Impact case study — AP14023 Improved tree and fruit nutrition for the Australian apple industry

Grower	Robert Green
Location	Lenswood, South Australia
Planted area	High density plantings under full netting

What was the research about

Between 2015 and 2021, AP14023 *Improved tree and fruit nutrition for the Australian apple industry* (delivered by the Tasmanian Institute of Agriculture, and Plant and Food Research New Zealand) worked to develop new knowledge to support apple growers in optimising nutrient management practices. The project was delivered as part of the broader Productivity, Irrigation, Pests, Soils phase 2 (PIPS2) program. The project delivered a series of field trials focused on understanding tree nutrient uptake and produced soil characterisation profiles for apple growing regions. The findings from this research were incorporated into the development of a decision support tool that provides strategic guidance for advisors and growers on the optimization of irrigation and nitrogen application for the major apple growing regions of Australia.

Robert Green, a 4th generation apple grower from Lenswood, South Australia, talked about his interest in optimising tree nutrition and the importance of research such as AP14023 for continuing to expand understanding of best practice possibilities.

What is your background and management approach towards soil health and tree nutrition in apple production?

“We have always been willing to give new growing techniques and management practices a go, particularly since the late 1990’s when we started planting our blocks on dwarfing rootstocks. This trend towards more intensive plantings has driven our interest in trying to optimise our management practices as much as possible. We started with drip irrigation when we came under a period of water stress, which then led to my interest in the importance of nutrition, as trees exposed to that type of watering develop smaller root systems and have a higher sensitivity to nutrition availability.

We started to conduct nutrient testing of our fruit, and from here we could understand what nutrition was being taken up through the fruit, and as a result, what we needed to replace back into the soil. It was at this point where we started to pay more attention to closely managing our nutrition inputs.”

What was your involvement with AP14023 and the PIPS program?

“While we weren’t directly involved in the AP14023 research, we really took an interest in what the research findings were saying around the impact that the timing of nutrition can have on how efficiently it is utilised by the tree in combination with other factors like the timing of water and the influence of your soil profile.

When we learnt that the research was going to be continued into a third phase through PIPS3 (project AP19006) we thought it would be a great opportunity to get involved in the ongoing trials that are focusing on adapting the learnings from AP14023 into more accessible, field based grower decision support tools.”

A key output from project AP14023 was the development of the Strategic Irrigation and Nitrogen Assessment Tool for Apples (SINATA). Have you used this tool and what has it shown you?

“Yes, we have downloaded SINATA and set it up with all our orchard particulars. It was really interesting to see what the tool recommended for us around nutrition and irrigation requirements in comparison to what we were already doing. It was reassuring to see that there was very close alignment between what was recommended by SINATA compared to our current practices. From a management perspective it has been a good resource to validate that our practices are basically in line with the recommendations that have been supported by all the research. While it’s good to see this alignment in the way we manage our orchard, it’s important to realise that we already paid very close attention to these areas. It wouldn’t surprise me if the tool presented alternative recommendations compared to current practices for growers that have spent less time focusing on refining their nutrition and irrigation management.”

What types of results and impacts have you experienced from acting on the findings of this research?

"The main discovery from the project was that nitrogen applied to trees after harvest was taken up less effectively compared to being applied pre-harvest. This was significant given the existing recommended practice across the industry focusing on the application of nitrogen post-harvest.

Since then, we've moved away from applying nitrogen post-harvest, to a pre-harvest timing in the mid to late spring and early summer period. As the trees are able to take up this nitrogen more efficiently, our nitrogen application has reduced between 30%-50% per hectare as a result."

Have there been any challenges along the way?

"Overall the adjustment to timing has been quite seamless because we were already operating an automated fertigation system. All we had to do was adjust the timing schedules.

The other challenge that isn't particularly surprising has been finding the time to learn more about the full potential of optimising nutrition. As a small family business we are always working across a range of competing tasks and priorities, so it can be challenging to dedicate the time necessary to learn and engage with research that reflects the full potential it has to offer. We are currently finalising our bushfire recovery program, and I'm sure that I'll get to spend even more time tweaking our nutrition management once we are through with this."

What do you see as the future opportunities for nutrition management for apple growers?

"The progress we've made so far has been great, and the idea of continual monitoring and improvement is essential into the future. Improving nutrient uptake efficiency has strong potential for some real dollar savings as we've seen the cost of fertiliser increase 2-or-3-fold in the last few years. The costs of sourcing and deploying water has also increased recently, so any initiatives to optimise these things are very important for the industry.

The main future opportunity in this space is to extend the level of insight to growers in a way that not only explains what the best approaches to nutrition management are for their orchard, but why the changes should be made. Being able to more confidently interpret and understand the reason for recommended practice changes will ensure a deeper understanding, and in turn support higher adoption."

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Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture. For more information visit www.horticulture.com.au.

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