentially exceeding 7.5 million tonnes. Western Australia alone will deliver what would have been regarded as a strong national crop a few years ago, of over 4.2million tonnes.

"Exceptional conditions in WA and SA this year have delivered strong yields, on the back of a significant lift in area of 7% and 25% respectively, while in NSW and Victoria the harvest has been much better than expected" said Nick Goddard, CEO of Australian Oilseeds Federation.

"Waterlogging, disease and crop losses due to flooding in NSW and Victoria, while devastating for affected farmers, have not significantly impacted the volumes we are seeing delivered across those states. Overall, quality has been fit for purpose and oil levels in the average range."

The AOF introduced a seasonal receival grade for canola this year which has enabled many growers to deliver grain that might otherwise have been rejected. This standard lifted the allowable mouldy seed count from 5 per thousand to 40 per thousand.

"The absolute size of this year's crop is testament to the investment in disease management, best practice agronomy, and broader farming-systems work that has been undertaken in recent years" Mr Goddard said. "It is also a recognition of Australian canola growers' adoption of best practice and response to market signals" he said.

The record Australian crop comes as the USDA forecasts global record oilseed production of 644 million tonnes, up 7% on last year. Soybean production is expected to come in just under 400 million tonnes, which is a record, while canola/rapeseed is also expected to reach a record of 84.3 million tonnes, despite a drop in yield for the Canadian crop and ongoing challenges in Ukraine. The loss of production in Sunflower seed, projected to be 12%, will provide support for alternate oils such as canola. The record production levels are resulting in good global oilseed stock levels, despite strong demand for food and biodiesel usage

The US EPA recently approved canola oil-derived renewable diesel as an advanced biofuels under the Renewable Fuel Standard (RFS) program, which is likely to further strengthen global demand for canola.

***Source: AOF, ABARES, GIWA***

## CANOLA HARVEST ESTIMATES (AS AT 19 DEC 2022) ('000 TONNES)

| | | | |
|---|---|---|---|
| New South Wales | 1350 | Western Australia | 4240 |
| Victoria | 1400 | Tasmania/Queensland | 20 |
| South Australia | 610 | National | 7620 |

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# APPROACHING AN AGRICULTURAL INTEROPERABILITY SPACE

**The latest advances of technologies such as IoT, AI and Big Data, among others, have boosted the adoption of smart farming practices that emphasise the use of ICT in farm management processes to exploit the available data.**

This, however, has led to an explosion of smart farming solutions and data availability that brings new challenges to be addressed. This fact introduces a lack of interoperability between different systems and platforms in the sector, especially the ones offered by different technology providers. Data is usually available by different sources, in different formats, and represented according to different models, thereby hampering data integration and exchange across multiple solutions. The lack of integrated data access and interoperability, in turn, hinders the full potential of value creation based on all data available, and the development of smart services and applications supporting the decision making processes.

The DEMETER project is addressing the need for technical and semantic interoperability through the Agricultural Interoperability Space (AIS) deployed and the underlying Agriculture Information Model (AIM) implemented. The former provides interoperability mechanisms to integrate and deploy a solution, while the latter provides the common (semantic) language used by DEMETER enabled applications to exchange data. In particular, AIM defines the data elements, including concepts, properties and relationships relevant to agri applications, as well as their associated semantics/meaning for information exchange. Built upon a thorough analysis of the related state of the art and practice, and driven by the elicited stakeholder requirements in DEMETER, AIM aims to establish the basis of a common agricultural data space and enable the interoperability of different systems, potentially from different vendors. This will in turn enable the analysis of data produced by those systems in an integrated manner to make economically and environmentally sound decisions.

## AIM DESIGN AND IMPLEMENTATION

AIM has been designed following a layered and modular approach, and is realised as a suite of ontologies implemented in line with best practices, reusing existing standards and well-scoped dominant models as much as possible and establishing alignments between them to enable their interoperability and the integration of existing data. AIM is scalable and can be easily extended in order to address additional needs and incorporate new concepts, maintaining its consistency and compliance. In particular, AIM comprises the following layers:

the meta-model layer defining the building blocks of AIM and enabling the back-and-forth conversion between datasets that are based on the property graph model and linked data datasets

the cross-domain layer defining relevant concepts and properties that are common across multiple domains, and which enable the interoperability with existing standard models and vocabularies

the domain layer defining agri-specific concepts and properties covering different aspects of interest of agri applications, and which enables the integration of relevant vocabularies in the sector.

The pilot-specific layer defining additional concepts and properties that are of specific use for particular applications.

Additionally, AIM defines a metadata model that can be used to describe datasets, services or applications in DEMETER.

A key value provided by AIM is that it harmonises and aligns relevant cross-domain standards such as Time Ontology, SOSA/SSN, GeoSparql, QUDT, Data Cubes, with domain-specific models such as Saref4Agri, FIWARE and INSPIRE/FOODIE, bridging various views on the agriculture data and providing a formal representation enabling unambiguous translations between them.

AIM is published as both human and implementation-ready machine-actionable resources, including the formal specifications

as ontology modules (OWL ontologies), JSON-LD contexts enabling services to exchange AIM-compliant data based on the already successful JSON format, and SHACL shapes enabling the validation of data against AIM semantics. AIM specification includes guidelines on how to find and identify relevant terms, how to create AIM-based JSON-LD content, as well as instructions to validate the generated content.

In line with FAIR principles [1], the AIM is released using persistent and resolvable identifiers (namely from w3id service), allowing access to the ontology on the Web via its URI, with support for content-negotiation, and ensuring the sustainability of the ontology over time. The AIM URL, by default, redirects and opens the ontology in the OGC definition server.

## HOW WILL AIM BENEFIT FARMERS AND TECHNOLOGY PROVIDERS?

For farmers, AIM will enable them to use the best suited solution for their needs, including systems and components from different technology providers that will be able to seamlessly interoperate and exchange data. The transparent use of these different components allows farmers to use the best and most cost-effective combination to carry out their activities efficiently and economically, avoiding vendor lock-in. Moreover, having data produced and collected by different systems in an AIM-compliant format will support farmers in their decision making processes, as the underlying tools and analytic services will be able to have an integrated data access to exploit the full value of available data.

For technology providers, on the other hand, producing and consuming data in an AIM-compliant format will allow their systems and components to interoperate with other existing solutions. This will allow them to focus their efforts on developing specialised components reflecting their main expertise, and/or reduce costs, time and efforts needed to develop components that are already available. Also, the possibility to interoperate with components from different providers will allow some providers, especially smaller (e.g., SMEs, start-ups), to enter in otherwise monopolised farming solutions. Additionally, technology providers will be able to ensure the future interoperation with other components, as long as they will be able also to produce/consume AIM-compliant data.

## WHAT WILL THE FUTURE OF AIM LOOK LIKE?

DEMETER has made a step forward to address the semantic interoperability challenges in the agriculture domain, through the creation of the Agriculture Information Model (AIM) and the proposed approaches to generate AIM-compliant data. As part of the efforts to support its future sustainability and adoption, AIM is starting the process of becoming an OGC recommendation supported by the OGC agriculture Domain Working Group (DWG). Additionally, several new projects are adopting AIM, to continue its adoption, validation and extension. In fact, not only projects in the agriculture domain can benefit from AIM. For example the project ILIAD which is building a digital twin of the ocean, is reusing the lower layers of AIM and adapting them to the Ocean domain, while the DIVINE project is exploiting AIM to promote the agri data economy. In many of these projects the goal is not only to produce standard data (i.e., AIM), but also to expose standard APIs to facilitate the data exchange between different systems/tools, such as the RESTFul OGC APIs to provide geospatial data to the web.

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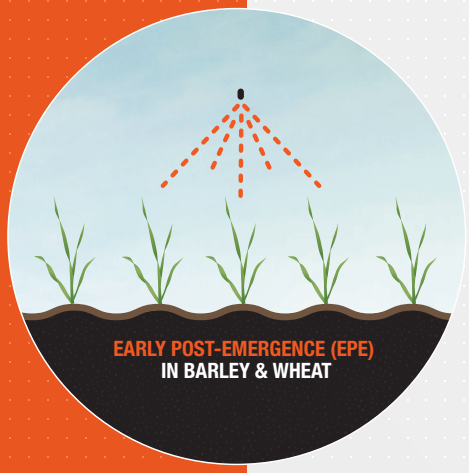


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# SALTY AND SUSTAINABLE – A BUSH FOOD WITH BUSINESS POTENTIAL

**A group of plants used by First Nations Australians as food, animal fodder and medicine could be a nutritious alternative to salt, according to University of Queensland research.**

PhD candidate Sukirtha Srivarathan from the Queensland Alliance for Agriculture and Food Innovation (QAAFI) has found that edible halophytes have potential as a bushfoods business opportunity.

“Australian edible halophytes like samphire, seablite, saltbush and seapurslane have nutritional benefits and bioactive properties,” Ms Srivarathan said.

“They’ve been used for more than 65,000 years as food – especially during drought – because they grow all year-round.

“They’re a good source of protein and most of them are a good source of fibre, minerals and trace elements, especially calcium, iron, potassium and zinc, while some also have considerable amounts of folate (vitamin B9) and vitamin C.

“Now we’re looking at how we can use these plants in food production.”

QAAFI Senior Research Fellow Dr Michael Netzel said the salt-tolerant halophytes are a sustainable food source.

“Halophytes have a lot of bioactive compounds, so it’s a more sustainable and healthy choice to eat as a salad or side dish,” Dr Netzel said.

“It’s these little things; if you can replace something with something healthier rather than changing the whole diet, it can have an impact.

“For example, instead of table salt you can use halophytes as a freeze-dried powder condiment.”

The research was conducted through the ARC Industrial Transformation Training Centre for Uniquely Australian Foods at the request of a Western Australian First Nation community led by Bruno Dann and Marion Manson.

Uncle Bruno said halophytes have long been a staple food for Nyul Nyul people in the Kimberley region, collected seasonally by his mimies (grandmothers) and gullords (grandfathers).

“We used to move from place to place every two or three months to collect different foods,” he said.

“Halophytes were a great mai (bushfood) when we were by the sea, then we would move inland and back again – living seasonally, in the cycles of life and the seasons, going with the land.”

Ms Srivarathan said she consulted extensively with the community during her research because there was not much western literature on the subject.

“They know these plants, it’s not new to them, so when it comes to potential applications, I got to know how they used them,” Ms Srivarathan said.

“It’s been a two-way communication which has been mutually beneficial.”

“The combination of this native, ancient crop and our state-of-the-art technology is a really good combination,” Dr Netzel said.

When her PhD is completed, Ms Srivarathan will continue to work with the community to get a product into market and plans to co-design a dehydrated halophyte substance.

“There has been high demand in using Indigenous edible halophytes for sustainable food production in the past few years, so this scientific profile will be a great help,” she said.

The research was published in the Journal of Food Composition and Analysis.

Samphire, saltbush and seapurslane are salt-tolerant halophytes with potential as a bushfoods business.

Sukirtha Srivarathan and Dr Michael Netzel.

# INTRODUCING LAWLER – THE GO-TO LUPIN VARIETY FOR THE EASTERN STATES.

**"Lupins are a fantastic break crop after a succession of cereals, allowing the use of different herbicides for weed control, breaking the life cycle of many diseases, and importantly, fixing nitrogen in the soil to be used by future crops. With the elevated fertiliser prices that we are seeing currently, I can see a larger swing into pulses for this reason alone".**

*James Whiteley, AGT's Manager of Variety Support*

**Launched at Baker Seed Co.'s annual field day on 21st October, Lawler is the first lupin variety released by AGT specifically for NSW and Victoria.**

Southern New South Wales is Australia's second largest Lupin growing region after Western Australia, producing around 85,000 tonne annually; equating to around 13% of Australia's lupin production. Although small in comparison to WA, lupins are the most widely grown pulse crop in southern NSW and considered an important tool in the rotation, where they thrive in the regions lower pH soils.

James Whiteley, AGT's Manager of Variety Support for Southern NSW, can see an expansion of lupin growing in the region into the future.

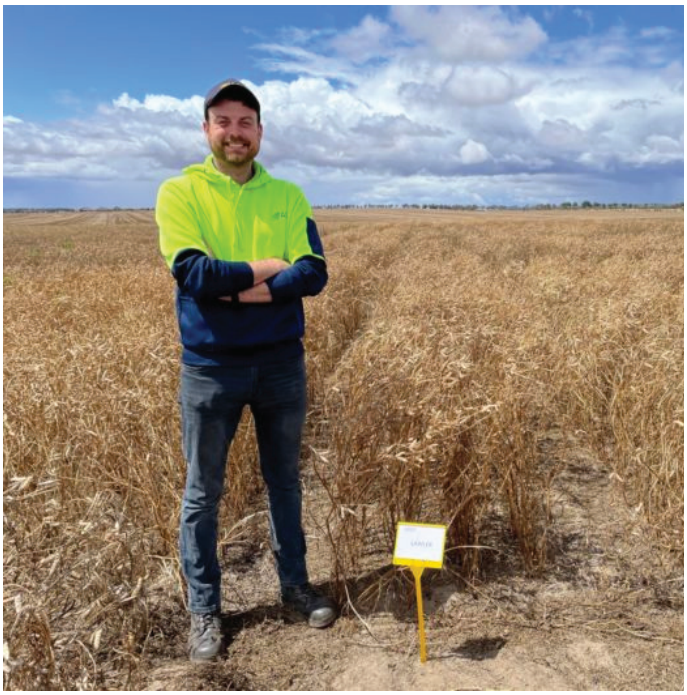
"Lupins are a fantastic break crop after a succession of cereals, allowing the use of different herbicides for weed control, breaking the life cycle of many diseases, and importantly, fixing nitrogen in the soil to be used by future crops. With the elevated fertiliser prices that we are seeing currently, I can see a larger swing into pulses for this reason alone".

In NVT trials, Lawler has consistently yielded well across all NSW, Victorian and South Australian lupin growing regions. In fact, across the 2021 NVT trials, Lawler was the highest yielding variety across the majority of regions.

According to AGT Lupin Breeder Matt Aubert, this data, along with an improved disease package, makes Lawler the ideal narrow leaf lupin to grow in the east.

"In environments where sheep graze lupin stubble over the summer, and where the risk of stem phomopsis is high, Lawler offers improved resistance compared to Coyote and similar to Wonga and PBA Barlock. Lawler also has improved tolerance to pod shattering and Metribuzin herbicide".

Limited commercial quantities of Lawler seed will be available for the 2023 season through AGT Affiliates and local retailers.



AGT Lupin Breeder Matt Aubert with new variety Lawler

# SEVEN INNOVATIVE FEMALES ANNOUNCED AS 2023 AGRIFUTURES RURAL WOMEN'S ACCELERATION GRANT RECIPIENTS

## ALICE BENNETT (CRYSTAL BROOK, SA),

## THEA WALKER (JARDEE, WA),

## NADINE HOLGATE (KIALLA, VIC),

## EMMA GOODALL (CLUNES, VIC),

## LEANNE KRUSS (DIMBULAH, QLD),

## KATE WEBSTER (MUTTAMA, NSW)

**Sara McCarthy (Narromine, NSW) successfully pitched their ideas, ranging from health chats, value-add ice cream and pastures under horse grazing, to a brain injury summit, Australian fibre apparel rental, classroom resources about agriculture and delivering medication with a drone.**

**"The AgriFutures Rural Women's Acceleration Grant is an important program as it provides a vehicle for women across the nation to realise their potential. It will nurture the development of new and exciting ideas, and we encourage the successful applicants to apply for the AgriFutures Rural Women's Award in the future,"**

*Managing Director of AgriFutures Australia, John Harvey.*

The Rural Women's Acceleration Grant was launched in 2021 and is designed to foster growth and development in women involved in Australia's rural and emerging industries, businesses, and communities.

"We are thrilled to be offering these seven rural women the leadership and development opportunities they need to make real and tangible impacts in their industries and communities," said Managing Director of AgriFutures Australia, John Harvey.

"The AgriFutures Rural Women's Acceleration Grant is an important program as it provides a vehicle for women across the nation to realise their potential. It will nurture the development of new and exciting ideas, and we encourage the successful applicants to apply for the AgriFutures Rural Women's Award in the future," said Mr Harvey.

Each of the seven women will receive a learning and development bursary of up to $7,000 for professional development to enable them to bring their idea, cause, or vision to life.

### Introducing the 2023 trailblazing women

Experienced commercial agronomist, Emma Goodall is excited that her concept of establishing agronomically sound pastures for the equine industry is now more than a dream.

"Being awarded the grant will quite literally "accelerate" the opportunity to pursue an idea that is on the "to do list" but until now lacked a real timeline – and fit the cliché of a goal without a plan," said Emma.

Ice-cream extraordinaire, Thea Walker has developed a sustainable ice-cream by utilising blemished or mis-shaped avocados from her family's avocado farm. Thea aims to turn her ice-cream idea into a commercial business through the AgriFutures Rural Women's Acceleration Grant.

"I aim to expand my business, marketing and networking skills to create a product that encourages collaboration with farmers, provides an opportunity to reduce food waste and educates the consumer about the agricultural industry," explains Thea.

From behind the counter to the skies, Pharmacist, Sarah McCarthy's rural drone delivery idea stems from the recent

increase in demand for health services and the lack of accessibility to pharmacy medication for rural communities.

"I am hoping to improve patient health outcomes of our rural families by improving access to medications by increasing convenience, reducing time limitations and eliminate geographical distance and natural disasters as barriers to access," explains Sarah.

Occupational therapist, Nadine Holgate is excited to be a successful applicant as the grant will help achieve her aim of improving outcomes for rural and regional Australians with a brain injury.

"Too often there is inequity in healthcare resources for rural and regional providers compared to metropolitan colleagues. Health providers like me need to be able to build skills and networks to provide an equitable service to rural clients," said Nadine.

Kate Webster's vision was born out of the concerning statistics around children's lack of knowledge of where their food comes from. Kate aims to provide a full educational package which is ready to be picked up and used in the classroom with options for students of all ages.

"I hope the program reaches students from all walks of life and aids in growing the future generations' understanding of not only where food comes from, but the importance of agriculture as a whole," said Kate.

Dr Alice Bennett is a Gastroenterologist based in the Mid North of South Australia and looks forward to accessing mentorship to structure her project 'Hats off for Health Chats'. The project is designed to deliver regular, health-related discussions to rural men and women.

"The grant will also aid in the delivery of each of the three pilot events, assisting in creating a relaxed, welcoming and enjoyable atmosphere," said Alice.

Staying true to her early Merino roots, Leanne Kruss is embarking on a sustainable, value-add paddock to podium Australian fibre apparel rental concept.

"I'm hoping to take my identified concept that is designed to support acceleration of consumer adoption of Australian food and fibre and make a significant contribution to a problem I have identified on my own professional journey," said Leanne.

With the support of the AgriFutures Rural Women's Acceleration Grant, all seven women will be undertaking a range of learning and development opportunities throughout 2023, equipping them with the skills and knowledge to advance their project from idea to reality.

Applications for the 2024 AgriFutures Rural Women's Acceleration Grant will open in September 2023.

To find out more about the Acceleration Grant, visit ***agrifutures.com.au/acceleration-grant***.

# NUTRIEN'S TECH TALENT DEVELOPMENT PROGRAM

**As the race for talent across the agriculture, mining and technology sectors continues to tighten,Nutrien Ag Solutions is hoping a new dedicated program will help prepare the industry with the skills needed now and into the future.**

The Nutrien Tech Talent Development Program launched this week, a new global training program for IT graduates.

"This is about building our pipeline of talented technical professionals to support the future needs of our farmers," said Lloyd Dias, Nutrien Ag Solutions Head of IT.

"Areas like technology and innovation are no longer enabling functions, they are core components of business strategy. The agriculture industry is embracing digital solutions to overcome challenges, meet demand and improve its overall productivity, sustainability and profitability, but to achieve this we need the right tech talent."

The Nutrien Tech Talent Development Program is currently looking for two IT graduates to join their global team. The 24-month program will see participants rotate through Nutrien's applications, data and analytics, cyber security and digital delivery teams to provide them with practical and diverse experience.

"This is a global program, so participants will also be able to spend time with our colleagues in Canada, America and Brazil during the rotations," said Mr Dias.

"We know recruitment is challenging across many sectors at the moment so we are focused on attracting the top talent but also retaining our staff through employee benefits, learning and development, and opportunities that can only be offered with a global company like Nutrien."

"If you've never considered a career in agriculture, now is the time to explore these opportunities and make a real difference to how we support our growers to feed the world," said Mr Dias.

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# INDUSTRIAL HEMP VARIETY TRIALS NOW WITH NATIONAL FOOTPRINT

**The emerging industrial hemp industry now has varietal trials in the ground in every state, and the Northern Territory in Australia. Farmers interested in growing the crop are invited to inspect the sites at a series of field days planned for 2023, dates include:**

Crops have been planted in northern New South Wales and southern Queensland in recent weeks to increase the network to nine Industrial Hemp Varietal Trial (IHVT) sites. These sites are designed to capture key performance data including yield and quality for different varieties under different agricultural sowing times and environmental conditions across Australia.

IHVT national coordinator Mark Skewes, of the South Australian Research and Development Institute (SARDI), said the key outcome of the three-year IHVT would be individual recommendations about which varieties to grow and the best time to sow in each region.

“Providing a coordinated approach across trials in different regions of Australia and providing access to comparable data will enable growers to make informed decisions on-farm,” said Mr Skewes.

The IHVT is aligned with the recent announcement of a $2.5 million investment by AgriFutures Australia to grow the industry, which aims to exceed $10m in production at farmgate by 2026.

“With a global industrial hemp market valued at $4.9 billion in 2019, and projected to reach $18.6 billion by 2027, this is a huge opportunity for Australian agriculture to produce an environmentally sustainable multi-purpose crop that can be used for everything from food to fabric and even building materials,” said AgriFutures Australia Emerging Industries Program Senior Manager, Dr Olivia Reynolds.

Industrial hemp, which must be grown under state government permits, has very low tetrahydrocannabinol content (THC) but is high in protein and healthy fats, and since 2017 it has been legal to sell industrial hemp seed for human consumption.

The need for the IHVT was identified in the Australian Industrial Hemp Strategic RD&E Plan (2022-2027) developed by AgriFutures Australia, which sets out a clear pathway to grow the industry. The plan has five major objectives covering seed and varieties; growing the crop; products produced from the crop; the sustainability of hemp; and the regulatory environment.

The field days will include trial site inspections and a presentation of the results to date.“This is a great opportunity for farmers, processors, food retailers and commercial investors to learn more about industrial hemp and the amazing opportunities it offers Australian agriculture,” said Mr Skewes. More information on field day times, locations and programs will be made available in early 2023 at Industrial Hemp | AgriFutures Australia

IHVT national coordinator Mark Skewes (left) inspects a trial site in Loxton with agronomist John Muir.

# HANDS-FREE HORTICULTURE SEES HIGHER PRODUCTION

**Labour use has decreased on Australian horticulture and dairy farms and increased on broadacre farms over the last few years, according to the latest ABARES survey results.**

ABARES Executive Director, Dr Jared Greenville said despite the decline in labour use, agricultural production has increased over the same period, indicating that farms have adapted to constrained labour supply.

"The total number of workers used by Australian horticulture farms decreased by around 20 per cent (29,300 workers) over the last three years, mainly due to a decrease in overseas working holiday makers," Dr Greenville said.

"When we look at changes to peak labour use, we have seen a reduction of close to 35,000 workers on horticulture farms compared to three years ago.

"Over the same period, horticulture production has increased by around three per cent, with farms adapting to constrained labour supply by finding ways to improve productivity, making greater use of capital equipment in the place of labour, along with increasing hours worked by employees.

"Farmers have looked to non-labour means of bringing the harvest in. Around 40 per cent of horticulture farmers have used machinery, like fruit picking machines, to help with the harvest. Others have altered crop plantings for a longer peak harvest.

"Large farms accounted for the almost all of the decrease in horticulture labour use over the last three years, and the largest farms also had the most difficulty recruiting.

"Labour use increased on Australian broadacre farms between 2018–19 and 2020–21, driven by improved seasonal conditions and higher production. Labour use declined on dairy farms over the same period, mainly due to decreases in the number of operating farms and the number of domestic and overseas workers per farm."

# CREDIT WHERE CREDIT IT'S DUE: THE NOT SO HUMBLE PULSE IN GLOBAL FOOD SYSTEMS

**Despite having been a staple food in many cultures for centuries, pulses are having a global resurgence as part of sustainable food production, food security and nutrition.**

Pulses are relative new-comers in large scale Australian cropping systems, but increasing evidence about their role in sustainable agriculture and nutritious diets is highlighting the power of the pulse.

Consumption of pulses like lentils, chickpeas, beans and peas is particularly low amongst Australians at less than a third of a serve a week.

promote sustainable and balanced diets that are healthy for both people and the planet.

“It’s one of the best examples of where Australian Dietary Guidelines reflects the benefits of sustainable agriculture practices. Choosing healthy, nutritious pulses supports Australian farmers and helps protect Australia’s ancient soils from erosion, while increasing carbon and nitrogen storage in soils and reducing greenhouse gas emissions. It’s a win-win-win for consumers, farmers, and the environment.

“Australian farmers, supported by plant science, use the most

**“Pulses are not just for vegetarians. World Pulses Day encourages all Australians to aim for three serves of pulses a week as one of the most effective things we can do to eat more sustainably.**

“We know that Australians are looking for ways to eat more sustainably and for more plant-based sources of protein, which the food industry is positively responding to. But the answer has been in our pantries the whole time”, said Chief Executive Officer of CropLife Australia, the national peak industry organisation for the plant science sector, Mr. Matthew Cossey.

“Pulses are not just for vegetarians. World Pulses Day encourages all Australians to aim for three serves of pulses a week as one of the most effective things we can do to eat more sustainably.

“Pulses are a delicious, inexpensive and important source of protein, micronutrients and prebiotic fibre which fosters beneficial gut microbiome. And with the world’s population expected to reach nearly 10 billion by 2050, it is more important than ever to

advanced technology and equipment to produce pulses of the highest quality. Combined with our favourable growing environments, good crop management and care in handling, there’s no reason pulses shouldn’t be a staple food here too.

Mr Cossey concluded, "Australians are becoming more aware of the impact of their food choices on their health and the environment, but knowing how to eat more sustainably can seem complicated and overwhelming. World Pulses Day is a great opportunity to get Australians back to the basics. Experiment with new recipes, add pulses into a broad range of other vegetables in your weekly diet and support Aussie farmers who are the ultimate stewards of the land."

# MELONS AUSTRALIA EXPORT STRATEGY

The Australian melon industry export strategy project is in progress and Melons Australia has partnered with specialist agrifood strategic planning consultancy McKINNA et al to deliver the contract.  Dr David McKinna and Catherine Wall from McKINNA et al will be working closely with Johnathon Davey to engage with our industry in order to produce a plan that best meets our needs.

The McKINNA et al team has had many years of experience in export market analysis and in-market research across all of Australia's key export markets (www.mckinna.com.au). This has included projects in horticulture, dairy, seafood and meat. They have produced the previous two highly successful vegetable industry export strategies and have worked with the AUSVEG trade team for many years. AUSVEG will be delivering the export program with Melons Australia under a new combined industry export initiative.

Melons Australia would like to invite any grower or exporter who is currently exporting or interested in doing so, to provide input into what they would like to see in the export strategy. If you would like to have a say over how industry levies are spent to advance melon exports please provide feedback to Johnathon via email – execofficer@melonsaustralia.org.au.

# CROPSCAN 3300H ON COMBINE GRAIN ANALYSER

**Now Fitted to John Deere X9 Combines.**

**The CropScan 3300H On Combine Grain Analyser provides real-time Protein, Moisture, Oil, Starch and Fibre data for wheat, barley, canola, corn, soybeans and other grains and oil seeds directly form the combine.**

Up to 240 samples are scanned for every tank or bin load as the grains or oil seeds are harvested. By combining Protein and Yield data from the combine, then a new set of field data layers are available to help farmers manage the quality and quantity of their crops and to develop Variable Rate Nitrogen Fertilization applications for the next harvest. The John Deere X9 Series combine is significantly larger than the previous models and has several changes to the clean grain elevator. CropScanAg in collaboration with Broden and Chris Holland, Grenville, NSW, have designed a new installation kit to suit the X9. The new kit includes a special mounting bracket to bridge across the seam which is now part of the X9's clean grain elevator. An extra long fibre optic cable has been designed to connect the CropScan 3300H Sample Head which is mounted on the outside of the clean grain elevator and the CropScan 3300H NIR Spectrometer which is mounted inside the combine's cab.

CropScanAg has established an API connection between the John Deere Operations Centre and the CropScanAg Cloud. The API enables boundary files to be automatically uploaded into the CropScan 3300H Touch Screen PC mounted inside the cab. Yield from the John Deere Operations Centre will also be uploaded directly into the CropScanAg Cloud within the next few months. As a result, farmers will have one location to capture all the farm field data collected during the harvest. CropScan 3300H users have free portal access so that they can download their data files.

CropScan 3300H Touch Screen PC showing real-time Protein map.


CropScan 3300H Sample Head installation on JD X9

The CropScanAg N-GAUGE Harvest Manager App and Nutrient Manager Apps will allow farmers to view and manage their harvest data directly from their smart phones or tablets. The N-GAUGE Harvest Manager provides a virtual storage system in the cloud where the quality i.e., Protein, Moisture and Oil data for each tank or bin load are recorded and then tracked as the grains are moved from combine to field bin to silo and to the customer. As well, farmers and their agronomists can view all the field maps for Protein, Moisture, Oil, Yield and Elevation directly on their smart devices. The N-GAUGE Nutrient Manager is an advanced module that uses proprietary algorithms to compute and display the performance data for each field on a smart device.

These performance maps include Protein/Yield Correlation, Nitrogen, Potassium, Phosphorous and Sulphur Removal, Nitrogen Use Efficiency and Water Use Efficiency. Variable Rate Fertilization prescriptions can be generated directly from the Nutrient Manager App and then posted to the John Deere Operations Centre for downloading to sprayers, spreaders or seeders. The CropScan 3300H On Combine Analyser and the CropScanAg N-GAUGE Apps provide John Deere users with a closed loop solution for managing grain on and off farm and to improve Yield through better Nitrogen management. With the rising cost of fertilizer and combines, the CropScan 3300H offers a ROI of 20-30% per annum.

For more information on the CropScan 3300H and CropScanAg N-GAUGE Apps, please visit our web site www.cropscag.com or call 02 9771 5444 (AUST) or 1(720)435-1139 (USA and Canada).

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- IBS application prior to Wheat*, Chickpeas, Faba beans, Lentils and Field peas as well as post-emergence in Lucerne and prior to summer crops.
- Pre-emergence activity against difficult to control grass and broadleaf weeds.
- Flexibility in crop rotations with short re-cropping intervals.
- Group 14 PPO mode of action with no known resistance.
- Enhanced burndown on emerged weeds.
- Long term residual control on fence-lines and channel banks.

** Excluding Durum varieties.*
*Registration pending APVMA approval February 2023.*

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AgroSolutions Division

**www.sumitomo-chem.com.au**

# ENZYMES HAVE PROVED THEIR WORTH IN AUSTRALIAN WINTER CROPS

**"The beauty of Elemental Enzymes' products is their simplicity, fitting into existing farmer practice during the fallow and at sowing time. They meet farmer objectives of improved profit margins per ha each year and longer-term improvements in soil health."**

*Elemental Enzymes Australia director Guy Perriman*

**Trials across Australian crops have proved the economic and environmental advantages of adding specific enzymes for more efficient use of fertiliser applications and soil nutrients to increase yield.**

A third year of field trials in wheat, barley and canola across Australian broadacre regions in 2022 confirmed that application of a small amount of enzymes could boost Australian winter-crop establishment and yield.

Elemental Enzymes Australia director Guy Perriman said the invaluable roles the patented stabilised enzymes played included converting unavailable nutrients like phosphate into plant-available forms, and converting carbon residues and soil organic matter into available nutrients.

"Enzymes are produced naturally in the soil by microbes and plant roots, but applying additional enzymes means growers can accelerate and enhance these important processes. Acting as a catalyst, enzyme reactions commence on application if moisture is present and continue for days, up to weeks. When applied with fertiliser at planting, enzymes start to work immediately and continuously near the seed, with germination into a nutrient-rich zone for better emergence and establishment.

"If farmers are dry sowing, the enzymes are idle until rains occur.

"The beauty of Elemental Enzymes' products is their simplicity, fitting into existing farmer practice during the fallow and at sowing time. They meet farmer objectives of improved profit margins per ha each year and longer-term improvements in soil health."

Already commercially successful in the US, several enzyme products have now been tested extensively in Australia and the first releases, Lumen and Res+ are available to distributors and growers in 2023.

## LUMEN

"Lumen is a stabilised liquid-concentrate blend of two important enzymes, lipase and mannanase, that trigger soil organic matter to release bio-available nutrients and water to the plant, and stimulate native microbial activity.

"The lipase component converts lipids in soil organic matter to allow release of bio-available NPK nutrients for the plant and to stimulate native microbial soil activity. The mannanase breaks down exudates around the outer layers of root tips, making it easier for them to absorb extra nutrient.

Distributing these enzymes in higher concentrations and more evenly along the plant row improves the use of applied nutrients and those already present in soil organic matter."

Mr Perriman said replicated field trials on phosphate-responsive soils had proven the ability of Lumen to improve fertiliser-use

WHEAT 2022 TRIALS RES+ AND LUMEN, BUCKLEY SOUTHWEST OF MELBOURNE, VIC

CANOLA 2022 TRIALS RES+ AND LUMEN, BUCKLEY, SOUTHWEST OF MELBOURNE, VIC

efficiency, and increase yields from existing crop nutrition practices for the farm and area. In many situations, applying only 80% of the standard rate of MAP plus the liquid enzyme Lumen have produced wheat yields, plant-counts, biomass and grain quality equivalent to the 100% MAP rate in soils where phosphorus fertilisers are recommended.

He said the liquid enzyme Lumen allowed growers to potentially stretch their phosphorus fertilisers across more hectares, without sacrificing yield.

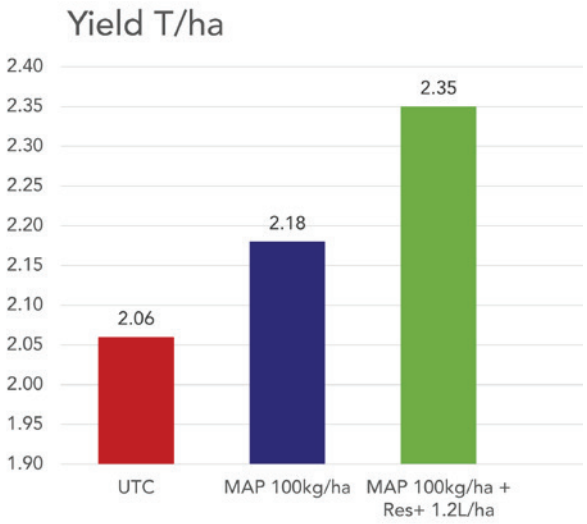
**Australian trials**

2020, 2021 and 2022 trials in West Australia, South Australia, Victoria and NSW proved the ability of Lumen to improve fertiliser-use efficiency leading to yield gains, by liquid injection at 16mL/ha.

Trials were typically run with MAP or NPK fertiliser blends. As well as getting more out of the applied fertiliser before it was tied up, there was also improved utilisation of N, P and K, with the enzymes making these nutrients more available to the plant

"So growers can confidently make the most of their fertiliser dollar this season by supplying the right amount of soil enzyme, right where and when it's needed. Supplies of Lumen are now available across Australia for the 2023 autumn-planting season, and can be ordered through growers' usual rural supply outlets via Agreva Sustainable Agriculture."

## RES+ CANOLA TRIAL, BUCKLEY, VICTORIA 2022




## RES+

**How does Res+ work?**

Res+ was developed by Elemental Enzymes to accelerate crop-residue degradation, allowing quick return of nutrients to the soil and enhancing microbial activity, soil health and planting conditions for the following crop. Mr Perriman said Res+ contained many key factors to speed up microbial attack of residues and release of nutrients from the retained stubble residue.

"Applying Res+ provides a uniform, high concentration of essential stubble-degrading enzyme, a humectant that locks in soil moisture on and within the stubble, plus key supporting nutrients right across the paddock – leading to faster, more consistent degradation of residues by microbes. The enzymes start work immediately and continue for several weeks, providing a nutrient-rich and friable area for improved crop establishment and growth.

"Res+ may be sprayed onto stubble after harvest, or through the fallow period, right up until sowing time in typical broadacre water volumes. It can be added to pre-planting knockdown and pre-emergent herbicides."

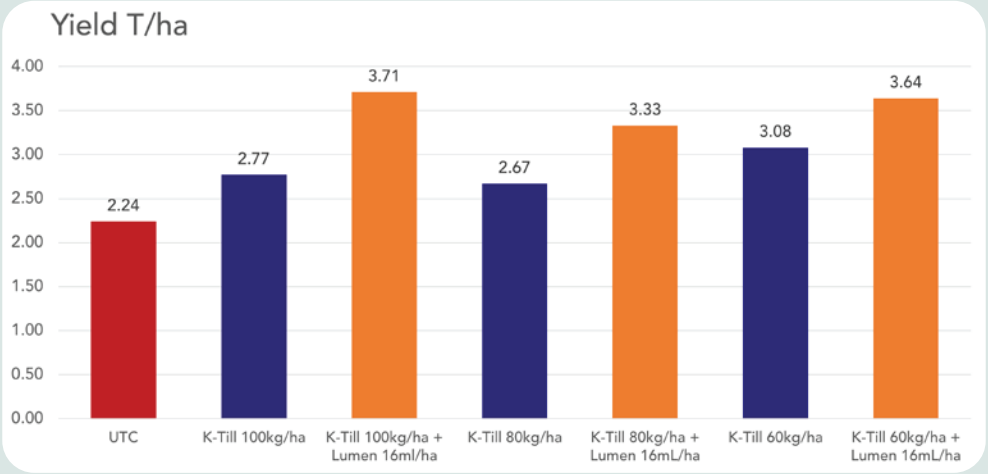
**Australian trials**

Multiple trials across Australia have confirmed the ability of Res+ as a unique product to speed up breakdown of crop stubble, improving workability and for quicker release of nutrients and improved soil structure for the following planting. Applied post-harvest or ahead of planting at 1.2L/ha, Res+ has led to higher yields and higher income from subsequent crops.

Res+ has been tested across many residue types, from cereals, pulse crops and sorghum, with excellent results for subsequent cereal and canola crops. A long-term study in wheat production in Katanning, Western Australia has resulted in year-on-year improved yields with more than 1T/ha of wheat grown over the 3-year period, compared with existing standard nitrogen and phosphorus programs.

Mr Perriman said this exciting new field of biological products could revolutionise agriculture by supporting plants' ability to survive and thrive from the best to the harshest of conditions, and by boosting yield from existing farm practices, resources and inputs.

## LUMEN WHEAT TRIAL, YORK WA 2022



# CORTEVA AGRISCIENCE ANNOUNCES COMMERCIAL LAUNCH OF OPTIMUM GLY® CANOLA

*Proprietary, advanced herbicide trait technology for canola will be available to Australian farmers for 2024 planting season.*

**Corteva Agriscience today announced plans for the commercial launch of Optimum GLY® canola – an advanced herbicide-tolerant trait technology for canola farmers in Australia, Canada and the United States.**

Optimum GLY® will be offered in Australia through Corteva Agriscience seed brand Pioneer® Seeds, with licensing, education, and demonstration trials in 2023 followed by commercial sales in 2024. In Canada and the United States Optimum GLY canola will be offered through Corteva Agriscience seed brands, Pioneer® and Brevant® seeds for planting in the 2023 growing season, with an accelerated ramp-up in a broader set of genetic backgrounds and maturities in the coming years.

"We are pleased to launch our Optimum GLY herbicide-tolerant trait technology, which represents a significant advancement to further strengthen Corteva Agriscience's industry-leading canola portfolio and bring new proprietary traits to the market," said Chuck Magro, Chief Executive Officer, Corteva Agriscience. "A culmination of years of research and development, Optimum GLY canola is designed to deliver top yield potential and agronomic trait performance for canola farmers, providing them with a greater measure of control over their crops."

Optimum GLY herbicide tolerance is a new, proprietary glyphosate trait technology intended to deliver enhanced weed control and a wider window of herbicide application, compared to first-generation glyphosate trait technology*, so farmers have more choices and flexibility for effective and responsible weed management.

"The launch of Optimum GLY canola builds on Corteva Agriscience's track record of delivering innovations to farmers," said Chuck Magro, Chief Executive Officer, Corteva Agriscience. "This is another solution from our robust pipeline that solves farm-level and field-level specific challenges while helping address global food security."

Farmers in Canada will have access to Optimum GLY herbicide tolerance through spring canola hybrids from both Pioneer and Brevant seeds brand, while farmers in the United States and Australia will have access to the product through the Pioneer brand. Corteva also intends to broadly out-license Optimum GLY herbicide tolerance technology to provide farmers more flexibility and choice of herbicide tolerant canola hybrids.

A rich source of protein and oil low in saturated fats, canola is an important crop to help sustainably meet the global demand for food and energy.

Corteva products are launched in accordance with our product launch policies and Excellence Through Stewardship® Product Launch Guidance.

For additional details please visit ***https://www.corteva.com.au/products-and-solutions/seeds/optimum-gly.html***

Optimum GLY®
HERBICIDE TOLERANCE

# LAST YEAR AUSTRALIANS ATE MORE AVOCADO THAN EVER BEFORE

**According to Avocados Australia's "FACTS AT A GLANCE" figures, in FY2021-22 Australians consumed 4.76kg of avocados per person, this was a significant increase on the previous year's figure.**

"It's clear that consumers took advantage of the lower prices experienced this year and ate more avocado," said John Tyas, CEO of Avocados Australia. "Avocados aren't like confectionery. If you eat a little more avocado, you don't need to feel guilty as you are having more of something that's healthy and nutritious."

According to a 2022 Avocado Nutrition and Health report1 published by Hort Innovation this year, studies have shown that people who regularly eat avocado have a lower Body Mass Index (BMI), a smaller waist and less weight gain over time. This year an expert roundtable recommended a serving size of 75g, or half a medium avocado. This is an increase on a previous recommendation of 50g. So for those of you who ate more avocado you don't need to feel guilty.

"It is great news that Australians are eating more avocado as that means consumers are benefiting from avocado's health-giving properties," Mr Tyas said.

"Our facts at a glance figures are a great reference for our growers, or anyone wanting to see how our industry is performing."

"The domestic consumption increase is a welcome trend considering that production is also expected to increase," Avocados Australia CEO John Tyas said.

The updated long-term forecast suggests Australia's avocado production is expected to continue to increase to about 170,000 tonnes by 2026, more than double the 2020-21 crop.

To view Avocados Australia's *FACTS AT A GLANCE* key statistics online **scan here**.

# VALUE IN AUSTRALIA OF AGRICULTURAL COMMODITIES

**Source**: *Australian Bureau of Satistics*

## Key statistics

- **The gross value of wheat increased 33% to $13 billion in 2021-22**
- **The gross value of canola doubled to $6 billion**
- **The gross value of livestock disposals increased 12% to $25 billion**
- **The gross value of livestock products increased 7% to $9 billion**

## Value of crops

The second year of La Nina conditions resulted in a mixed season for broadacre and horticultural crop production in the eastern states. Flooding across areas of New South Wales and Queensland from November into December 2021 affected the growth and harvesting of many winter crops while South Australia and Victoria experienced destructive hailstorms in January 2022.

In comparison to the eastern states, Western Australia experienced improved soil moisture levels and highly favourable growing conditions during 2021-22 resulting a bumper harvest for the state's broadacre crops, notably wheat and canola crops.

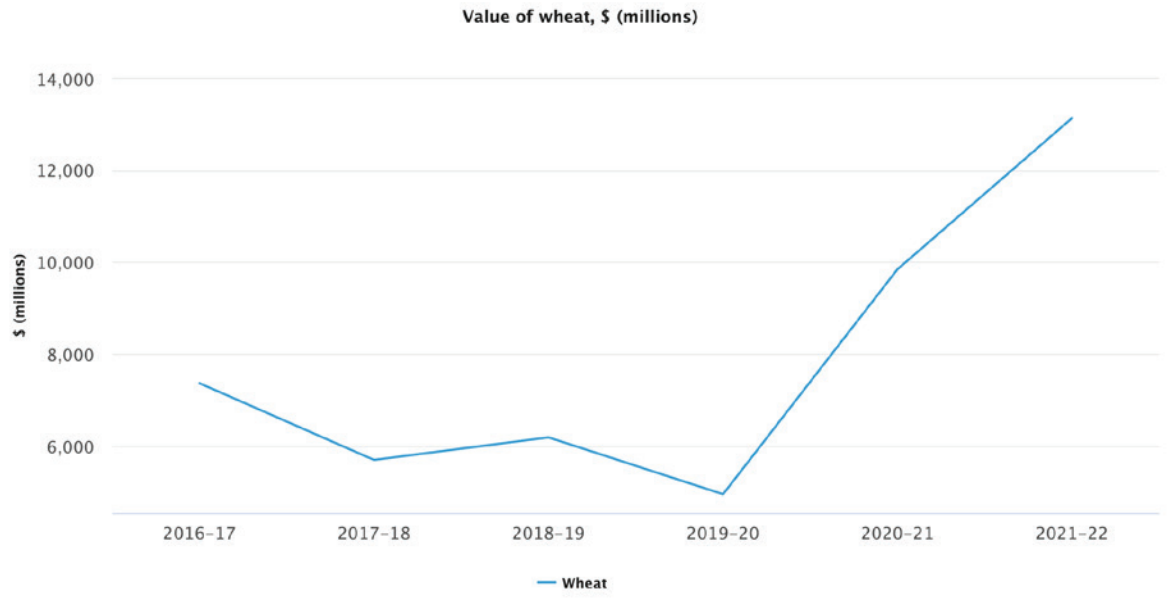
## Key crop results for 2021-22:

- **$13.1 billion for wheat (up 33% from 2020-21)**
- **$6.0 billion for canola (up 105%)**
- **$4.4 billion for barley (up 17%)**
- **$4.2 billion for cotton (up 186%)**
- **$853 million for grapes for wine production (down 30%)**
- **$793 million for almonds (up 26%)**
- **$699 million for potatoes (down 11%)**
  **Livestock disposals and livestock products**

The gross value of livestock disposals increased 12% to $25 billion in 2021-22. Graziers used the improved seasonal conditions and better pastures as an opportunity to rebuild their stocks which has resulted in tighter supply for meat producers and increased prices.

## Key livestock results for 2020-21:

- **$15.3 billion for cattle and calves (up 14% from 2020-21)**
- **$4.9 billion for sheep and lambs (up 14%)**
- **$3.2 billion for poultry (up 9%)**
- **$1.6 billion for pigs (up 1%)**
- **$9.1 billion for livestock products such as wool, milk and eggs (up 7%)**




Source: Australian Bureau of Statistics, Value of Agricultural Commodities Produced, Australia 2021–22 financial year

| COMMODITY DESCRIPTION | GROSS VALUE ($) |
|---|---|
| Broadacre crops - Cereal crops - Wheat for grain | 13,144,048,707 |
| Broadacre crops - Cereal crops - Oats for grain | 518,939,674 |
| Broadacre crops - Cereal crops - Barley for grain | 4,357,569,655 |
| Broadacre crops - Cereal crops - Sorghum for grain | 1,015,163,555 |
| Broadacre crops - Cereal crops - Rice for grain | 275,071,534 |
| Broadacre crops - Non-cereal crops - Cotton lint (irrigated and non-irrigated) | 4,193,620,813 |
| Broadacre crops - Non-cereal crops - Oilseeds - Canola | 6,001,876,222 |
| Broadacre crops - Non-cereal crops - Sugar cane - Cut for crushing | 1,377,088,010 |
| Hay - Total | 1,689,245,795 |
| Nurseries, cut flowers or cultivated turf - Nurseries - Outdoor | 782,584,945 |
| Fruit and nuts - Citrus fruit - Oranges | 583,221,770 |
| Fruit and nuts - Pome fruit - Apples | 645,747,298 |
| Fruit and nuts - Other fruit - Bananas | 536,167,440 |
| Fruit and nuts - Nuts - Almonds | 792,724,825 |
| Fruit and nuts - Grapes - Wine production | 852,559,875 |
| Vegetables for human consumption - Potatoes - Fresh market and processing | 699,298,094 |

# CSIRO RESEARCHERS HELP DELIVER FOOD SECURITY WITH MAJOR INTERNATIONAL GRANT

**A $34 MILLION GRANT FROM THE BILL & MELINDA GATES AGRICULTURAL INNOVATIONS (GATES AG ONE) FUND HAS BEEN AWARDED TO AN INTERNATIONAL CONSORTIUM OF SCIENTISTS TO IMPROVE CROP PRODUCTIVITY AND FOOD SECURITY IN SUB-SAHARAN AFRICA AND SOUTH ASIA.**

**An international consortium of scientists has received a $34 million grant from the Bill & Melinda Gates Agricultural Innovations (Gates Ag One) fund to improve crop productivity and food security in sub-Saharan Africa and South Asia.**

Leading agriculture researchers from Australia's national science agency CSIRO are part of the Realizing Increased Photosynthetic Efficiency (RIPE) project, an international collaboration with the University of Illinois, the University of California, Berkeley, Lancaster University, the University of Cambridge, the University of Essex in the UK and the U.S. Department of Agriculture, Agricultural Research Service.

> **"We have already seen major improvements in crop productivity in field trials conducted by the RIPE project. This new research as part of the RIPE project will have an additional impact on reducing hunger and rural poverty,"**
>
> *CSIRO scientist, DR TJ Higgins*

The project aims to end hunger worldwide by improving the complex process of photosynthesis to increase crop production.

With the demand for protein set to double in places like Africa by 2050, CSIRO scientist Jose Barrero said the focus is now on improving staple food crops, including cowpea, in some of the most disadvantaged and harsh landscapes on the planet.

"Cowpea is an important vegetable food source for smallholder farmers in Africa where it is a major source of protein," Dr Barrero said.

CSIRO scientist TJ Higgins said the goal is to develop new improved cowpea varieties that provide better yield and that help deliver global food security in light of the expected population growth in West Africa and the challenging impacts of climate change.

"Existing work by CSIRO and partners on improving outcomes for crops in Africa has already led to the development and commercial release of the world's first genetically modified cowpea in Nigeria," Dr Higgins said.

"This new cowpea variety is resistant to an important insect pest, the Maruca pod-borer.

"We have already seen major improvements in crop productivity in field trials conducted by the RIPE project. This new research as part of the RIPE project will have an additional impact on reducing hunger and rural poverty," he said.

RIPE Project Director Steven Long said the work being done by CSIRO and the RIPE team was world-leading and would have profound implications for small-scale agriculture in developing countries.

"This is where science can make a real difference to human outcomes, unlocking improvements in productivity without requiring more inputs from farmers with limited resources", Dr Long said.

The RIPE project was started in 2012 by the Bill & Melinda Gates Foundation, the UK Foreign, Commonwealth and Development Office (FCDO), and the U.S. Foundation for Food and Agriculture Research.

The ongoing work is now being supported by Gates Ag One, a not-for-profit subsidiary of the Gates Foundation, created to leverage global crop science to meet the needs of smallholder farmers.

CSIRO's Legume Engineering team from left to right: Andy Moore, Jenny Gibson, Javier Atayde, TJ Higgins, Luch Hac, Lisa Molvig and Jose Barrero (Team Leader).

Cowpea growing at CSIRO's Black Mountain site

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# Navigating the 'Green Bridge'

Summer weeds are thriving, green peach aphids are on the rise. Turnip Yellows Virus is a genuine threat to seedling canola this Autumn.

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