NEW ZEALAND
The BeeKeeper
DECEMBER 2016 | VOLUME 24 No. 11

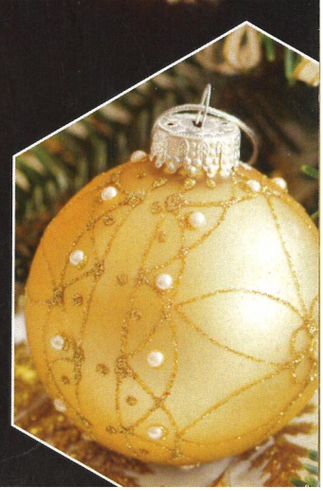
Expressions of interest sought for ApiNZ Focus Groups
ApiNZ Board

Nosema breakthrough
Plant & Food Research

Testing mānuka nectar
Dr Megan Grainger

NZ flax for summer
Linda Newstrom-Lloyd and Angus McPherson

Making your hard work pay off
Frank Lindsay



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Front cover: Honey bee taking nectar from New Zealand Flax (Phormium tenax 'Tricolor') *in the Flax Collection at Landcare Research, Lincoln. Photo: Finn Scheele ©Trees for Bees NZ.*

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Due on the 6th of the month prior to publication.
All articles/letters/photos to be with the Editor via fax, email or post to Nancy Fithian (see details above).

Articles published in *The New Zealand BeeKeeper* are subject to scrutiny by the Apiculture New Zealand management committee. The content of articles does not necessarily reflect the views of Apiculture New Zealand.

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APICULTURE NEW ZEALAND

EXPRESSIONS OF INTEREST SOUGHT FOR APINZ FOCUS GROUPS

Expressions of interest are being sought from ApiNZ members and participants in the wider industry who would like to be considered for a position on the following four focus groups.

ApiNZ Science and Research Focus Group

There are up to 10 positions to fill, including one chairperson.

The Science and Research Focus Group's purpose is to ensure that the New Zealand apicultural industry benefits from relevant research undertaken both in New Zealand and overseas, by facilitating and directing funding to research priorities, and communicating relevant research outcomes.

The scope is Bee Health only; Market access and Biosecurity research is done by other focus groups in collaboration.

The goal is to make the industry stronger and more profitable by leading policy and programmes to protect the health of NZ's bees, and that support the ongoing growth and value of the apiculture industry.

Technical skills set relevant to the focus group are required. Actual and reasonable expenses will be reimbursed.

The focus group will report to the Apiculture NZ Board. A member of the Board will sit on the focus group.

Expressions of interest can be sent to info@apinz.org.nz with the subject line 'Science and Research Focus Group application' **by 5.30pm Saturday, December 31, 2016.**

Please include a CV and a 100-word statement detailing why you should be considered for a position on the focus group.

Selections will be made by a sub-committee of the Apiculture NZ Board.

ApiNZ Biosecurity and GIA Focus Group

There are up to 10 positions to fill, including one chairperson.

The Biosecurity and GIA Focus Group will have the purpose of:

- progressing GIA so ApiNZ has good biosecurity plans in place
- working on opposing the import of honey and bee products from countries of known risk
- working with Government to keep pests and diseases out of New Zealand
- ensuring NZ bee products are acknowledged for their authenticity and integrity, through the development of best practice policy for industry.

The focus group will report to the Apiculture NZ Board. A member of the Board will sit on the focus group.

Technical skills set relevant to the focus group are required. Actual and reasonable expenses will be reimbursed.

Expressions of interest can be sent to info@apinz.org.nz with the subject line 'Biosecurity and GIA Focus Group application' **by 5.30pm Saturday, December 31, 2016.**

Please include a CV and a 100-word statement detailing why you should be considered for a position on the focus group.

Selections will be made by a sub-committee of the Apiculture NZ Board.

ApiNZ Education and Skills for Jobs Focus Group

ApiNZ invites interested participants to be considered for a position on this focus group.

Education and Skills for Jobs will liaise with industry and government on setting national standards that ensure continued pathways for skills development.

- It will provide leadership, analysis and advice that contributes to the development of National standards for Training New Zealanders to have appropriate Skills for Jobs
- It will work with the relevant agencies to establish national and technical standards, as well as protocols that are necessary for delivery of the standards.
- It will ensure delivery of efficient and practical training and skills, policy formulation and priority setting that meets the needs of the industry.

The focus group will report to the Apiculture NZ Board. A member of the Board will sit on the focus group. Technical skills set relevant to the focus group are required.

Expressions of interest can be sent to info@apinz.org.nz with the subject line 'Education and Skills for Jobs Focus Group application', **by 5.30pm Saturday, December 31, 2016.**

Please include a CV and a 100-word statement detailing why you should be considered for a position on the focus group.

Selections will be made by a sub-committee of the Apiculture NZ Board.

ApiNZ Māori Engagement Focus Group

ApiNZ invites interested participants to be considered for a position on this focus group.

Māori engagement is of significant importance to both industry and government and will require a wide range of expertise and thought leadership to deliver:

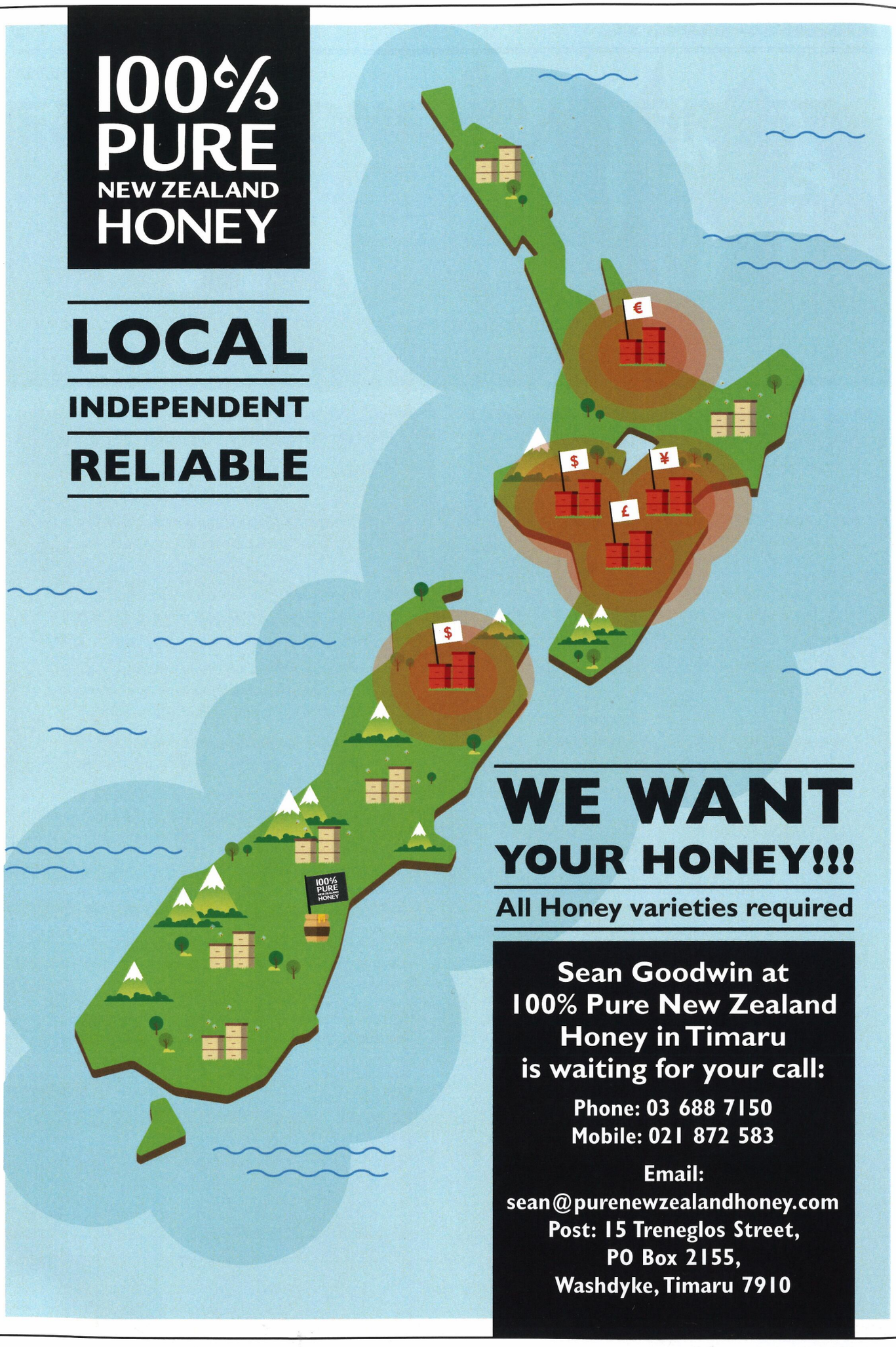
- analysis, advice and action that contributes to the development of pathways for engagement within existing and future Industry activity
- establishing proactive partnership and lead roles with Government and Industry agencies to establish procedure and protocols that are appropriate and accountable
- it will participate in development of pathways to policy formulation and priority setting that meet industry needs.

The focus group will report to the Apiculture NZ Board. A member of the Board will sit on the group. Contributory skill set with know how/want to/can do attitude is required.

Expressions of interest should be sent to info@apinz.org.nz with the subject line; 'Māori Engagement Focus Group application', **by 5.30pm Saturday, December 31, 2016.**

Please include a one-page CV overview and a 100-word statement detailing why you should be considered for a position on this focus group.

Selections will be made by a sub-committee of the Apiculture NZ Board. Successful applicants will be notified by January 30, 2017.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Our thoughts are with everyone who has been affected by the earthquakes in North Canterbury and the myriad quake and weather disruptions in Wellington and elsewhere. Stay safe.

THANKS, EVERYONE: SEE YOU IN FEBRUARY!

The Publications Focus Group (Frank and Mary-Ann Lindsay, Serena Richards and Jenny Nelson) and journal editor Nancy Fithian wish you all a safe, happy and healthy festive season, and a bumper crop for 2017.

We hope you will be able to take some time to be with family and friends before resuming work.

Sincere thanks to our advertisers, without whom the journal would not be published—please support them! We are also grateful to everyone who has contributed articles and photos over the past year.

Thanks also to the members of the ApiNZ Board and Management Team for their tireless efforts on behalf of all ApiNZ members, and to Certa Solutions for a job well done again this year.

NB: The deadline for the February 2017 journal is Monday, 9 January, with a cutoff date of 16 January for articles and advertising. Please mark the date in your 2017 diaries now.

APINZ **HOLIDAY CLOSURE** DATES

The ApiNZ office will be closed from 23 December 2016 through to 6 January 2017, reopening 9 January 2017.

On behalf of CE, Karin Kos, newly appointed Chair, Bruce Wills and the ApiNZ Board, we wish you a bountiful season, and safe and happy holidays.

pī·ā·ora BEES GIVING LIFE | APICULTURE NEW ZEALAND

LAND USE AGREEMENTS AVAILABLE FOR PURCHASE

Apiculture New Zealand has developed two Land Use Agreements that will be available to members at a significantly discounted price.

The two land use contracts now available for purchase from the ApiNZ website are:

- Apiary Land Use Agreement – Land Owner/Beekeeper Profit Share: For those beekeepers offering a crop share arrangement.
- Apiary Land Use Agreement – Site Rental: For those beekeepers paying a set apiary site rental or per hive rate to the land owner.

The agreements will be $195 +GST for ApiNZ members and $455 +GST for non-members.

These can be found on the ApiNZ website here: http://apinz.org.nz/land-use-agreement/

The agreements will be personalised to the purchaser, so on application you will need to answer some questions which will be added to your document.

Once payment is received this document will be sent to you via e-mail.

If you have any questions, please contact the ApiNZ Management Team on 04 471 6254 (Monday to Friday 8.30–5.30) or e-mail info@apinz.org.nz.

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APICULTURE **HEALTH AND SAFETY** PROGRAMME **FORMED**

Apiculture New Zealand is proud to have formed a partnership with OnFarmSafety New Zealand to provide essential Health and Safety programmes for its members.

The Health and Safety documents can be ordered via the ApiNZ website's online shop at significantly discounted prices to members.

The core Health and Safety programme covers your Policies, Code of Conduct, Employment, Hazard and Risk management, Hazardous Substances, Vehicles, Business Training, Emergency Procedures, Accidents and templates that you can use.

Through business support OnFarmSafety New Zealand can work with all members to help develop their Health and Safety policies and rules so that understanding and communication is clear and defined from the owners, management, workers, and any other person who enters your workplace.

This programme will be customised to reflect your business by adding your business name, details and logo. When purchasing the documents, you will be asked to fill out a questionnaire with these details for OnFarmSafety New Zealand.

Module 1: On Farm/Hive Site

Member price: $200 | Non-member price: $325

This module provides systems relating to Health and Safety in the management and operation of your hive sites, including landowner-related documents, safe working procedures and a Master Hazard List.

Module 2: Beekeeping

Member price: $200 | Non-member price: $325

This module provides safe operating procedures when working with your bees and hives, including transporting hives, Personal Protective Equipment (PPE), and a Master Hazard List.

Module 3: Honey Processing

Member price: $200 | Non-member price: $325

This module provides safe operating procedures for your honey extraction process, and a Master Hazard List.

Apiculture Health and Safety Programme

Member price: $450 | Non-member price: $750

This is the core Health and Safety programme providing an effective Health and Safety operating system for your business that covers the key components to become compliant once implemented and continuously maintained.

Additional modules are available to assist you to focus more on various health and safety issues with their business.

ABOUT ONFARMSAFETY

OnFarmSafety New Zealand is a nationwide company which specialises in helping business owners to take control of their health and safety needs, and implement individualised workable risk management procedures that look after everyone. They support businesses to take ownership of, customise, and implement their health and safety programme.

For more information or to purchase your Health and Safety Programme visit the Apiculture NZ website – www.apinz.org.nz or phone (04) 471 6254.

PEST AND DISEASE CONTROL

SPHECOPHAGA VESPARUM: ESTABLISHMENT AND RECOVERY RATES

B.J. Donovan, Donovan Scientific Insect Research, Canterbury Agriculture and Science Centre, Lincoln
E-mail: Barry.Donovan@Plantandfood.co.nz

I was the scientist in the Entomology Division of the old DSIR who instigated and managed the wasp biocontrol project from 1979 to mid-1992, and thereafter operating privately until the Foundation for Research, Science and Technology terminated my funding in 2005.

Groenteman (2016) says the imported wasp parasitoid *Sphecophaga vesparum vesparum* which our team released widely over the country is established at only two sites, and so has "failed so miserably".

The facts are that following the first release of parasitoids at Pelorus Bridge in Marlborough in 1987, the parasitoid was found to have attacked two nests of the common wasp *Vespula vulgaris* by 1988. Later the parasitoid was recovered from a German wasp nest, *V. germanica*, in east Christchurch, and from a common wasp nest in the Botanic Gardens in central Christchurch. Subsequently attacked nests have been found in 12 sites ranging from Ashley Forest and Mount Grey (30 km and 40 km north of Christchurch, respectively), and 10 other sites in the hilly areas to the west and northwest of Christchurch from View Hill near the Waimakariri River about 50 km from Christchurch, to near Hawarden about 65 km away in a straight line in North Canterbury. These later recoveries were made mainly by Mr Geoff Watts, with the most recent being the View Hill discovery in mid-April this year. Most of the sites are from 10–20 km apart.

During summer 1990, a staff member of the Tararua District Council reported the discovery of eight parasitoid cocoons in a piece of comb 10-cm square from a nest of the German wasp in the Tararuas. The attacked nest was about 800 m from a parasitoid release box.

On 12 May 2014, comb from a common wasp nest collected at Wainui on the western shore of Akaroa Harbour, Banks Peninsula, was placed into a sealed container at the Canterbury Agriculture and Science Centre at Lincoln. Seven days later, an adult parasitoid emerged from the comb, with another on the eighth day. Previous studies of the life cycle of the parasitoid showed that at least nine days elapsed from the laying of eggs to the first emergence of adults, so the appearance of an adult on the seventh day suggests that the nest was attacked in the field. From another common wasp nest collected and handled similarly, parasitoids emerged eight days after it was collected in Akaroa.

Comb of the common wasp collected by Geoff Watts from Mt. Thomas, Canterbury, March 1998. One hundred and thirty cells contain cocoons of the parasitoid Sphecophaga vesparum vesparum, *most of which appear orange. For each cocoon, one developing wasp has been killed.*

At Pelorus Bridge, 1,034 developing wasps had been killed in one nest. The nest was poisoned on 16 May 1988 when still very active, so if the colony had been left to die naturally some weeks later, the number of wasps killed would have been even greater. This nest was 625 m away from the nearest parasitoid release box, so parasitoids flew at least that distance to attack the nest.

Barlow, Beggs and Moller (1998) believed that the parasitoid was increasing its population about three-fold annually, and in subsequent years was spreading at a mean rate of 1 to 1.5 km per year, and by 1993 up to 22,950 nests would have been parasitized. Now, after 28 years, nests up to 42 km away could be being attacked. But at Pelorus Bridge one attacked nest was found 7.1 km from the parasitoid release site in the third year after the first parasitoid release (J. Beggs pers. comm.), which means that parasitoids had dispersed at a mean annual rate of 2.36 km per year. At this rate, after 28 years parasitoids could by now be up to 66 km away.

So because established parasitoids could have been dispersing widely from a release site, we cannot be at all sure as to how many separate establishment events there may have been. However, the large distances between some of the earlier recoveries suggest that there were probably at least half a dozen separate establishment events in the Canterbury area alone. This further suggests that over the country there were probably a great many. If so, an extrapolation from the data of Barlow, Beggs and Moller (1998) indicates that many millions of wasps have been and are being killed annually. Far from "failing so miserably", the wasp parasitoid has been and is being very successful.

Additional parasitoid introductions

Yes, not enough wasps are being killed. This is why we went on to introduce two more parasitoids, the North American S. *v. burra* and the Middle Eastern S. *orientalis*. These two enemies of other social wasps did not have the genotypes of either of our two species of wasps as victims, and the thinking behind their introduction was that we wanted our wasps to be confronted by enemies that did not 'speak' to them, to use the terminology of Groenteman (2016). What we were looking for was an enemy that to wasps would be as lethal to them as varroa is to honey bees. Varroa originated from the Eastern honey bee and so does not 'speak' to our Western honey bee, which consequently is unable to understand that it is being attacked. Whether the new parasitoids are established or not is unknown because the cancellation of funding by the Foundation for Research, Science and Technology in 2005 meant that all work in this area ceased.

But we had plans to introduce even more enemies specific to wasps, such as more strains of *Sphecophaga* from Asia and especially Korea and Formosa, four species of a beetle parasitoid in the genus *Metoecus*, and up to five species of parasitic wasps in the genus Bareogonalis (Donovan, 1996). All these enemies attack wasp brood, and we hoped that the more enemies we could establish here, the more they would interact synergistically in a wasp nest to foster a greater level of attack by each of them. The successful establishment and expansion of *S. v. vesparum* over the past 28 years shows that the importation of wasp enemies is a viable strategy. With luck, Landcare researchers will be able to expand their wasp biocontrol project to increase the number and range of enemies to the point where wasp numbers are permanently reduced.

References

Barlow, S. D., Beggs, J. R., & Moller, H. (1998). Spread of the wasp *parasitoid Sphecophaga vesparum* following its release in New Zealand. *New Zealand Journal of Ecology, 22*(2): 205–208.

Donovan, B. J. (1996, June). Progress with biological control of wasps. *The New Zealand Beekeeper, 3*(5): 12–13.

Groenteman, R. (2016, October). Wasp biocontrol updates: *Sphecophaga* again. *The New Zealand Beekeeper, 24*(9), 950–951.

PEST AND DISEASE CONTROL

NOSEMA BREAKTHROUGH REPORTED

The New Zealand Institute for Plant & Food Research Limited

Our small but mighty bees are under siege from a range of pests and diseases. Thankfully, some relief may be in sight for these important insects from a particularly dangerous disease—one that can destroy entire hives.

Assessing brood viability after heating comb to kill Nosema. Copyright © Plant & Food Research. All rights reserved.

Preliminary results from a pilot study undertaken by scientists at Plant & Food Research indicate that a breakthrough has been made in the fight against the pathogen *Nosema ceranae*.

N. ceranae is a cousin of *N. apis*, which has been endemic in New Zealand since the 1800s. Both are spore-producing parasites that attack the gut lining of bees, leading to a shortened lifespan in adults. In severe cases, the entire colony can collapse. Because *Nosema* is primarily spread through faeces on contaminated honeycomb, preventing any infection is a near-impossible task for the beekeeper, meaning that bee health and commercial costs of *Nosema* have largely been seen as 'a fact of life'.

During the springs of 2014 and 2015 many New Zealand beekeepers, particularly in the Coromandel, experienced severe and unexplained colony losses—a pattern that had not been seen before. Affected colonies initially appeared strong and healthy coming out of winter. However, over a short period virtually the entire colony would disappear, leaving behind a healthy queen with brood and a few hundred worker bees. Productivity loss was estimated at between 40–60% for the season. *Nosema ceranae* had first been identified in New Zealand in 2010 and was fingered as a potential culprit for the losses after the development of a diagnostic test by John Mackay from dnature Ltd.

In response, a team from Plant & Food Research began a collaboration with Coromandel beekeeper Dr Oksana Borowik—initially confirming high levels of *N. ceranae* in affected colonies, and then exploring potential management initiatives to prevent the spread of the disease between hives. Their early findings are exciting: heat-treating the comb and hiveware to 50°C for 90 minutes killed *Nosema ceranae* spores, increased brood viability and ultimately increased bee numbers by 50%.

The team will attempt to replicate these results and build on this initial study with further investigations into the effect of seasonality and long-term heat treatment on bee populations. If heat treatment is found to be a safe and consistent management option for beekeepers plagued by *Nosema*, this research has the potential to greatly improve the health and productivity of New Zealand beehives—and the lives of those tending them—well into the future.

RESEARCH

TESTING NECTAR TO SELECT MĀNUKA TREES FOR HIGH-GRADE HONEY

Dr Megan Grainger, Operations Manager–Food Division, Analytica Laboratories

Testing of mānuka nectar is a practical method to identify mānuka *(Leptospermum scoparium)* plants that will contribute to higher-grade mānuka honey. Results can be used to rank the plants according to the dihydroxyacetone (DHA) and Leptosperin content of the nectar.

The benefit of nectar analysis

Methylglyoxal (MG) is the compound in mānuka honey responsible for the non-peroxide activity (NPA). MG is formed from the conversion of dihydroxyacetone (DHA). A hive of bees will visit many flowers from various trees which will dilute the overall DHA and Leptosperin in a batch of honey; hence the more mānuka trees with high DHA and Leptosperin that are in the flight range of the hive, the higher the maximum MG value (and NPA) will be. At present, little information is known about the pathways of expression for both DHA and Leptosperin in the nectar, but the concentration of both compounds is known to vary between Leptospermum species. There is considerable interest from nurseries, landowners and beekeepers to find varieties of mānuka that express high levels of DHA.

Collecting the sample

Analysis of nectar requires representative samples of each tree to be collected; one sample is created by combining the nectar of 10 flowers from one tree. There are three recommended sampling techniques; these are summarised in Table 1. The more care that is taken when collecting a sample, the more reflective the results will be of the tree. Key considerations when sampling are to ensure that there is visible nectar on the flowers (Figure 1) and that it has not recently rained. It is recommended that a fine-mesh bag is placed over the branch a day before sampling to keep insects off the flowers; a plastic bag may cause condensation to form which will dilute the nectar.

Table 1. Overview of three nectar collection techniques.

Sampling Method	Advantages	Disadvantages
Direct Method Collect pure nectar from 10 flowers into one tube	• Preserves flower • 100% nectar	• Impractical in-field • May produce very small sample volume
Wash Method Take 10 flowers from tree and place in a tube with 1.5 mL water	• Quick and easy • Practical	• May dilute sample too much • May introduce extra sugars
10x10 Method Dissolve nectar on flower using 10 µL water; repeat for 9 flowers into same tube	• Sufficient volume for analysis	• Multi-step technique • Time consuming

Figure 1. Visible nectar on a mānuka flower.

Analysis of nectar and normalisation of results

Nectar is primarily made up of glucose (~40%), fructose (~40%), sucrose (~2%) and water (~20%). There are also minor compounds present (e.g., amino acids and phenolic compounds). Samples are analysed using High Performance Liquid Chromatography (HPLC) to detect DHA, Leptosperin, fructose and glucose.

The three methods for nectar collection dilute samples to various volumes (i.e., no dilution, 0.1 mL total volume or 1.5 mL total volume); hence results from different sampling methods cannot be directly compared without normalising the DHA and Leptosperin to the sugar concentration. Honey is made up of approximately 80% sugar (800 g sugar per 1 kg). Therefore the DHA and Leptosperin are reported per 800 g of sugar; this normalised result gives an approximate level of mg/kg that would be expected in a honey that was created entirely from the one sample, allowing samples to be compared. Historically DHA results were been compared to 80° Brix. This is a measure of the sugar concentration of a solution, which is equivalent to 800 g of sugar per 1 kg.

The importance of chilling samples

Once the nectar is collected, it is necessary to chill or freeze it due to the high sugar content which can cause fermentation (depletion of sugars). Alternatively, samples collected using the Wash or 10x10 methods can be preserved using a 10% alcohol solution. To illustrate the effect on the normalised result, a pure nectar sample was divided in two: one half was diluted with water and the other with 10% methanol to preserve the sample and prevent fermentation.

The samples were stored at room temperature and analysed over four days to simulate samples sitting in the field and during postage. The DHA and Leptosperin concentrations did not change over this period; however, the sugar concentration in the sample diluted with water decreased by ~20% during this time due to fermentation.

If we say that the original sample had 100 mg/L DHA and 20 g/L sugar, the normalised DHA would be 4,000 mg DHA/800 g sugar. However, if the sugar concentration dropped by 20%, then the normalised result would be 5,000 mg DHA/800 g sugar, making the tree appear to have a higher DHA content that could cause it to be wrongly selected.

Table 2. Summary of DHA in honey and nectar.

	DHA in honey	Normalised DHA in nectar
	(mg/kg)	(mg/800g sugar)
Average	981	3,887
Median	817	2,940
Maximum	5,330	27,070
Total # samples	3,661	1,309

A tree which produces high levels of DHA, but does not produce many flowers or large volumes of nectar may not be as good as a tree with slightly less DHA, heavy floral density and good nectar flow.

Interpreting results to select good trees

The normalised results for DHA in nectar can be very high (results over 20,000 mg DHA/800 g sugar have been reported). It is important to note that the concentration of honey will not be this high due to the dilution from other flowers. A set of 1,300 nectars and non-related honey samples (3,661 samples with < 4 mg/kg HMF and >100 mg/kg DHA) analysed at Analytica Laboratories showed the nectar results were about four times higher than the honey samples (Table 2). In addition, a paper published in 2009 (Adams, Manley-Harris and Molan) reported the DHA in nectar was more than double the concentration found in honey.

When selecting trees for planting, a number of factors need to be taken into consideration, aside from the DHA concentration. Physical properties of the tree are important, such as floral density, and volume of nectar and resilience of the tree to the environment also need to be taken into consideration. A tree which produces high levels of DHA, but does not produce many flowers or large volumes of nectar may not be as good as a tree with slightly less DHA, heavy floral density and good nectar flow. The flowering period of the species of mānuka tree needs to line up with the latitude of planting—plants that flower early in the season will perform poorly if planted too far south because it will not be warm enough for them to produce nectar at the time of flowering.

Kauri Park (2016) has collated data on a number of mānuka varieties which includes their natural flowering time. For example, trees in the Far North flower in weeks 39 to 44, while Hawke's Bay varieties flower in weeks 49 to 1. Further south, varieties from Westport flower in weeks 51 to 3. Therefore, if the Far North variety was planted too far south, it is unlikely to provide the bees a sufficient nectar source.

Obtaining the most information from a site

For beekeepers and landowners wanting to understand the variability over a hive site, the way a site is sampled may differ depending on whether it is a naturally planted site or if the trees are from a nursery. The higher the number of plants analysed from one site, the greater the amount of information that will be gained. Samples could be collected, then combined, to get an average concentration for a site, but this comes with the risk of masking high-producing plants.

For example, 10 trees were sampled from a naturally planted site. The results were analysed as individual samples and a portion of each were combined to created one sample. Eight of the 10 samples were below detection limit, and the remaining two samples had high DHA (8,243 and 27,070 mg/800 g sugar). When the concentration of individual samples were averaged, the result was 3,531 mg/800 g sugar; however, the composite sample was below the detection limit of the method (see Figure 2 on page 15). In comparison, samples collected from 10 trees on a site that had been planted with nursery-supplied trees had only a 2% difference between the average results and the composite result.

The popularity of nectar testing is growing due to the information that can be learned about a floral variety or a hive site. The normalised results are used to compare sites

continued...

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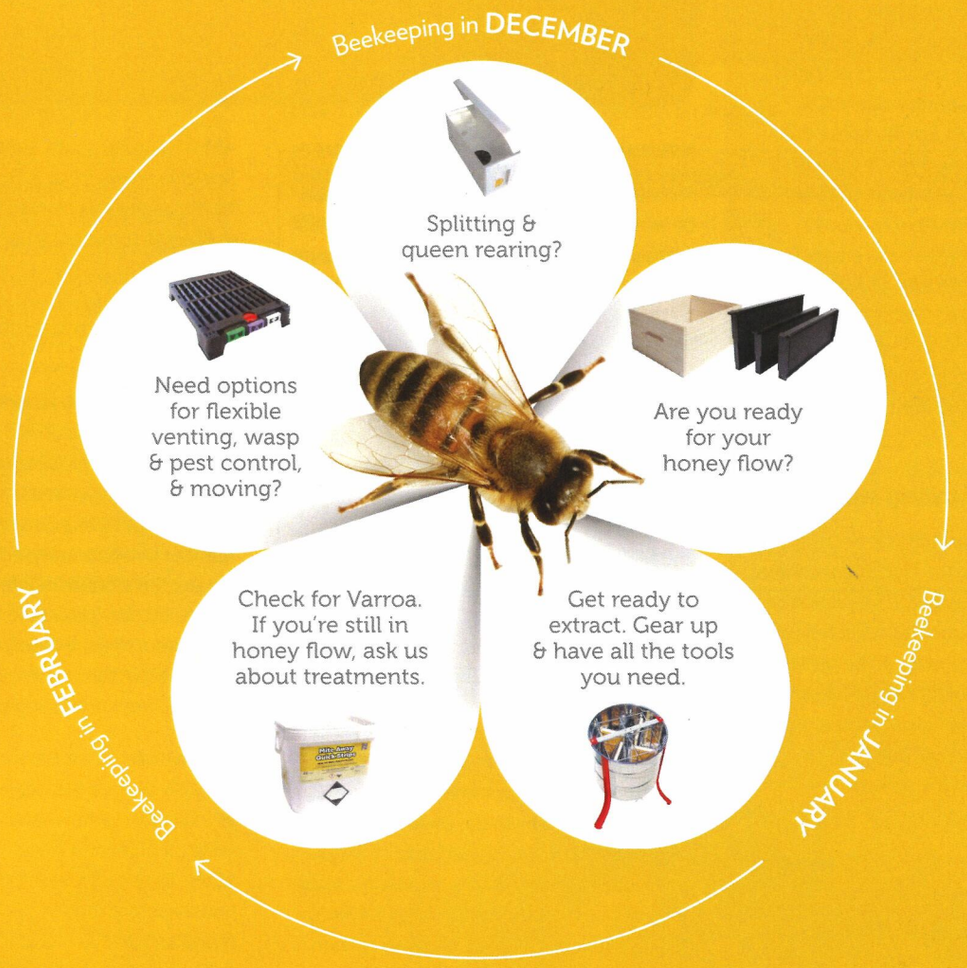

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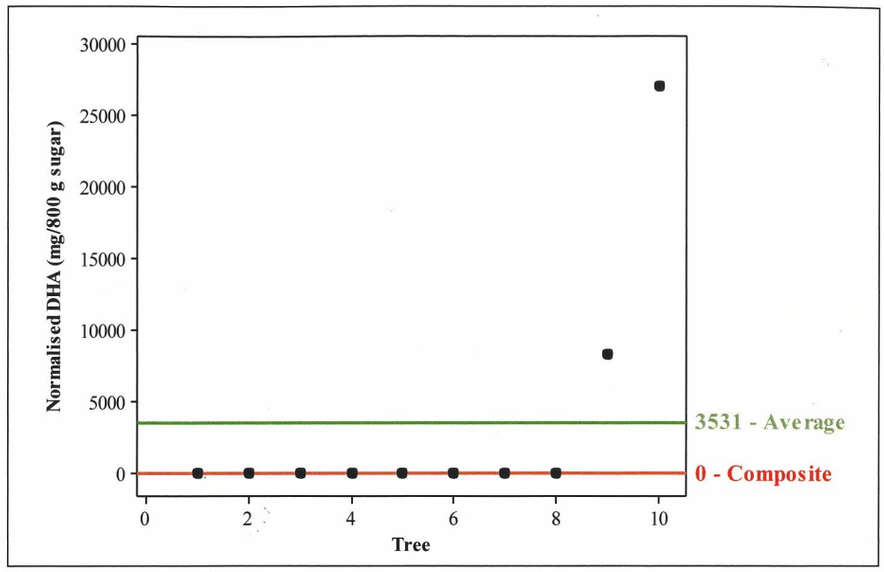
or trees relative to each other and can estimate if the site will produce high-grade mānuka honey.

At right: **Figure 2.** Results for 10 trees analysed from one site. Samples were analysed separately. In addition, equal portions were added together to form one composite sample that was below the detection limit of the method.



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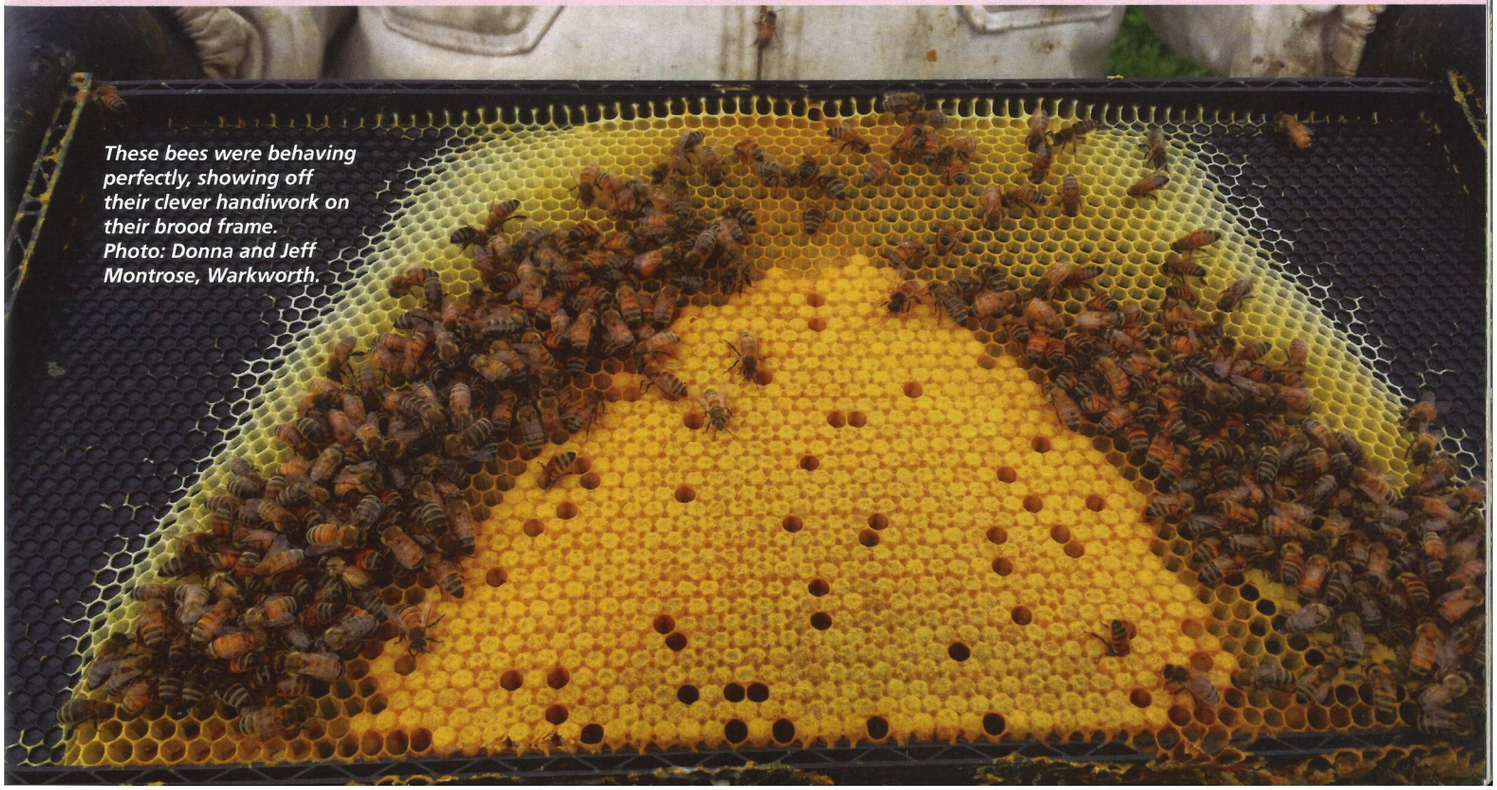
KEY POINTS

- Analysis of the nectar of mānuka trees is a useful tool for beekeepers, landowners and nurseries to identify trees that will contribute to higher-grade mānuka honey.
- Dihydroxyacetone (DHA) and Leptosperin are present in mānuka nectar. The concentration of these compounds differs between varieties of mānuka.
- DHA is converted to methylglyoxal (MG), which is responsible for the non-peroxide activity (NPA) in mānuka honey.
- Samples are collected by combining the nectar from 10 flowers on one tree. Samples may be 100% nectar or a form of dilution (either 0.1 mL or 1.5 mL liquid to dissolve the nectar).
- Samples must be chilled so that fermentation of the sugar does not occur.
- Concentrations of DHA and Leptosperin are normalised to the sugar content, which gives an approximation of the mg/kg that would be found in a honey solely created from the one tree.
- The reported result for the nectar is at least double the concentration that will be found in a honey, due to bees diluting the honey with nectar from many mānuka and non-mānuka flowers.
- Northland varieties of mānuka flower early in the season; flowering occurs later in the season the further south the trees are. If Northland varieties are planted too far south, they will flower before the weather is warm enough for nectar to be produced.
- When choosing good trees, floral density, nectar production and resilience to disease are other factors that should also be considered.



These bees were behaving perfectly, showing off their clever handiwork on their brood frame. Photo: Donna and Jeff Montrose, Warkworth.

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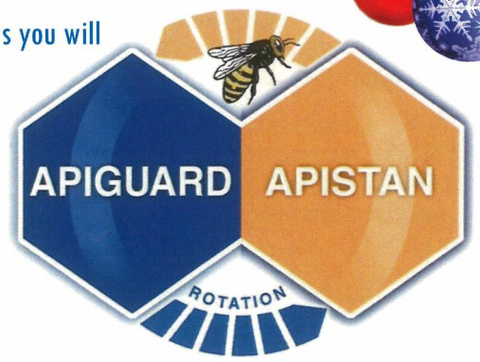

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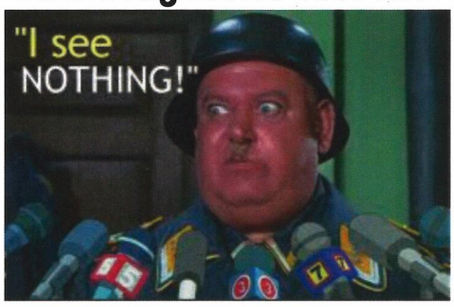

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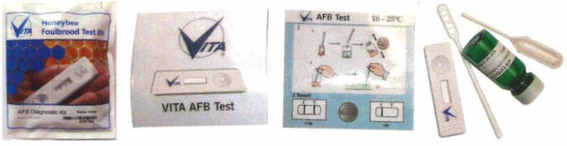

AFB can be eliminated from NZ if it is identified and those infected hives are burnt. But you don't want to burn false positives.

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Normal hours resume on the 4th Jan 2017

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INTERNATIONAL BEEKEEPING NEWS

SOLOMON ISLANDS COMMUNITY PROJECT

Abridged from report provided by World Vision

Ian is a 27-year-old teacher in the village of Bethel, in East Malaita, where beekeeping has changed the course of a community. As a father of three, Ian said life in the village was challenging, and the standard of living was low, with poor road access, and limited ways to earn money.

East Malaita is one of Solomon Islands' most vulnerable areas, with over 80 per cent of people there depending on fishing and subsistence agriculture for their livelihood. This exposes them to threats in the form of commodity price fluctuations, natural disasters, and the impacts of climate change.

World Vision New Zealand partnered with the East Malaita community in 2014, and has an economic development programme in place, which sets up producing groups that save money, and invest back into local businesses.

"People depended entirely on local food crops from their garden," Ian said. "World Vision brought two honey bee boxes to my community, and one of them is almost ready for harvesting."

He said beekeeping was slowly growing as a viable business in East Malaita. "The first eight bottles we harvested in 2015, we shared only for the community members," he said. "Now we are looking forward for a second harvest of the same beehive. We are going to sell honey to support our saving groups."

Ian said the community had high hopes for further expansion, making it a key part of the local economy. "Our plan is to increase the number of honey beehives and boxes amongst community members so that they will have ownership of it and manage it themselves," said Ian.

But the small beekeeping industry still faced obstacles, he said. "The challenges we have faced with this honey bee project is we cannot access any proper training that will teach us how to keep and manage honey bees and increase the numbers of beehives."

In addition to training resources for local people, the presence of the Asian bee also threatened honey production, according to a recent Activity Progress Report about the success of the programme. The Asian bee's parasitic nature has led to low or slow honey production, and the community does not yet have the technical capabilities to eliminate it.

The report said the community's understanding of how to manage the hives, and to do it in collaboration with others, was only in its beginning phases. "As a result, the beehives are not yet managed to their full potential," the report said. "This will be prioritised by the team in Year 3, particularly with hands-on mentoring and coaching." Once the expansion is complete, the honey producers will work on the harvesting and selling of their products.

"There are 13 honey hives in place across eight communities, with training provided by the Dala Honey Bee Farmers Association," said the report. "The team is continuing to increase the number of honey hives across these communities, with supporting farmers in the management of these hives a key focus for Year 3, in addition to harvesting, marketing, and selling of honey products."

[Editor's note: if you are interested in supporting this community project, go to https://www.worldvision.org.nz/ways-to-give/smiles/smiles-catalogue-fy17/1713-a-beehive]

Photos provided courtesy of World Vision.

REVOLUTIONARY Beekeeping

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This award-winning and patented mobile honey harvesting system makes beekeeping easy, enjoyable and profitable.

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The best innovations solve a painful problem. In Grant Engel's case, the hard physical lifting, hours spent carting honey boxes and waiting in line for his honey to be extracted were the catalyst for inventing his mobile honey harvester. Now all suppliers to RevBee use Grant's harvester and say that not only is their workload reduced but their honey is cleaner, and their hives healthier than before.

So how does the honey harvester work?

The mobile honey harvester is a lightweight stainless steel box that allows you to harvest honey directly from the frames right next to the hives. As you push the frame through the harvester, the honey and wax is scraped off the frame and flows directly into a food-grade sealable pail that sits underneath. The harvester comes fully MPI certified with an RMP.

That sounds too easy!

Well, it gets better. RevBee collects the honey from their suppliers at RevBee's expense. The suppliers get paid (then more than a few like to go fishing).

8 Reasons the RevBee Honey Harvester is a Winner

- **Eliminates heavy lifting** – you carry only a lightweight honey harvester and pail. No need to remove and transport honey boxes.
- **Select frame harvesting** – hand-pick quality honey frames and bank it.
- **Healthier hives** – no honey boxes waiting to be processed and open to dirt and disease.
- **Remote locations are now accessible** – set up hives in places that were previously too hard to manage.
- **Cheaper outlay** – only one honey box is needed as it can be harvested multiple times. Run more hives at less cost.
- **Fast and convenient** – no more booking or waiting in line. Your honey is collected from your door at RevBee's expense.
- **Competitive honey prices and great cash flow** – you receive prompt payment for your honey.
- **MPI certified** – with RMP in place.

I can handpick frames to harvest so I control the quality of the honey – especially when Manuka is flowering. Stephen (Large Commercial)

Previously my boxes would sit for up to 2 weeks before getting spun out and that's time when dirt and disease gets in. There's none of that with this system – I harvest the honey directly into a food grade box, put the lid on and that's done. Luke (Commercial)

The machine is simple and lightweight. You can keep the hives to 2 boxes high so I'm working at an easy level. You're just taking honey, not transporting heavy boxes and frames. And by harvesting directly into a bucket, you can see exactly what volumes are being produced from that hive. Mark (Large Commercial)

This is my second year using it and I don't think you can beat it. It's quick, cost effective, and allows you to set up hives in locations that otherwise you wouldn't bother going. It's just too easy. Luke (Commercial)

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TREES FOR BEES CORNER

STAR PERFORMERS PART 2: NEW ZEALAND FLAX FOR SUMMER

Linda Newstrom-Lloyd (Trees for Bees Botanist) and Angus McPherson (Trees for Bees Farm Planting Adviser)

Trees for Bees has produced a new series of fact sheets showcasing the 'best of the best' bee plants that will maximise nutrition benefits for your bees. In this issue of the journal, the team explains why New Zealand flax is a 'star performer'. For more information, see www.treesforbeesnz.org.

Phormium tenax
harakeke
flax
New Zealand flax
kōrari

Phormium cookianum
whaririki
mountain flax

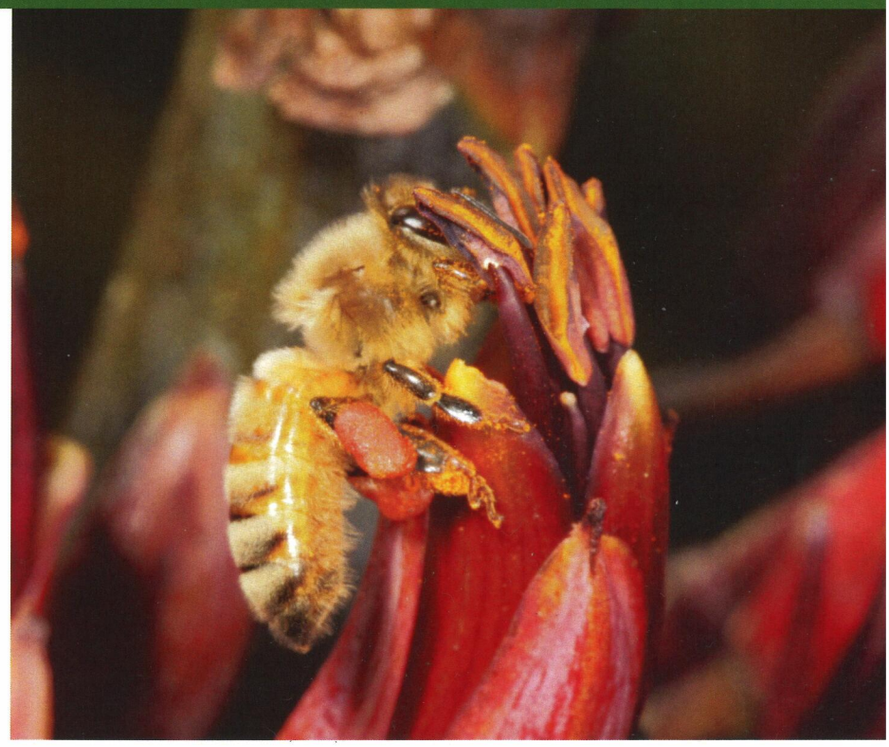


Figure 1. *Native New Zealand Flax:* Phormium tenax *from Sealers Creek in Auckland Island. Anthers protrude from the top of the tubular flower. The honey bee has large orange flax pollen pellets on hind legs. Photo: Finn Scheele ©Trees for Bees NZ.*

New Zealand flax is a star performer because it has the highest protein that we have measured in pollen (ca. 35% to 45%) and plenty of pollen is produced in each flower. Flax flowers in late spring to summer (anytime from September to January), which can conflict with or complement the honey flow season. We worked with two species, *Phormium tenax* and *Phormium cookianum* in the National New Zealand Flax Collection at Landcare Research, Lincoln. We collected at several sites in East Coast/Gisborne as well. In the Flax Collection you can see a great range in height and number of flowering stalks and size of leaves. Flowers are usually red but some varieties have yellow or greenish petals.

Pollen

Access to pollen is easy for bees because each flower has six large anthers that protrude well beyond the top of the floral tube. Honey bees always mix the pollen with nectar to form large pollen pellets in their pollen baskets (Figure 1), but native bees *(Leioproctus* spp. and *Lasioglossum* spp.) pack their hairy back legs with dry pollen without nectar. In contrast, another type of native bee, the masked bee *(Hylaeus* spp.) consumes the pollen to store in its crop (Figure 3a). This pollen is then regurgitated in the nest to make a ball of pollen to provision the fertilised egg, which will emerge as a bee the following spring. Competition for pollen between native and honey bees can be observed when bee densities are very high (as shown in Figure 3b).

The pollen in one flax flower weighs on average about 5 mg (range from 2 to 9 mg depending on the variety). Some large prolific varieties of flax can produce over 2000 flowers per season but small varieties with few stems produce only a few hundred. Since one bee needs from 120 to 140 mg of pollen to grow from egg to adult, then one single large plant with 10 to 20 stems can support from 70 to 80 bees (for example, the Gold Edge variety from Three Kings Island), but a small plant with limited stems will support fewer bees.

Nectar

New Zealand flax flowers produce bountiful nectar (ca. 100 µl) which sometimes fills the floral tube to the brim. Even honey bees with their short tongues can access nectar at the top of the tube (see Figure 2, next page). But the floral tube is too narrow and filled with stamens for honey bees to crawl

continued...

Figure 2. Flower of New Zealand flax from Sealers Creek in Auckland Island. The honey bee is taking nectar at the top of the tubular flower which is filled to the brim with nectar. If the nectar level is high enough, the bee's tongue (7 mm) can reach it. Photo: Finn Scheele ©Trees for Bees NZ.

very far into the flower. When the nectar is drained to a level below their reach, honey bees will sometimes access a little nectar at the base of the floral tube by inserting their tongue in between the petals. Honey bees are competing with nectar-loving birds like tui. If the birds take the nectar first, the honey bees will lose out.

Planting advice

New Zealand flaxes are widely used in Trees for Bees demonstration farms, primarily in riparian zone planting, but also as part of land stabilisation planting and wet areas, as excellent low shelter in shelterbelts, and as part of mixed native and exotic species plantings. It is a unique native plant used for weaving, cordage, landscaping and wetland restoration. For more information, go to http://www.landcareresearch.co.nz/science/plants-animals-fungi/plants/ethnobotany/weaving-plants/information-sheets/harakeke-and-whaririki

As noted earlier, the main species that we have used to date have been the common New Zealand flax *(Phormium tenax)* and the mountain flax *(Phormium cookianum)*, with a wide number of varieties that can be used. It is important that the flaxes you plant flower as expected, especially the more cultivated forms. *Phormium tenax* grows quite large in time (up to 5–6m), and so it may not be suited where space is limited. In these situations, *Phormium cookianum* can work well as it only grows to about 2m, and can have narrower and more pendulous leaves, giving a softer appearance.

As flaxes typically flower between September and January, this can cause overlap with pollination services and honey harvesting, which needs to be considered in your planting plans

As flaxes typically flower between September and January, this can cause overlap with pollination services and honey harvesting, which needs to be considered in your planting plans. Early settlers in New Zealand complained about flax nectar contaminating their clover honey as these can flower simultaneously. While flax can flower at the same time as mānuka, it could be an important pollen source since honey bees do not take mānuka pollen and need another pollen source at this time.

Where planting along watercourses, it is important to ensure that the flaxes aren't so close as to impede water flow in flood events. While the flaxes will tolerate being submerged underwater, larger plants can impede water flow, leading to damming and further flooding. It is best to establish grasses such as *Carex secta* adjacent to but still above the normal water flow level, with flaxes located further away from the stream margin and out of the flood zone if possible.

Another issue with flaxes is that they can provide attractive nesting sites for rats when planted close together in groups. If this is an issue in your area, spread your flax plants out so that they don't provide nesting sites around their base.

With good planning and selection of the best varieties and convenient flowering times for your goals, flax can give a big boost to your bees because of their highly nutritious and abundant pollen.

Figure 3a. The native masked bee (Hylaeus sp.) 'eating' the pollen from a native New Zealand Flax flower in Waikato.
Photo: Neil Fitzgerald ©Trees for Bees NZ.

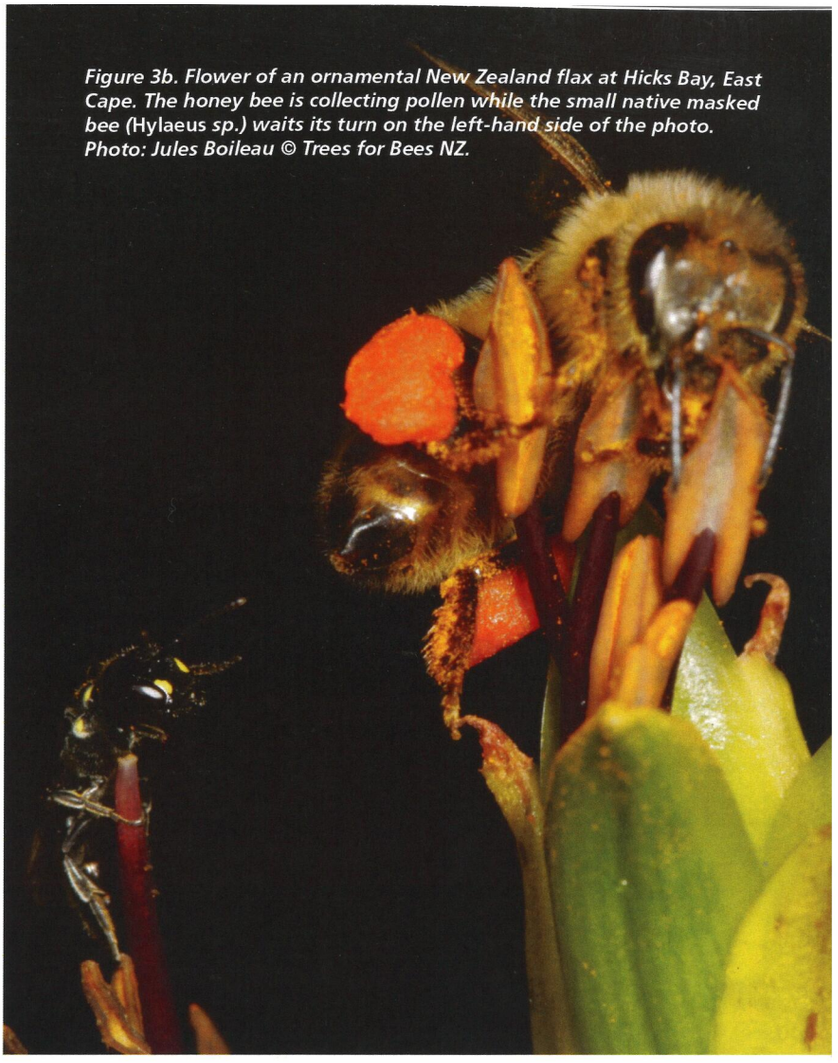


Figure 3b. Flower of an ornamental New Zealand flax at Hicks Bay, East Cape. The honey bee is collecting pollen while the small native masked bee (Hylaeus sp.) waits its turn on the left-hand side of the photo.
Photo: Jules Boileau © Trees for Bees NZ.

EDUCATION

UK APPRENTICES IN NZ: PART ONE

Margaret Ginman

Waikato beekeepers John and Pauline Bassett are involved in organising a reciprocal arrangement between the UK and New Zealand for beekeeping apprentices. In the first of a series of articles, Margaret Ginman of the UK journal *Bee Farmer* reports on the experiences of Rowse/Bee Farmers' Association apprentices in New Zealand.

Training provided by the Bee Farmers' Association (BFA) for young people entering bee farming is world class. To that end, five trainee bee farmers went to the southern hemisphere to learn about the beekeeping season there, which coincides with the winter months here in the United Kingdom (UK). Four of them are on the Rowse/BFA apprenticeship scheme. The fifth is training outside of the scheme with one of the UK's top bee farmers. How one of the apprentices fared in New Zealand (NZ) is described in detail below.

Organisation

The trips were organised with the help of Robert Field, Field Honey Farms, Dorset, and Pauline Bassett who, with her husband, runs a few hundred hives on New Zealand's North Island, just a couple of hours' journey from Auckland. After much discussion with immigration officials it was decided that the young people could enter the country under the visa waiver system.

Pauline and I reviewed the apprentices' curriculum vitae, along with reports from their assessors relating to the progress and development of each individual, to decide where best to place each of them.

Thirteen New Zealand beekeeping businesses had answered Pauline's request for expressions of interest to act as hosts. We asked each of them to provide a brief profile so that we could best match them with the particular interests of each apprentice. The decision was made to place Phoebe Lamb at Kaimai Range Honey, Tauranga, near the Bay of Plenty, with hosts Ralph and Jody Mitchell; Sebastian (Seb) Leaver at Kintail Honey (Wairarapa branch), Carterton, near Wellington; and Tim Davis would stay with the Bassetts themselves.

Hives being placed into a manuka site. (This photo appeared on the front cover of the April 2016 edition of Bee Farmer.*) Photo: Phoebe Lamb.*

Loaded up and ready to go to the manuka.

Kaimai Range Honey

Kaimai Range Honey, where Phoebe Lamb was placed, was started ten years ago by Ralph and Jody Mitchell. It is now a 1500 colony, multi-award-winning family business which specialises in manuka honey production throughout North Island. It also provides kiwi fruit pollination services locally around the Tauranga area. The business is a fully export-certified RMP (risk management programme) honey extraction and storage facility.

The couple are also part of another 1500+ colony operation in a joint venture with friends. This business is called Kai Ora Honey, in Northland.

In New Zealand, Kaimai Range Honey sells speciality honeys exclusively through the Tauranga farmers' market, but the majority of its honey is exported to Europe and Asia.

The Mitchells are continuing a family tradition of beekeeping in the Kaimai Range since the 1920s with both of their daughters, Tamara and Zoe, actively working with the busy team. Members of the team are mainly in their 20s with around seven working from the home base and six working up north.

Ralph is originally from Cornwall, in the UK. He went to New Zealand in 1989 to work, at the age of 21.

Ralph and Jody are actively involved with the National *[Beekeepers]* Association of New Zealand; Jody is vice president of the Bay of Plenty branch. *[This article was written before the NBA became ApiNZ.]*

Phoebe's story

Phoebe tells her story in her own words: 'As an apprentice bee farmer nearing the completion of my first training year, I was granted the opportunity to travel to New Zealand to study migratory beekeeping on a large-scale commercial honey farm.

'After approximately 30 hours in the air, I found myself in Tauranga, a port city located on the north-eastern side of North Island. My placement was with Ralph and Jody Mitchell of Kaimai Range Honey. I was to assist with the management of more than 3000 colonies of honey bees in apiaries all over North Island. The Mitchells also possess a large extraction unit and take on extraction contracts from other local bee farmers. I was welcomed into a diverse multi-national team of mixed ages and abilities, and so the work began.

'At the very start of my stay I was invited to shadow the team as they loaded 200 palletised colonies on to trucks and drove through the night for over 350 km. We were taking the bees into the Taranaki bushland, where densely growing manuka means that many copses and clearings suitable as apiaries can only be reached by helicopter! I was astounded to watch the hives get strapped together, lifted delicately into the air to be flown over the treetops to their new locations.

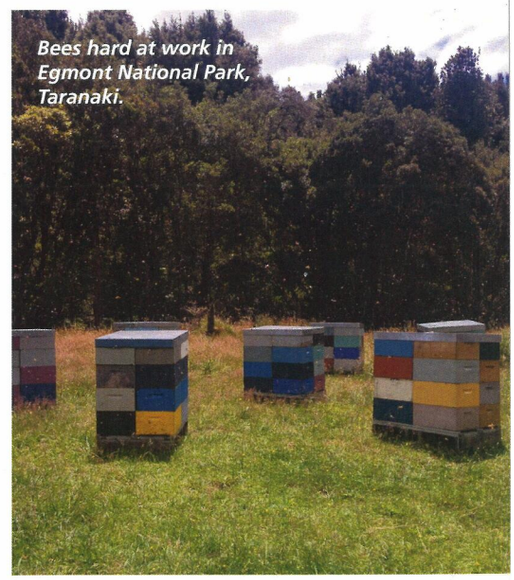
'The colonies would not be inspected for a number of weeks during the summer, so only the strongest colonies had been selected for manuka-gathering and supers had been added pre-emptively.

'Most of the time, I was to be found in the extraction room, a temperature-controlled unit within the gargantuan storage shed. Between two of us, we were expected to extract around seven pallets' worth of super frames per day; this translates as around 1260 standard Langstroth frames over an eight or nine hour period. This number diminished if we were extracting manuka honey as its thick, gelatinous consistency means it travels through the tanks and tubes at a slower rate than other types of honey.

'I really enjoyed working in extraction as I enjoy training to perfect manual tasks, in addition to getting the chance to see the super combs from many very different colonies. I was able to study various types of honey and pollen, as well as patterns in which honey can be stored by the bees within Langstroth boxes. (Here at Beeworthy Hives in the UK, we use modified National hives.)

'When there was beekeeping to be done, depending on the task in hand, a small crew of between three and six beekeepers would disembark from headquarters in suitable vehicles with all the relevant kit (for hive inspections, varroa treatment, honey harvesting, etc) and set out to visit the numerous apiaries all over the Kaimai Range, the Waikato and Taranaki. The team worked quickly and efficiently to complete the tasks in hand, the newer and younger beekeepers (such as myself) always under the watchful eyes of the more experienced members of the crew.

'The days could feel long. One had to remember to remain hydrated when suited up under the midday sun, but I'm sure I could never tire of driving around such a breathtakingly beautiful island.



Bees hard at work in Egmont National Park, Taranaki.

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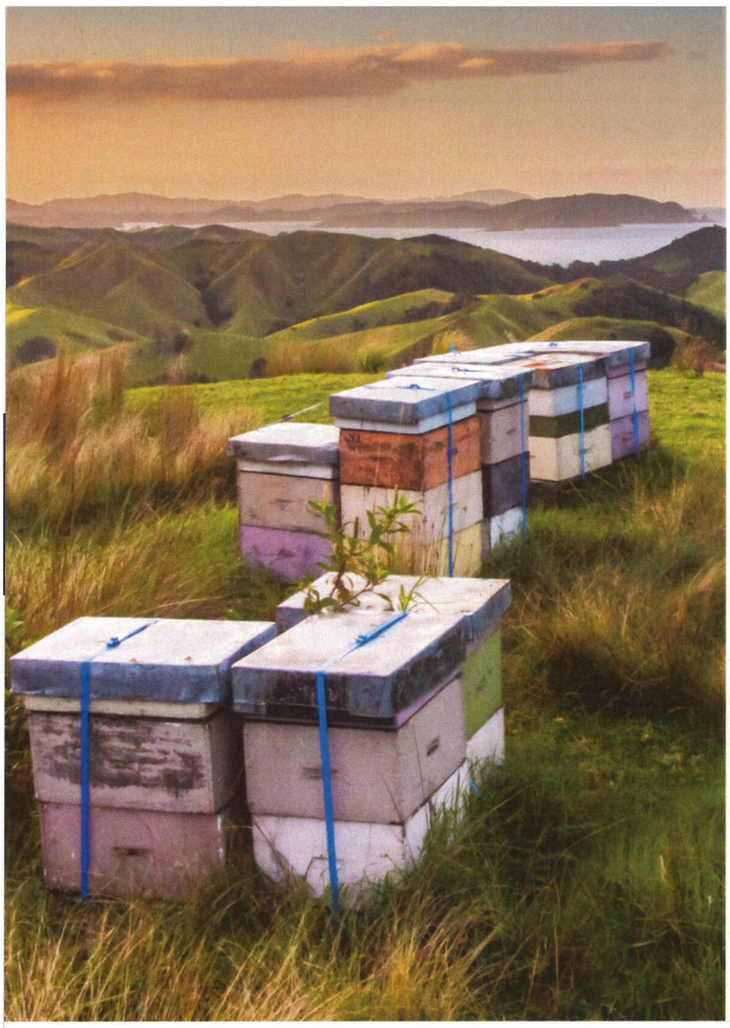

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'It makes me feel like the luckiest person alive when someone from my home town compliments my tan and asks if I had a nice holiday. In response, I get to say: "Thank you, I was training with the help of the Bee Farmers' Association"'.

Phoebe's employer's view

Kathy Shaw, Phoebe's employer (and mum) says of the experience: 'Firstly, a massive thank you to the Rowse/BFA apprenticeship scheme, without which Phoebe's apicultural career opportunities would be seriously diminished.

Visiting a very large and successful bee farming enterprise in New Zealand has meant that Phoebe has been able to experience a very professional operation, the sheer scale of which precludes poor management techniques which would be uneconomical in terms of time, labour or equipment; or, as Phoebe says: "There's no faffing about!"

'The extraordinary ease of handling the hundreds of colonies with which she has been working has taught both Phoebe and ourselves an enormous amount. Her photographs of palletised hives, crane-lifts, hoists, flat-bed trucks, stacker trucks and helicopters are having an immediate influence on how we are planning improvements to our own operation. British costs would probably prevent us from hiring too many helicopters, but we are now giving serious consideration to improving our processes for lifting and transportation of hives.

'The kiwi honey-harvesting process which Phoebe has shown us also demonstrates extreme simplicity and efficiency. Kaimai Range Honey, where she has been working, has very large storage areas for both supers waiting to be extracted and for drums full of honey waiting to be exported. However, the actual extraction and settling area is no bigger than our own, just much better designed. We are currently building a new honey house and will definitely be learning from Phoebe's experiences in this department.

'Even queen rearing and re-queening seems to be much less complicated and less intensive than our own endeavours, while resulting in 80–90 per cent of the production colonies going into winter headed by a young queen. I'm looking forward to learning much more about this in the forthcoming year.

'However, the situation for bee farmers in New Zealand hasn't been all plain sailing this year. The weather has been far from predictable, with an early drought and water restrictions in some areas being followed by heavy rain storms. This led to a lack of nectar flows as the nectar was washed away before any bees could collect it. The manuka in the area where Phoebe was located was very late flowering and flexibility regarding the placement of the hives became paramount. We are reminded that being adaptable, looking for good forage crops and moving the bees to them is now an integral part of our own bee farming.

'When Phoebe left for New Zealand, her sponsors, Freedom Brewery, had recently installed a water reclamation and wetlands area to deal with the copious amounts of waste water resulting from the brewing process. Freedom Brewery has a very strong ethos of environmental sustainability and its name refers to the fact that its lagers are completely free from animal derivatives and harmful chemicals.

Phoebe visited several extraction set-ups in her time on North Island.

'The apiary they have created next to some of the purifying ponds and reed beds is to be looked after by Phoebe with a little help from ourselves. We have supplied both hives and bees. Press interest in the brewery's bees has exceeded all our expectations. Both local and national press is awaiting Phoebe's return from New Zealand in order to interview her about the apprenticeship scheme and Freedom Brewery's involvement in it. This opens up huge marketing opportunities for them and, indeed, for us. Hopefully good publicity for the BFA, too!'

Tamara Mitchell (left) and Phoebe Lamb (right).

Acknowledgements

Thanks to Margaret Ginman, General Secretary of the Bee Farmers' Association, and Bee Farmer editor Alex Ellis for permission to reprint and supplying photographs, some of which are reprinted here. Thanks also to Apiculture New Zealand Waikato Hub member Pauline Bassett for liaising with the Bee Farmers' Association to obtain permission to reprint these articles.

Source

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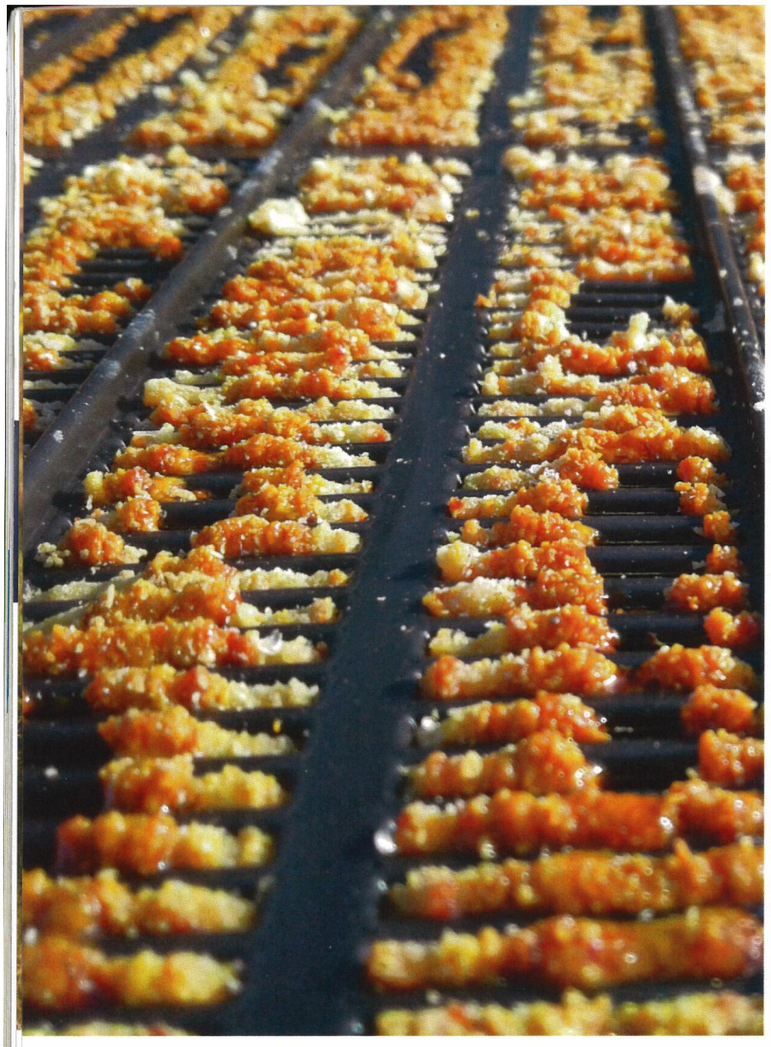
Photography: Isaac Knap, Phoebe Lamb and supplied by Sebastian Leaver.

[Editor's note: part two of this article will appear in an upcoming issue of The New Zealand BeeKeeper.*]*



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FROM THE CHATHAMS

FOSTERING AN "ACTIVE CULTURE FOR BEEKEEPING"

Mana Cracknell and Michele Andersen

Our active culture for beekeeping on Chatham Island engages many platforms, several of which we have listed below. If bees will create and sustain the environment we require to ensure our existence, then they will need to co-opt and retrain us to help them do that.

We think this will be done by:

- capitalising and maintaining clean, disease-free and healthy bee colonies and by preserving the DNA diversity[1] within that population
- enabling them to breed high-quality durable queens[2] and bees[3] fit for environment, function and purpose
- vesting major time and effort into research and field trials to inform and upskill[4] our bee awareness, management approaches and adaptive practices.

With the arrival of November, the bees are busy pollinating the apple trees and small plots of kahikatoa *(Leptospermum scoparium)* destined to produce high-quality seed and stock for future plantings, trials and tribulations.

A limited range but reasonable quantity of pollen is being collected in the pollen trap. This is mainly gorse, canola-gone-feral, tiny amounts of clover and some grass pollens. Pollen samples are sent to Massey University for identification and analysis as part of a project aimed at building and maintaining a pollen record for the island that extends back millions of years.

Nectar[5] hives have already been set up. The bees will mostly forage clover (the predominant nectar), but they will also forage harakeke, naturalised thistle, dandelion and ribbonwood—an endemic that produces a fine honey with a greenish-lime tinge. The main flow will begin near the end of November and extend into March 2017, weather permitting.

A small number of trial hives will also specifically target tarahinau *(Dracophyllum arboreum)*, an endemic that produces a nectar that resembles pink champagne. This pollen and nectar will be sent to a university or private lab for testing and assessment—cross fingers!

During the last two winters we have encouraged colonies to produce 'winter-specific bees' and at the same time, we have been engaged in trialling an autumn–winter hive set-up (one brood box and one honey super) during the spring–summer honey flow.

Results from both experiments in terms of winter hive loss (less than 1%), and increased amounts of honey gathered in the spring-summer flow (three boxes of honey per hive as opposed to one), justify amending the traditional island spring–summer set-up of two brood boxes and one to two honey supers.

As an overarching goal, in 2014 we bred diversity up to capture increased vigour. In 2015 we bred diversity down, focusing on increased calmness.

Amplifying traits

In 2016 we will continue to amplify and consolidate particular traits in sections of our bee population. For instance, last year (2015) we bred five hives that have a New Zealand seasonal clock. This year those hives built up rapidly in September–October. Drone comb in those hives will ensure the New Zealand seasonal clock trait is passed through new queens to produce a generation of bees that would build up fast enough to target New Zealand mānuka flowering in October. It is important to maintain this trait on the island because it enables us to produce nucs for island beekeepers.

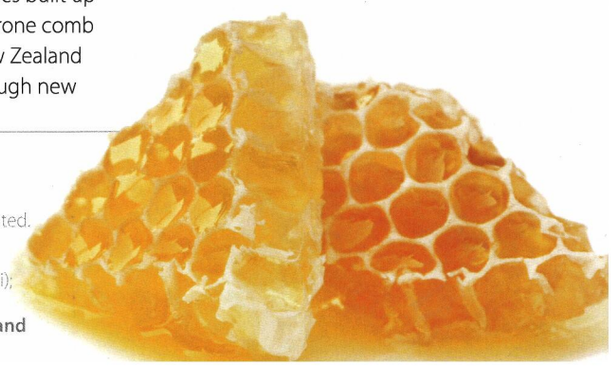
One of the other pre-identified set of qualities for continued amplification and distribution this year is a set of traits wherein the queen and her colony demonstrate advanced nurturing and ability to produce excellent naturally mated supersedure queens out to three generations in one honey season. This particular trial began three years ago (2013). The methodology was a bit shaky but we are fully satisfied with the outcome/results.

Breeding and finishing hives are now primed to receive and on-rear queen cells (November). In some parts of the island, the number of drones currently on the wing is sufficient to produce a good natural queen mate and also to fill the initial straws of drone semen for artificial insemination (AI). The AI project will complement and underpin research and development.

In December 2016 or February 2017, there will be a grafting and queen-rearing course on the island for existing beekeepers.

Postscript

If beekeepers are coming to the island, let us know by e-mailing us at mandersen@xtra.co.nz



1 Whakapapa and tatai: vertically and laterally integrated aspect of DNA.

2 Puhi-kai-ariki: a queen raised on royal food (jelly).

3 Tai-mahana: ancient word for bees in a cluster or colony. It is a reference to the warmth generated.

4 Matatau: skilled accomplishment.

5 A history lesson in time—**Maru:** honey (ancient Rei-puta Māori); **Marui:** honey (Rei-puta Māori); **Maruia:** to overflow as waves, honey or swarming bees; **Maruiwi:** hive or ancient word for numerous tribe (New Zealand Māori); **Madhu:** honey (Sanskrit); Miere: honey (French); **Mead and Honey Mead:** honey and a drink made from honey (Celtic and Modern English).

REGIONAL REPORTS

FROM THE COLONIES

[Editor's note: these colonies reports were written before the North Canterbury earthquakes.]

WAIKATO

We are no longer in mud; instead, the drying winds have taken their toll and the ground is hard and cracked. However, rain has finally come, which is a relief. Meantime the western parts of the Waikato have been doused with rain and the beekeepers are sick of it. In line with the vagaries of the weather are colonies that are very variable, some ready to take a crop while others are struggling.

Beekeepers here are disconcerted by the arrival of the 'corporate' businesses. Huge loads of hives have been brought to the Coromandel in the past couple of weeks and a number of local beekeepers—people who not only work their hives here but live here too—have come up against the promises of money and been asked to leave their current hive sites. This is very often at short notice. In the end, everyone will lose out because there will not be enough mānuka or bush nectar to support such huge numbers of hives.

In the central Waikato there are similar concerns regarding the huge 'assembly line' holding yards where the hives change in vast numbers almost daily. Maybe the managers of these operations should pay more attention to the lectures at Conference (e.g., Gordon Wardell on almond pollination in the USA). The day one of the field-staff beekeepers overlooks a case of AFB will start a major headache for many others.

I was shocked to see a photo of giant willow aphids infesting Japanese fodder willow in the King Country: see photo at right. I presume that the mild winter has meant that aphids have overwintered well and are already into their new season. Some biological control measures can't come soon enough.

The Waikato Hub will have held two more Apicèll meetings by the time this goes to press, then probably a lull while we all concentrate on getting the best from the summer season. However, we have set a date for a field day, to be held on Saturday 8 April 2017 in Thames. Although open to all, the particular focus of the field day will be for new entrant beekeepers. I should have more information on this for the next colonies column in February.

Meantime, I wish everyone a sweet and successful season.

- Pauline Bassett, Life Member

Photo taken by 15-year-old Emily Woods, Opotiki.

Giant willow aphid, taken on 21 September. Photo: Rob Atkinson.

BAY OF PLENTY

BOP is a hive of activity with kiwifruit pollination in full swing. I had some hives in a hail net trial and have been pleased with the results. I will expand on this in the next journal.

I am hearing reports of very big differences in hive conditions between beekeepers. Overstocking in areas is becoming a problem, but it can happen very easily because you may have no idea of sites that may only be 500 metres away. Beekeepers need to network and talk to each other to get on top of this problem.

I am starting to see irresponsible beekeepers filling up at service stations with no scrim over their bees again. We will get banned from using these stations if these few idiots don't start being more considerate. The general public is scared of bees.

Anyway, we are looking forward to a great season.

- Bruce Lowe

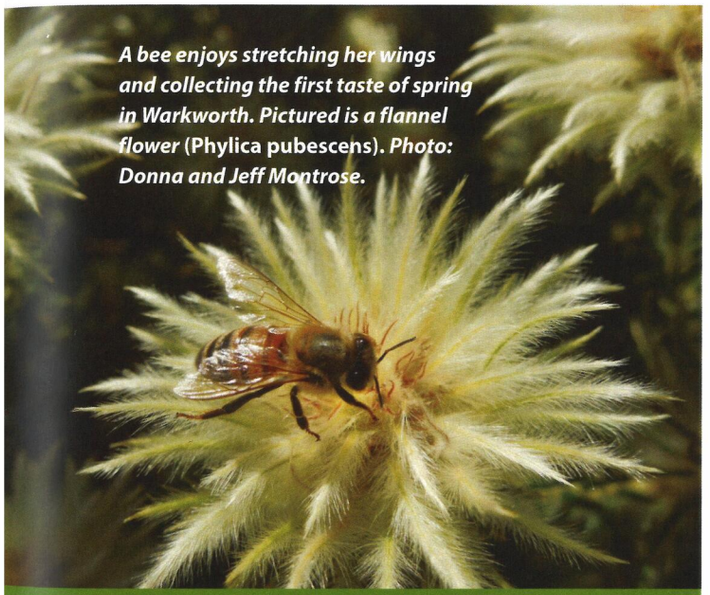
HAWKE'S BAY

The weather has changed from plain awful to indifferent with a few really good days, and some of the dry areas could use some rain. Willow flows were moderate to poor, partly because of the weather but also because many of the trees are showing significant damage from willow aphids especially in the areas where they were first hit. Well over half the trees are showing dead branches and perhaps 20% are either dead or nearly so. Golden and pussy willows seem particularly badly affected.

The willow flowering has been very late this year, which may be climatic, but I suspect it is also to do with stress. Many of the buds on the end of the branches are failing to open properly.

The Hub has been running a beginners' course which has been very popular, and we also ran a AFB refresher course which had good attendance.

- John Berry, Hub President



A bee enjoys stretching her wings and collecting the first taste of spring in Warkworth. Pictured is a flannel flower* (Phylica pubescens). *Photo: Donna and Jeff Montrose.

NELSON/UPPER SOUTH ISLAND

October weather was wetter than average, with some areas getting over 90 percent more rainfall than normal. This has definitely made it trickier to get to some apiary sites. Hopefully November will be drier. Most hives are building up well, with low varroa. Some beekeepers are needing to feed hives, partly due to the unsettled weather. Apple pollination has finished, with boysenberry flowering in full swing and kiwifruit beginning, or not far away.

The Nelson Beekeepers Club apiary is doing well, with over four hives. The regular apiary meetings are providing some valuable knowledge and confidence for new beekeepers. As I write, this club is getting organised for the annual A&P show in November, where they will have a 'Bee Expo' with an exciting range of all things to do with bees and beekeeping.

Hopefully all will have an enjoyable festive season. I hope there is plenty of nectar of all types to gather for both bees and beekeepers.

- Jason Smith

CANTERBURY

Members are advised that a number of heavy AFB infestations have been detected in North Canterbury. Beekeepers operating in the Conway River and Waiau should be particularly vigilant.

Oxford and Ashley: Extremely high numbers of queen wasps are being reported in foothills and honeydew areas; baiting is recommended.

Mid Canterbury Plains: Weather patterns are alternating between very warm days then heavy rain and cold, which is quite unusual for this time of the year. It has made it a bit difficult at times with queen bee rearing and matings. Soil temperature needs to increase before we get a flow. Varroa in rural areas doesn't seem too bad.

Velvetleaf: 20 copies are available of the MPI booklet *Help Stop the Spread of Velvetleaf* for those that are interested. It may be helpful to those on cropping farms and pollination contracts. We can do our bit to support biosecurity activities relating to this incursion.

Last Hub Meeting of the Year: In November, a beekeeper social get-together was held at the Hornby Working Men's Club, over a meal, to share ideas on an informal basis.

First 2017 Hub Meeting: 21 February 2017 at 7.30 pm in the Federated Farmers' Building, Unit 8, 35 Sir William Pickering Drive, Christchurch.

- Maggie James, Hub Secretary

CHRISTCHURCH

By the time this issue goes to press, the Christchurch Bee Club will have had its annual display at the Canterbury A&P Show.

This is a very busy time over three days. Our display is in the farmyard section with lots of young animals for company, and as a result lots of young humans also turn up.

It is interesting seeing the change from "eew yuk, bugs" to soon having their noses pressed up against the display hives and half an hour later being able to tell the difference between a queen, worker and drone.

The teenage boys look very shocked when told that the drones explode and die when mating the queen. Even the staunchest boys look stunned. The mothers also look shocked when told a queen can lay the equivalent of her own body weight in eggs a day.

While there is no real benefit to the club directly, the curiosity of the public and information shared certainly raises public awareness for the industry and the plight of the bees.

The past month's weather has been a mix of light rain and fine days, certainly different from this time last year, keeping everything green and lush. There is even some excess honey on the club hives, even though it's not known to be a particularly good honey-producing site.

As I drive around the city at the moment, I get whiffs of scent from the flowering trees such as horse chestnut, cabbage tree and other roadside and garden trees. Flowering seems prolific.

continued...

Swarm numbers seem greater this year after a few years of low numbers, meaning our swarm-collecting members are being run off their feet. It remains to be seen if this is a consequence of more people keeping bees. This may have to be addressed in more depth at club field days.

Last field day was once again well attended by new beekeepers looking for information and bees. Beeline Supplies from Dunedin came up and supplied equipment selling several starter kits.

Although this is a very busy time for beekeeping, have a great Christmas and New Year.

- Lindsay Moir

Photo taken by 15-year-old Emily Woods, Opotiki.

SOUTH CANTERBURY

We have had a glorious flowering of trees, shrubs, etc in spite of a dry start to October. We have had good showers of rain throughout October and also into early November (at least 80–100 millimetres). This has really fuelled the grass growth. The dandelion flow was short and sharp; not as long as some previous years, but the hives certainly filled the brood boxes well with it, with some hives producing a full box of honey. Queen wasps seem to be in abundance this spring.

Hives are well into producing queen cells and swarming. The turbulent weather has had us in suspense waiting to see how queen mating turns out.

A case of AFB was discovered locally and reported. This was possibly caused by feeding honey/water to birds in the winter/spring. This incident followed a theme of awareness for bees in local newspapers during September's Bee Aware Month. These articles highlighted why feeding honey water to birds is not a good idea. A further article put in a local paper reminded the general public of what happened (beehives having to be burnt with $400–500 up in smoke) with the transfer of AFB spores. Feeding honey water to birds might not seem like a big deal, but it actually is.

Also, a continuing reminder of the bee-friendly trees and shrubs home gardeners can plant is important. These are two ongoing things the general public can help with. They are interested and want to help.

Best of luck for a good honey flow: things are looking good at the present time.

- Noel Trezise

WEST COAST

The sudden explosion of buttercup, broom, and wineberry is currently providing the bees with a small banquet of nutritional diversity. Unfortunately, intermittent weather is still restricting their foraging opportunities; therefore, supplementary feeding is still required. Pollen reserves are, however, building up nicely, particularly due to the bees with their lovely golden manes as they return from gathering the broom pollen. The native quintinia tree is beginning to flower as at early November, which could result in some interesting honey flavours appearing in the hives if the weather settles.

Weather conditions have been turbulent at times but thankfully this hasn't deterred our virgin queens from heading out on their mating flights, with improved percentages in contrast to last year.

The onset of wineberry seems to kick off the swarming impulse throughout the area; however, we seem to be experiencing fewer swarmy hives appearing than expected. A combination of late snow falling in the hills, and inland frosts may have been responsible for the slight delay in plants flowering, resulting in a more manageable rate of hive buildup. However, we have been receiving calls regarding rogue/feral swarms appearing in the town, which we try to collect to avoid any risk of diseases and varroa potentially spreading throughout the region.

On that note, it was great to see our friendly new disease inspector doing his rounds this month. We have been noticing quite an influx of new beekeepers trucking in more hives into the area, which is a constant reminder to remain vigilant in monitoring signs of disease throughout your operation.

- Carla Glass

ABOUT THE APIARY

MAKING YOUR HARD WORK PAY OFF

Frank Lindsay, Life Member

December is here and everything you have done over the last four months will have paid off (well, that's what we hope). The weather hasn't helped to promote a steady build-up. November has been extremely wet in my part of the country. A couple of small mating nucs died through not having enough stores.

Some of the larger colonies have been living day to day on what nectar they can bring in. The swarms that found a home away from another beekeeper's beehive are likely to have died, as bees can't build new comb and feed themselves in the rain. Many beekeepers have been feeding hives to keep brood production going.

We are not sure how our honey crop will pan out this season. All the wet weather in the west has promoted good growth of pasture plants but as farmers will tell you, not much guts. We have seen good growth of mānuka bushes in some areas but far fewer flowering buds. With this and overstocking of hives, some could perhaps be in for a minor flow.

Set up hives to maximise your crop

Most of us are optimists (you have to be to be a beekeeper) and will be setting hives up to produce their best crop. Now is the time to decide what to do with your hives. Small hives don't produce much honey. It's not hive numbers that count, but the population in each hive. You need a minimum of two full-depth (three, if you're using three-quarter-depth) boxes full of bees to produce a decent honey crop.

It's not hive numbers that count, but the population in each hive.

Once the main flow starts, the bees and brood from small hives with new queens can be used to top up other weak hives, after first putting the queen and two frames of capped brood into a nuc box to build up during the season.

Hives that produced queen cells and were split to stop them from swarming can be put back together, with the new queen on top of the original hive to boost their population. Use two sheets of newsprint to slow the merging of the bees. I move the first honey box slightly ajar to provide an upper entrance and to stop the upper bees trapped by newsprint from overheating in hot weather. (With the amount of rain we're getting as I write this, overheating is unlikely to occur.)

New beekeepers with only foundation frames should put only one super of foundation on at a time. Draw up an outside frame from the brood super below and place it in the middle of the super. After a few days, inspect and move the fully drawn frames out one, putting another foundation frame between. It's a slow and laborious process, but the only way to ensure you get all your frames drawn out evenly.

You cannot just put a super of foundation (undrawn) frames on top of the hive and expect the bees to draw them out. Bees don't see foundation frames as a resource, so have to be encouraged to move up into the new frames by lifting up a few drawn frames from the super below. If you choose to use plastic frames in your honey supers, you shouldn't mix plastic frames with beeswax frames as the bees tend to only draw out the natural frames further. We have to initially force the bees to start to draw them, so it's necessary to interspace a few plastic frames in the brood super first until they start to draw them out. Once started, you can then move these up into the next full super of plastic frames and the bees will follow.

You cannot just put a super of foundation (undrawn) frames on top of the hive and expect the bees to draw them out.

Drawing out frames requires a huge effort from the bees.

For those with a super of willow honey on top of the brood nest, you have to create spare storage space to stimulate the bees to collect more honey. Checkerboard the existing full frames of honey with empty drawn combs in the second super and above.

Drawing out frames requires a huge effort from the bees. A good flow or continuous feeding is necessary to keep the bees drawing out wax. This means until you have an excess of drawn frames, you do not produce much honey: enough for the bees to winter with but not much for the beekeeper.

Getting more out of your hive

One must consider that 30,000–40,000 bees are required to look after the brood nest. In some hives only 20% of the bees are bringing in nectar. We can change this around so fewer nurse bees are required to look after the brood nest and therefore more are gathering nectar by creating a brood break.

One method is to just squash the queen. I knew a commercial beekeeper who did this with all his singles. At the beginning of the honey flow, he would kill the queens in any weak hive and add a super of honey frames for the crop. The bees put new nectar in the brood nest initially but once the new queen started laying, they moved the honey up into the honey super. In February, he would remove the honey super and requeen all the hives to set them up for the next season with new productive queens.

If this is not to your liking, you could Demaree the hives. Find the queen and the frame she is on. Put the queen and frame into the centre of a brood super full of foundation frames, which is placed on to the bottom board. Then place a queen excluder on and rearrange the remainder of the brood so that frames with eggs are placed in the middle, immediately above the queen excluder.

Five days later, check the second super for emergency queen cells and rub any out. If the second super looks crowded, add another honey super. It takes a while for the bees to build out the new foundation and in the meantime, the hive will have produced far more honey than it would have if left as is. This works well for a short honey flow.

The amount of honey crop gathered is also dependent on the amount of varroa in the hive. Mite levels of more than one percent stresses the bees and diverts them from honey production. Make sure any miticide strips are out of the hive before the flow starts. Check mite levels by sugar shake or an alcohol wash. This takes a lot of time but when you know the mite levels, there are no surprises.

You will also identify those hives that will surprise you with higher mite levels. These may need to be treated again. Put any honey boxes on another hive for a couple of weeks (check for AFB in both hives first) until the emergency treatment reduces the mite level. We are all likely to see this happening as more mites become resistant to Bayvarol® and Apistan®.

If you find resistant mites after a standard treatment, you cannot use Apivar® at this time of the year and get a honey crop as this product requires a two-week withdrawal period before the honey supers can go on again. Use one of the fumigant products that give a quick knock down and disperse just as quickly.

Once you have identified resistant mites in your hives, you will have to re-plan your treatments and do far more mite monitoring. The easy times with some treatments are coming to an end. It may change how some commercial beekeepers manage their hives. Perhaps divert or put on a new staff member to monitor and treat hives.

continued...

Extracting

Try and get your first crop off before Christmas to beat the Tutin Regulations deadline. If it's not completely capped, shake the frames to make sure the honey is mature (if it's wet, a few drops of nectar will drip out). I also wouldn't put the outside frames from the honey supers in the extractor as these tend to have a higher moisture content. There's no use extracting early if the honey is going to ferment later next year.

Refractometers are fairly cheap now and take the guesswork out of determining whether the honey is ready to extract. Measure a sample of honey from several frames in each super to give you an average for the super. If it's under 18.6% water content, the honey can be extracted. If it's higher, stack the supers onto drip trays in a room and put in a dehumidifier, a heater set to 35°C and a fan. Offset the supers (overlap supers back and front to allow air to move through them) and leave for 24 hours. From my experience, 10 litres of water in the dehumidifier drops the moisture in the honey frames of 60 boxes by one percent.

For those of us in wet areas (high humidity, hives in the bush, etc.), I make a wooden roof with a 50-mm rim for each stack of supers (like the roof of an Australian hive). Cut a hole to fit a domestic heater. Offset the stack of supers on the drip tray by 25 mm or lift them on blocks slightly so air can circulate. I get my fans from the dump recycling depot; you can also get dehumidifiers there as well—Woods is a good model. Get an electrician to electrically check them and add a plug. Clean the dust out with a vacuum cleaner, especially at the air exit, and put on the fan only. Hot air from the heater, directly down on to the frames will melt them; hence the need to another heater in the room. (Warm air holds more moisture so is therefore easier to remove.)

You soon get to know how long it takes to remove moisture so your honey is reduced below 18% moisture by measuring all the supers in the stack every day. I reduce mine down to 17% as they keep better, but some would say by taking out extra moisture I'm removing weight, therefore money. I prefer to produce a premium product so don't look at value until it's in a container.

Ways to help quake-affected beekeepers

We all feel for the beekeepers in the earthquake areas of the South Island. Some will have lost hives and will be affected for a few years to come. Hives split open by the shaking will be robbed and going from the Cyclone Bola experience in the Gisborne area in 1988, AFB will become a major problem for a year or so.

We can help our fellow beekeepers. How about making a few nucs for them? ApiNZ no doubt can organise delivery in the autumn when the roads open and the beekeepers there have had time to assess their needs. Insurance is OK but it doesn't cover bees. These beekeepers will need bees to keep going.

If you are one of those affected and need a hand, or just to have someone beside you for a while, do ask. We tend to be loners and battle through rather than ask for assistance. Two helpers can make a lot of difference.

Give a book for Christmas

Books are always a good Christmas present for a beekeeper. As a gift for a new prospective beekeeper, a wise choice is *Storey's Guide to Keeping Honey Bees* by Malcolm T. Sanford and Richard E. Bonney (ISBN 978-1-60342-550-6).

For the more experienced (second year plus), a reprint of *Queen Rearing Simplified* by Jay Smith (ISBN 978-161476-052-8) would be a good present. Even if you're not interested in producing queens, you should at least have the knowledge and it will certainly improve the way you introduce queens.

Things to do this month

Check feed. Check for failing queens. Introduce nuclei. Super hives—get them on before the bees need them.

Control swarming. Make nucs out of any hive that swarms and combine weak hives to make full-strength units for honey production. This is the best time to get queens mated for those making their own replacements or ordering queen cells.

Prepare the honey house equipment. Undertake the first honey extraction in some areas. Do a full brood frame check for AFB before removing any honey or combining hives. Get the honey off before 1 January to meet all the testing requirements for those in the tutin/scolypopa areas.

Fit foundation into comb honey supers. Put the comb honey supers on when the first three-quarter-depth frames are being used for honey storage. (This super is put under the comb honey supers to prevent the bees storing pollen in the comb super frames if there's a break in the weather.)

Check hives for mites. Keep those mite numbers low.

Have a good Christmas break, even if it's only a couple of days. Take time off and spend it on family activities. Most commercial beekeepers' families hardly see them at this time of the year. Family time is important. Take a break before you get into the extracting season. We hope you have a good crop. All the best from the Publications Focus Group team.

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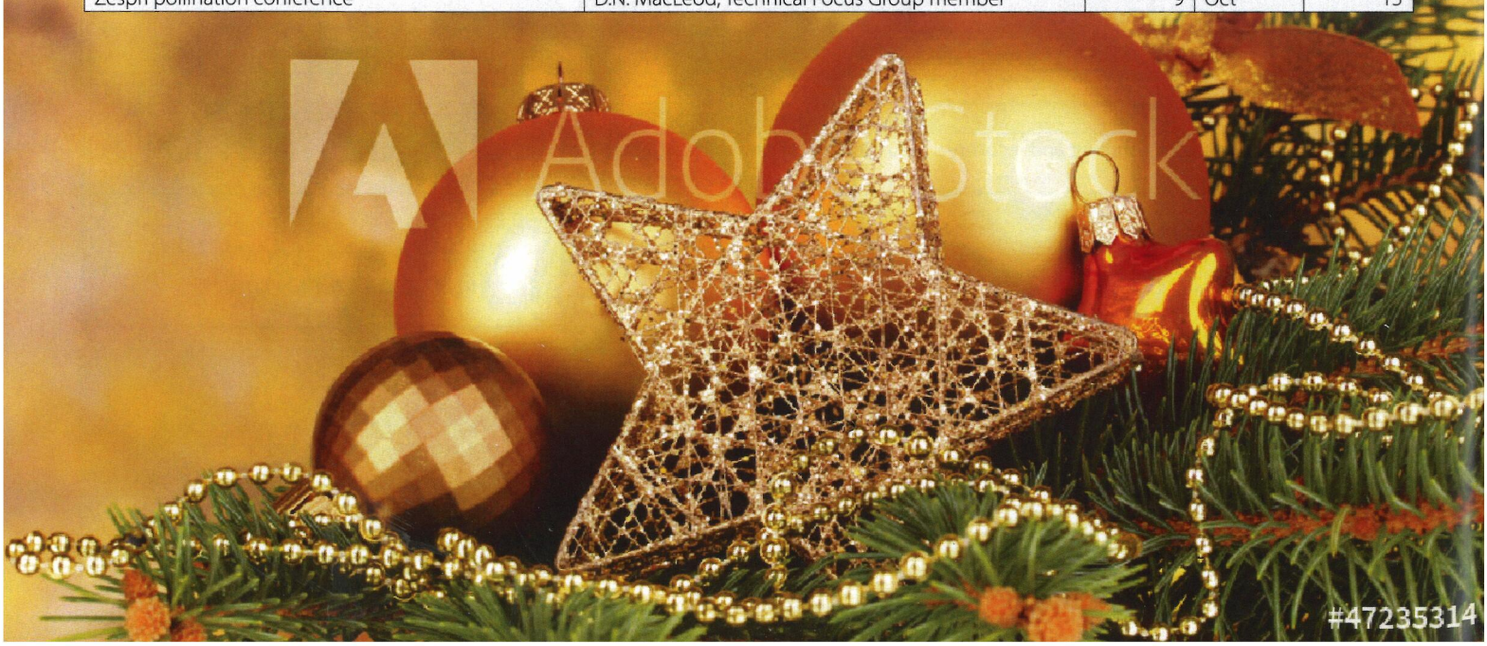

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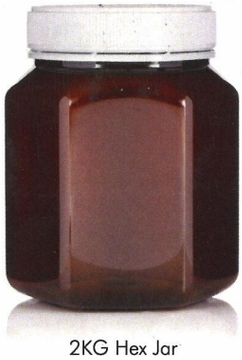

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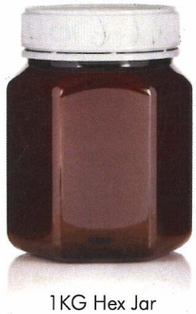

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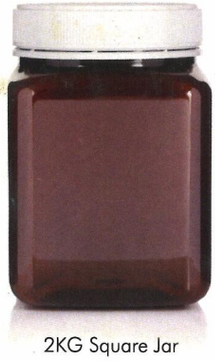

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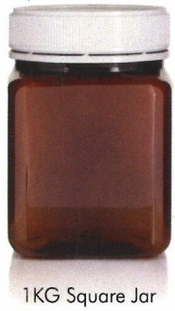

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