

The UWA Institute of Agriculture



GRDC-funded research led by UWA is advancing understanding of nitrogen use efficiency to strengthen the productivity and sustainability of Australian canola systems

Continued Page 12



THE UNIVERSITY OF
**WESTERN
AUSTRALIA**

IN THIS ISSUE

P5 BUILDING ON SUCCESS

P6 ALL THINGS AG

P7 EXPLORING THE FUTURE OF NITROGEN USE IN AUSTRALIAN CROPS

P13 UNLOCKING THE SECRETS BENEATH OUR FEET



From the Director

Western Australia's grains industry has once again demonstrated its strength and resilience, delivering a record-breaking 27.35-million-tonne harvest. Decades of investment in agricultural research, industry development, extension services, an innovative farming community, and strategic marketing have played a pivotal role in underpinning this remarkable growth.

Building on this strong foundation, The UWA Institute of Agriculture Annual Industry Forum will explore a timely and forward-looking theme: *2030 Agrifood Opportunity: Can we capitalise on \$200 billion growth?* The forum will be held on 8 July at The University Club and will feature a keynote address by Mark Allison, CEO of Elders and other industry leaders. This event will bring together leaders from industry, government, and academia to discuss strategies for positioning Australia to seize this significant opportunity.

The year has commenced with strong engagement across several key events. The GRDC Grains Research Updates in Perth once again provided an important platform for sharing the latest developments in grains research, and I was pleased to contribute to the Legume Session (see page 4). The Mike Carroll Travelling Fellowship also continues to play a valuable role in supporting knowledge exchange and professional development internationally to our PhD students (see page 8).

We were also honoured to welcome Dr Alison Bentley, Deputy Director (Science) at CSIRO Agriculture and Food, to deliver the 2026 Brian Carlin Memorial Lecture (see page 7). Her presentation, Can less be

more? Rethinking nitrogen fertiliser use in Australian cereal cropping, attracted more than 90 attendees from academia, industry and government, and stimulated important discussion on sustainable intensification and input efficiency.

Looking ahead, I am very much looking forward to the 2026 Postgraduate Showcase on 27 May, where six outstanding PhD students will present their latest research across agriculture at UWA. I am also pleased to announce that, after three years, we will be hosting a UWA Farm Ridgefield Open Day on 11 September. All are welcome to visit the farm and see firsthand the research being conducted to support resilient farming systems, environmental stewardship, and community engagement.

Finally, I would like to extend my sincere congratulations to Professor Dominique Blache and Professor Sally Thompson on their recent appointments as full professors at UWA, recognising their outstanding contributions to research, teaching, and leadership.

Hackett Professor Kadambot Siddique
AM CitWA FTSE FAIA FNAAS FISPP FAAS FPAS
kadambot.siddique@uwa.edu.au

Front cover photo: Dr Samantha Harvie, Professor Sergey Shabala, Professor Harvey Millar, Professor Zed Rengel, Dr Lukasz Kotula, Professor Nanthi Bolan, Professor Kadambot Siddique, and Dr Sneha Priya Pappula Reddy.

National recognition for WA grain leader

Catalina Farms owner and The UWA Institute of Agriculture Advisory Board Member Rod Birch awarded OAM for dedication to advancing Western Australia's grains sector.

Rod Birch has been recognised with the Medal of the Order of Australia for his significant and enduring contributions to Western Australia's grains industry. Over his career, he has developed expertise across crop science, business, finance, mechanics, and technology, leveraging both hands-on experience and a wide professional network to drive innovation and growth in the sector.

Since 2012, Rod has contributed his knowledge and experience as a member of The UWA Institute of Agriculture's Industry Advisory Board, helping to link research, innovation, and farming practice. Beyond this role, he has held numerous leadership positions on boards, committees, and panels, providing guidance and supporting the development of the grains industry across the state.

The award recognises decades of dedication to the industry, reflecting his commitment to fostering growth, mentoring others, and strengthening connections between research, farmers, and communities. Through his professional leadership, Mr Birch has played a pivotal role in advancing Western Australia's grains sector and ensuring its ongoing innovation and sustainability.



Indigenous saltbush trial at UWA Farm Ridgefield, Pingelly, Western Australia.

Saltbush plantings for soil health and farm resilience at UWA Farm Ridgefield

Saltbush is a hardy perennial shrub widely used in Western Australia to restore degraded, saline lands while providing reliable feed for livestock. At UWA Farm Ridgefield, saltbush has been incorporated into several restoration plantings as part of ongoing efforts to improve productivity and landscape resilience.

One of these sites forms part of Georgia Welsh's PhD research at Murdoch University and consists of a mosaic of shrub-based shelter treatments (1-hectare plots) alongside an open pasture control area. Treatments include relatively palatable native shrubs such as Anameka old man saltbush and relatively unpalatable native shrubs such as Rhagodia preissii, with comparable energy and protein levels. The site contributes to the Edible Shelter Project, a collaboration between Murdoch University, UWA, CSIRO and NSW DPI, led by Dr Serina Hancock at Murdoch University.

Within this broader framework, Anggi Rahmawati, a UWA Master of Biotechnology student, is investigating how saltbush plantings influence soil microbiology and overall soil health under working farm conditions. Her study focuses on saltbush growing within a mixed grass understory and examines how these shrubs shape soil bacterial communities responsible for nutrient cycling, organic matter decomposition and carbon storage. Because these microbial communities underpin soil fertility, stability and resilience, understanding their response to

saltbush is critical to assessing long-term restoration success.

This research contributes practical, farm-scale evidence to restoration efforts at UWA Farm Ridgefield. By clarifying whether established saltbush plantings foster healthier and more diverse microbial communities, improve soil conditions for plant growth and grazing, and strengthen the resilience of salt-affected paddocks.

Anggi Rahmawati
24437011@student.uwa.edu.au

UWA researchers take centre stage at WA's premier grains event

UWA researchers and students were prominent throughout the GRDC Grains Research Update 2026 program in Perth, delivering a wide array of research-driven presentations across agronomy, sustainability, crop management, and soil science.

Held on 16–17 February at Optus Stadium, the event showcased the latest research, technology, and innovations driving productivity and profitability in WA's grains sector.

A highlight of the first day was Hackett Professor Kadambot Siddique, who presented *"What is stopping us from growing more pulse crops and the influence of geopolitics on marketing pulses from WA"*. His talk examined the agronomic and market-related challenges limiting pulse production in Western Australia. Professor Siddique highlighted that adoption at scale is influenced by production factors, trade dynamics, market access, and global political developments, emphasizing the need for coordinated research and strategic market positioning.



UWA SNAGS students with Hackett Professor Kadambot Siddique and IOA Business Manager Diana Boykett at IOA stall.

Other participation from UWA included Associate Professor Louise Barton who explored GRDC sustainability initiatives and the implications of residual fertiliser nitrogen for WA's cereal crops. UWA Senior Lecturer Dr Craig Scanlan reflected on three decades of soil testing and plant nutrition research. PhD students Chloe Rout, Suma Karki, Amber Balfour-Cunningham, and Yasodhini Liyanage shared insights on intercropping strategies, aluminium toxicity mitigation, reduced spraying practices guided by beneficial insect monitoring, and innovative biofertilisers for

crops and pastures. Emerita Professor Lynette Abbott also contributed her extensive expertise across the sessions.

At The UWA Institute of Agriculture (IOA) stall, Communications Officer Ana Mendigutxia and Business Manager Diana Boykett welcomed UWA Students of Natural and Agricultural Sciences (SNAGS), and other early-career researchers, engaging them in discussions about careers, research opportunities, and the future of agriculture in WA, while sharing updates on the latest UWA initiatives and research.

International scholars bring global expertise to UWA

The UWA Institute of Agriculture is hosting a vibrant group of visiting researchers from Pakistan and China, each contributing valuable insights into sustainable agriculture, environmental science, and ecosystem management.

From Pakistan, Sana Abdul Sattar, a PhD student at the University of Agriculture, Faisalabad, is advancing research on chromium tolerance in *Brassica napus*. Her work focuses on sustainable soil remediation using biochar, biodynamic amendments, and beneficial microbes, while gaining hands-on experience in plant stress physiology and advanced laboratory techniques. Dr Mukkram Ali Tahir, Associate Professor at the University of Sargodha, brings expertise in soil salinity and its impacts under global climate change, contributing practical solutions for resilient agriculture. Both are supported by Higher Education Commission (HEC) of Pakistan.

From China, Associate Professor Xuerui Gao from Northwest A&F University, Xi'an, studies water-saving strategies for dryland agriculture, drought adaptation, and efficient rainwater use, drawing comparisons with Western Australia's semi-arid climate. Xue Mo, a PhD student at Beijing Forestry

University, is exploring the "plant-soil-microbe" feedback system in wetlands, focusing on how beneficial bacteria help plants establish and improve soil function under flooding and salinity. Jin Zeng, a PhD student at Yunnan Normal University and research assistant at Jiangsu Academy of Agricultural Sciences, investigates microbial mechanisms of N₂O emissions in orchards under mechanized deep fertilisation, aiming to support sustainable, low-carbon farming practices. All are supported by China Scholarship Commission (CSC).

These international exchanges demonstrate the value of global collaboration in agriculture. Working closely with Hackett Professor Kadambot Siddique and colleagues, the visiting researchers gain access to advanced methodologies and local expertise while contributing their own perspectives, strengthening partnerships, and driving practical solutions for sustainable agriculture worldwide.



Visiting scholars with Hackett Professor Kadambot Siddique at The UWA Institute of Agriculture.

Building on success: UWA and African partners advance ACIAR-funded rapid-cooking bean breeding

The University of Western Australia, through The UWA Institute of Agriculture, continues to strengthen its partnerships across Africa in the Australian Centre for International Agricultural Research funded Rapid Cooking Bean Project (ACIAR-RCBP).

UWA has partnered closely with the Alliance of Bioversity International and CIAT (Alliance-CIAT) in Kawanda, Uganda, which coordinates the African bean breeding network. Led by Professor Wallace Cowling with Dr Renu Saradadevi and Hackett Professor Kadambot Siddique, the UWA team works with African colleagues including Dr Clare Mukankusi (Global Breeding Lead – Common Bean, Alliance-CIAT), Pan Africa Bean Research Alliance (PRABA) Director Jean-Claude Rubyogo, and Dr Winnyfred Amongi (Alliance-CIAT). The collaboration spans six countries – Uganda, Kenya, Tanzania, Burundi, Rwanda, and Ethiopia – with contributions from national bean breeders and agronomists.

Over the first six years, the project achieved substantial genetic gains: average cooking time was reduced by ~30%, grain yield increased, and bean seeds were enhanced with higher iron and zinc content. These advances were guided by rapid cycles of genomic selection using BRIO breeding principles. Rapid-cooking beans provide social, environmental, health, and economic benefits: they reduce fuel use and smoke exposure, lessen labour burdens for women and children, and improve nutrition through biofortified beans.

Phase 2 planning for ACIAR-RCBP took place in Nairobi, Kenya, from 2–4 February 2026, with representatives from Alliance-CIAT, PABRA, and all partner countries. Discussions focused on delivering



Dr Renu Saradadevi and Professor Wallace Cowling during the visit to Kenya.

market-ready bean varieties, fast-tracking their release, and ensuring participation of both women and men smallholders in variety selection. Engagement with seed companies and processors was highlighted to strengthen distribution pathways, alongside training African plant breeders in BRIO-based methods.

Field visits to the KALRO Research Station at Katumani showcased drought tolerance screening, critical for adapting to Kenya's changing climate. At Ausquest Farm in Machakos, the team observed large-scale bean production under no-till systems, revealing strong commercial interest in rapid-cooking varieties and underscoring the importance of aligning breeding with market demand.

The ACIAR-RCBP Phase 2 meeting reinforced the project's success in co-designing bean breeding and variety release in Africa. By integrating scientific innovation, regional coordination, gender-responsive selection, and robust seed systems, the partnership is well positioned to advance rapid-cooking bean lines through final testing, release, and adoption.

UWA's engagement exemplifies how international research partnerships, built on shared priorities and capacity development, can deliver lasting benefits to African farming communities.

Professor Wallace Cowling
wallace.cowling@uwa.edu.au

All things ag: Land. Technik and Agritechnica

Roast goose, schnitzel, and agricultural engineering featured on the agenda when Centre for Engineering Innovation Agriculture & Ecological Restoration (CEI:AgER) Director Associate Professor Andrew Guzzomi and Dr Stuart Watt visited Hanover, Germany in November 2025.

Australia is a major player in agriculture, with Western Australia leading the nation in grain production and offering strong potential for innovation in agricultural engineering. Yet geographic distance can make it challenging to stay connected with global developments in machinery, AI, automation, and emerging technologies from Europe and the United States.

International events such as the Land. Technik Conference and Agritechnica are therefore crucial. CEI:AgER representatives attended both, starting with Land. Technik, an annual conference uniting leading experts from academia and industry. "I was really impressed by the quality of research and strong participation from both companies and researchers," says Associate Professor Guzzomi. "It was great to see agricultural

engineering recognised as a discipline in its own right."

Next came Agritechnica, the world's premier trade fair for agricultural machinery, attracting over 476,000 visitors from 171 countries. "Every corner had something innovative," says Dr Watt. "We came away with ideas and equipment orders already underway." The scale and diversity-spanning mechanical, electrical, AI, and software engineering-made it an unforgettable experience.

Beyond technology, the trip fostered valuable international connections. "Since returning we've recorded podcast interviews for our AgTech micro-credential with some really interesting people we met over there," says Associate Professor Guzzomi.



Sebastian Schlegel, alongside Dr Stuart Watt and Associate Professor Andrew Guzzomi.

With new equipment, collaborations forming, and future conferences marked, the visit was a significant step forward for the Centre. CEI:AgER is ready to make its mark on the global stage.

Associate Professor Andrew Guzzomi
andrew.guzzomi@uwa.edu.au

UWA contributes to shaping evidence-informed environmental policy for Nepal

On 26 January 2026, UWA participated in a national workshop in Kathmandu, Nepal, examining the role of evidence in environmental policy-making.

The workshop, jointly organised with Brunel University London and Tribhuvan University's Institute of Forestry,



UWA's Associate Professor Ram Pandit with workshop participants in Kathmandu.

focused on how evidence from large international assessments, including the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and the UN Global Environmental Outlook, is used in shaping Nepal's environmental policies.

Associate Professor Ram Pandit from UWA School of Agriculture and Environment presented preliminary findings from the British Academy-funded project, highlighting the extent to which evidence has influenced policy content, conceptual understanding, procedural approaches, and behaviour among policy-makers. Other presentations included Franklin from United Nations Framework Convention on Climate Change, discussing the global assessment process, and Ugan Manandhar, outlining funders' engagement in environmental policy research.

Since the project's inception workshop in May 2025, the team has reviewed

policy documents, conducted focus group discussions with parliamentarians and senior bureaucrats, and surveyed professionals directly involved in environmental policy-making. The workshop provided a platform to discuss how global assessment evidence is practically adopted in Nepal's environmental policy processes, revealing early indications of content and conceptual uptake in environmental management.

The workshop involved around 40 participants from government, academia, and non-governmental organisations. For UWA, the project not only strengthens international collaboration and knowledge generation but also contributes to developing the university's research agenda in environmental policy and management.

Associate Professor Ram Pandit
ram.pandit@wabsi.org.au

Can less be more?

On the afternoon of 18 March 2026, the Bayliss Lecture Theatre at The University of Western Australia buzzed with anticipation. Farmers, researchers, students, and industry representatives gathered to hear Dr Alison Bentley, Deputy Director (Science) at CSIRO Agriculture and Food, deliver the 2026 Brian Carlin Memorial Lecture.

The question guiding the lecture was both simple and urgent: *Can less be more? Rethinking nitrogen fertiliser use in Australian cereal cropping.*

Nitrogen has long been both a cornerstone and a constraint in global agriculture. Essential for plant growth yet often limited in natural systems, its widespread use through synthetic fertilisers has sustained crop yields for decades, underpinning the global importance of cereals such as wheat. Yet, as Dr Bentley outlined, this success comes with growing challenges. In many cropping systems, only 30 to 50 per cent of applied nitrogen is taken up by plants, leaving the rest to be lost to the environment, driving up costs for growers and contributing to broader environmental impacts.



Dr Alison Bentley delivering the 2026 Brian Carlin Memorial Lecture.

She also emphasised using nitrogen wisely with the 5Rs - right source, right rate, right time, right place, and right response - simple principles that make a real difference to both yields and the environment.

Drawing on decades of research in wheat and barley genetics and breeding, Dr Bentley showed how Australian cereal systems can shift towards greater sustainability without sacrificing productivity. She highlighted practical innovations, including novel field-based testing platforms to better understand crop performance, emerging seed technologies, and Biological Nitrification Inhibition (BNI), a natural process through which some plants reduce nitrogen loss and greenhouse gas emissions.

“We need to make sure that this issue is placed as a priority in policy-making,” Dr Bentley stressed, “as it has a profound impact on the world and food security.”

“I think having land and not ruining it is the most beautiful art that anybody could ever want to own,” Dr Bentley quoted the artist Andy Warhol, offering a pathway that supports both farm profitability and environmental stewardship.

During her visit to UWA, Dr Bentley engaged closely with the university’s agricultural research community. She met with Hackett Professor Kadambot Siddique, Director of The UWA Institute of Agriculture, and PhD students from UWA, toured facilities with Dr Judith Lichtenzweig and the PEG Research Collective and met with Professor Harvey Millar’s research group and Professor Wallace Cowling and Dr Sheng Cheng.

The Brian Carlin Memorial Lecture honours the legacy of Mr Brian Carlin, whose pioneering work in set stocking transformed farming in Southwest Western Australia. Established in 1966, the series continues to bring leading agricultural scientists to UWA, connecting cutting-edge research with practical application in the field.

A recording of the lecture is available on [The UWA Institute of Agriculture YouTube channel](#).



Expanding the frontiers of agricultural science through the Mike Carroll Travelling Fellowship

On 5 March 2026, The UWA Institute of Agriculture (IOA) hosted the Mike Carroll Travelling Fellowship Presentation Evening at the Bayliss Lecture Theatre, welcoming over 60 attendees, including students, colleagues, and friends of the Carroll family.

The event celebrated the achievements of the Fellowship and provided a platform for recipients to share insights from their international research experiences.

This year, UWA PhD student Boyu Zheng undertook research training at Professor Peng Yu's laboratory, Technical University of Munich, Germany, focusing on rhizosphere microbial community profiling and advanced microbiological techniques.

Miguel Vaz Pereira, PhD student at UWA on crop genetics and genomics at the Batley Lab, travelled to Europe, first attending the Brassica Conference 2025 in Giessen, Germany, before visiting the John Innes Centre, Norwich, UK, and Rothamsted Research, Harpenden, UK. His training supported research on the impact of sterols in canola and associated insect interactions.

The presentations highlighted the tangible impact of international research exposure on postgraduate training, with recipients sharing how their Fellowship experiences have informed their academic work, enhanced methodological approaches, and fostered collaboration across institutions.

Established in 2003 in memory of the late Dr Mike Carroll, former Director General of the Western Australian Department of Agriculture, the Mike Carroll Travelling Fellowship recognises his enduring contributions to the agricultural sector.

Since its inception, 34 students have benefited from this initiative, which continues to honour Dr Carroll's legacy of curiosity, collaboration, and leadership by offering transformative opportunities for scholars to engage with the global research community.

A recording of the lecture is available on [The UWA Institute of Agriculture YouTube channel](#).



Fellowship recipients Boyu Zheng and Miguel Vaz Pereira along with Carrol family and IOA Director Hackett Professor Kadambot Siddique.

The secret signals of waterlogged roots

In a world where climate change is rewriting rainfall patterns and flooding fields, oilseed crops face a growing threat: waterlogging.

Submerged roots struggle for oxygen, leading to hypoxic or anoxic stress that can stunt growth and reduce yields.

In a book chapter "Phytohormones in Waterlogging and Flooding Resilience of Oilseed Crops," UWA researchers Ali Bandehagh, Zahra Dehghanian, and Nicolas L. Taylor, explore how these crops fight back.

Published in 2025 in the book *Oilseed Crops Under Abiotic Stress* (edited by A. A. H. Abdel Latef, Springer Nature Singapore Pte Ltd.), the chapter highlights the central role of phytohormones such as ethylene, abscisic acid, and gibberellins. These hormones act as chemical messengers, orchestrating molecular, physiological, and biochemical responses that help plants form oxygen-conducting

structures like aerenchyma and adventitious roots, maintain growth under stress, and survive prolonged flooding.

By reviewing current knowledge, detailing recent advances in hormone interactions, and discussing future strategies like genome editing and breeding for waterlogging resilience, the chapter provides a roadmap for securing oilseed crop productivity under climate-induced flooding. Its relevance is clear: understanding and harnessing phytohormones could make the difference between crop failure and survival in a wetter, more unpredictable world.

Dr Ali Bandehagh
ali.bandehagh@uwa.edu.au



Afsaneh Rialy, Sam Lloyd, Angad Singh, and Suyog Subedi at UWA Farm Ridgefield.

UWA Farm Ridgefield trial delivers powerful insights on methane reduction

17-month study delivers critical data to shape future low-emission grazing systems.

The Methane Emission Reduction in Livestock Stage 3 Part 1 trial has concluded at UWA Farm Ridgefield, marking an important step forward in developing practical methane mitigation strategies for grazing sheep.

Over the 17-month project, the research team generated a substantial dataset that will inform future approaches to reducing livestock emissions while maintaining productivity. Regular liveweights, body condition scores, rumen fluid samples, blood samples, wool samples and methane emission measurements were collected to build a comprehensive understanding of animal performance and environmental impact.

The scale of the trial was significant. More than 600 lambs were born throughout the project, with each lamb individually caught, weighed and tagged shortly after birth. This level of detailed monitoring provides valuable insight into how methane reduction strategies interact with growth, reproduction and overall animal health, a crucial consideration for industry adoption.

The trial was led by post-doctoral researchers Dr Stephanie Payne and Dr Suyog Subedi, supported by a committed team including Angad Singh, Sam Lloyd, Jamie King, Hatem Al-Khazraji, and current Agricultural Science students Janet Kok and Emma Pretorius. The contribution of casual research and technical assistants was essential to managing the intensive on-farm workload.

The project also fostered strong international collaboration. Visiting students Halak Chauhan from University of North Carolina Wilmington, Afsaneh Rialy from University of Kurdistan, Daria Lotito from University of Naples Federico II and Clement Chatard from VetAgro Sup provided invaluable support while gaining hands-on experience in Australian on-farm research.

Together, the team has laid important groundwork for future methane mitigation strategies that balance productivity with climate responsibility.

Dr Stephanie Payne
stephanie.payne@uwa.edu.au



Associate Professor Nic Taylor at the award ceremony.

International acclaim for Associate Professor Taylor's impact in plant physiology research

Associate Professor Nicolas Taylor was awarded the International Fellowship of the Indian Society for Plant Physiology (ISPP), New Delhi, for 2025, in recognition of his outstanding contributions to plant physiology.

The Fellowship was presented during the inaugural session of the 6th International Conference on Plant Physiology (ICPP 2025) at Tamil Nadu Agricultural University, Coimbatore, on 15th December 2025.

ISPP congratulated Professor Taylor on his significant research contributions in Plant Physiology. The award highlighted his work on how proteins, lipids, and metabolites influence plant responses to environmental stresses and crop productivity, leveraging plant phenotyping and machine learning.

Reflecting on the award, A/Professor Taylor said he was deeply honoured by the recognition from the Indian Society for Plant Physiology. "ISPP has long played a pivotal role in advancing plant physiology research across diverse agro-ecological systems, and I have greatly valued the scientific exchanges and collaborations that have emerged through this community over the years," he said.

He noted that the Fellowship reinforces the importance of international collaboration in addressing global challenges such as climate resilience and food security, and highlights UWA's growing impact in data-driven plant science, phenomics, and stress biology. "This recognition reflects not only individual contributions, but the strength of collaborative research teams at UWA and our shared commitment to translating fundamental plant science into real-world agricultural outcomes."

Associate Professor Nic Taylor
nicolas.taylor@uwa.edu.au

UWA set to take precision agriculture to new heights

The Microelectronics Research Group (MRG) at The University of Western Australia (UWA) is accelerating commercialisation of its cutting-edge MEMS spectrometer-on-a-chip technology for agricultural applications, advancing a powerful new frontier in precision farming.

Funded by an Australian Economic Accelerator Ignite project and supported by advanced microfabrication facilities at the WA node of the Australian National Fabrication Facility (ANFF-WA), the team is working closely with commercial partner Magic Wavelength Pty. Ltd. to bring compact, high-performance scanning spectrometers into real-world agricultural use. These sensors are designed to deliver rapid, in-field crop analysis, enabling more targeted and efficient input use.

The partnership has recently expanded to include Indian drone manufacturer Avironix, marking a significant step toward fully integrated drone-mounted crop scanning systems. Together, the collaborators aim to deliver drone-mounted spectrometers capable of high-resolution crop monitoring and precision spraying applications.

In January, Avironix CEO Peter Langford visited UWA to deliver one of the company's large crop-sprayer drones, now set to serve as a test platform for the integrated scanning technology. The team is currently progressing through the certification

process to enable the drone's operation in Australia.

A preliminary prototype of the drone-mounted scanner has already been developed, demonstrating the feasibility of compact, airborne spectral sensing tailored to broadacre farming systems.

Dr. Kevin Fynn, Managing Director of Magic Wavelength, said the collaboration represents a major milestone for agricultural innovation.

Peter Langford, Avironix CEO said "This project showcases how advanced microelectronics developed at UWA can translate into practical tools that improve productivity and sustainability on farms. By integrating sensing and spraying in a single drone platform, we are moving closer to truly data-driven agriculture."

With strong industry engagement and global collaboration, UWA's microelectronics research is poised to make a tangible impact on the future of precision agriculture.

Associate Professor Dilusha Silva
dilusha.silva@uwa.edu.au



Avironix team with Professor Lorenzo Faraone.



Dr Ding in the field.

Advancing the future of livestock through genetics, microbes and behaviour

UWA School of Agriculture and Environment has appointed Dr Luoyang Ding as a Lecturer in Livestock Science, strengthening research in animal welfare, behaviour, and biological systems central to modern livestock production.

At the core of his work is understanding how genetics and gut microbiota shape livestock temperament, cognition, welfare, and productivity. Dr Ding's research builds on UWA's strengths in livestock production, reproductive biology, nutrition, and pasture systems. "It adds a mechanistic layer focused on behavioural biology and host-microbiome interactions, showing how temperament and stress responsiveness influence both productivity and welfare outcomes," he explains.

While traditional livestock research prioritises growth, reproduction, and feed efficiency, Dr Ding shows that temperament is more than a behavioural observation. "Behavioural traits such as temperament are often treated as secondary or difficult-to-measure variables," he says. His findings demonstrate that these traits have genetic, microbial, and physiological foundations, affecting health, immune function, meat quality, and overall performance.

"My previous findings on genetic markers associated with sheep temperament open the possibility of incorporating behavioural resilience into selective breeding programs, alongside traits like growth rate and meat quality," he adds. "On the microbiome side, my recent

studies help to understand how gut microbial communities influence stress responses and tested the possibility to reduce stress responses by rumen microbe inoculation."

Dr Ding is also developing technological solutions to make welfare monitoring practical for farmers. "My work on daily activity and core body temperature aims to develop digital and intelligent protocol that automatically monitor behavioural indicators of welfare. This allows earlier intervention and more data-driven management decisions at the farm level," he explains.

Looking ahead, Dr Ding wants to translate complex biology into actionable outcomes for livestock systems.

"I aim to establish a research platform at UWA that integrates genetics, microbiomics, behaviour, and digital technologies to better understand and enhance livestock welfare and productivity," he says.



Dr Ding at Crawley Campus.

He is exploring how host genetics and gut microbiota shape temperament and stress resilience, whether heritable biomarkers can predict early-life welfare outcomes, how behaviours might be influenced through gut microbes, and whether AI and sensor technologies can provide scalable measures of stress and welfare in commercial systems.

Through this work, he hopes to create livestock systems that are both more productive and ethically managed. "Ultimately, I hope to deliver outcomes that allow welfare-related traits to be incorporated into breeding indices and farm management strategies, contributing to livestock systems that are not only more productive, but also more ethically and sustainably," he concludes.

Dr Luoyang Ding
luoyang.ding@uwa.edu.au

Smarter nitrogen uses for profitable and sustainable canola

GRDC-funded research led by UWA is advancing understanding of nitrogen use efficiency to strengthen the productivity and sustainability of Australian canola systems.



Canola flower at UWA Glasshouse.

Canola is one of Australia's most important oilseed crops, but it is also highly demanding in nitrogen. Typically, around 80 kg of nitrogen per hectare is required to produce one tonne of grain, yet less than half of the applied nitrogen is actually taken up by the plant. The remainder is lost through leaching, runoff, or gaseous emissions, leading to both economic losses for growers and significant environmental impacts.

Led by Professor Sergey Shabala and a large team of UWA researchers, this project aims to improve nitrogen use efficiency (NUE) in canola by better understanding how plants acquire, transport and utilise nitrogen under contrasting supply conditions. By identifying physiological traits and proteomic variations associated with higher NUE, the research will help define priority targets for future breeding programs focused on more sustainable and cost-effective canola production.

The first phase of the project is a large-scale glasshouse experiment, screening 300

canola varieties under high (equivalent to 120 kg N/ha) and low (40 kg N/ha) nitrogen treatments.

The experiment is conducted across two stages: a vegetative phase examining early growth and biomass accumulation, and a reproductive phase assessing yield and seed traits. Measurements also include biomass, yield components and tissue nitrogen concentration to capture variation in NUE followed by seed proteomics.

Field trials will be conducted in 2026 and 2027 with selected varieties and breeding lines to validate findings from the glasshouse studies.

The project is expected to identify genotypic differences in NUE and establish the groundwork for breeding canola varieties that produce more with less nitrogen.

Professor Sergey Shabala
sergey.shabala@uwa.edu.au

Bridging research and STEM education to drive innovation in agriculture

From satellite data to buzzing drones, Roberto Lujan Rocha is shaping the future of agriculture by making technology practical, accessible, and inspiring.

As a UWA researcher and PhD student, he focuses on weeds. "Current artificial intelligence still struggles to accurately identify morphologically similar species. At early growth stages, grass weeds can look almost identical to wheat, making them difficult to detect." Roberto is developing models that predict where weeds are likely to emerge.

By combining satellite imagery, yield anomalies, and environmental data, his work enables proactive and spatially informed management that will help farmers save costs, reduce herbicide resistance, and protect productivity.

But Roberto's vision extends beyond research papers. Through Squadrone, the

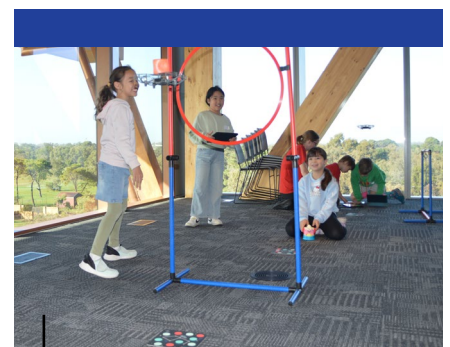
company he founded, he is connecting agricultural innovation with classrooms and communities. From drone workshops and coding clubs to mini-drone light shows, Squadrone sparks curiosity and shows young people how agriculture is a high-tech, creative field.

"Agriculture is becoming increasingly data-driven," Roberto says. "By engaging students early, we give them the skills and confidence to be part of that transformation."

For him, the best way to bridge that gap between university research and the next generation is by making agricultural research visible, accessible, and relatable. "Practical demonstrations, interactive workshops, and programs that combine coding, drones, and real agricultural data show young people that agriculture is a sector where they can apply science, technology, and creativity" he explained.

In his view, agriculture intersects with fields like defence, space, and artificial intelligence, and young people should see it as part of the future of innovation rather than just as traditional farming.

Roberto Lujan Rocha
roberto.lujanrocha@uwa.edu.au



Kids playing with drones at the Squadrone workshop at Murdoch University.

Unlocking the secrets beneath our feet: Professor Brajesh Singh joins UWA

When you think about the engines of life on Earth, microbes might not be the first thing that comes to mind. Yet for Distinguished Professor Brajesh Singh, the invisible communities living in soil hold the key to our planet's future.

Recently appointed to the UWA School of Agriculture and Environment and The UWA Institute of Agriculture, Professor Singh brings a unique combination of fundamental research, global policy impact, and hands-on solutions for sustainable agriculture and environmental restoration. "I am delighted to join the academic community at UWA, a leading research-intensive university that holds the 1st national ranking in Agriculture Science," he says.

"I see enormous opportunity to work together with our colleagues in UWA to contribute towards addressing some of the key global challenges linked to food security, biodiversity loss, and environmental health."

Professor Singh's research, spanning more than 350 publications and advisory roles with organisations including the Food and Agriculture Organization of the United Nations, has advanced understanding of how soil biodiversity underpins ecosystem functions.

"Through my fundamental research, my work identifies the quantitative relationships between soil biodiversity and ecosystem functions, and how natural and anthropogenic pressures such as global change affect this," he explains.

But understanding the problem is only part of the equation. Professor Singh is equally focused on practical solutions.

"Increasingly, my research focuses on using emerging digital and AI tools to predict current and future distributions of microbial communities, from regional to global scales, to inform agriculture industries, policy agencies, and support growth of bio-innovation and local industry," he says.

Turning this vision into reality begins with the lab. "The priority is to establish the lab to ensure current research projects and student activities continue without delay.

There will be a significant number of people, including multiple postdocs, moving with us," he explains. "After this, I will start conversations with colleagues at UWA across disciplines and with industrial and governmental agencies across WA, to identify areas of interest and partnerships aligned to the strategic vision of UWA."

Supporting him is a talented team, including Associate Professor Catriona Macdonald, who studies how climate, land management, and environmental change affect nutrient cycling and microbial processes, and Dr Jun-Tao Wang, who uses soil informatics and genomic tools to track microbial communities and assess soil health.

Looking ahead, Professor Singh is clear about his role.

"Our goals are to boost agricultural profitability and enhance environmental resilience."

We aim to provide our farming communities and other stakeholders with tools and knowledge that can achieve these twin goals simultaneously. Ultimately, economic resilience is fundamentally linked to many positive social outcomes. We aim to foster growth of agricultural and bio-innovation sectors to enhance profitability, stimulate industry expansion, and create new employment opportunities in WA and beyond."

Professor Brajesh K Singh
brajesh.singh@uwa.edu.au



Professor Brajesh K Singh.



Dr Jun-Tao Wang.



IOA Director Hackett Professor Kadambot Siddique with attendees to the conference.

UWA showcases global leadership in sustainable agriculture at Sixth International Agronomy Congress in New Delhi

The UWA Institute of Agriculture (IOA) Director, Hackett Professor Kadambot Siddique, represented The University of Western Australia (UWA) at the Sixth International Agronomy Congress, held 24–26 November 2025 in New Delhi and hosted by the Indian Society of Agronomy.

The congress was convened under the theme *Re-envisioning Agronomy for Smart Agri-food Systems and Environmental Stewardship*. Professor Siddique was invited to deliver both a keynote and a lead address, contributing to international discussions on strengthening resilient, climate-smart agri-food systems capable of addressing food security, productivity and environmental sustainability challenges.

He also served as Co-chair of a special session on impactful farmer innovation at

the invitation of Dr Rajbir Singh, Deputy Director General (Extension) at the Indian Council of Agricultural Research. In his lead presentation, *Role of Farmer Groups in Sustainable Agriculture*, Professor Siddique highlighted the importance of collective action, farmer networks and locally driven innovation in accelerating the adoption of sustainable practices at scale. The session featured nine innovative farmers from across India, showcasing practical advances that complemented his research-based perspective.

During his visit to India, Professor Siddique also led a workshop at Galgotias University in Delhi on biochar's role in sustainable agriculture. He outlined how biochar improves soil health, boosts crop productivity and reduces environmental impact, with an interactive Q&A session engaging faculty and students.

Professor Siddique also visited Amity University in Delhi, where he serves as an Adjunct Professor, and delivered a lecture to both students and faculty. The University of Western Australia maintains an ongoing collaboration with Amity University.

Hackett Professor Kadambot Siddique
kadambot.siddique@uwa.edu.au

Comic-book style contracts helping farmers share data

An interdisciplinary team of researchers led by Professor Camilla Andersen, from The University of Western Australia's Law School, have been engaged to deliver farmer-centred contracting practices for a project led by the Department of Primary Industries and Regional Development (DPIRD) and funded by the Western Australian government.

Through a three-year program of work the initiative aims to enhance the clarity, transparency and equity of data sharing through DPIRD's novel data exchange platform Extrata and other commercial platforms.

Professor Andersen has extensive experience with industry-research collaboration in comic book contracting, ranging from medical genomics to banking, on everything from employment contracts to product disclosure statements.

"This project responds to farmer demand for non-corporate alternatives to dominant agri-tech business models," Professor Andersen said.

"The initiative aims to give farmers confidence and control when signing up to data sharing licence contracts or agreements for a range of purposes."

Key team members include Professor Sharon Purchase, from UWA Business School, whose expertise in consumer value, trust, and agribusiness relationships will examine how contract transparency benefits data-sharing participants; Professor Julia Powles (UWA Tech and Policy Lab), a leading expert in data governance, formerly Executive Director at UCLA Institute for Technology, Law & Policy, providing oversight and consultancy; and Professor Leanne Wiseman (Griffith University), whose research explores how intellectual property affects access to digital technologies and agricultural data, with a focus on the Right to Repair.

DPIRD project lead Darren Gibbon said the department would work closely with UWA to transform how farmers understand data-



Professor Sharon Purchase, Darren Gibbon and Professor Camilla Andersen.

sharing and licensing. "By replacing dense legal text with clear, pictorial contracts, we aim to cut confusion, boost transparency, and empower farmers to make confident, informed decisions about their data," he said.

Professor Camilla Andersen
camilla.andersen@uwa.edu.au

Unravelling parasite survival strategies



Dr Paz in the paddock with sheep.

Parasitic worms represent a persistent challenge for global sheep production, causing significant losses and increasingly evading drug treatments.

In a newly accepted study in *Symbiosis* (Springer), Dr Erwin Paz and colleagues from the Marshall Centre and UWA School of Agriculture and Environment reveal a hidden ally aiding these parasites: their own gut bacterial communities.

Focusing on *Teladorsagia circumcincta*, a major cause of diarrhoea and weight loss in sheep, the team identified what they call the “nematobiome”—a term introduced in this study to describe the worm’s gut microbiome. Unlike the bacteria in the sheep’s stomach, the nematobiome is entirely distinct and includes three potentially new bacterial species. These bacteria appear to support the parasite through antioxidant production, nutrient scavenging, and defense against microbial competitors, forming a mutually beneficial relationship.

The findings provide crucial insights into how parasites persist in hostile environments and highlight potential avenues for innovative control strategies. Beyond parasite management, the bacterial compounds may offer biotechnological applications, deepening our understanding of complex host–parasite–microbe interactions.

This work represents an international collaboration involving Dr Paz, Dr Eng Guan Chua, Emeritus Professor Graeme Martin, Dr John Quiñones, Dr Rommy Díaz, and Dr Chin Yen Tay from UWA and Universidad de La Frontera, Chile.

Dr Erwin Paz Munoz

erwin.pazmunoz@uwa.edu.au

AHRI’s Dr Kehua Wang, AHRI PhD student Miranda Slaven, WeedSmart’s Joanne Contencin, Kalyx’s Yaseen Khalil, AHRI’s Shane Baxter and AHRI PhD students Chloe Rout and Luk Lam. Photo: AHRI



WeedSmart extends UWA herbicide resistance program into 13th year

WeedSmart, Australia’s national herbicide resistance extension initiative, has entered its 13th year, continuing to translate UWA research into practical guidance for farmers and agronomists.

Weeds continue to impose a heavy economic burden on Australian agriculture, costing grain and cotton growers an estimated \$4.43 billion annually, according to GRDC data. WeedSmart highlights the importance of protecting existing herbicides to ensure the long-term viability of the grains industry.

The program, supported by the Grains Research and Development Corporation (GRDC), Cotton Research and Development Corporation (CRDC), and commercial partners, is entering Phase 7 of its national extension activities, aiming to promote sustainable herbicide use through integrated weed management strategies.

Central to the initiative is the “Big 6” framework of integrated weed management, which encourages growers to combine cultural, mechanical, and chemical approaches.

While adoption of these strategies has increased over the past decade, recent herbicide resistance test results suggest the threat remains significant. Economic modelling by the UWA post-graduate Dr Rick Llewellyn in his 2025 study *Impact of Weeds on Australian Grain and Cotton Production* underscores the ongoing challenge.

WeedSmart works closely with the Australian Herbicide Resistance Initiative (AHRI) at UWA to translate cutting-edge research into practical advice. The Perth-based program has expanded its digital outreach, recently appointing UWA communications graduate Abbey Wheeler to manage its communications strategy.

The program also hosts WeedSmart Week, an annual event that connects farmers, agronomists, and researchers for hands-on learning. This year, WeedSmart Week will be held in Griffith, NSW, in August.

Abbey Wheeler

weedsmart@uwa.edu.au

Reinventing plasticulture to grow food without the eco hangover

A global team of scientists has proposed a major overhaul of plasticulture – the use of plastic mulch in agriculture – to maintain yield gains without harming the environment.

Plasticulture boosts crop production by up to 30 per cent and improves water efficiency by nearly 50 per cent, making it vital for global food security. However, persistent plastic residues in soils and microplastics in food chains have raised serious ecological and health concerns.

A new study in *Nature Communications*, co-authored by Hackett Professor Kadambot Siddique, Director of The UWA Institute of Agriculture, with collaborators from China, the US, Canada, Morocco, Japan, and Switzerland, outlines six priorities for sustainable plastic mulch use. These include AI-enabled precision application, bioengineered “smart” mulches, and global plastic offset mechanisms.

“Scaling up AI-driven eco-farming could halve plastic use without reducing yields,” Professor Siddique said. “Advances in biodegradable films and organic alternatives can cut soil contamination and environmental impact.”

The study also recommends circular approaches such as blockchain-enabled traceability to track plastics and prevent waste, alongside expanded reuse and recycling infrastructure. Local incentives could encourage farmers to adopt low- or zero-plastic practices, while embedding plastic management into UN carbon trading frameworks would link pollution control to global climate goals.

“Together, these strategies can pivot plasticulture toward a climate-resilient, ecologically sustainable model – balancing food security with environmental stewardship in an era of climate uncertainty,” Professor Siddique said.

Hackett Professor Kadambot Siddique
kadambot.siddique@uwa.edu.au

Plastic films applied to the soil surface as physical mulches.



Awards and industry recognition

Name	Award
Dr Sarah Whitnall	2026 AARES (Australasian Agricultural and Resource Economics Society) Quality of Research Discovery Award - Early to Mid-Career Researchers.
Associate Professor Nic Taylor	15 Dec 2025 International Fellow of the Indian Society of Plant Physiology
Emerita Professor Lynette Abbott	WA Women’s Hall of Fame

Visitors to IOA

Name of visitor	Visitor’s organisation and country	Host details	Dates of visit
Xue Mo	Beijing Forestry University, China	Kadambot Siddique	June 2025 - August 2026
Xuerui Gao	Northwest Agriculture and Forestry University, China	Kadambot Siddique	December 2025 - December 2026
Sana Abdul Sattar	University of Agriculture, Faisalabad, Pakistan	Kadambot Siddique	December 2025 - June 2026

Name of visitor	Visitor's organisation and country	Host details	Dates of visit
Jin Zeng	Yunnan Normal University, China	Kadambot Siddique	December 2025 – December 2026
Rai Mukkram Ali Tahir	Pakistan	Kadambot Siddique	February 2026 – October 2026
Asha Karunaratne	Sabaragamuwa University, Sri Lanka	Kadambot Siddique	September 2025 – December 2025

New postgraduate research students (PhD)

Student	Topic	School	Supervisor(s)	Funding body
Ann Uwera	Drought and heat stress effect on the cooking time and nutritional quality of common bean	School of Agriculture and Environment and IOA	Prof Wallace Cowling, Prof Kadambot Siddique,	UWA and WAARC
Dori Kusuma Jaya	Characterisation of Local Agricultural Wastes-Biochar as a Composting-Bulking Agent for Improving Soil Microbiome and Potatoes Yield under Tropical Semi-Arid of Lombok, Eastern Indonesia	School of Agriculture and Environment and IOA	Prof Nanthi Bolan, Prof Kadambot Siddique, Emielda Yisuharni	

Memorandum of understanding

Name	Date
Australian and Indian Partners in the Australia India Water Centre	26 January

Research grants

Title	Funding period	Funding body	Investigators
How climate extremes shape plant microbiome functions and pathogen invasion	15/02/26 - 14/02/29	ARC Australian Research Council	Dr Chao Xiong
ZNE-Ag CRC Project 4010 Enabling Adoption	1/02/26 - 1/03/30	ZNE-AG CRC LIMITED	Prof Marit Kragt Marit, Dr Heather Bray, Dr Bradd Witt, Prof Ruth Nettle, Dr Joanne Wisdom, Brian Ruddle
GRDC International Visiting Fellow	15/01/26- 30/06/26	Grains Research & Development Corporation	Dr Ken Flower, Dr Michael Ashworth, Prof Adj Martin Vila-Aiub
Assessment of microplastics in soil and grain crop systems and potential mitigation using microbe modified biochar	1/05/26 - 1/05/29	Forrest Research Foundation	Dr Nishita Narwal, Dr Kosala Ranathunge, Prof Nanthi Bolan, Prof Kadambot Siddique

UWA IOA 2026 Publications

Peer Reviewed Journals

Previously unreported

- Pan Y, Tan T, Meng J, Guo H, Dong Y, Cui Y, Yu N, Jin X, Zhang Y, Zou H, Bolan N, & Siddique KHM (2026). Biochar and moisture variability shape soil carbon pools via microbial carbon-degrading genes. *Journal of Environmental Management* **397** doi:10.1016/j.jenvman.2025.128157
- Li G, Ma L, Zhang Q, Li Y, Wu M, Niu W, & Siddique KHM (2025). Balancing maize yield, greenhouse gas emissions, and soil functions through nitrogen fertilizer reduction and microbial network regulation. *Land Degradation & Development* doi:10.1002/ldr.70369
- Raza A, Salehi H, Madadkar Haghjou M, Rahman MA, Peng Y, Li Y, Charagh S, Khan MIR, Chen Y, Siddique KHM, & Hu Z (2026). The hidden role of amino acids and secondary metabolites in plant drought tolerance. *Plant Science* **364** doi:10.1016/j.plantsci.2025.112919
- Mo X, Shi S, Chen Y, Siddique KHM, Liu J, Zhang Z, & Zhang M (2026). Bacterial regulatory strategies for ecological function and stability of plant-soil continuums under hydrological variability. *CATENA* **263**. doi:10.1016/j.catena.2025.109714
- Jiang F, Li Y, Xiao C, Li L, Siddique KHM, Yang L, Li C, & Hu W (2025). Combined application of irrigation and biochar increased sugar beet yield by optimizing source-sink relationships. *Plant Soil* doi:10.1007/s11104-025-08139-2
- Li Y, Lu J, Feng H, Chen J, Yang Q, & Siddique KHM (2025). Soil cellulase activity responds to straw return and correlates with soil organic carbon dynamics: A global meta-analysis. *Plant Soil* doi:10.1007/s11104-025-08223-7
- Babington S, Ding L, Tilbrook AJ, Maloney SK, & Blache D (2025). A comparison of normalization methods for the expression of genes associated with oxidative stress in the liver of sheep. *BMC Genomic Data* **26** Article 53 doi:10.1186/s12863-025-01345-y
- Murtini ES, Setyawan HY, Yuwono SS, Mamluhah L, Rahayu LF, Zhu M, & Okoye CO (2025). An investigation into the preparation and characteristics of carbonized rice straw for black food dye. *Cogent Food and Agriculture* **11** Article 2546987 doi:10.1080/23311932.2025.2546987
- Huang T, Sun R, Wu Q, Zhang X, Li J, Zhou B, Liao Y, Qin X, Reynolds M, & Siddique KHM (2025). Assessment of genetic improvements in wheat yield and nitrogen use efficiency under different nitrogen input levels: A global perspective. *European Journal of Agronomy* **171** doi:10.1016/j.eja.2025.127813
- Chen S, Zhang Y, Ma J, Bai M, Long J, Liu M, Chen Y, Guo J, & Chen L (2025). Contribution of soil Microbial Necromass Carbon to Soil Organic Carbon fractions and its influencing factors in different grassland types. *EGUsphere* doi:10.5194/egusphere-2025-1122
- Wu Z, Zhang Y, Fan Y, Wang C, Li B, Rengel Z, Shen J, le Cadre E, Whalen J, & Tang X (2025). Decadal manure substitution reshapes microbial communities to drive plant and microbial carbon accumulation in soil carbon fractions. *Geoderma* **463** Article 117581 doi:10.1016/j.geoderma.2025.117581
- Chen J, Huang Y, Zhou X, Wen Y, Chen Q, Gao H, Sun D, Wang L, Ming A, & Lambers H (2025). Decreased management intensity and mixed planting enhance Eucalyptus productivity through improved soil quality under eco-silviculture management in southern China. *Plant and Soil* **516** 2157-2177 doi:10.1007/s11104-025-07853-1
- Li T, Zheng J, Li Y, Mou Z, Zhang J, Wu W, Wang T, Wang F, Wang J, Hui D, Wu D, Yuan Y, Lambers H, Sardans J, Penuelas J, & Liu Z (2025). Divergent chemical responses of soil carbon and phosphorus to nutrient addition mediated by functional carbon pools in tropical forests. *Plant and Soil* doi:10.1007/s11104-025-08102-1
- Samuditha S, Fernandez AB, Siddique KHM, Biswas J, & Vithanage M (2025). Exploring Biochar Impacts Through Omics Sciences: Enhancing Rhizobiome Understanding. *J Soil Sci Plant Nutr* **25** 8522-8544 doi:10.1007/s42729-025-02650-2
- Kharel S, Foster K, Guthrie M, & Kingwell R (2025). Farm profit impacts of consecutive drought years under climate scenarios in Southwestern Australia. *Australian Farm Business Management Journal* **22** Paper 1 doi: not available
- Pang J, Xu W, & Siddique KHM (2025). Harnessing the rhizosphere for sustainable agriculture: prospects for intercropping systems. *Plant and Soil* doi:10.1007/s11104-025-07983-6
- Sarfaraz Q, Sharma R, Drescher GL, Zafar M, Shafi MI, Anderson GC, da Silva LS, & Solaiman ZM (2025). Interactive effects of biochar and ammonium fertilizer on wheat yield, soil acidity and their residual effect on soybean under no-tillage conditions. *AIMS Agriculture and Food* **10** 819-838 doi:10.3934/agrfood.2025043
- Wang W, Wang Y, Li JM, Li MY, He P, Cui Y, Ji SJ, Wang WY, Kavagi L, Ashraf M, Chen Y, Rillig MC, & Xiong YC (2026). Long-term intercropping mitigates warming-induced carbon loss via enhancing microbial and substrate resistance. *Soil Biology and Biochemistry* **212** doi:10.1016/j.soilbio.2025.110022
- Zhang K, Bai J, Wang J, Guo J, Sun H, Liu J, Siddique KHM, & Mao H (2025). Polyethylene microplastics modulate zinc oxide nanoparticle toxicity: Effects on nutrient dynamics and rhizosphere bacterial community in pakchoi. *Applied Soil Ecology* **216** doi:10.1016/j.apsoil.2025.106505
- Whitnall S, & Beatty T (2025). Postharvest losses from temperature during transit: Evidence from a million truckloads. *American Journal of Agricultural Economics* doi:10.1111/ajae.70019
- Yang R, Harrison MT, Yang Y, Wang C, Shabala S, Huang M, Zhao C, Zhou M, Sun C, & Liu K (2025). Pre-harvest sprouting in cereals: Global incidence, impacts and mitigation strategies. *Field Crops Research* **333** Article 110111 doi:10.1016/j.fcr.2025.110111
- Mercer GD, Mickan BS, Gleeson DB, Walker E, Krohn C, Buhmann CH, & Ryan MH (2025). Probing the pump: Soil carbon dynamics, microbial carbon use efficiency and community composition in response to stoichiometrically-balanced compost and biochar. *Soil Biology & Biochemistry* **205** Article 109770 doi:10.1016/j.soilbio.2025.109770
- Khan KS, Naveed M, Ditta A, Alam T, Mumtaz MZ, Abbas A, Manzoni S, & Li L (2025). Soil C/P stoichiometry mediated microbially driven phosphorus mobilization: New insight in soil P management. *Journal of Soil Science and Plant Nutrition* **25** 7691-7709 doi:10.1007/s42729-025-02624-4
- Ye D, Lin Y, Liu T, Zhang X, Tang Y, Wang K, Huang H, Yu H, Wang Y, He X, & Li T (2025). Soil microbial community harboring key genes drives rhizosphere phosphorus mobilization of phosphorus-accumulating *Polygonum hydropiper*. *Applied Soil Ecology* **213** Article 106314 doi:10.1016/j.apsoil.2025.106314
- Xie L, Yang Y, Ma J, Deng J, Gille CE, Zhang Z, Liu M, Robson TM, & Wang QW (2025). Variation in seedling growth, root exudates and rhizosphere microbial communities of two temperate tree species under fluctuating light and extreme drought. *Plant and Soil* **517** 487-507 doi:10.1007/s11104-025-07878-6

January to April

- Zhou L, Tao H, Qiliang Y, Feng H, Siddique KHM, & Jin T (2026). Biochar particle size shapes soil water-oxygen conditions and delays senescence in sweet corn under mulched drip irrigation. *Soil and Tillage Research* **258** doi:10.1016/j.still.2025.107049
- Duan C, Li J, Wu S, Yu L, Feng H, & Siddique KHM (2025). Monitoring abandoned cropland in the hilly and gully regions of the Loess Plateau using Landsat time series images. *Journal of Integrative Agriculture* doi:10.1016/j.jia.2025.04.021
- Pan Y, Tan T, Ren R, Meng J, Yu N, Jin X, Zhang Y, Zou H, Bolan N, & Siddique KHM (2026). Soil organic carbon decomposition in response to moisture, microbial communities, and biochar addition in Alfisols. *Biochar* **8** 5 doi:10.1007/s42773-025-00513-8
- Hu X, Chen S, Ping X, Siddique KHM, & Cowling WA (2025). Time-series transcriptomic analysis of flower tissue during heat stress in heat-resilient and

- heat-sensitive *Brassica napus* L. *Frontiers in Genetics* **16** doi:10.3389/fgene.2025.1736538
- Yang X, Zhang M, Huang T, Dang P, Zhang M, Han X, Sun R, Reynolds M, Song F, Joseph CO, Siddique KHM, Hussain T, & Qin X (2026). Film mulching mitigates yield loss by enhancing growth and nitrogen uptake in late-sown winter wheat on the Guanzhong Plain. *Agriculture* **16** 198 doi:10.3390/agriculture16020198
- Li Z, Shi N, Yuan Y, Chang H, Meng Y, Shan W, Moskvicheva E, Ansabayeva A, Jia Z, Ren X, Siddique KHM, Ding R, Wu P, Li H, Liu J, & Zhang P (2026). Deep fertilization effects on potato production and GHG emissions depend on soil C:N:P-enzyme interactions: Evidence from a 4-year study. *European Journal of Agronomy* **175** doi:10.1016/j.eja.2026.128001
- Wu M, Zhang T, Chu J, Gong Y, Xia Z, Wang Q, Siddique KHM, & Lu H (2026). Temporal sensitivity of maize starch to short-term low-light stress: Critical window during early grain filling. *Journal of Agriculture and Food Research* **26** doi:10.1016/j.jafr.2025.102596
- Samuditha S, Fernandez AB, Siddique KHM, Biswas J, & Vithanage M (2025). Exploring Biochar Impacts Through Omics Sciences: Enhancing Rhizobiome Understanding. *Journal of Soil Science and Plant Nutrition* **25** 8522–8544 doi:10.1007/s42729-025-02650-2
- Jia Y, Li Y, He J, Biswas A, Siddique KHM, Hou Z, Luo H, Wang C, & Xie X (2025). Enhancing precision nitrogen management for cotton cultivation in arid environments using remote sensing techniques. *Field Crops Research* **321** doi:10.1016/j.fcr.2024.109689
- Yang N, Zhang M, Jia H, Zhao X, Farooq M, Dang P, Wang S, Pan X, Joseph CO, Siddique KHM, Xue J, & Qin X (2026). Response of maize to supplemental irrigation and other agronomic practices in different regions of China: A meta-analysis. *Agricultural Water Management* **325** doi:10.1016/j.agwat.2026.110159
- Li Y, Liang J, Wang H, & Siddique KHM (2025). Editorial: Biochar in agroecosystems: optimizing soil fertility and crop productivity. *Frontiers in Sustainable Food Systems* **9** doi:10.3389/fsufs.2025.1609784
- Jiang Q, Li Y, Yang Q, Yang L, & Siddique KHM (2026). Response of reactive nitrogen loss to straw return: a meta-analysis. *J Soils Sediments* **26** 7 doi:10.1007/s11368-025-04215-3
- Ahmad AS, Yi L, Biswas A, Song X, Ishchanov J, & Siddique KHM (2026). Metabolic transformation and urban heat island dynamics: Achieving thermal balance in Chinese megacities. *International Journal of Environmental Research* **20** 63 doi:10.1007/s41742-025-01029-6
- Zhang J, Wang B, Zhang Q, Luo P, Fu Q, Liu C-A, & Siddique KHM (2026). Quicklime sterilization of planting holes and topsoil enhances Sacha inchi yield and suppresses root rot in tropical conditions. *Industrial Crops and Products* **241** doi:10.1016/j.indcrop.2026.122779
- Li Y, Wang X, Gong F, Guan Y, Wu Q, Chi D, Bolan NS, & Siddique KHM (2026). Alternate wet-dry irrigation coupled with magnesium-biochar fertilizer improves carbon sequestration, NH₃ mitigation, and water-N use efficiency in rice paddies. *Environmental Technology & Innovation* **41** doi:10.1016/j.eti.2026.104765
- Musani T, Sharma R, Lim H, Goes A, Plester D, Sarathchandra SS, Siddique KHM, & Solaiman ZM (2026). From industrial residue to agronomic asset: Gyplime's role in enhancing wheat yield and soil health. *Journal of Soil Science and Plant Nutrition* doi:10.1007/s42729-026-03025-x
- Li Y, Liu W, Li Y, Ge T, Guan T, Kim D-G, Liang G, Shurpali N, Bhattarai HR, Virkajärvi P, Siddique KHM, & Shen Y (2026). Cropping systems mediate carbon and nitrogen substrate effects on soil carbon dioxide and nitrous oxide emissions. *Journal of Soil Science and Plant Nutrition* **26**, doi:10.1007/s42729-026-03031-z
- Whitnall SC & Beatty TKM (2026). Climate change and field-level crop quality, yield, and revenue. *Journal of the Association of Environmental and Resource Economists* **13**, 261–291. doi:10.1086/736749
- Tian X-Q, Qi S-H, Turner NC, Liao Z-Q, Liu X-D, Cai L, Yang D, Zhang J-Q, Ma S-D, Scoffoni C, & Fang X-W (2026). Mistletoe achieves aerial parasitism via high leaf hydraulic efficiency but this poses a risk of hydraulic failure under drought stress. *Tree Physiology* **46** doi:10.1093/treephys/tpaf164
- Ren L, Li Z, Chen Z, Ji Y, Wu P, Liu E, Chen G, Moskvicheva E, Ansabayeva A, Jia Z, Siddique KHM, Wang Y, & Zhang P (2026). Maize yield and nitrogen use efficiency are increased by optimizing nitrogen fertilizer depth under film mulching in semiarid region. *The Crop Journal*, doi:10.1016/j.cj.2025.12.005
- Kaur S, Padihar D, Jha UC, Singh M, Sharma KD, Prasad PVV, Siddique KHM, & Nayyar H (2026). Harnessing wild Cicer for climate-resilient chickpea: Genetic resources, traits, and genomics insights. *Plant Stress* **20**, 101264. doi:10.1016/j.stress.2026.101264
- Yao H, Zhang T, Chen S, Kuang Y, Cheng Y, Liang Q, Feng H, Zhou G, & Siddique KHM (2026). Precision mapping of soil salinity in reclaiming salt-induced wasteland with UAV multispectral images and machine learning. *Computers and Electronics in Agriculture* **244**, 111532. doi:10.1016/j.compag.2026.111532
- Ma M, Bai C, Sun Z, Zhang S, Liu H, Salam SA, Pang J, Yong JW, Liu Y, Lambers H, & Siddique KHM (2026). Foliar magnesium application: A new nutrient management strategy to enhance peanut yield in phosphorus-limited soils. *Journal of Agriculture and Food Research* **26**, 102764. doi:10.1016/j.jafr.2026.102764
- Solaiman Z, Bolan S, Sharma S, Mukherjee S, Mathew S, Thakur R, Bhargava PC, Hou R, Singh E, Chaurasia D, Singh S, Wang F, Kirkham MB, Siddique KHM, & Bolan N (2026). Soil as a source and sink for antimicrobial resistance. *Advances in Agronomy* **196**, doi:10.1016/bs.agron.2025.10.004
- Wu Y, Liu X, Zheng J, Xia G, Pooniya V, Pang J, Siddique KHM, & Chi D (2026). Rice straw biochar and mulched drip irrigation synergistically enhance nitrogen fixation and yield of peanut in a dryland cropping system. *Field Crops Research* **341**, 110416. doi:10.1016/j.fcr.2026.110416
- Gibbs AJ, Fuentes S, Adams IP, Hajizadeh M, Ben Mansour K, Guy PL, Fribourg CE, Ziebell H, Kreuze J, Fox A, & Jones RAC (2026). A phylogeny of the Tymoviruses, sensu stricto, and its global interpretation in space and time. *Plant Disease*, doi:10.1094/PDIS-01-25-0061-RE
- Choudhary M, Yan G, Siddique KHM, & Cowling WA (2026). Genetic mapping and transcriptomic profiling reveal key regulators for heat tolerance during meiosis in wheat. *Plant Stress* **20**, 101287. doi:10.1016/j.stress.2026.101287
- Chadalavada S, Bolan S, Mukherjee S, Hata A, Fan C, Lee Y-Y, Sharma S, Rentachintala LRNP, Petersen-Perlman J, Safari N, Siddique KHM, & Bolan N (2026). Climate change and groundwater contamination: out-of-sight and hidden threat. *Groundwater for Sustainable Development* **33**, 101599. doi:10.1016/j.gsd.2026.101599
- Wang L, Guo S, Ge T, Mancl KM, Hijri M, Iseri Y, Lee S-J, Feng S, Wang L, Ji H, Sun D, Wei Z, Zhang Y, Lu P, Zhang X, Yang W, He C, Zhang J, Zhao Y, Dong D, Yang Y, Kang S, Siddique KHM, Zhao M, & Gan GY (2026). Plastic mulch productivity-sustainability tradeoffs and pathways toward an eco-friendly framework: insights from a global meta-analysis. *Nature Communications* **17**, 1924. doi:10.1038/s41467-026-68798-2
- Kemal SA, Kumari SG, Kumar PL, You MP, van Leur J, & Barbetti MJ (2026). New and emerging diseases of temperate grain legumes in the Nile Valley and Red Sea region: Faba bean gall and virus diseases: a review. *Agronomy* **16**, 479. doi:10.3390/agronomy16040479
- Han X, Xu C, Chen Y, Farooq M, Siddique KHM, Dang P, Zhang M, Liao L, Zhang L, Wang S, Pan X, & Qin X (2026). Mitigating carbon and nitrogen footprints while enhancing ecosystem economic benefits via strategic application of slow-release fertilizer and mulching. *Agriculture* **16**, 532. doi:10.3390/agriculture16050532
- Bai C, Ma M, Liu H, Salam SA, Pang J, Liu Y, Sun Z, Yong JW, Lambers H, & Siddique KHM (2026). Optimizing the growth and production of sorghum by intercropping with peanuts under effective photoprotection. *Field Crops Research* **341**, 110431. doi:10.1016/j.fcr.2026.110431

- Padhiar D, Kaur S, Parida SK, Jha UC, Sharma KD, Prasad PVV, Siddique KHM, & Nayyar H (2026). Genotypic variability and trait associations for cold stress tolerance in cultivated chickpea (*Cicer arietinum* L.) during the reproductive stage. *PLOS One*, doi:10.1371/journal.pone.0343120
- Lin Y, Yang X, Nan T, Du T, Kang S, Butterbach-Bahl K, & Siddique KHM (2026). Irrigation-induced changes in rhizosphere and bulk soil properties shape microbial communities and functions in a winter wheat–summer maize system. *Agricultural Water Management* **327**, 110249. doi:10.1016/j.agwat.2026.110249
- Fagerholm N, Coles NA, Beery T, Torralba M, Hakkarainen V, Albert C, Andersson E, Bergstrom R, Bieling C, Gentin S, Klonner C, Olafsson S, Raymond C, Rouhiainen H, & Wamsler C (2025). Operational principles for fostering transformative qualities and capacities in higher education sustainability science and practice. *Sustainability Science*, doi:10.1007/s11625-025-01746-z
- Duan H, Zhao Y, Sun W, Li W, Siddique KHM, Mao H, & Zhou L (2026). Physicochemical determinants of metal-based nanoparticle uptake and translocation in plants: A review. *Current Opinion in Environmental Science & Health* **50**, 100718. doi:10.1016/j.coesh.2026.100718
- Raza H, Tahir MA, Sabah NU, Iftikhar R, Rashid M, Alatar AA, & Faisal M (2026). Multivariate and correlation analysis of cadmium contamination in the food chain across spatio-temporal scales. *Agricultural Water Management* **327**, 110255. doi:10.1016/j.agwat.2026.110255
- Jones RAC & Congdon BS (2026). Australian cool-season pulse seed-borne virus research: 3 Pea seed-borne mosaic virus. *Viruses* **18**, 322. doi:10.3390/v18030322
- Liu X, Liu H, Farooq M, Siddique KHM, Haider FU, & Li X (2026). Beneficial microorganisms mediating wheat responses to abiotic stress: advances and perspectives. *Agricultural Research*, doi:10.1007/s40003-026-00971-x
- Hettithanthri O, O'Connor J, Solaiman ZM, Siddique KHM, & Bolan N (2026). Unravelling subsoil acidification: mechanisms, consequences and remediation. *Soil Use and Management*, doi:10.1111/sum.70191
- Jeddi K, Cruz C, Siddique KHM, & Hessini K (2026). Form-dependent roles of nitrogen in root growth and metabolic adaptation of *Spartina alterniflora* to increasing water scarcity. *Physiologia Plantarum*, doi:10.1111/ppl.70838
- Jat RA, Reddy KK, Choudhary RR, Kumawat A, Siddique KHM, Jain NK, Rashmi I, & Dinesh D (2026). Conservation agriculture improves soil quality, system productivity, and profitability in semi-arid peanut-wheat rotation in medium black calcareous soils. *Agronomy Journal*, doi:10.1002/ajg2.70328
- Nichols PGH, Peck DM, Stefanski A, Wintle BJ, & Simpson RJ (2026). Softening of temperate annual pasture legume hard seeds on the soil surface and with shallow burial at three contrasting sites in southern Australia. *Crop and Pasture Science*, doi:10.1071/CP25032
- Ying F, Lv Z, Huo Y, Chen C, Zhao Z, Hu X, Lakshmanan P, Lambers H, Zhang F, & Cong W-F (2026). Sustainable intensification of maize through improved nutrient and plant density management in a water-sensitive lake basin agroecosystem. *Field Crops Research* **339**, 110326. doi:10.1016/j.fcr.2026.110326
- Zhou Z, Wang G, Wu M, Ma W, Li X, Chen Y, Chen L, & Pang D (2026). Soil microbial community co-occurrence network structure and its drivers in arid mountainous areas. *Applied Soil Ecology* **218**, 106738. doi:10.1016/j.apsoil.2025.106738
- Xu J, Wang M, Xie B, Jia J, Rengel Z, & Shen J (2026). Integrating Fertisphere and rhizosphere acidification improves phosphorus-use efficiency on calcareous soil under localized nutrient supply. *Journal of Soil Science and Plant Nutrition*, doi:10.1007/s42729-025-02969-w
- Wang H, Yao Y, Wang H, Chen J, Tang X, Lakshmanan P, Chen X, Deng Y, & Zhang F (2026). Innovative integrated management achieves high productivity and profitability of sugarcane in China with low environmental costs. *European Journal of Agronomy* **175**, 127985. doi:10.1016/j.eja.2026.127985
- Tao Y, Gao Q, Fan X, Wu H, & Shabala S (2026). From uptake to resilience: How metal-based nanoparticles can enhance plant drought tolerance. *Plant and Soil*, doi:10.1007/s11104-025-08230-8
- Holguin J, Striker G, & Crepy M (2026). Flooding during the growing season does not promote *Echinochloa colona* seedling emergence but shifts cohorts to summer drawdown periods. *Plant and Soil*, doi:10.1007/s11104-025-08237-1
- Weller J, Thompson S, Leopold M, & Mastrantonis S (2026). Estimating regolith thickness in the complex lateritic landscape of the southern zone of rejuvenated drainage in Southwest Western Australia. *Catena* **263**, 109773. doi:10.1016/j.catena.2025.109773
- Lu Y, Du Y, Hu X, Wang T, Gu X, Niu W, & Siddique KHM (2026). Enhancing tomato productivity through nitrogen management and aerated drip irrigation: A root-shoot coordination perspective. *Soil & Tillage Research* **257**, 106973. doi:10.1016/j.still.2025.106973
- Fidelis S, Moura GA, Nascimento ST, Maia AS, Maloney SK, & Fonseca VF (2026). Animal agrivoltaics facilitates the sustainable intensification of sheep production in tropical areas. *Small Ruminant Research* **255**, 107691. doi:10.1016/j.smallrumres.2025.107691
- Imani A, Sepehr E, Rengel Z, & Hajizade N (2026). A cost-effective image-based machine learning framework for automating active iron estimation in Peach (*Prunus persica* (L.) Batsch) leaves. *Scientific Reports* **16**, 1. doi:10.1038/s41598-025-24391-z
- Paz EA, Chua EG, Martin GB, Quiñones J, Díaz R, & Tay CY (2026). Insights into the nematobiome in gut of a helminth, *Teladorsagia circumcincta*. *Symbiosis*. doi:10.1007/s13199-026-01127-9
- Tian C, Bu C, Wu S, Li X, & Siddique KHM (2026). The microbial network stability in cyanobacterial and moss biocrusts respond differently to climate warming. *Microorganisms* **14**, 713. doi:10.3390/microorganisms14030713

UPCOMING EVENTS

Postgraduate Showcase 2026

27 May

Industry Forum 2026

8 July

UWA Farm Ridgefield Open Day

11 September



Register to attend our events on Eventbrite

IOA MISSION

To develop and communicate innovative evidence-based solutions for ethical food production, environmental sustainability and agribusiness advancement.



Editor: Ana Mendigutxia Balil
 ana.mendigutxiabalil@uwa.edu.au
 The UWA Institute of Agriculture
 Phone: +61 8 6488 4717
 The University of Western Australia M082
 35 Stirling Hwy, Crawley
 WA 6009 Australia

The UWA Institute of Agriculture acknowledges the contribution of The FA Hadley Bequest and The WE Rischbieth Bequest for support towards communications activities.