AUSTRALIAN MACADAMIA SOCIETY

AusMac2024

Research Hub

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Hort Innovation

Poster Abstracts

AUSTRALIAN MACADAMIA SOCIETY

AusMac2024

Poster Schedule

Morning Tea - Production Systems (10.20am to 11.10am)

- **Biodiversity in macadamia orchards** - *Dr Darren Kriticos & Dr Tania Yonow, Cervantes Agritech*
- **Developing a macadamia industry resilient to future flooding events** - *Dr Suzy Rogiers, NSW Department of Primary Industries and Regional Development (DPIRD)*
- **Enhancing macadamia machine operational efficiency: harvesting and spraying** - *Harry Goy, Fieldin*
- **Integrated orchard management (IOM) versus non-IOM: a comparison of runoff** - *Dr Mitch Call, Southern Cross University (SCU)*
- **Introducing the macadamia grower guide** - *Jeremy Bright, NSW Department of Primary Industries and Regional Development (DPIRD) & Stephanie Alt, Give Soil a Chance*
- **Macadamia planting density has a strong effect on orchard productivity in a decade-long trial** - *Dr Amnon Haberman, Queensland Department of Agriculture and Fisheries (QDAF)*
- **Pest modelling for macadamia management** - *Dr Darren Kriticos & Dr Tania Yonow, Cervantes Agritech*
- **Potential use of triazole growth retardants as a tool for canopy management in macadamia** - *Dr Amnon Haberman, Queensland Department of Agriculture and Fisheries (QDAF)*
- **Quick unroll erosion control with flexible concrete mats: Protecting macadamia orchards and improving farm tracks and drainage** - *Alan Theron & Richard Mould, Australian Concrete Mats*

Lunch – Pest & Disease (12.30pm to 2.00pm)

- **An integrated systems-based approach for pest management in Australian macadamia: research update** - *Dr Bishwo Mainali, Macquarie University & Dr Darren Kriticos, Cervantes Agritech*
- **Generalist predators for pest control in macadamia orchards** - *Dr Bishwo Mainali, Macquarie University*
- **Improving fruit and banana spotting bug control using pheromones** - *Dr Andrew Hayes, University of the Sunshine Coast (USC) and Kempsy Adams & Stefano De Faveri, Queensland Department of Agriculture Fisheries and Forestry (QDAF)*
- **Insights into rachis tip dieback in macadamia** - *Xiaoxue Xu, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Modelling disease dynamics in macadamia** - *Dr Mohamed Zakeel Mohamed Cassim, CSIRO*
- **On-farm crop losses and impacts of pests and diseases in a range of macadamia orchards** - *Ziyu Shao, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Pest control benefits of microbats in macadamia orchards** - *Rani Davis, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Pest READI: Co developing solutions to area-wide integrated pest management (AW-IPM)** - *Dr Tracey Steinrucken, CSIRO Pest READI*
- **Phomopsis graft dieback disease in macadamia nurseries** - *Jahangir Khan, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Potential of simulation models for predicting husk rot severity in macadamia orchards** - *Theophilus Mensah, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Temperature dependent development and survival rates of Leptocoris tagalicus** - *Dr Bishwo Mainali & Dr Syed Z Rizvi, Macquarie University*
- **What we know about Scolytid beetle activity in macadamia; extreme weather events can exacerbate the impac**t - *Dr Saleh Adnan, NSW Department of Primary Industries and Regional Development (DPIRD)*

Afternoon Tea / Trade Expo Networking – Breeding/Genetics, Novel Technologies, Nutrition & Pollination (3.45pm to 6pm)

BREEDING/GENETICS

- **Finding genetic markers for the nut characteristics which predetermine macadamia resistance to fruit spotting damage for use in an indirect selection strategy** - *Shelley Gage, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Novel propagation technology for Australian macadamia** - *Magnolia Hu, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Vigour in macadamia: Genetic and physiological insights into rootstock and scion** - *Pragya Dhakal Poudel, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*

NOVEL TECHNOLOGIES

- **Innovative cryopreservation technology for the Australian macadamia** - *Xueying Li, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*
- **Macadamia yield monitoring sensor trial** - *Andrew Auld, James Auld & Tom Flanagan, NSW Department of Primary Industries and Regional Development (DPIRD)*
- **Rapid nut quality assessment** - *Dr Michael Farrar & Associate Professor Shahla Hosseini Bai, Griffith University*
- **Waterfind's water management application** - *Nick Sayer & Sean Warren, Waterfind*

NUTRITION

- **How macadamia roots 'farm' beneficial bacteria in Serenade** - *Damien Odgers & Lore Saupp-Saunders, Bayer Crop Science*
- **Macadamia organic amendment project** - *Jeremy Bright, NSW Department of Primary Industries and Regional Development (DPIRD)*
- **Using microalgae-based soil probiotics to improve nutrient retention in macadamia farms** - *Dr Edoardo Bertone, Griffith University & Dr Juliane Wolf, University of Queensland*

POLLINATION

- **Feeding the bees: Investigating the impact of floral resources and supplementary feeding on the health of stingless bee colonies in macadamia orchards** - *Dr Claire Allison, Hawkesbury Institute for the Environment, Western Sydney University*
- **Pollination in macadamia: Knowledge gaps and opportunities** – *Joshua Coates, Australian National University*
- **Self-fertility in macadamia: Insights for macadamia breeding** - *Palakdeep Kaur, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland*

Morning Tea – Pest & Disease (10.30am to 11.15am)

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Lunch – Breeding/Genetics, Novel Technologies, Nutrition, Pollination & Production Systems (1.00pm to 3.00pm)

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Day 2

THURSDAY 31 OCTOBER

PRODUCTION SYSTEMS

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By Category

Breeding/Genetics

Finding genetic markers for the nut characteristics which predetermine macadamia resistance to fruit spotting damage for use in an indirect selection strategy

Shelley Gage, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Fruit spotting bug (FSB) poses a major threat to Australian production, causing both immature nut abscission and mature nut kernel damage. This project aims to develop a marker-assisted selection tool for pest resistance, focusing on husk and shell hardness, which previous studies have linked to resistance. Trials involve exposing racemes to FSB and measuring nut traits and damage. A second study on macadamia accessions under natural infestation supports this genomic approach, promising earlier insect resistance selection for breeding programs.

Novel propagation technology for Australian macadamia

Magnolia Hu, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

The industry faces challenges with current clonal propagation methods. Tissue culture provides an innovative solution, enabling mass production of uniform, disease-free rootstocks.

This poster describes a PhD project that is aiming to create a high-throughput tissue culture system for two rootstocks, Beaumont and H2, and two scion varieties, MCT1 and A203. This research will further involve testing *in vitro* micrografting to speed up production and improve grafting success rates and investigating the genetic factors that affect rooting ability in macadamia.

Vigour in macadamia: Genetic and physiological insights into rootstock and scion

Pragya Dhakal Poudel, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Managing tree vigour is vital for optimising productivity and profitability in macadamia cultivation. Excessive vigour leads to orchard crowding, shading, restricted machinery access, and also hampers breeding programs. While other tree crops benefit from vigour-controlling rootstocks and cultivars, macadamia growers lack suitable options and rely on labour-intensive and costly methods of managing vigour.

This research tackles these issues by investigating the genetic and physiological factors influencing tree vigour in macadamias. By evaluating a variety of rootstocks, the study offers practical recommendations for controlling vigour and improving water-use efficiency through insights into stomatal traits and aquaporin expression. Additionally, it explores genetic parameters of vigour traits at various growth stages, aiding in the selection of superior genotypes for breeding and understanding the physiology of macadamia vigour control.

Novel Technologies

Innovative cryopreservation technology for the Australian macadamia

Xueying Li, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Much of the wild macadamia germplasm remains untapped for breeding, and its diversity is threatened by habitat destruction. Traditional conservation methods like seed banking are not ideal for macadamia due to the seeds' low cold tolerance and the high genetic variation among commercial cultivars. Cryopreservation could play a crucial role in conserving macadamia by maintaining long-term germplasm collections.

This study aims to develop an effective cryopreservation technology for macadamia cultivars using true-to-type shoot tip materials. The research focuses on establishing an optimal tissue culture regeneration system for the 'Beaumont' cultivar to enable recovery of preserved plant tissues after liquid nitrogen treatment. Results so far show excellent survival and regrowth rates after four and eight weeks post-cryoprotection. Ongoing trials involve immersing shoot tips in liquid nitrogen. This research lays the groundwork for effectively preserving diverse macadamia germplasm, supporting the sustainability and future development of the macadamia industry.

Macadamia yield monitoring sensor trial

Andrew Auld, James Auld & Tom Flanagan, NSW Department of Primary Industries and Regional Development (DPIRD)

NSW DPIRD and macadamia growers James and Andrew Auld, will showcase their collaboration on a sensor for mapping macadamia yields. This innovative sensor enables in-field harvest monitoring, recording crop quantity with GPS position and time data. The output allows growers to view productivity across their orchards at various scales, identifying areas of low and high yield to implement targeted management strategies.

NSW DPIRD is currently trialling the sensor's accuracy and functionality at the Alstonville Centre for Tropical Horticulture. Initial results from this trial will be shared with in this poster presentation.

Rapid nut quality assessment

Dr Michael Farrar & Associate Professor Shahla Hosseini Bai, Griffith University

Macadamia growers and processors depend on producing high-quality kernels to maximise productivity and profit. Two critical quality measures within the assessment of macadamia kernels are internal discolouration (brown centre) and rancidity level (peroxide value: PV). However, these issues can often go undetected during modern processing because brown centres are not always visible on the kernel surface, and rancidity is entirely invisible. As a result, these defects may not be identified by colour sorters, which rely solely on visible spectrum information. This research highlights the potential of imaging technologies to predict nut quality in real-time, enabling processors and growers to expedite quality assessments.

Waterfind's water management application

Nick Sayer & Sean Warren, Waterfind

This presentation will introduce Waterfind's new water management application, which is designed to help macadamia growers optimise their water resources. This app enables users, or water rights holders, to track water usage, manage budgets, and stay informed about water market events. It provides a dynamic view of current and projected end-of-season water positions, facilitating early market decisions to maximise water value. The application supports effective and efficient water management across multiple users and sites, all from a mobile device.

Nutrition

How macadamia roots 'farm' beneficial bacteria in Serenade

Damien Odgers & Lore Saupp-Saunders, Bayer Crop Science

This poster will highlight research by Bayer CropScience, conducted in Australia and in collaboration with Rutgers University scientists. Dr James White from Rutgers has led a world-first study demonstrating how macadamia roots use beneficial bacteria contained in Serenade® Soil Activ to enhance tree nutrition, growth, and resilience. The research reveals how macadamia roots effectively 'farm' these bacteria to absorb nutrients, offering new insights into crop nutrition for macadamias. The poster will include an overview of R&D findings from Rutgers and a summary of trial work in Queensland's Wide Bay region, showcasing the impact of the *Bacillus amyloliquefaciens* QST 713 strain (Serenade) on root colonisation and nutrient uptake.

Macadamia organic amendment project

Jeremy Bright, NSW Department of Primary Industries and Regional Development (DPIRD)

This poster will describe a study on macadamia production using organic amendments, such as chicken/cow manures and wood chip blends, based on grower reports of above-industry-standard nut-in-shell (NIS) production without additional chemical fertilisers. The trial, conducted at the Alstonville Centre for Tropical Horticulture examines replacing up to 100% of chemical fertilisers with these organic amendments.

The study measures total non-structural carbohydrates monthly as an indicator of tree health and productivity. As the project progresses, improvements in soil health, root systems, and reduced soil and nutrient runoff are expected. Additionally, the trial aims to enhance soil biology, which improves soil structure and productivity.

Using microalgae-based soil probiotics to improve nutrient retention in macadamia farms

Dr Edoardo Bertone, Griffith University & Dr Juliane Wolf, University of Queensland

Researchers at Griffith University have been investigating sustainable biofertiliser that can deliver nutrients efficiently while minimising energy and water use. The project investigated the effectiveness of soil 'probiotics' containing live bacteria and microalgae. These probiotics aim to shift the soil microbiome towards beneficial strains, improving soil health and function. Another benefit is that microalgae deliver captured CO2 to the soil. The researchers have also trialled incorporating these probiotic additives into mats used for erosion control and revegetation.

Attendees will learn about the outcomes of field trials with young macadamia trees in Bundaberg, which investigated how these probiotics affect nutrient retention and water quality. Early results indicate that these sustainable probiotic additives could offer a cost-effective solution for reducing erosion and retaining nutrients, promoting healthier trees and supporting local microalgae production.

Pollination

Feeding the bees: Investigating the impact of floral resources and supplementary feeding on the health of stingless bee colonies in macadamia orchards

Dr Claire Allison, Hawkesbury Institute for the Environment, Western Sydney University

Managed stingless bees are used for pollination in macadamia, where they are often permanently located. However, there are concerns that orchards may not provide enough diverse floral resources year-round to sustain colony health. Healthy colonies with larger foraging populations are crucial for effective macadamia pollination.

This poster describes a year-long experiment with stingless bee hives in eight macadamia orchards in Northern Rivers, NSW. The study is investigating ways to enhance foraging habitat quality and provide additional resources. Four orchards have intentional cover crop plantings, while the other four do not. Hives in each orchard are subjected to different supplementary feeding regimes. The study compares the impact of these additional floral resources and feeding regimes on colony health and foraging activity. Preliminary data shows interesting effects, which will be reported along with insights on better managing stingless bee health in macadamia orchards.

Pollination in macadamia: Knowledge gaps and opportunities

Joshua Coates, Australian National University

This poster presentation will outline a project aimed at understanding and improving pollination practices for Australian macadamia growers. Previous research shows that managed honeybees, feral honeybees, and native insects, such as stingless bees, play a key role in pollination. This project will survey growers, beekeepers, and industry representatives to gather insights into current pollination practices and knowledge. The survey findings, along with a review of existing research, will help identify gaps and opportunities for future work. The goal is to enhance crop productivity and resilience by integrating research with practical management strategies for macadamia pollination.

Self-fertility in macadamia: Insights for macadamia breeding

Palakdeep Kaur, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

This study explores self-fertility in macadamia, a crop that relies heavily on cross-pollination due to its self-incompatibility. Developing self-fertile cultivars, which can produce nuts without the need for external pollinisers, could significantly improve orchard design and profitability. While some self-fertility has been observed in macadamia, the genetic diversity and mechanisms behind this trait are not well understood.

The research investigates the genetic basis of self-fertility using a diverse collection of macadamia germplasm, including commercial and heritage cultivars, breeding lines, and wild accessions. The study employs an outcross pollen exclusion method to evaluate self-fertility levels and uses genetic mapping to identify related markers. Additionally, it examines the spatial and temporal separation of male and female reproductive organs in different cultivars and investigates where pollen tube growth is inhibited in self-infertile cultivars.

The findings from this research will advance the understanding of macadamia reproductive biology and have the potential to improve breeding practices.

Pest & Disease

An integrated systems-based approach for pest management in Australian macadamia: research update

Dr Bishwo Mainali, Macquarie University & Dr Darren Kriticos, Cervantes Agritech

The researchers will present their work on establishing a decision-support system for pest management in macadamia farming. They will discuss the project scope, key learnings and outcomes so far, current activities, and anticipated deliverables. The project includes studies on pest occurrence patterns, biology, population dynamics, and environmental factors, as well as interactions with natural enemies and macadamia phenology.

The projects aims to utilise this data to develop a macadamia agro-ecosystem model with economic analyses and integrated pest management strategies, along with a risk matrix.

Generalist predators for pest control in macadamia orchards

Dr Bishwo Mainali, Macquarie University

This poster focuses on the potential predators for contolling macadamia pests, the gut contents analysis (genomic) of key predators, and the efficacy of predators on pest control. It will present orchard invertebrate community data, gut contents of predators and predator-prey interactions.

Improving fruit and banana spotting bug control using pheromones

Dr Andrew Hayes, University of the Sunshine Coast (USC) and Kempsy Adams & Stefano De Faveri, Queensland Department of Agriculture Fisheries and Forestry (QDAF)

Current management strategies for fruit spotting bugs (FSB) and banana spotting bugs (BSB) rely heavily on calendar-based pesticide applications due to the lack of effective pest monitoring systems.

This poster presents an update on the levy funded project which aims to develop improved FSB and BSB management tools. The project focuses on two main goals: developing a more effective BSB trap and creating a pheromone lure for FSB. In lab and field trials, one new trap product showed comparable effectiveness to the current commercial trap and maintained adhesive integrity over four weeks. For FSB, potential pheromone compounds have been extracted from unmated males, and initial tests indicate that females respond to several compounds. Ongoing bioassays are determining the effectiveness of these pheromones. The successful development of these traps is expected to enable macadamia growers to implement more targeted pesticide applications, reducing unnecessary pesticide use and improving crop quality.

Insights into rachis tip dieback in macadamia

Xiaoxue Xu, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Rachis tip dieback (RTD), also known as ‘rat tail’, typically develops from the tip of the rachis or raceme. Recent studies have revealed several fungi, including those causing flower blights, cause RTD. Depending on the infection timing, RTD can lead to a significant shortening or even total loss of the affected racemes. Macadamia racemes are particularly vulnerable from the raceme elongation stage to full elongation. This poster will describe research exploring RTD’s contributions to flower blight epidemics and to develop effective management strategies for flower diseases in macadamia orchards.

Modelling disease dynamics in macadamia

Dr Mohamed Zakeel Mohamed Cassim, CSIRO

Area-wide integrated disease management (AW-IDM) is a promising approach that requires thorough evaluation of different management strategies.

In the Northern Rivers region of NSW, frequent climatic events like flooding exacerbate soilborne diseases such as Phytophthora root rot in macadamias, caused by *Phytophthora cinnamomi*. As part of the Pest READI project, researchers are developing a novel modelling approach to evaluate the effectiveness of various landscape designs, complexities, and watercourse management strategies in controlling Phytophthora root rot.

This poster presentation will outline the project's approach using disease models, remote sensing techniques and spatial analysis to integrate historical data on disease incidences, spatial information on crop cultivation, climate data, and soil characteristics. The project will develop disease risk maps and enable the simulation and assessment of landscape management scenarios for mitigating the impact of soilborne diseases and managing watercourses to prevent flooding-related disease outbreaks.

On-farm crop losses and impacts of pests and diseases in a range of macadamia orchards

Ziyu Shao, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Previous industry benchmarking has highlighted significant productivity variations between macadamia farms, with potential for industry-wide improvements through adopting best practices. This study applies lean design principles to investigate and generate information on seasonal crop loss from various factors.

This poster will present the preliminary results, which show that pests and diseases are major contributors to crop loss. Data from the 2024/25 season reveal substantial regional and cultivar differences. Current estimates suggest on-farm losses range from 5%-10% of total yield, with a detailed economic assessment of these losses in progress.

Pest control benefits of microbats in macadamia orchards

Rani Davis, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

In Australia, macadamia production has heavily relied on pesticide use, but growing resistance, costs, and public health concerns have driven the search for Integrated Pest Management (IPM) alternatives. One promising strategy is leveraging microbats, which consume 30-100% of their body weight in insects nightly, including pests significant to macadamia crops. In South Africa, microbats are known to reduce husk and kernel damage from moths in particular, and they save the Australian cotton industry an estimated $63.6 million in pest management annually.

This research investigates the potential of microbats as biological control agents in Australian macadamia orchards. The poster will summarise relevant research, present preliminary findings about microbats in Sunshine Coast orchards, and invite interested growers to participate. This study aims to identify which pests microbats can control and how to support their activity, potentially reducing reliance on chemical pesticides and enhancing sustainable pest management practices.

Pest READI: Co developing solutions to area-wide integrated pest management (AW-IPM)

Dr Tracey Steinrucken, CSIRO Pest READI

Effective area-wide integrated pest management (AW-IPM) requires a coordinated approach at the landscape level. To promote more sustainable practices, informed decision-making is crucial for optimising the use of existing chemicals and increasing access to and knowledge of non-chemical alternatives.

Pest READI aims to enhance communication and cooperation to support farming prosperity. The project works with communities to develop and implement new plant pest management methods across various industries and regions. Over five years, Pest READI will integrate knowledge into a digital platform, co-designed with stakeholders, to connect decision-making processes across landscapes.

This presentation will cover discussions within the pilot region of the Northern Rivers of NSW, addressing current gaps, needs, practices, and future directions for pest management. Additionally, the poster presentation will outline plans to co-develop tools for improved decision-making, risk analysis, and AW-IPM in the horticultural sector.

Phomopsis graft dieback disease in macadamia nurseries

Jahangir Khan, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

This poster addresses the role of fungal pathogens in Phomopsis graft dieback, often linked to poor grafting hygiene, but with unclear primary infection sources. Researchers surveyed major macadamia nurseries across Australia and identified six Phomopsis (*Diaporthe*) species associated with graft dieback. The survey revealed a high detection rate of fungal pathogens in scion wood compared to rootstocks. Among these, *Diaporthe australiana* was the most prevalent and caused severe graft dieback. The findings will highlight the significance of scion wood as a potential infection source and underscore the need to consider this in disease management within nursery operations.

Potential of simulation models for predicting husk rot severity in macadamia orchards

Theophilus Mensah, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Husk rot, caused by various fungal pathogens including Diaporthe (Phomopsis) species, frequently affects macadamia fruit in Australia, leading to premature fruit drop in about 90% of cases. Managing husk rot is complex, as it requires understanding the conditions that promote infection and disease development. This poster describes a forecasting tool to predict husk rot severity based on climatic conditions. Recent evaluations indicate the tool can predict husk rot severity with 92% accuracy, providing valuable insights for managing and preventing yield loss in the Australian macadamia industry.

Temperature dependent development and survival rates of Leptocoris tagalicus

Dr Bishwo Mainali & Dr Syed Z Rizvi, Macquarie University

This poster will present the life history performance of *Leptocoris tagalicus*, from egg hatching through various developmental stages, to adult longevity and reproduction, at a range of orchard temperatures.

What we know about Scolytid beetle activity in macadamia; extreme weather events can exacerbate the impact

Dr Saleh Adnan, NSW Department of Primary Industries and Regional Development (DPIRD)

The macadamia industry in the Northern Rivers region is encountering increasing pest challenges, in particular, growers have noted a recent increase in Scolytid beetle infestations.

When macadamia bark beetles (MBB) damage trees that are already stressed following events such as waterlogging or drought, this can lead to significant tree damage or death. Post-flood field surveys in Northern NSW revealed that MBB that usually tunnel into macadamia bark and stems, can sometimes even penetrate through leaf axils. The surveys also identified several other beetle species, including the Asian granulate ambrosia beetle, *Cnestus solidus*, *Hypothenemus melasomus* and *Cryphalus subcompactus*, in commercial orchards. Laboratory tests showed that while MBB and *Hypothenemus* species did not carry pathogenic fungi, ambrosia beetles such as *Euwallacea*, *Xylosandrus* and *Cnestus* species did.

The presentation will explore how extreme weather events and poor tree health management contribute to these pest outbreaks and their impact on macadamia cultivation.

Production Systems

Biodiversity in macadamia orchards

Dr Darren Kriticos & Dr Tania Yonow, Cervantes Agritech

The poster will provide an overview of the first season's field data collected as part of the Integrated Pest Management in Macadamia project, discussing findings on the diversity of insect fauna in orchards. This data has been collected by drop sheet sampling conducted by pest scouts in three different macadamia growing regions.

Developing a macadamia industry resilient to future flooding events

Dr Suzy Rogiers, NSW Department of Primary Industries and Regional Development (DPIRD)

This presentation discusses the results of a trial that examined the effects of flooding on five different cultivars on two rootstocks. Entire two-year old plants were submerged for one week, two weeks, or exposed to a double flood separated by one month. Canopy health and leaf photosynthesis were assessed for three months after removal from the flood water. Suzy will present preliminary findings from this flood study and discuss relevant learnings for the industry. This includes analysis of cambium vitality, carbohydrate levels, any impacts of *Phytophthora* and cultivar differences.

Enhancing macadamia machine operational efficiency: harvesting and spraying

Harry Goy, Fieldin

Harry will present analysis on improving machine operational efficiency during macadamia harvesting and spraying. As macadamia orchards expand, optimising machinery operations is crucial for ensuring productivity and sustainability. The presentation will cover advanced technologies and best practices for machine efficiency, focusing on reducing inefficiencies, enhancing precision, and maximising yield.

Harry will highlight innovative solutions from Fieldin, which leverages real-time data analytics to monitor and enhance machinery performance. This technology aids growers in making informed decisions, leading to significant improvements in fuel consumption, labour costs, product usage, and overall operational efficiency. Attendees will learn how to integrate these advancements into their operations, resulting in more sustainable and profitable macadamia farming.

Integrated orchard management (IOM) versus non-IOM: a comparison of runoff

Dr Mitch Call, Southern Cross University (SCU)

This poster presentation will explore the benefits of integrated orchard management (IOM) for macadamia farms, a concept recognised since 2016 but not fully quantified in terms of its impact. Mitch Call from SCU, with funding from the NSW Marine Estate Management Strategy, has researched this topic. The trial compared IOM (16 x 4 m tree spaced) with pre-IOM (8 x 4 m tree spaced) systems, measuring soil loss, nutrient losses (particularly nitrates and phosphates), yields, and quality. Additional observations from the trial will also be reported in this poster.

Introducing the macadamia grower guide

Jeremy Bright, NSW Department of Primary Industries and Regional Development (DPIRD) & Stephanie Alt, Give Soil a Chance

This poster presentation highlights the development of a comprehensive publication on macadamia cultivation, created over four years despite challenges such as COVID, drought, and floods. Each chapter of the publication has been carefully proofed by industry focus groups and reviewed by a program reference group. The publication is designed as a binder, allowing for easy updates and replacements of chapters as new information becomes available. The poster provides an overview of the modules, which cover essential topics including soil health and nutrition, new orchards, cultivars, young and bearing trees, and updates on IOM drainage. It outlines how these modules offer valuable insights and practical guidance for both established and new macadamia growers.

Macadamia planting density has a strong effect on orchard productivity in a decade-long trial

Dr Amnon Haberman, Queensland Department of Agriculture and Fisheries (QDAF)

This poster explores the impact of planting density on macadamia orchard productivity and management. The research compared three planting densities (high, medium, and low) across two cultivars over ten years. High planting density boosted early orchard productivity, with cumulative yields per hectare higher than low density. However, higher pruning requirements in the high-density system affected yield, highlighting the need for effective canopy management. The poster will discuss considerations for increasing planting density and orchard profitability including a sustainable canopy management strategy.

Pest modelling for macadamia management

Dr Darren Kriticos & Dr Tania Yonow, Cervantes Agritech

The researchers will present an overview of the pest management model being developed as part of the Integrated Pest Management in Macadamia project and overview preliminary results. They will discuss why modelling is critical to advancing management of macadamia and how economics can be incorporated into modelling.

Potential use of triazole growth retardants as a tool for canopy management in macadamia

Dr Amnon Haberman, Queensland Department of Agriculture and Fisheries (QDAF)

This poster describes a study that evaluated the use of growth retardants, such as paclobutrazol and uniconazole, for managing canopy vigour, particularly within high-density macadamia orchards. These growth retardants were found under certain applications to reduce vegetative vigour and canopy volume, potentially lowering pruning needs and improving resource allocation to reproductive growth. Additionally, functional-structural plant modelling was used to predict the long-term canopy implications. Results indicate that certain growth retardants could be integrated into canopy management strategies to support the intensification of macadamia orchards.

Quick unroll erosion control with flexible concrete mats: Protecting macadamia orchards and improving farm tracks and drainage

Alan Theron & Richard Mould, Australian Concrete Mats

Flexible concrete mats provide hard armour protection while allowing natural vegetation to grow through, and can be used in orchard swale drains, dam spillways, and on farm tracks and roads to prevent erosion and boggy conditions. The mats control erosion by slowing water flow, capturing topsoil, and supporting vegetation growth. They also create a stable surface for vehicle access, aiding in maintenance and mowing even during wet weather.

This presentation will showcase real-life applications of flexible concrete mats in macadamia orchards. It will demonstrate how these mats are easily installed and highlight their benefits compared with traditional erosion control methods. The mats offer savings in both purchase and installation costs.

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