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SOILLESS AUSTRALIA

Protected Cropping Australia Industry Trade Magazine

PCA

Combating powdery mildew in capsicum

The latest on substrates for hydroponics

A global view of greenhouse growing

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SINCE 1990

New appointment to PCA Board

Francesco (Frank) Merenda from Western Australia has stepped up to join the PCA Board.

He fills a vacancy left by the resignation late last year of long-term Board Director, Zak Iqbal. PCA Chair Andrew Tour thanked Zak for his long service and for the many roles he has played while a Director.

"On behalf of the Board, I would like to sincerely thank Zak for his many years of service as a Director of Protected Cropping Australia," said Andrew Tout. "Zak has been a generous contributor of his time, insight and energy, and his commitment to PCA and the broader protected cropping sector has been most deeply valued.

"I particularly acknowledge Zak's leadership as Chair of the 2025 Conference Committee. The care and effort he brought to this role made a real difference," he said.

Frank has more than 40 years of agri-business experience as a farm owner/director in large-scale broadacre vegetable farming and nationally as a consultant to some of Australia's leading agri-business operations. Frank has developed extensive networks in the agribusiness sector across Australia and has extensive experience in end-to-end supply chain management including strategic commercial production, marketing and food processing industries.

He is currently engaged in protected cropping projects, north (Mediterranean Vegetables) and south (Cherry Orchard) of Perth.

Frank Merenda has joined the PCA Board.

Nuffield Scholarships
now open for 2027

Applications are now open for the 2027 Nuffield Scholarships.

Nuffield develops farmers with the global perspective, insight and confidence to influence Australian agriculture

"This scholarship is not about having the perfect project. It is about backing people with intent," states the Nuffield media release. "People prepared to challenge assumptions, think beyond their own operation and contribute to the future of their industry."

Nuffield Scholarship recipient and a previous Chair of Protected Cropping Australia, Nicky Mann, endorses the scholarship and urges people to apply.

"It's a once in a lifetime opportunity!" says Nicky. "A Nuffield Farming Scholarship is an incredible investment in primary production and building capacity in our number one resource – our farmers.

"If this is something you are considering – please apply!"

Applications close May 8, 2026. For more information or to apply visit Nuffield (nuffield.com.au).

Promoting greenlife on the national stage

Greenlife should be a visible, valued part of Australia's cities and national infrastructure – including at Parliament House. That's the message from the new CEO of the nursery industry peak body Greenlife Industry Australia (GIA), Sean Cole.

Sean Cole is the new CEO for Australia's peak nursery industry body and plans to raise the profile of greenlife with politicians.

Sean succeeds Joanna Cave, who led major initiatives such as rebranding and improving ties with retailers like Bunnings. Under Joanna, GIA focused on biosecurity, urban greening, and sustainability, as well as addressing industry challenges and aiming for $3.2 billion in growth by 2030.

Sean, who started in January amid a southern heatwave, brings management and agricultural experience. He holds a Bachelor of Economics and is a GAICD graduate. Committed to supporting growers and supply chain partners, he aims to strengthen the industry's voice and is currently listening to feedback from state bodies and members.

He champions more greenery in infrastructure, citing international examples, and seeks stronger mandates to make greenlife a national priority. With experience in GrainGrowers and citrus, Sean values quick responses to biosecurity threats and backs GIA's Plant Health work.

Passionate about small businesses, Sean supports improved marketing and ongoing collaboration with major retailers. He also endorses Chris Leptos's role as Independent Greenlife Reviewer for resolving supplier concerns, an initiative between the industry and retail giant, Bunnings.

Parliamentary meeting

Keen to get the spotlight on greenlife, Sean and colleagues met with federal parliamentarians, including WA Senator Glenn Sterle, Chair of the Senate Standing Committees on Rural and Regional Affairs and Transport, to discuss the role greenlife plays in supporting cooler cities, more liveable communities and climate resilience.

From reducing urban heat and improving wellbeing to strengthening local economies, the nursery industry has a critical role to play in shaping Australia's future built environment, he said.

These conversations are about ensuring greenlife is better recognised and more consistently embedded in national policy and planning discussions.

Where are substrates headed?

A thought-provoking webinar on the future of substrates in protected cropping hosted by Indoor-ag Conversations, put the spotlight on future directions for growing media. Jennifer Stackhouse reports.

Titled 'Where do we go from here? The future of substrates in CEA', the online discussion was hosted by Kyle Barnett, Program Director, Indoor-ag Con, who introduced a panel of three international speakers from different parts of the substrate industry. Jennifer Neujahr from Profile Products and Kyle Freedman from Jiffy, both based in the US, and Marcus Comaschi, from the UK company GyroPlant, spoke about the state of substrates in the light of growing global demand. Growers currently rely on peat, coir and wood fibre for their growing needs but there are new options.

Over the next hour, the panelists explored how shifting availability, cost, and sustainability pressures are reshaping one of horticulture's most essential resources.

High global demand

Jennifer Neujahr kicked off discussion quoting European research and stating that forecast growth means demand will dramatically exceed supply in the next two decades.

The research stems from forecasts from Wageningen University & Research and Next Step Solutions that indicate the world could face a 40 percent shortage in substrate volume by 2050. Even with expanded production of peat, coir, wood fibre, and other alternatives, demand is outpacing supply.

Jennifer stated that new supplies and new types of substrates will be needed to fill the gap.

"Ahead of us – no single material can meet the demand," she stated.

Kyle Freedman recommended hydro-gel as one of the new substrates that will help bridge the gap in demand for substrates while Marcus Comaschi, who co-founded the start-up company GyroPlant, said his company is providing a silicone-based, reuseable substrate for growers called a GyroCup.

"There's not one solution for all," he warned adding that what's used depends on the grower, the crop and irrigation systems. GyroCup is a type of plug that's available in a range of sizes.

"Transportation, climate and labour are important factors in making the choice of substrate," said Jennifer. "Growers need to think about new options and try them – be curious, there are some neat ideas out there."

Jiffy's new gel-based substrate, Jiffy Gel, was launched in June 2025 after lots of trials said Kyle.

"We have decades of experience with other substrates, but it does take time to educate growers. New products take time," he explained. "Hydro-gel is more of a niche product and one that's geared to high end of production."

Growers may also find that different substrates work for different parts of the growth cycle. Marcus cited research in the UK where a strawberry grower under protected cropping grew seedlings in silicone and then transferred the plants into coir.

One of the main differences between new substrates such as gel and silicone, versus traditional coir and other options, is the value of reuse. Upfront costs may be high but there is payback said the panel.

"A reuseable product is more expensive so it needs to pay back over time," said Marcus. "Other benefits include a clean environment, reduction in pathogens, easy clean and a reduction in waste including packaging."

Jennifer added to the cost debate noting that transport costs have risen around the world and this is a massive challenge for those producing traditional bulky substrates and those using them.

"Growers are looking for compressed products or reuseable products to reduce costs," she said. "Consistency is also important and wins over low cost."

Some new products may also be able to be manufactured on site. Jiffy's gel product reduces shipping costs and reliance on complex supply chains by allowing producers to create the substrate where it is used said Kyle.

Jennifer Neujahr, Global Business Development Leader, Profile Products, US.

Kyle Freedman, Global Segment Manager, CEA, Jiffy Group, US.

Marcus Comaschi, Design Engineer and Co-founder, GyroPlant Ltd, which is based at Didcot in the UK.

Cannabis crop.

Understanding cannabinoids

Where do the well-known cannabis compounds THC, CBD and CBC come from? That was the question researchers posed and answered with a study of the plant's enzymes.

Researchers at Wageningen University & Research in The Netherlands have experimentally demonstrated for the first time how cannabis acquired the ability to produce cannabinoids tetrahydrocannabinolic acid (THCA), cannabidiolic acid (CBDA) and cannabichromenic acid (CBCA). In the process, they also developed enzymes that show promise for the biotechnological production of cannabinoids for medicinal applications.

In a study published online on December 26, 2026 in the scientific journal *Plant Biotechnology Journal*, researchers reconstructed extinct enzymes that were active millions of years ago in ancestors of the cannabis plant. In cannabis, enzymes play a key role in the production of cannabinoids – bioactive compounds with, among other things, medicinal potential.

From generalists to specialists

In modern cannabis plants, the distinct bioactive compounds THC, CBD, and CBC are produced by specific, specialised enzymes. The Wageningen researchers show that this was not always the case. The common ancestor of these enzymes was able to produce several cannabinoids at the same time. Only after gene duplications during cannabis evolution did enzymes emerge that specialised in the production of specific compounds.

The researchers used a technique known as ancestral sequence reconstruction. Based on DNA from modern plants, this method makes it possible to infer what enzymes looked like millions of years ago. These 'ancestral enzymes' were then resurrected in the laboratory and experimentally tested. The study provides the first experimental evidence that the biosynthesis of cannabinoids such as THC originated within a relatively recent ancestor of cannabis and subsequently became increasingly refined.

Cannabis in the greenhouse.

Fundamental insight and new opportunities

The study shows how fundamental research into plant DNA can deepen our understanding of evolution while also enabling innovative applications. The reconstructed ancestral enzymes proved to be easier to produce in micro-organisms, such as yeast cells, than their modern counterparts. This is significant, as cannabinoids are increasingly produced using biotechnological approaches.

"What once seemed evolutionarily 'unfinished' turns out to be highly useful," says WUR researcher Robin van Velzen, who conducted the study together with his colleague Cloé Villard. "These ancestral enzymes are more robust and flexible than their descendants, which makes them very attractive starting points for new applications in biotechnology and pharmaceutical research."

As an example, Robin points to one of the reconstructed 'evolutionary intermediates' that produces CBC very specifically – a cannabinoid known for its anti-inflammatory and analgesic properties.

"At present, there is no cannabis plant with a naturally high CBC content. Introducing this enzyme into a cannabis plant could therefore lead to innovative medicinal varieties," he concluded.

This summary was published by Wageningen University & Research. Read the full research report online at https://onlinelibrary.wiley.com/doi/10.1111/pbi.70475.

"...THC ORIGINATED WITHIN A RELATIVELY RECENT ANCESTOR OF CANNABIS AND SUBSEQUENTLY BECAME INCREASINGLY REFINED."

Greenhouse production will continue to expand in 2026 says Rabobank. Photo Adobe Stock Photos.

Global greenhouse report in for 2026

The global greenhouse sector continues to adjust to new challenges and long-term trends concludes a report just in on greenhouse production worldwide.

According to Rabobank's global greenhouse update, governments' push for self-sufficiency, persistent climate issues, and technological progress are shaping investment and crop decisions around the world.

The report, titled *Global greenhouse update*, is produced for Rabobank by key authors, Lambert van Horen and Cindy van Rijswick. The overview suggests that across markets, governments are placing greater emphasis on domestic production, a trend accelerated by the COVID-19 pandemic and concerns about food security.

As more countries seek to approach self-sufficiency in fresh vegetables, investment in greenhouse capacity is expected to rise, even while short-term growth expectations among global suppliers have become more cautious.

At the same time, crop portfolios are evolving. While tomatoes remain the backbone of protected high-tech horticulture, strawberries and leafy greens are emerging as key growth categories. Blueberries are also continuing to expand production (see 'World blueberry forecast' page 27). Experiments and trials with alternative crops continue to expand, though Rabobank suggests commercial breakthroughs remain distant (see 'New crops for greenhouses' page 26).

Structural shifts are also being driven by energy and technology. The rapid build-out of data centres could open the door to new synergies (see 'Data centres offer heat source' page 27), such as using residual heat in greenhouse clusters. Meanwhile, robotisation is accelerating, with picking and harvesting technologies advancing first due to their repetitive nature and strong business case.

Future outlook

Looking ahead, climate change stands out as a defining challenge for the agriculture sector and for protected cropping. More extreme weather, shifting crop suitability, and rising pest and disease pressures will likely prompt investments in climate adaptation measures at plant, farm, supply chain, and country levels.

Regionally, developments are diverse. In North America, Canadian production is scaling up, while the US is still becoming less self sufficient in key vegetables (especially tomatoes), and Mexico continues to strengthen its position with a broad mix of protected cultivation systems. Europe and North Africa are experiencing competitive realignments – particularly between Spain and Morocco – alongside ongoing consolidation in The Netherlands. Asia, led by China, continues to scale protected low-, mid-, and high-tech cultivation rapidly.

Overall, 2026 marks a period in which self-sufficiency, the energy transition, technological adoption, and climate pressure converge, creating both challenges and new avenues for innovation and growth for the global greenhouse industry.

For more information, download the full report from Rabobank (Rabobank.com/knowledge).

Robot bees all the buzz in horticulture

Innovative research from Canada promises a technological revolution in greenhouses and a new era for pollination.

Canadian researchers are abuzz as their latest advancements in robotic pollinators, or 'robot bees', begin transforming the landscape of horticulture. According to research highlighted a recent issue of *Greenhouse Canada*, these mechanical tools are under trial across a range of controlled growing environments and offer promising solutions to the challenges faced by conventional pollination methods.

With bee populations under increasing threat around the world from pesticides, disease, and climate change, the horticultural sector has been searching for reliable alternatives to ensure crop yields including artificial 'bees'.

Collaborating with tech innovators and grower JEM Farms in Kingsville, Ontario, Canadian researchers have developed sophisticated robot bees equipped with advanced navigation systems and artificial intelligence.

Researcher Dr Shahpour Alirezaee, who is based in the Department of Computer and Electrical Engineering at the University of Windsor, has been a leader in the development of robotic bees. He believes technology can improve crop yield and quality as well as aiding food security. The robotic pollinators are designed to work alongside actual bees to extend pollination windows for example at night or in the short-day periods of winter as well as replacing labour.

Electric and computer engineering Assistant Professor Dr Shahpour Alirezaee in the mechatronics lab at the University of Windsor, Canada with an AI pollinator. Photo Mike Wilkins/The University of Windsor.

Berries, including strawberries, need bee pollination for fruiting. In many greenhouses outside Australia, bumblebees are top pollinators. Photo Adobe Stock Photos.

Unlike natural pollinators, robot bees don't flit from flower to flower seeking nectar and pollen. These large AI driven units combine a technology that senses the location of a flower through a 3D camera lens and a second unit that uses vibration to pollinate the flower. The robot is mounted on a platform and equipped with arms and specialised tools.

"Once we locate the flowers, the robot's signal triggers a second robot to reach the location, where a vibration mechanism is used to pollinate the flowers," Dr Alirezaee explained.

Canadian Horticulture reports that each pollinating unit costs around CAN$25,000 (or around AUS$27,200) with one to two units need for a small greenhouse and five or more for a large structure. The life of the artificial pollinators is estimated to be five to 10 years.

Benefits for Australian growers

While the research is based in Canada, the implications of a loss of pollinators are global. Australian horticulturists, who often contend with fluctuating bee populations and biosecurity restrictions, which have become more apparent since the introduction of varroa mite to parts of eastern Australia, may benefit from adopting similar technology. Robot bees could offer a consistent, controllable alternative to natural pollinators, improving yields and reducing reliance on imported bee colonies.