

NURSERY PAPERS

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Global review and gap analysis of nursery industry research and development initiatives

SUMMARY

The landscape of Research, Development and Extension (RD&E) for Australia's horticultural sector has changed substantially over the past 10 years with significant policy shifts at a national level and a need for greater collaboration to ensure investments are used effectively.

A new global review conducted by RM Consulting Group (RMCG) has unearthed leading RD&E from around the world, highlighting the opportunities for Australia's nursery industry to learn from what is currently occurring in other countries and adopt practices and technology to our conditions and systems.

This nursery paper looks at recent international RD&E programs of relevance to the Australian nursery industry.





THE RESEARCH

RMCG's research set out to achieve the following:

- Identify the main issues the nursery industry is facing globally and, from an RD&E viewpoint, the major drivers for industry
- Assess these issues against the current operating environment and prioritise accordingly
- Identify RD&E capability (people) and capacity (facilities) globally
- Detail current international and Australian RD&E programs

FINDINGS

PRIORITIES

Review of the nursery industry profile, current challenges and opportunities, and national trends show that while considerable research has occurred in the past, new technology and practices can be slow to be adopted by nursery businesses. Reasons for this are varied, including the diversity of business size, capacity and capability and range of products developed within the nursery industry.

The industry is currently investing in a range of RD&E to meet the needs of the industry as guided by the industry's Strategic Investment Plan (SIP). In consultation with industry, RMCG identified the following RD&E priorities for nursery growers:

Reducing the industry's environmental footprint through improved resource use efficiency

Improving production and process efficiencies (both in the field and within protected cropping systems)

Reducing production costs through automation and uptake of new technology

Improving supply chain efficiencies and logistics

Improved understanding by industry of end user needs/desires

AUSTRALIAN RD&E CAPACITY AND CAPABILITY

The review identified that given the direction and investment from industry there is extensive capacity and capability within Australia to conduct RD&E that will address key issues.

In fact, Australia is leading the way globally in a number of research fields of relevance to the nursery industry including:

- The use of Next Generation Sequencing technology to improve the efficiency of screening process for biosecurity at Murdoch University
- Increasing the level of green infrastructure in urban space by the Green Infrastructure Research Group at Melbourne University
- The development of new tissue culture systems to improve the time taken to generate new seedlings at Queensland Alliance for Agriculture and Food Innovation (QAAFI) and the University of Tasmania
- The development of new technology for monitoring of plants and the automation of production tasks at University of Sydney and the University of New England (UNE)
- Production of plants within a protected system (glasshouses/greenhouses) at the University of Western Sydney





INTERNATIONAL RD&E ACTIVITY OF RELEVANCE TO THE AUSTRALIAN NURSERY INDUSTRY

Environmental stewardship and sustainability

Increasing regulation in resource use efficiency has resulted in RD&E providers focusing on ways to reduce the environmental footprint of plant production. This is particularly evident in Europe (Germany and the Netherlands) and some states in the US. California, through the California Centre for Urban Horticulture, has developed a water use efficiency rating system which is used for all new landscaping. The Wageningen University and Research (WUR), several German Universities and the University of California all have ongoing research programs investigating better ways to manage inputs and the re-use and recycling of outputs with WUR focusing on innovative ways to manage plastic.

Improving systems and practices

The Netherlands, Canada and the UK have a number of research projects focused on improving systems and practices. The Greenhouse Horticulture Unit at WUR is developing new complete concepts and integrated designs of production systems with mobile cultivation systems, revolutionary greenhouse designs or systems for the early detection of plant diseases.

In the UK, the Agriculture and Horticulture and Development Board (AHDB) has funded a number of research projects investigating innovative ways to manage pest and disease and reduce labour costs through automation. Their GROWBOT project is exploring the use of new, human-robot interactive, soft robotic systems and their application for semi-automated propagation of multiple varieties of ornamental plants. There are also some private providers based in Europe who are currently developing and selling various types of automation suitable for use in nursery production systems.



Biosecurity

Biosecurity was not a focus of RMCG's review as it is likely to be country specific and dependent on existing regulations. Of potential to increase the efficiency of quarantine processes is the use of Next Generation Sequencing (NGS) which is currently part of a research project by WUR. There are potential collaboration opportunities with Murdoch University in Western Australia, which is also investigating the potential of this technology.

Increasing the demand for nursery products

There are several ongoing breeding programs in Europe (Euro-Trials) and in America (University of Kansas) that are assessing new ornamental and woody plant varieties. To speed up the breeding process, which has traditionally been difficult for ornamentals, a number of projects are investigating the use of molecular and genetic tools to improve efficiency of plant selections.

Researchers based at Michigan University and Texas A&M University in the US have conducted several projects on consumer purchasing behaviour and preferences. These researchers have significant expertise and experience in marketing,

financial analysis and benchmarking, and the situation/outlook for nursery and greenhouse crops in the US.

Urban greening and associated research on key factors that influence tree survival (soil quality and health, tree species selection and water use efficiency) are part of programs managed by the University of California and Vineland Institute of Canada. The social and health benefits of plants is also being investigated by the Faculty of Agricultural Sciences and Landscape Architecture in Germany as part of their 'Green Care' program.

Skills and workforce management

SmartHort aims to help the UK horticultural industry increase productivity and address the challenge of access to affordable labour through: improving management practices; supporting skills development; and identifying new technologies. As part of this program they are investigating how automation and robotics may help to offset labour pressures in the long-term. Short-term solutions may be found through changes to management practices, such as the introduction of Lean, Champion and Continuous Improvement. Investing in the skill-set of the workforce through training and apprenticeship schemes could also help to increase productivity and improve staff retention and recruitment.



WAGENINGEN UNIVERSITY AND RESEARCH

The Netherlands is home to one of the world's leading horticultural universities; Wageningen University and Research (WUR), which has extensive capabilities, experience and facilities to conduct innovative R&D for the nursery industry.

Current priority research areas at WUR include the reuse and recycling of water, energy and climate management, as well as next generation sequencing for biosecurity screening, all of which are relevant to growers in Australia.

Wageningen's name keeps popping up in Australia. The institution recently collaborated with Western Sydney University on a state-of-the-art vegetable glasshouse, and provided input into the University of Tasmania's Hort Masterclass.

IMPLICATIONS FOR THE NURSERY INDUSTRY

From integrated pest management, to logistics and plant genetics, there is plenty of international research for Australian growers to explore, learn and adapt to suit their businesses.

In some countries like the Netherlands and Germany for instance, growers face higher scrutiny on environmental stewardship, and while Australia is a much larger, vast country, there is a lot to gain by understanding how international markets are addressing these areas.

RMCG's review provides international insights for the Australian nursery industry to foster collaboration with others, leverage investments, share skills and identify new ways to grow the nursery sector on home turf.

The Global review and gap analysis of nursery industry research and development initiatives (NY17006) project has been funded by Hort Innovation using the nursery industry levy and funds from the Australian Government.

LINKS TO RESOURCES

PAST EDITIONS OF NURSERY PAPERS ARE AVAILABLE ONLINE on the Nursery & Garden Industry Australia website http://www.ngia.com.au/Section?Action=View&Section_id=46