

Overcoming challenges in supporting remote and regional growers

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Abstract. With Zespri's 2010 release of three new commercial kiwifruit varieties, each with unique growth habits, the requirement for technical growing support to regions outside the main growing area of the Bay of Plenty (BOP) has increased. Also with the arrival of the *Pseudomonas syringae actinidae* epidemic and the impact it has had in the BOP the commercial significance of other kiwifruit growing regions has increased and hence, strategically supporting these regions to increase productivity is an imperative. Providing technical support to a wide geographical area provides challenges. Each region has a unique growing environment and industry infrastructure and, therefore, different extension requirements. In terms of technical support most of the regions outside of the BOP do not have dedicated technical personnel. Access to technology can be barrier in accessing information as rural broadband is not yet available to many kiwifruit growers. The key is having a multifaceted approach in both the collection and dissemination of technical information thereby ensuring information is targeted at each region's unique growing environment.

Keywords: kiwifruit, geographical spread, networks, regional, technology

The New Zealand kiwifruit industry comprises approximately 3,200 orchards, from Kerikeri in the north of the North Island to Nelson at the top of the South Island. Eighty per cent of the industry's productive orchards are currently located in the Bay of Plenty (BOP): the remaining 20% are spread amongst 10 regional growing centres.

In 2010, Zespri released three new commercial kiwifruit cultivars. With unique growth habits and environmental challenges, and the arrival of the *Pseudomonas syringae actinidae* (Psa) epidemic in November 2010, the commercial significance of other kiwifruit growing regions has increased and hence, strategically supporting regional growers to increase productivity is more important than ever. Technical capabilities outside of the BOP vary from region to region, as do the challenges in supporting these areas. A lack of dedicated technical personnel, and the unique growing environment and industry infrastructure mean that each region has unique extension requirements, and must be approached as such.

Industry structure

The New Zealand export kiwifruit industry operates under a single desk structure under grower control; government legislation prevents anyone other than Zespri (formerly the New Zealand Kiwifruit Marketing Board) from exporting kiwifruit from New Zealand to any markets other than Australia. Growers choose which post-harvest supplier they use for packing and cool storage, but all fruit is exported and marketed by Zespri. In this sense, while post-harvest suppliers compete with one another for tray volumes, growers are not competing with one another for per-tray returns, as a per-tray price is paid for each variety, and a pool of money is split across the grower pool, allocated according to fruit dry matter levels at harvest and other criteria (Everett 2011). Growers can earn premiums for their fruit if it holds well in storage, or can be picked in the very early weeks of the season, but depending on the contracts they have with their post-harvest supplier, this money is split between the grower pools in various ways.

Zespri is in a unique position in that it has a relationship with every grower, and it is in the interest of every grower to make sure that the other growers do well, in order to maintain Zespri's brand reputation, and to optimise marketing opportunities. In 2010, Zespri commercialised three unique kiwifruit varieties: Gold3, Gold9 and Green14. Growers were able to bid for a license to grow one or more of these varieties. Each variety had been through several years of pre-commercial trials, when growers in various growing regions were allocated 0.25 ha trial blocks to grow on a commercial basis. There were 19 blocks of Gold9, 23 blocks of Gold3, and 42 blocks of Green14. It was on the basis of these growers' experiences and trials carried out on the crops they produced, that the decision was made to commercialise these varieties. In 2010 and 2011, 1,026 ha over approximately 960 orchards were grafted to these three varieties.

Psa and the recovery pathway

In November 2010, the bacterial disease Psa was discovered in New Zealand on a BOP orchard (Everett 2011). Over the previous few years, kiwifruit orchards in Japan, Korea, Italy and France had been infected with the same disease, affecting production in Japan and Korea, and

killing vines in Italy and France, where a more virulent strain was present (Mazzaglia 2012). A gold kiwifruit variety commercialised by Zespri in the 1990s, Hort16A, appeared to be particularly susceptible to the disease (Everett 2011).

Over 2011, Hort16A orchards in the BOP were devastated by this disease. Zespri proposed a 'recovery pathway' in early 2012, which involved growers exchanging Hort16A licenses for an equivalent area of the less susceptible Gold3 for a fixed price. There was also an allowance for non-Hort16A growers to bid for extra Gold3 licenses. Over 2,200ha of license was allocated, 1,800 hectares of this in exchange for Hort16A. Winter 2012 was the biggest grafting effort the industry in New Zealand had ever attempted and this time, instead of being just the top growers who were confident they could manage this new variety that not much was known about, many growers were forced to change to Gold3 in order to stay in the industry. Extension needs around growing this variety had changed significantly.

Plate 1. Gold3 kiwifruit



In the BOP, where the majority of the industry and therefore pre-commercial trials were based, there is a significant pool of technical personnel: Zespri staff, staff at post-harvest facilities, consultants and growers. Outside of the BOP, it is a very different story. Technical personnel are few and far between, and if they are involved in extension at all as part of their roles, are usually responsible for several crops in addition to kiwifruit. For example, in Kerikeri, technical staff are involved in Packhouse operations, as well as day-to-day orchard management and harvest operations, for avocados, citrus crops and kiwifruit. Specialised knowledge about growing Gold3 in this region is limited, particularly as Gold3 was initially prompted as a variety suitable only for an early harvest window, so there was no pre-commercial trial block in this area which is not an early region. Hawkes Bay does not have a post-harvest facility in the region – all fruit is trucked to other areas for packing and cool storage. Technical staff from these better-resourced areas travel to visit growers and run technical events, but as they are a very small proportion of their grower base, these orchardists receive only limited support.

Zespri decided that more support for regional growers was necessary and late in 2011 created a role in its Orchard Productivity Centre (OPC) for a regional technical officer who is dedicated to developing programmes and frameworks to facilitate effective extension to these regions.

Specific regional data

Being able to provide growers with data that is specific to their growing area is a significant challenge. With 80% of the industry, as well as a significant proportion of the research capability, based in the BOP, the majority of data comes from this area. Significant environmental differences mean that this data is not always particularly relevant to other growing regions. Several programmes aim to help fill this void.

Pre-commercial trials

Pre-commercial trial blocks of each of the three licensed varieties were planted in most growing regions. However, Gold3 was first proposed as a variety suitable to fill an early harvest window, so was only planted in regions that were seen as typically 'early'. Other regions tended to plant Gold9, which was a proposition seen as more suitable for later harvest windows. In the final year of pre-commercial trials, it was discovered that Gold3 had a much wider harvest window

than had been anticipated, and was in fact suitable for planting in all growing regions – but areas such as Kerikeri, Whangarei and Nelson did not have pre-commercial blocks that could be monitored and have data collected from.

Scientific research

Scientific trials can be extremely important, but are often of limited value if the environmental conditions they were carried out under are significantly different from those growers have to work with. Carrying out trials over more than one region becomes very expensive and is seldom done.

On-orchard monitoring programmes

The Focus Orchard Network (FON) programme, similar to those run in the New Zealand viticulture, pip fruit and dairy sectors, has as one of its components an on-orchard monitoring programme. In regions where the FON orchard does not have Gold3, or where the FON programme does not have an orchard, monitoring programmes have been set up to allow benchmarking with a local site rather than against the whole industry. Data gathered in the monitoring programme is collected by a third party and is available on their website, which the majority of industry use already as they carry out pre-harvest maturity and residue testing. Users can choose variables, download data sets and compare across regions. The current website, though, does not allow users to load their own data to plot against the benchmark – this is an area we would like to move towards.

Extension methods

One size definitely does not fit all when it comes to supporting regional and remote growers. Each region has varying technical capability, experience, environmental conditions, and desire for knowledge. Therefore a tailored, multi-faceted approach is necessary, with each area having a specific mix of techniques for data collection and dissemination.

Media

The New Zealand Kiwifruit Journal The New Zealand Kiwifruit Journal (the official bi-monthly publication for the New Zealand kiwifruit industry, published by Zespri), is a repository for technical information. Industry-funded research projects, case studies, and financial models are published in this bi-monthly forum. However, as an industry-wide publication, it has limited value as an extension tool for region-specific technical issues.

Canopy The Zespri grower website 'The Canopy', is again, very generic as it is used across the whole industry. Resources specific to various stages of growth or techniques can be widely used and growers can access information when it suits them to do so, but many growers do not have access to rural broadband and those that do often have very limited data caps, severely restricting the use of the website. The average age of kiwifruit growers in New Zealand is approaching 60 years, so for some growers the use of computer technology is challenging. This site can only be accessed by industry personnel. Specific pages within the website are dedicated to technical information around the licensed varieties, and resources have been separated into 'Grafting and establishment' and 'Fruiting canopies' pages, to allow growers to access only the information they need.

Figure 1. A snapshot of the home page of the Zespri Canopy website



Videos Having growers talking to other growers is one of the most powerful ways of encouraging innovation, but with limited availability of broadband, many growers can't access this sort of information. Sending out DVDs of particularly relevant videos is one way to get around this, but is not a particularly effective extension tool. However, for those growers who can access videos, having another grower talk directly to them from their orchard can be very powerful. After an event, we try to video attendees' 'top tips' for other growers – this is a good way of 1) getting growers to articulate what they think the most important factors of the topic are, and 2) allowing non-attending growers to hear directly the views of other growers.

On-line discussion forums With an aim of being more immediate and of growers in different parts of the country being able to communicate with one another and suggest ideas, an on-line discussion forum is being initiated on the Canopy website. Initially, we will suggest topics for discussion, but the aim is to eventually allow this forum to support itself. However, to avoid it becoming a political forum, posts will be vetted before they are made live.

Events

Holding events, while being a relatively inefficient use of resources, is one of the most important aspects of this whole extension programme. Building networks of growers and the people who support them will empower them to look to each other more for ideas and solutions – even if it's a catch up at the local sports club - getting growers to talk to each other is a huge boost to their capabilities. More formal events are required when trying to address specific technical problems, but these can vary from relatively informal discussion groups to seminars presented by scientists.

Kiwitech seminars KiwiTech seminars are held annually around the country. This forum is an opportunity to take scientists on the road and to put them in direct contact with growers. This gives growers the opportunity to ask questions directly relevant to their growing environment and at times challenges the scientists to reconsider some of their findings in the light of what they hear from growers who have experienced different responses in their orchards.

Field days and discussion groups One of the primary tools for extension, field days are expensive, weather-dependant, time-hungry and sometimes very challenging to organise, but are one of the most effective extension tools available. The FON has previously been targeted at Hayward production only. This programme has now expanded to cover licensed varieties, and will in the future be the key vehicle for delivery of extension events around fruiting Gold3. Grafting and establishment are quite a separate field and as such separate events are held to support growers going through this phase of orchard development. Needs for each region are identified, and appropriate events run to support these needs. For example in June 2013, 12 grafting workshops were held across the various regions, to support those growers planning to do their own grafting. Several series of events will follow to support the various stages of growth – timed in each region to be held at the most appropriate stage for the growth patterns occurring there.

When extension agents don't have the answers, or solutions don't follow a 'recipe', discussion groups can be a very constructive way of getting growers together to talk about their experiences. The presence at this type of event of growers who trialled varieties before their commercial release cannot be over-valued, as these growers are several seasons ahead of the pack and can provide some very useful 'steers' for the discussion. Particularly at a regional level, these are usually fairly influential people and their opinions are usually respected by the rest of the grower community. Making sure that any recommendations are sense-checked by these growers means that there are unlikely to be any major challenges at discussion groups.

In March 2013, bus tours were held in the BOP over two days (two sessions per day), where suppliers provided transport for their growers, and they visited three different orchards at the same stage of development of Gold3 canopies. Suppliers from outside the BOP brought groups of growers to this event, but in the future we would ideally identify properties suitable for them to visit in their own regions and support them in holding this type of event. In some regions, growers already do this informally several times a year – but we would like to expand this so that all growers have the opportunity to visit orchards that have something they can learn about.

Plate 2. Growers visiting a Ngai Tukairangi Trust orchard in Tauranga as part of a March 2013 bus tour



Webinars To allow us to reach a large number of growers without taking scientist on the road (which is expensive, time-consuming and logistically difficult), webinars enable growers to hear directly from the scientists and to ask questions, without all the difficulties of a 'road show' type event. R&D meetings are increasingly being held like this – growers can dial in from their home computer to watch the meeting remotely. We plan to trial this technology for extension events starting in July 2013, having a scientist present results on HiCane research from Te Puke to a group of growers in Kerikeri. We will get the growers to gather in a central location where we will screen the presentation and they can suggest questions to be asked of the presenter. The plan is that the scientist will not be in front of an audience – this presents difficulties as the remote audience can miss out on hearing questions from the floor asked without a microphone, or the speaker gesturing to something on the screen – they see only the PowerPoint presentation. Speakers need to carefully structure presentations to show and highlight items of particular significance – no laser pointers!

Other grower support

Supporting grower trials A key part of the role of the OPC is to support and/or run grower trials, which help with identifying research needs, designing robust trials, help with trial set up, data collection and analysis and communicating outcomes to other growers.. For regions where technical information and technical capability are limited, supporting grower trials is one of the key roles of extension agents, as Rogers (2003) explains: 'change agents often seek to speed up the innovation-decision process by sponsoring demonstrations of a new idea' (p.177). A SmartKiwi fund can provide up to NZ\$5,000 per trial for costs such as chemical application, lab testing and analysis, and the use of consultants. Helping growers to understand the importance of control areas and randomised design in trials is one of the key ways we can empower growers to design and set up their own trials. To support this, we have several technical bulletins on trial design, sample collection, and a spread sheet growers can use to help assign treatments randomly and then analyse results for significance. These trials can also have a very useful place in helping to validate science findings in their environment.

One way to get around this is to replicate, on a small scale, a science trial to validate the findings in several regions. For example, trunk girdling and root pruning trials will be carried out this season on several orchard in South Auckland, to see if we can replicate the dry matter response scientists saw in BOP soils, in the wetter climate and heavy soil types of this region. Use of budbreak enhancing sprays such as hydrogen cyanamide (HiCane) in northern regions is particularly important for Gold3 (Zespri 2012), but until this season we had only anecdotal evidence of the best timing for application. A trial of rates and application dates carried out in both Te Puke and Kerikeri will be very useful for growers in both these areas, but growers in other areas will need to carry out trials to fine-tune the applications under their unique conditions.

Supporting supplier events One of the simplest ways to help develop technical capability in the regions is to support supplier events. When post-harvest suppliers run events, many growers attend who would not turn up to a 'Zespri' event; they are much more comfortable with the grower group they know and the technical personnel they have regular contact with. Supporting these events by providing technical information, or by attending and contributing, helps not only to reach a different group of the grower pool, but also strengthens bonds with the technical staff, who we often rely on to help organise our own events. Where a supplier is running their own event, we would much rather help with this than run our own event in competition. In several regions though, there are only two post-harvest suppliers and often growers strongly align with one or the other. Sometimes running our own events helps to avoid forming 'silos' where there are two distinct groups of growers.

A multi-faceted approach

Dissemination of messages and coordination of technical events for regional growers takes a lot of effort. Geographical isolation, unique environmental conditions, technological and technical limitations, and lack of effective grower networks can be significant barriers to the uptake of new technologies, and the successful growing of the new Gold3 cultivar is no exception. In the end, all the types of extension techniques discussed above are aimed at improving the technical capability of growers and the people who support them and empowering them to seek their own solutions through discussion and robust grower trials.

The key is having a multifaceted approach in both the collection and dissemination of technical information, ensuring that information is targeted at each region's unique growing environment.

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