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APIARIST'S ADVOCATE

News, Views & Promotions – for Beekeepers – by Beekeepers



In the Wake of Disaster

We count the cost of several natural disasters to strike beekeepers and ask, what next?

In the Wake of Disaster



The impact of Cyclone Gabrielle on New Zealand, February 12-14, was catastrophic and a national state of emergency was declared. Naturally, many beekeepers and their businesses were caught up in the carnage.

The destruction included entire businesses as honey extraction and storage sheds, thousands of hives, beekeeper's homes, vehicles and belongings met disaster. We survey the damage up and down the east coast of the North Island and ask, where to from here?

Some of the immediate impacts of a natural disaster of Cyclone Gabrielle's magnitude are obvious – the apple bin come to rest on the Comvita shed roof in Napier tells a story, the hives strewn along the nearby beach, or washed up against fences all over the district and in Tairāwhiti, a landslide forcing through an extraction shed wall in the Coromandel – but the full effects on any industry are impossible to measure, especially just weeks from disaster striking. The initial destruction, apparent to all, will soon be enlarged by the troubles that ongoing disrupted operating conditions and hardship bring to both beekeepers, beekeeping business and others who rely on the apiculture industry for food production and pollination.

Apiculture New Zealand (ApiNZ) holds many of those beekeepers among their membership and, around a fortnight on from the cyclone hitting New Zealand, chief executive Karin Kos says their efforts have involved helping organise immediate assistance to both members and non-members, while also working on plans to keep help coming.

"We've been trying to coordinate support through the government agencies and make sure that the government's listening to our industry," Kos says.

That has involved helping get sugar feed supplies and varroa treatments into areas where access is difficult.

Defining the impact of Gabrielle, including mapping estimated hive losses so the information can be passed on to the Ministry for Primary Industries (MPI) in the hope of making financial assistance available to beekeepers, is another key task ApiNZ is undertaking. They estimate hive losses at 5000-6000, mostly on the Hawke's Bay plains where many hives had recently been moved to for overwintering, following a largely unproductive honey season in the interior of the island.

"A week before the cyclone hit, a lot of people had brought hives back down from the high country because there was no mānuka this season," explains Beekeepers Hawke's Bay club president Graham Heaven.

"Down the road from where my son lives there were 400 hives which had been placed in a hive dump site only a week earlier. I went down to check them out and now there is not a hive to be seen. 400 hives gone, and I mean gone, nothing to be seen."

A SNAPSHOT OF DAMAGE

Among those beekeeping operations whose hives suffered such a fate were the Melita Honey hives of the New Zealand Honey Group.

"A lot of our hives are on winter sites, close to rivers, and in some cases, on Regional Council land, we're right next to the rivers," CEO Lars Janson says.

"We knew we would have lost a certain amount of sites, but it wasn't until a few days later before we realised that, actually, there's at least 700 that we've lost, and counting."

He expects that number to reach around 1000 of their 6500 hives, to go along with six flooded



Disaster and a national emergency strike the Hawke's Bay as the cities of Napier and Hastings feel the brunt of Cyclone Gabrielle.

shipping containers of supers stored on Links Road in Napier.

"That's basically all contaminated. We'll have to burn all that and we don't have insurance on any gear that's not at our main base in Hastings," Janson says.

It's a significant loss of hiveware and honey bee colonies for Melita, but Janson's thoughts also go to other beekeepers who have lost larger proportions of their operations and hence he is working with ApiNZ and MPI to ensure support for beekeepers.

"I don't want to say we are that heavily impacted because, from an industry perspective, my main concerns are for those that are in a worse boat than us and that is a lot of the smaller guys that we operate alongside. They're just local beekeepers, that we know and we work closely with, that have lost huge chunks of their business. Some have lost a couple of 100 Hives out of 600 – that's a third of the business," Janson says.

It's far from just the hive losses that is bringing the hurt to beekeepers though, with tales such as the damage to Melita's storage containers or silt riddled sheds and homes emerging. Among the most astounding is the damage caused to Comvita Honey's Hastings offices, storage and extraction plant, plus a house for staff accommodation.

"The shed is about five metres tall and we had the level of flooding that meant that water went over the top of the building and also submerged the house as



Beehives and fruit bins – both washed away in the wake of Cyclone Gabrielle in the Hawke's Bay.



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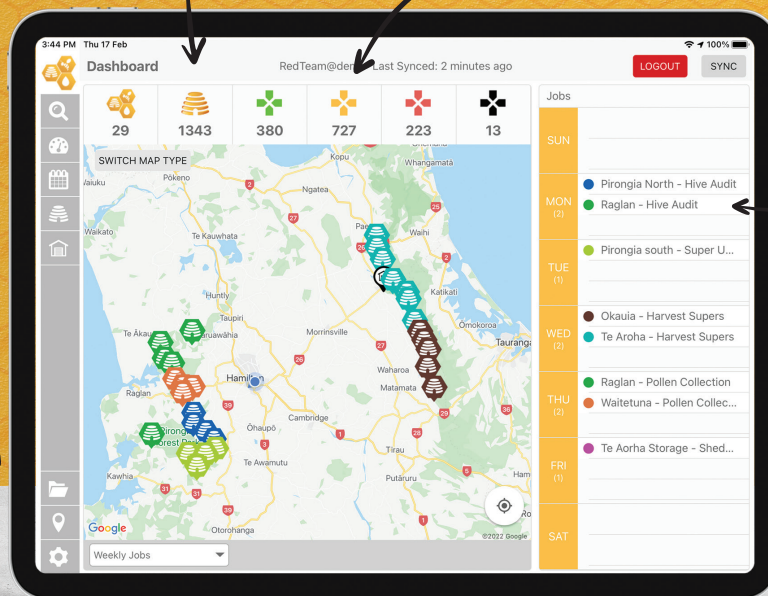
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well. At this point, we're working through our insurance process," Comvita chief operations officer Tracy Brown says.

Along with CEO David Banfield, Brown visited the Hastings site on February 20 and says it is likely a write-off.

"The level of impact is catastrophic. It's completely inoperable, and will be inoperable for the next while. At the moment it's still under a level of sludge and water which is about knee deep and it's quite hazardous to actually access. It became quite clear as we walked through the buildings that they've been submerged. Everything inside has been impacted as well and we're looking at quite a significant disruption to our Hawke's Bay branch."

Comvita are now looking for a temporary location to base their operations out of in the region, and are slowly returning to business as usual to conclude the honey harvest. The honey extraction runs which were planned for the Hastings site have been redirected to Comvita's central extraction site. Staff welfare has been the primary concern of Comvita, Brown says, and the four who were living on site are now in alternative accommodation.

"I think our team on the ground at Hawke's Bay, led by Ethan Paulsen our branch manager, has been amazing, but it has been quite stressful for them with a lot of long hours. It's been extremely challenging for anyone who has been impacted by this weather event. To experience flooding that might come up to your knees and then to find out that the place that you go to work, and the place where you actually live, has been completely submerged, is difficult to comprehend," Brown says.

Someone who experience that first hand was Jonty Moffett, owner of Flanders and Moffett, a 1600 hive beekeeping operation based between Hastings and Napier. Moffett spent a hectic morning of February 14 taking to Landcruiser and then jet-ski as flood waters rose and he attempted to ensure the safety of his family, RSE horticulture workers and horses, as detailed in *As the Waters Rise*.

The Moffett family would end up waiting out the flooding in the attic of their house, which is now a write-off, while a shed full of honey supers has been contaminated and numerous vehicles damaged, along with considerable harm to their orchards and horticulture business including cool store and processing plant.

Further north, Coromandel beekeeper Irma and Ivan Steenhuis' Jacob's Well Honey business is another to suffered at the hands of Cyclone Gabrielle after a landslide caved in a wall of their extraction shed.

"We've got no honey this season, the bees are getting hungry and so far we have only extracted about 120 kilos, then we have a landslide crush the carport and buckle the end wall," Irma Steenhuis describes their predicament.

"We might be able to get one more lot of honey off the hives, but with the roads damaged we are struggling to get to some places. We can't afford to employ anyone and my husband needs an operation for a health issue. It will have to wait until winter time."

Adding to their difficulties, a small kiwifruit orchard they own suffered severe frost this season, reducing its crop significantly.

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APICULTURE
NEW ZEALAND



The extraction and storage shed of Jacob's Well Honey in the Coromandel has copped a landslide, just one of many instances of beekeeping sheds suffering extensive damage in the wake of Cyclone Gabrielle.

"We've just heard from the insurance company that they will only pay for removal of about two metres of landslide around the shed, the rest we will have to remove ourselves. I would love to know if we can access any financial help with that. Everything seems to be set up to support farmers and growers," Steenhuis says.

WHAT NOW?

With stories like those emerging, it begs the question – what will be left behind, both of beekeeping businesses and beekeepers?

"The cost of hive loss is irrelevant in comparison to the destruction of entire business models," warns Nick Taylor, general manager of New Zealand Beeswax, who have contacted many of their North Island beekeeping clients in the wake of the disaster.

"Every other disaster I have seen in this industry, hives have been lost in certain areas but not entire operations. This time it's whole business models lost and that is the scary bit."

While initial reactions have been to ensure the immediate safety of people, as the weeks wear on and thinking turns to business recovery, there needs to be support provided to all businesses hard hit, not least beekeepers, Taylor believes.

"Having lived through the Canterbury earthquakes, the adrenalin wears off and it is a dark place that replaces it," he says.

While ApiNZ might still be in the midst of immediate crisis response, the long-term implications on beekeeping businesses and beekeeper health is something they are aware of, Kos says.

"It's been a tough couple of seasons and then to have this happen on top of all of it, that's really tough. It's really hard and

it does concern me how people are going to fear. They've got to get through the immediate needs, but then, longer term, I think it's going to have some big, far-reaching impacts," Kos says.

"Beekeepers, as part of the primary sector, are going to need support through this, financial support. So that is the big reason why I've been trying to put the economics and figures together, such as hive losses, so we can go to government with a compelling story."

Part of that lobbying will be stressing the impact of beekeepers' struggles on horticulture. So, ApiNZ are working with Horticulture New Zealand in their appeal to government. At The New Zealand Honey Group, Janson can see a serious need for government support to beekeepers, especially small and medium sized commercials.

"There's been a glut of honey on the market in the past year, which means sales are down for these guys. Their cash flow was at rock bottom as it was and now they've lost almost everything. My push is to get support, not really for ourselves, but support for these guys to help them continue. If all these guys fold or decide to exit the industry the impact will be for not just our own industry, but for horticulture. Hawke's Bay has got so many orchards and so much fruit that needs pollinating," Janson says.

While beehives may be brought in from out of the region to fill pollination contracts come spring, Janson believes the passive pollination provided by apiaries nearby to orchards, but not in paid contract, has been significant up until this point. With hive numbers now reduced in the region, growers could see the effects.

"Without hives, if all those guys exit the industry, then the pollination is going to be an issue for the horticultural sector and it's going to be an issue for us on production of honey, meaning prices are going to spike and drop all the time. The impacts are quite large. So, a little bit of a longer-term view to making sure that these guys get support when they need it is required

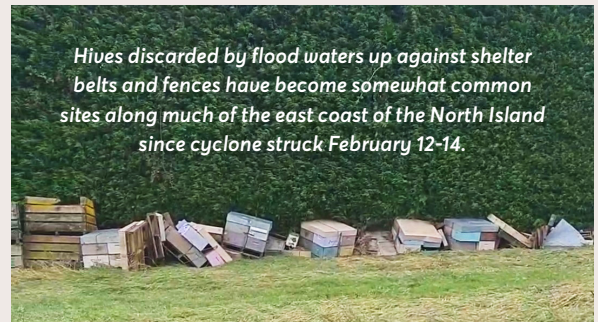
"If MPI can step up and find a pathway for these guys to get through, even if it's just some sort of support to be able to get them through to the next season, where they can then have the ability to produce some revenue again. It won't save them all, but it's going to save some of them. If we don't do anything, to support the smaller beekeeping companies now to get them through, then that's where the issue is going to be," Janson implores.

For some beekeepers it is probably already too late.

"I have spoken to a lot of people who are not going back into beekeeping. They are totally disillusioned about it," Heaven says.


The club president has lost 100 of 120 hives he had in the flood plain, but is aware other people are worse off. A discussion he had in the week following disaster drove it home that beekeepers, while they might have their troubles, are just one group severely affected by a disaster which has killed, made homeless and destroyed businesses across a wide range of walks of life and industries.

"I was speaking to a kiwifruit grower client this morning," Heaven relays. "They said, 'no worries about the lack of hives, we haven't any bloody kiwifruit trees left alive anyway!'"



Controlled Burn

For those beekeepers of the Hawke's Bay who have had hives destroyed and who wish to burn damaged hives, Lars Janson is organising a community burn pit – in conjunction with the AFB Management Agency and taking appropriate measures to prevent spread of honey bee diseases. Registered beekeepers in the area should have received an email with details, but for further info Lars can be contacted via email:

lars@melitahoney.com 

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As the Waters Rise



In an event as impactful as Cyclone Gabrielle any number of gripping stories emerge as the force of Mother Nature puts humans' safety and survival at risk. In Napier for Jonty Moffett, horticulturalist and owner of Flanders and Moffett beekeeping business, in six hectic hours on February 14 his thoughts soon turned from concern for his orchard, hives and equipment, to that of his family and staff as flood waters rose, lives were put at risk and he scrambled to ensure others' safety.

By mid-morning flood waters were so high and so fast on the increase, road vehicles were no longer of use and Moffett was left with but one option if he wanted to continue to aid his 80 Regional Seasonal Employer (RSE) orchard staff and neighbours – the jet-skis. A bad time for one to have a flat battery then...

After a quick swap around of batteries he got both up and running, one for a friend and one for himself, no sooner than the flood waters floated it off the trailer. From there it was throttle down.

While the 'washup' of the flood would be extensive damage to the Flanders and Moffett shed and headquarters, some hives, his orchard packhouse and cool-store, crops, apple trees and even a write-off of his own home and several of his family members' houses, in those hectic hours on the jet-ski, it was people's safety at the forefront.

A MORNING LIKE NO OTHER

Moffett's morning started about 6am with a check of the family's apple, rock melon, watermelon and maize crops.

"It was a wet and ruthless night, so I got up early to shoot around the orchard and check on damage," he picks up his recollection of an action-packed day.



Jonty Moffett at a time of drier feet. The horticulturalist and owner of Flanders and Moffett beekeeping business has seen both his businesses and home hard hit by Cyclone Gabrielle.

"At that early morning stage it wasn't too bad. So, when I got home I jumped on the side-by-side with my daughter to go and take a look at the river. We got halfway down and the water was coming to meet us."

That necessitated sending his teenage daughter home as he headed for his nearby parents' house.

"I waded through waist-deep water to get there and discovered they had got out. I then went to our yard where our RSE staff stay to check on them and they were alright."

A quick trip to the nearby marae to check in there was followed by the decision to head home, with concern for their low-lying house.

"By the time I got home it was pretty clear it was getting serious fast. The family went inside and I let horses out of the paddocks and took their covers off. My wife was grabbing food and water and belongings."

With the family scrambling up to the attic to keep dry, that's when the jet-skis became the only option to get around fast.

"I went out to some low-lying areas to try and ferry people to the hills. By that stage houses were already totally submerged and I was ducking under powerlines, the water was that deep. At that point I went home to join the family in the attic and waited until the water went down. We were huddled in an attic with my



Annie Moffett catches on camera the moment her father Jonty Moffett and friend head out into flood waters to check on neighbours.

parents, a couple of my kids, some neighbours. There were about 10 of us.

"We had a little window in the attic which was going to be our escape hatch if the water got any higher. You looked out to see the water flowing past, the horses huddled behind a shed and it began to sink in a bit. That was flood day. Rock bottom, and ever since then we have been rebuilding."

THE DESTRUCTION

While Moffett's beekeeping team, headed by business partner Jeff Flanders and their staff of four, have yet to assess most of their 1600 hives, losses are expected to be minimal compared to the damage to their headquarters at the Moffett orchard where supers were washed away and silt laden. Water through beekeeping and orchard vehicles rendered them inoperable, while crops have been destroyed and most apple trees simply won't survive.

"It's life changing," Moffett says.

"It's rock bottom and we are trying to move from crisis management to semi-operational. It's a matter of forming a plan that will work. We have options in front of us, but it is early days yet. We need to work through some things with the insurance company. We don't know how many hives we have left on a lot of the farms, but I don't think there will be a large number washed out. Some would have though."

Luckily varroa treatments are in their hives, as gaining access to many will take some time. This season they have had a "next to nothing" honey crop thus far.

"I can't see us getting a crop. Nothing worth talking about anyway. Jeff is optimistic, but I've never seen a lot come in in March."

As for the sheds, they are working to tidy up.

"We have shovelled everything out and dumped it. The little bit of honey we had in stock will be ruined. All our supers, frames and boxes have been washed away. We have picked most of them up again, but the frames are full of silt."

ONWARDS

His family is currently living out of a campervan on their property, two of his brothers and his parents have also had their homes destroyed, and there are also the 80 RSE staff from Samoa to worry about. It's undoubtedly going to be a challenging 'rebuild' for orchard, apiaries, home and factory.

As for the beekeeping side of his business, he calls this the "cherry on top of a terrible season". Despite all that, Moffett is trying to focus on the positives.

"I am truly blessed with the people who are around me. My family, my mates. It's times like this you actually find out how good they are. They are tough, resilient, talented and I am lucky to be surrounded by that. It gives you strength, it gives you belief that you can actually make it," he says.

Then there are the little things.

"Hopefully today we get power. I might have a hot shower tonight," Moffett says, adding, "everyday gets a bit better". 🐝

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What to Learn from Cyclone Gabrielle?



Cyclone Gabrielle has been just terrible for those directly in its path. It's formed part – just part – of an astonishing run of bad weather across the northern part of the North Island in recent months. And the Pacific cyclone season still has a few weeks to run. It ain't over yet.

One of my conclusions from this is that we need to plan for regular or at least more frequent cyclone seasons in the years ahead. By that I mean expecting to be affected by cyclones most years, rather than assuming (or hoping) we have years between cyclones, and so treating these big summer/autumn storms as exceptional. We need to get both government and economy/community organised accordingly. What might that mean?

A NEW EMERGENCY SERVICE

First, the immediate response deserves better civil defence planning and preparation. Those involved have worked really hard in recent weeks. But I think we need a better framework: it's time to seriously consider a version of the State Emergency Services that underpin disaster responses in Australia, augmenting the Fire, Police and Ambulance services with trained and equipped volunteers (and a professional backbone, with resilient

communications). Adding up our floods, earthquakes and other weather events, the case for an organised and well-equipped response system looks overwhelming.

IMPROVED POLICE TACTICS

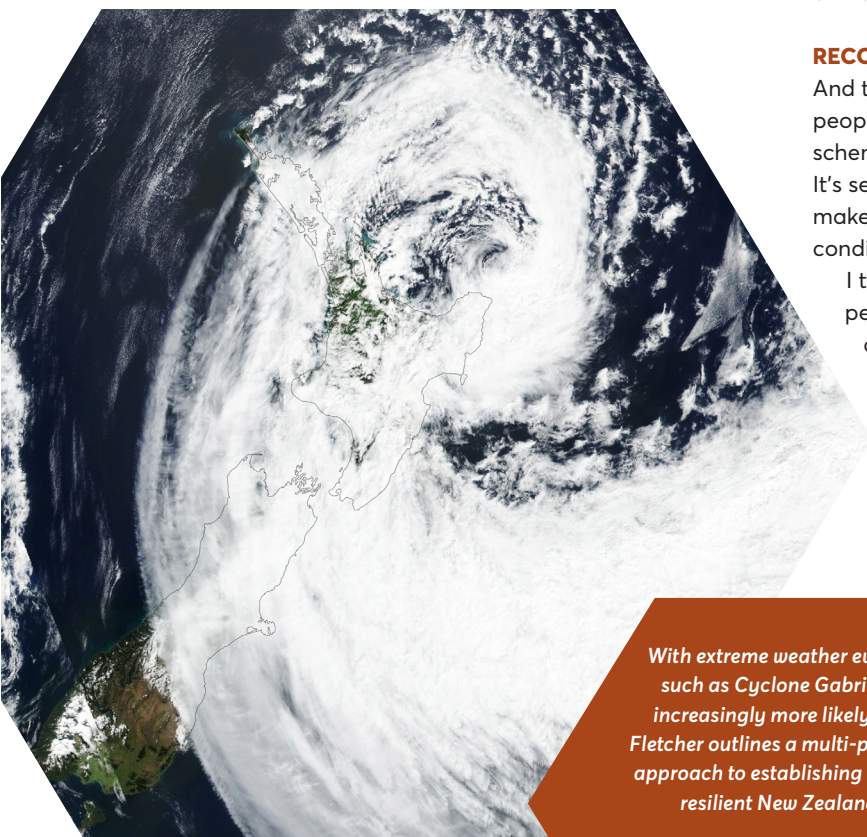
Matched by a better grip by the Police. The biggest disappointment for me in the Gabrielle response effort has been the public spat about Police response. I think there have been enough police in the right place, working really hard. But it's a no-brainer that in a disaster situation, people deserve extra reassurance, more visible order, and that the authorities should want and need trained eyes on the ground. Whether or not there's more actual crime is to just misunderstand what policing is about in this situation. It's been a failure of imagination, which I count as a failure of leadership. Police need to get into the habit of ostentatiously moving towards the problem as news breaks, not as crime figures are collated. Public confidence matters.

RECOVERY - \$

And then there's the recovery. Initially, once lives are safe and people accounted for, it's about money. The Government has schemes for farms and businesses, and a Minister newly in charge. It's set up a task force. Work and Income New Zealand can make civil defence payments to people and families, subject to conditions (have a look at the WINZ website; it's daunting).

I think that is Wellington-centred thinking that misses the point: people will largely sort themselves out if they can get money quickly to buy what they need. A cash grant to everyone in the affected area is the ideal. Something like \$2000 each. A flooded family of five with \$10000 cash will still be flooded, but they'll be a lot better off, the kids back at school, decent food on the table, even if incomes have stopped, and the family likely to stay in the district, get back to work and feel optimistic about things. Waiting for the employer to wrestle with MPI or MBIE (why aren't they offering just one scheme?) or navigating the choppy waters of the WINZ system is all likely to be too little, too late and too much bother. People deserve better.

With extreme weather events, such as Cyclone Gabrielle, increasingly more likely, Ian Fletcher outlines a multi-pronged approach to establishing a more resilient New Zealand.





The biggest disappointment in the wake of Cyclone Gabrielle has been the public spat over the police's response writes Ian Fletcher – "It's been a failure of imagination, which I count as a failure of leadership".

RECONSTRUCTION

Then there's reconstruction. There's talk about managed retreat and not rebuilding in some areas. There may be some specific places where that's right, but we can't just abandon a whole stretch of coastline. The challenge is to reap the benefits of what can be very productive land while coping with potentially more frequent or severe floods. So, resilient infrastructure (especially bridges and water supplies, we're discovering). New building rules (houses on stilts?).

And two institutional changes that really matter: firstly, a new deal on flood and storm insurance for both insurers and policy-holders everywhere. That might mean extending the EQC framework to flood and storm risks. Or it might mean a new framework entirely. But in any case, it'll take the Government to broker and implement the deal (and maybe to underwrite it). Government should announce that process now.

Secondly, forestry and forestry slash. It's a more local problem, but an alarming one. It currently seems that forestry harvesting involves trashing the watercourses and stripping the soil resources of the affected country. Recovery takes years. Plans to plant a huge area of exotics for carbon sequestration seem just stupid if the harvesting process will be as wantonly destructive as current practices show. The ministerial review (already announced) feels limp. A clear commitment to sustainable harvesting rules that control slash and prevent erosion is the only place Government can go. How quickly they get there will be a real measure of how determined they are to tackle these and related climate consequences. Let's see how they measure up.

Ian Fletcher is a former head of New Zealand's security agency, the GCSB, chief executive of the UK Patents Office, free trade negotiator with the European Commission and biosecurity expert for the Queensland government. These days he is a commercial flower grower in the Wairarapa and consultant to the apiculture industry with NZ Beekeeping Inc. 🐝

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Welcome to the Quarterly Honey Market Chat

Producing and selling honey – it's the backbone of almost every beekeeping business. Procuring honey – it's essential to any honey packer's business. Perhaps that's why our stories on the state of the honey market are so well received by readers?

With all that in mind, at *Apiarist's Advocate* we have decided to launch this Quarterly Honey Market Chat, with this the first instalment, March '23. Over the next four pages you will find a space where both honey producers and buyers can communicate, with commentary from buyers, and potentially listings of honey from producers who wish to appeal to buyers.

I believe the disconnect between beekeepers and those who take the honey to the end market place is hamstringing the returns available to apiarists. While we don't expect this space to be a silver-bullet solution to any of the honey market's struggles, it should help beekeepers gain a better understanding of what forces are at play in the market place, where the best potential outlet for their honey is, and what they should be producing.

It should also help the packers explain their positions, as I think many beekeepers believe the packers are 'creaming it', without understanding the nature of the domestic and international honey trades.

Of course, nothing beats a reliable, long-term relationship between producer and packer with open dialogue, and that should be the goal of both parties. We just hope this column can fill any void where those don't exist or add to people's knowledge where they do.

We hope to be back in June with the next update. Until then, read on and support those advertisers/contributors who have made the effort to connect with the industry here. And if you are a honey buyer wanting to have your say on the situation, or a honey producer wanting to get some extra exposure for what you have to sell, get in touch!

Patrick Dawkins, editor.

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Mānuka Orchard

Logan Bowyer
Owner

It's undoubtedly a shocker of a honey production season for much of New Zealand. Bad weather and hardship for the beekeepers over the last few seasons has reduced this season's production in the North Island and here at Mānuka Orchard in the Bay of Plenty our extraction plant volumes are well down on last year so far, tracking at 10%.

A poor production season can only help those who do have honey to sell as the honey types in short supply have become more sought after/valuable as a result. It may take a few more months before we see the retail prices lift to reflect this supply constraint though.

We have active buyers, both domestic and international, coming to us seeking honey now and we have orders that we would like to fill for rewarewa, bush

and fresh mānuka with 300MGO max prediction. Please reach out if you have any of these honeys.

If you have honey in storage, then it is good to understand how marketable your honey is. Testing and evaluating the results enables us to grade the likelihood of a sale. There is also the consideration of blending fresh with old, to keep the old stock saleable.

Our view is there will be a shortage in certain varieties for the next 12-24 months due to the low volume harvest this season, floods and pressures on beekeepers forcing them out of the industry. To navigate the next 12 months the NZ honey industry will need to maximise the potential of the smaller volumes we have in these low areas of supply. We have advice and ability in this area, if you would like to know more.

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James Annabell
Chief Executive

Advocate readers will be well aware of the ambitious **"100,000 Hive Project"** which Egmont Honey launched over winter as our commitment to growing honey markets. The project has been well received by beekeepers and our conversations with them encouraging, so much so that we have commitments from honey producers to supply around 90% of the non-manuka honey we need for the current season.

That doesn't mean Egmont Honey won't be an active buyer from anyone we haven't met with yet though. As we all know by now, it's been a poor production season in many parts of the country – not least of all in our own Taranaki. Therefore, it is likely that we will once again be an active buyer of bush and clover/pasture honey, from both North and South islands.

I write this amidst a sales trip to Australia and the UK, as we look to sure up and grow relationships with retailers in these key markets. Aiding these efforts to take more New Zealand honey to the world is Egmont Honey's recent sale to Nestle. The reach and backing provided by the world's largest food company can only aid our market growth efforts, and thus relationships with more beekeepers will be required.

As for mānuka honey, well we are no island there and so, like most others, we are still holding stock. That could change in both short and medium/long term though. Short term, a poor North Island

honey season could see mānuka scarcity approach faster than expected. Longer term – and I told an industry leaders meeting this recently – I am optimistic a mānuka turnaround will come, just look at where demand for bush honey was a few years ago, to it being much more sought after now.

As beekeepers, packers and marketers of honey we are well aware of the pressures that all aspects of our industry are facing. I genuinely sympathise with those who are doing it a bit tough at the moment. I can assure you we are doing all that we can to continue putting NZ honey on the global map. For example, we will have a booth at the largest natural product Expo in the USA next month, we will also have product sitting on the Garden of Life booth which is one of the largest natural health brands in the USA and is Nestle Health Science owned, maximising our exposure.

If you ever want to hear what we are up to or interested in supplying Egmont Honey pick up the phone and give us a yell.



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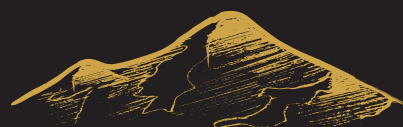
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Airborne Honey

John Smart

General Manager, Sales

First of all, our thoughts go out to those beekeepers in the North that have been fighting wet weather for months only to also be caught up in the devastation brought on by Cyclone Gabrielle. Understanding the challenges faced in the North (with the potential of a reduced honey crop looking likely) creating a supply issue, offset by a strong season in the South Island, we have found honey prices have firmed. This will be reflected in Airborne's offers to beekeepers at present – some good news for the producer there.

We felt it necessary to also caution beekeepers this year about the temptation to hold on to honey in the search for increased demand. To support this caution,

we wanted to give you an overview on our thoughts on the demand for honey.

Reviewing NZ supermarket data, it has shown that Kiwis have remained basically static over the last twelve months regarding KGs purchased. Bearing in mind the inflationary pressures and the fact that households are projecting to have less discretionary spend over 2023, we are projecting that this demand will, at best, remain static.

Reviewing NZ's export volumes, it is worth noting the downward trend continued in 2022 (1,630 M/T less than 2021) on top of a downward trend in 2021 (2,217 M/T less than 2020). Early indications for exports are that Jan 2023 this year has started another 91.5 M/T down compared with Jan 22.

Less exports means less demand from the buyers on shore, so those who hold on too long run the risk of 'missing the boat' in this era of honey stockpiles. As always, it's a balancing act for producer and packer!

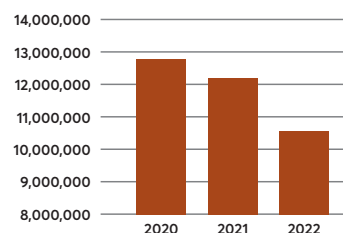
For Airborne, our sales numbers are holding up so far in 2023. A lot of our trade is through supermarkets, which are more reliable and thus our sales more constant. With this in mind, New Zealand's beekeepers can rely on Airborne

to be a continual purchaser of their honey as we feed a hungry NZ and international market with your honey. We have long-term, healthy relationships with producers, but due to our businesses' growth, we are always looking to speak with more beekeepers. So, whoever you are and wherever you are based, give us a call and let's talk honey. 🐝

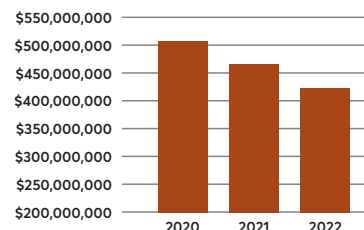
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Auckland Flooding Soaks Hives and Club HQ



BY CHRIS NORTHCOTT

Even before cyclone Gabrielle, the severe rainfall and subsequent flooding and landslips over Auckland Anniversary weekend caused damage without precedent to many homes and businesses across the region, as well as the loss of several lives. Auckland apiarists were not without losses too. At the end of an unusually wet summer with modest honey harvests the rising water levels topped off a poor season with colonies either drowned or washed away. Club president Steve Leslie reported that most members, being hobbyist with only one or two garden hives, had variable experiences. The worst was one member on the outskirts of Auckland who lost her fourteen hives when the nearby stream rose by over two meters, burst its banks, and swept them away.

The club apiary in Central Auckland also suffered losses. Readers of *Apiarist's Advocate* may remember that the club was recently forced to relocate from their apiary site at the Mt Albert Unitech campus. A new location was found nearby in Sandringham at an old bowling green in Gribblehurst Park. In its central location surrounded by trees, it was an ideal spot – so it would seem. Leslie explains that the whole area was once a floodplain. The street address is in fact on "Cabbage Tree Swamp Drive", which says something about the geography of the area before it was developed many decades ago.



"The morning after". The scene which welcomed Auckland Beekeeping club members at the club headquarters in Sandringham on January 28, with the club hives at back.

In the past flooding on the club grounds had only ever been an inch or so in depth. On the Friday night of the January 27 flooding, the water level rose to around waist deep. As reported by a club member who lives locally, the water was only around two inches deep when he left an event at the next door building at 9pm. However, when he returned at 11pm to check on the apiary it was apparent that their hives would not likely survive the extraordinary rainfall. The water would not recede until the following day.

Six hives had been present at the club grounds, all placed on stands raising them 30 centimeters above the ground level. Some had been knocked over by picnic tables that had floated across on the floodwaters from the nearby community hub building. Of the two hive stacks that had been left standing, many of the workers had moved up into the supers, but the queens and drones were trapped beneath the queen excluders and subsequently drowned. The capped brood in the lower boxes were likewise drowned, while the younger and uncapped brood were washed away. An additional colony in a bench hive managed to survive by having most of the bees cram into the roof space.

The following day, members and even some helpful neighbours gathered to clean up the mess around the apiary. Hiveware was reassembled, dead bees were cleared from waterlogged hives, live bees were transferred to bolster weaker colonies, and plans were made for replacing drowned queens and for nucs to restart hives. The onsite shipping container and its stored contents were



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dried out – fortunately most of their stored gear fared well due to excellent shelving that was in place.

The club extraction day that had been set for February 11 unsurprisingly did not go ahead. Honey, being highly water absorbent took in a lot of floodwater and so whatever honey wasn't washed away would have been contaminated by whatever pollutants were present. In any case, the surviving bees would need what little honey was left. In place of the planned extraction day, members checked the hives – two weeks since the cleanup and recovery – and discussed what needed to be done to recover a drowned hive.

Club members were given the following advice for any flooded hives: take out every frame and shake out all the water, don't expect capped brood to have survived, and don't try to keep any honey for extraction – leave it for the colony. A well-strapped hive with enough boxes should be able to save most of the bees (unless of course it is knocked over).

When asked what their plans were going forward, Leslie conceded that "it's a difficult one". All the hives were already raised a foot above ground level. This was flooding at a scale not seen before – like everyone else, the club wonders if this was a one off, or whether it will be repeated. The Auckland Beekeepers Club is not keen to move again – their recent shift cost a lot of effort and expense. The plan, for now, is to wait and see whether the current location remains viable for them. Having higher and flood-proof stands is a possibility, but these make working on the hives increasingly difficult when they are six or seven stacked boxes tall!



Auckland Beekeeping Club hives in recovery mode following January 27 flooding, having been prepared for the incoming Cyclone Gabrielle.

"We are still thinking our way through this one", Leslie concluded.

Ahead of cyclone Gabrielle (still several days away at the time of the interview), Leslie was unsure how the incoming storm would affect the surviving hives. The picnic tables which had floated across from nearby and knocked over hives were temporarily commandeered for new hive stands and strapped down to keep them in place in any high winds. No doubt this will prevent the tables from floating away in any further flooding! (Leslie later reported that the hives came through the cyclone unscathed).

In the June edition of *Apiarist's Advocate*, Leslie had reported that the move to the new club site had been "so far so good". Eight months on, keeping hives at the new location has proven unexpectedly disastrous. Like many other homes and businesses around Auckland (and beyond, given Cyclone Gabrielle's impact) the Auckland Beekeeper's Club has to decide whether to move or to adapt to any potential future flooding. 🐝

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Volcanic Eruptions, Tsunamis and the Volunteer Beekeeper



Carterton beekeeper David Cramp's three-decade long career in apiculture, in both keeping bees and publishing, has taken him around the globe. British by birth, he studied apiculture in Wales, before taking up commercial beekeeping roles in Spain and, more recently, New Zealand. However, now semi-retired, it is volunteer work in the Pacific Islands which has most recently captivated him – building and rebuilding beekeeping communities despite the horrors, to both people and bees, brought about by volcanic eruption and tsunami.

BY DAVID CRAMP

Volunteer Service Abroad (VSA) is very much a New Zealand icon, and is a great example of New Zealand soft power operating for mutual benefit in the Pacific. VSA teams with partner organisations in many of the island groups and effectively answers their requests for help according to needs.

An island ministry for example may need the assistance of a water engineer, or a veterinary assistant, or a public health organisation may need the help of an early childhood nurse, and once a suitable assignment has been agreed, VSA will recruit suitably experienced volunteers to meet the task. VSA provides the volunteer with flights to and from location, medical insurance, decent accommodation, and a living allowance based on local

prices. Volunteers don't lose out financially, (but you don't save much either!). VSA assigned me to Tonga in January 2020, the Cook Islands in May 2022 and Tonga again in September 2022 until Christmas.

My assignments started in 2020 when a climate change NGO, "OHAI Inc" (www.ohaitonga.org) in the Kingdom of Tonga requested an experienced beekeeper to re-establish community beekeeping in the Kingdom. VSA recruited me to help. After a series of interviews in which the author of a recent article in the *Advocate* (Frank Lindsay) played a part, I headed off in January that year.

TONGA 2020 AND A SUPER-BEE?

There are many colonies of honey bees in Tonga – mainly the feisty Northern European dark bee, but they all lived in walls and ceilings of houses, schools and other buildings and, for many years, haven't been managed, except by one or two beekeepers. Previous attempts at managing them usually fell apart when disease was introduced from New Zealand in the '80s and '90s and again in 2015 when some queens were imported from New Zealand.

Both *Varroa destructor* and American foulbrood (AFB) exist but, whereas varroa is not a danger and treatment is not required, AFB is its usual killer self – but rare. Investigation into the cause of destructor's failure to harm the bees was researched by an Australian university in 2015, but no conclusion has yet been reached. I have asked the team if they could resume the research, because who knows?... Tonga may have a super bee! This of course raises the question of banning imports of bees from elsewhere and I took a lot of time persuading people not to do so and to take bio-security seriously. If the current stock is genetically diluted before its anti-varroa abilities are researched, then who knows what we may have missed?

As for AFB in Tonga, its rarity may perhaps be because of the natural distribution of unmanaged colonies throughout the islands which makes infection less likely. If this theory is correct, I had



Before he returned with a 'bee vac' to vacuum up swarms with, collection of Tonga's wild bee populations was hard, hot and messy work for volunteer David Cramp, as witnessed at this Tongan primary school.

Photos: Supplied

to bear that in mind while setting up managed, more crowded, beekeeping sites.

I had to hit the ground running on first arrival in Tonga 2020 and, with a local colleague and a staff member from Ohai, we raided houses (including the Queen's palace) and ripped out walls and ceilings, cut out the colonies and put them into hives and hoped for the best - with many failures. This was how it had always been done before. It was hot, sticky and painful work and wasn't an ideal way of doing things. I vowed to overhaul the method and make it not only 100% successful, but far less stressful for the bees and the beekeeper.

BUILDING A TONGAN BEEKEEPING COMMUNITY

At the same time, I was tasked with training 30 beekeepers from scratch. Beekeeping equipment and the trainer (me) were provided by New Zealand and all other training costs by Australia. So, we all hoped for a bright future – not of multi-hive, industrial-scale beekeeping, but small-scale community-based set-ups to provide income for beekeepers from hive product sales and a much-needed paid pollination service for local growers.

Within seven weeks we built hive numbers up to around 30, trained 30 beekeepers, and then Covid hit and all aid workers were pulled out, preventing me from overhauling the bee removal methods and building further. Seeds had been sown though and with follow up Zoom hive inspections and telephone advice over the next two years, the project prospered until the whole lot got



David Cramp extols the virtues of beekeeping to some young Cook Islanders at a job fair – all part of the diverse range of tasks undertaken during his beekeeping visit with Volunteer Services Abroad.

blown up by the volcanic eruption and subsequent tsunami in January 2022.

With no flowers (ash covered), many colonies starved (few colonies had extensive stores for reasons discussed below), while the human population were too busy surviving to tend to them. By the time Tonga opened up again in September 2022 and I was able to return, there were just two hived colonies left. One of them had AFB (I burned it), and the other had a barren queen and was failing rapidly.



Hive numbers needed building and this time I was better prepared... I had designed and built a bee vac!

COOK ISLANDS 2022

But before my return to Tonga in September 2022, I was assigned in May for three months to the Cook Islands to work with the Ministry of Agriculture on invigorating community beekeeping, training new beekeepers, and upskilling existing ones. I was also tasked with writing both a manual of beekeeping in the Cook Islands, and Cook Island National Beekeeping Standards to be put into legislation. The Cooks are a wonderful place to keep bees. No varroa, (and I never saw any AFB) and with feisty dark bees, but I did find some calm, yellow Italians in a tree trunk on Mauke Island.

Seeing the rhythm of beekeeping in another tropical island group where the bees don't conform to our norm, and confirming the different bee 'seasonal rhythm' in my mind was great learning, and writing it all down in a manual was a useful exercise because beekeepers there only ever read beekeeping manuals referring to temperate zones. Until beekeepers recognise the different tempo and annual flow, it is difficult to run bees there.

An example being, with flowering all year round, the bees have no need to store great quantities of honey at any one time, and managing this adaptation is the key to island beekeeping and honey production. If the bees produce four or five frames of honey, don't wait for them to fill the box because you can go back in a couple of weeks' time and it's all gone. They eat it and start again because there are always more food sources available to them. This was a common occurrence in both Tonga and the Cooks.

Drones exist all year round as well and it is common to find queen cells in what we would call winter. I have also moved a frame of brood and eggs in 'winter' or the dry season (same winter

months as here) so that the bees could produce a mated queen – and it worked. But despite these differences, the bees have not yet entirely forgotten their old seasons. Rapid build-up and swarming still occurs in the months we would call spring as the wet season begins. Drone production increases at this time and drops off somewhat in winter. As for feeding sugar, unless you've made a split, or hived a swarm, and fancy giving a little sugar as a boost, there is rarely any need.

The Cook Islands assignment also included representation at school job fairs, radio and TV talks and advisory visits on demand to rural beekeepers. It went well and, after a three week break back in New Zealand, I headed back to Tonga in September for a three-fold task...

TONGA TAKE TWO - 2022

Once again OHAI received funding, this time for the re-establishment of managed bees, training for 10 female farmers, and publication of a manual entitled "Food for Bees. A Guide for Gardeners, Beekeepers and Farmers in Tonga". So, my days were filled with house raids for bee colonies and the evenings in writing the book and preparing a training course.

One of my main tasks was encouraging beekeepers to start again. They were devastated by the volcanic damage to their homes, farms, bee colonies, food and water supply, and communication with the outside world. Their spirits were low. It was hard work, physically and mentally, and only on Sundays was I able to take a break, and that only because it is forbidden to work on Sundays.

Overall, the work is hot, hard, very hands on, and full of mosquitos. Relief occasionally came in the form of invitations to the NZ High Commission festivities, which provided a nice diversion every now and again.



David Cramp goes through some beekeeping basics with Cook Island locals on the island of Mauke in May 2022.

BEE VAC TO THE FORE

Using the Bee Vac, removing colonies from walls and ceilings became a much easier, calmer affair, with few if any aggressive bees. It worked a treat, and, although it was still hot work (29 degrees and 75%+ humidity), over long hours, we were pleased with the results.

Of the 25 colonies we established in the short time I was there, all of them thrived, and of course having now been trained in using the bee vac, the local beekeepers have continued to expand the colony numbers since my departure. And that really is what it's all about. Training local people so they can do it all on their own without further help. Otherwise, what's the point? And, that training isn't just about beekeeping. It's also about production and marketing of hive products, pollination, biodiversity and ecosystem management, cyclone management (I had initially forgotten about volcanoes and tsunamis), pesticide use, and the importance of local solitary bee species and other pollinators. Many of my audience were growers, not just beekeepers. This training was accomplished both in the classroom and in the field and the students eagerly absorbed as much knowledge as they could in the time available.

Having said they can now do it on their own, there will always be room in future for a VSA beekeeper to return to the Islands to teach advanced beekeeping – queen rearing, AFB recognition, different hive splitting methods (I taught them simple, walk away splits – which all worked), and more bio-security work.

Also, as the ten lady farmers for whom training was supposed to be provided couldn't be found during my time there, they still

need training by someone (when found). I can assure you that any beekeeper giving their knowledge and experience to the island people, will learn as much from them, as they do from you. It's definitely a two-way flow of knowledge and learning.

And an improved model 'super bee vac' is now in trials! 🐝



Part of David Cramp's job description on the Cook Islands was to produce a local beekeeping manual, which he completed and presented to the Secretary for Agriculture here.

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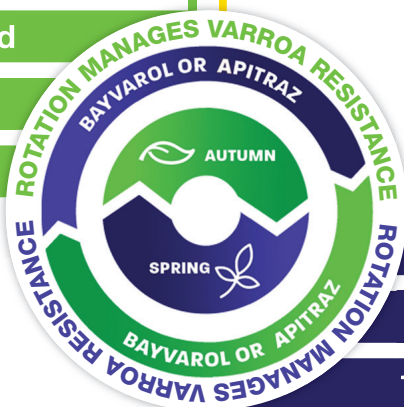
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The Scientist Opening Doors to Beekeeping Diversity



To survive the current honey industry downturn many beekeepers are turning to diversification of services and products. The doors to some of those income streams have been eased open with research conducted decades ago, as Maggie James finds out when she discusses the comprehensive career of beekeeping-scientist Ronald van Toor, who helped pave the way for New Zealand's multimillion-dollar live honey bee export industry.

BY MAGGIE JAMES



Ronald van Toor has packed plenty into both his working career and recreational pursuits, including contributions to live bee exports and royal jelly production within the beekeeping industry. While science was there from the start of his career, bees came a bit later.

"In the early '70s I left school and began working as a lab technician at Alliance Freezing Company, in Lorneville near Invercargill," van Toor picks up his story.

"I finished at the works as water treatment plant manager, having obtained a hands-on Certificate of Science through the New Zealand Institute of Technology, the esteem of a Bachelor of Science in today's world."

It wasn't all work and no play though. Van Toor was a kayaker of some skill in his younger years and, along with a couple of Southland kayaking mates, paddled as part of the 1974 Commonwealth Games slalom kayaking selection trials on the Rakaia River. Whilst the trio didn't make the team as individuals, they all achieved mid-field results.

"A one-year stint followed on the 10,000-acre Lands and Surveys, Dale Farm Settlement Block at Te Anau, being one of the best times of my life," van Toor continues.

"I married as a teenager, and with two young boys we came onto the Settlement. We often dingy sailed Lake Te Anau. I learnt to hunt, ride horses, shear, kill and process sheep and beef, including farm husbandry skills and livestock management, and driving farm machinery."

After that informative year, an eight-year stint as a technical officer for the Ministry of Agriculture and Fisheries (MAF) based in Gore followed, beginning with a major

Esteemed beekeeping scientist Ronald van Toor still keeps his hand in with some backyard beehives in Canterbury, decades on from first cracking a hive lid in the 1980s and a range of research projects which have benefited the New Zealand apiculture industry.

Photo: Maggie James.

weather phenomena and extreme kayaking, van Toor explains.

"We shifted to Gore to a 10-acre block with a homestead we intended to do up. One side bordered the airport, the other the Mataura River flowing between the freezing works and paper mill. A month following the property purchase, the river flooded through the house.

"This created a phenomenal one-off opportunity! I was the first person to kayak the manmade weir and the natural grade five Mataura Falls in full flood. I was petrified and knew if I couldn't get over the weir I would drown in its base. Immediately down river is the six metre Falls drop, but I believed I had the skills to survive!"

Even nowadays NIWA still list the 1978 Southland/West Otago weather event as an extreme 100-year event. There was an area loss of 850 beehives, 1250 hectares of crop and 340kms of fencing. It was an extreme start to life in Gore, which soon saw the van Toors settle down and beekeeping first enter the fold.

"Later I obtained my pilot's fixed wing licence. We had sheep and cows, and a horse for the kids. I learnt karate and trained sheep dogs. Also, my uncle Herman van Puffelen, who immigrated to New Zealand in the 1950s and became a commercial beekeeper and keen photographer at Waitahuna, Central Otago, delivered three hives to me at Gore. He told me I was now a beekeeper and inspired me into bee research.

"Andrew Matheson, author Practical Beekeeping in New Zealand, was also at times available in the area for advice. Later, my uncle supplied photographs for Andrew's publications."

The Te Anau and Gore stints were to shape van Toor's career,

constantly building on the skills and philosophies learnt at this time. He became interested in anything to do with the outdoors, leading to a professional career in crop protection and efficient management of honey bees. It was following a MAF Tech period in the mid-1980s that his career researching honey bees really took off.

"We went up to Invermay Ag Research and for nine years I was a technical officer, researching integrated control of major pasture weeds and insect pests, and pollination of crops with honey bees and specialisation of integrated pest management of beehives," van Toor explains.

LIVE BEE EXPORTS TO CANADA

In 1989 the National Beekeepers' Association of NZ (NBA) contracted van Toor for just over one year to evaluate the parasitic status of the endemic pollen mite present in New Zealand beehives. Using bees from two commercial outfits in Otago and Canterbury, research revealed the mite contained pollen and bee-derived salivary antigens. The outcome proved the mite is not parasitic on bees, but rather is a scavenger of pollen within bee colonies. The findings helped open the door for a new export earner for Kiwi beekeepers as it contributed to the lifting of trade embargoes on live honey bees exported to Canada and Korea.

The main market would be Canada, where there is demand for producing colonies for almond pollination in California. The live bee exporting season is generally late February to May in New Zealand.

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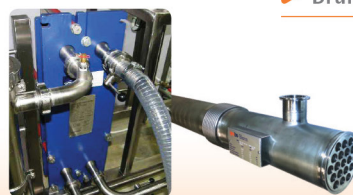


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Spot the mad-keen kayaker. Ronald van Toor tackles the Maitava River in full flood 1978, becoming the first person to kayak the manmade weir and the natural grade five Maitava Falls – a “petrifying” experience.

Gradually live bee exports increased and in 2014 37,704 packages were exported. Coinciding with the mānuka boom, exports of live honey bees dramatically declined yearly to 9,804 packages in 2020. However, 2021 and 2022 have seen package bee numbers significantly rise with 18,333 packages in 2022 according to Ministry for Primary Industries data.

ROYAL JELLY PIONEER

Van Toor also kept busy with a Masters in Science, Crop Protection, through Bath University in 1990, with surfactant technology to improve herbicide surfactant uptake in weeds the subject.

Then came another of van Toor's major contributions to the apiculture industry when he developed techniques for production of fresh royal jelly from beehives. A book on the subject from his pen, *Producing Royal Jelly: A Guide for The Commercial and Hobbyist Beekeeper*, was published in 1997, 2006 and 2013.

It provides an easy to read, fully illustrated guide providing all available practical information on the production of royal jelly, covering in step-by-step detail the production, storage, and sale of the product.

"In the early '90s I worked on a research project with Ben and Dot Rawnsley, Happy Valley Honey, Auckland region, at their property to produce quantities of royal jelly, and helped developed royal jelly production systems for use in hives," van Toor looks back.

The Rawnsleys sent a consignment of royal jelly to Europe as a result of the research, at a time when production of the highly valued 'organic' royal jelly was possible in New Zealand, and before the incursion of varroa mite forced the use of miticides in hives. These days, Happy Valley Honey continue to produce and market New Zealand royal jelly fresh in 10ml vials, and as an ingredient in a range of products including honey, chewable tablets, soaps, and their skin care range.

SLIPPING INTO NEW SHOES

After transferring to AgResearch's Lincoln lab in Canterbury, van Toor would eventually leave the institute which he had dedicated so much knowledge to in 1996, comfortably slipping into a new career.

"I left AgResearch and bought into an established company as managing director of sheepskin footwear with five other directors, 40 staff, a tannery in Dunedin and a sheep skin manufacturing

plant in Christchurch. We were the largest producer of sheepskin footwear for New Zealand – 15,000 pairs domestically including The Warehouse contract, plus 15,000 pairs exported to Japan and the US.

"Unfortunately in 1998, following free trade agreements, The Warehouse opted to purchase overseas product much more cheaply than our natural product and we lost their contract. The US dollar was high, and many New Zealand tanneries were closing. We elected to put the company into receivership."

BACK TO THE BOOKS

From there it was back to agrichemicals, working for Bayer based in Christchurch as a field researcher, testing their agrichemicals for registration in commercial crops. However, just over a year later, more fulltime study at Lincoln University beckoned, undertaking a PhD in development of a biocontrol of an exotic fungus causing camellia flower blight.

The knowledge gained from that study and research has provided an understanding of novel control for other economic pests in New Zealand, van Toor says.

"Since 2002 I have held the position of Scientist – Crop Protection at NZ Crop and Food Research based at Lincoln, managing insect pest problems in crops, along with pesticide use and resistance."

This position has included a multiyear stint in Scotland, 2008 to 2010, as senior scientist at Scottish Crop Research Institute in Dundee on a Marie Curie Fellowship to study management of virus transmission by insecticide-resistant aphids in potato seed crops.

Now 50 years on from that first job as a lab technician at the freezing works, with daredevil kayaking on the weekends, a career of scientific achievement continues. It is now pest insects which occupy much of his working time and not so much honey bees. However, beekeepers up and down New Zealand are still benefitting from previous work though, proving that appropriate investment in scientific research can pay dividends.

Next month we will look at van Toor's work regarding ingestion of Varroa destructor by pseudoscorpions in honey bee hives, and his various industry viewpoints.

If you wish to discuss any aspect of this story with Ron van Toor email Ronald.vanToor@plantandfood.co.nz 🐝



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Amitraz – A Successful Mite Killer, But No Free Lunch



Amitraz, the active chemical in popular varroa treatments Apivar and Apitraz, has become a staple in New Zealand beekeeper's pest management plans. How does it work and is there any downside to use of this highly successful varroa control agent? Science writer Dave Black explores the science of amitraz and uncovers that while the good news outweighs the bad, there is still no free lunch when it comes to introducing chemicals to your beehives.

BY DAVE BLACK

While New Zealand beekeepers have managed to reduce their dependence on chemistry for the detection and control of *Varroa destructor* most of us haven't been able to forget about it altogether. The pyrethroid miticides tau-fluvalinate (Apistan) and flumethrin (Bayvarol) were always going to need a 'support act' and for us, with the benefit of seeing things unfold elsewhere, the most obvious candidate was amitraz. This could be supplied in the same safe form beekeepers were used to handling, as Apivar or Apitraz, both of which declared 500mg of the active ingredient in each plastic strip. No one regards amitraz as a universally 'safe' chemical (nothing is) but it had some important things in its favour.

Using miticides of any kind in a beehive comes with a cost and it's important we understand this as completely as possible to ensure the treatment we apply isn't worse than the problem we are trying to cure. One of the things that makes amitraz valuable is that its effect is quite different from the effect of a pyrethroid. That way, before varroa fully adapt to resist pyrethroids we have something else to use. By sheer luck, it also turns out that varroa mites are much more sensitive to amitraz than bees are, and it's not just a matter of scale. That means, our bees are less likely to suffer from 'off-target' doses or residues and the quantity we use can be minimised. Our 'safety margin' (that is the difference in dose size between 'effective at killing varroa' and 'effective at killing bees') with amitraz, while about a third of that for Apistan, is more than double that for oxalic acid or thymol (Johnson, 2013).

HOW DOES AMITRAZ WORK?

In the last couple of years it has become much clearer how amitraz works to kill varroa mites, and correspondingly, how mites can change to survive exposure to amitraz, and actually, why bees are not as susceptible (Ye, 2020, Guo, 2021, Hernandez-Rodriguez, 2021). There were two alternative possibilities, the pest either working out how to 'de-toxify' the thing that's doing the damage, or modifying the 'target' of the treatment so it can't be damaged. While we thought we knew what the target was in the case of mites – octopamine receptors – we were wrong about the detail. That's probably why studies of the effects of amitraz are sometimes quite inconclusive, even contradictory.

Octopamine is the invertebrate equivalent of adrenalin for humans, first identified in an octopus. It's a neuromodulator and can have a wide-ranging effect on the whole nervous system. Amitraz attaches to the octopamine receptors, mimicking the action of octopamine in some respects but with a catastrophic and slowly lethal cascade of uncoordinated signals. We now know which of the several possible receptors in mites amitraz affects (it has the catchy name Oct β 2R) and that in *V.destructor* two different amino acid modifications (one present in the US, one in France)



An Apivar strip, which along with Apitraz are the registered methods for New Zealand beekeepers to apply amitraz treatments to their hives – treatments which are highly effective at killing varroa mites, but can build up in wax.

confer resistance. We also know that the reason honeybees tolerate amitraz is because their version of Oct β 2R is different again, with three different amino acid substitutions.

AMITRAZ'S EFFECT ON BEES – GOOD AND BAD NEWS.

Even if amitraz is relatively non-toxic for honeybees, some level of sub-lethal effects are quite credible given that amitraz works by being similar to octopamine. It's almost obvious that, like adrenalin, it might have an effect on heart rate isn't it? Researchers have investigated many aspects of their physiology, reproduction, and behaviour in the last 20 years and so far produced inconclusive results about ill-effects. There are plausible molecular mechanisms and changes in gene expression caused by amitraz, so we can't discount it.

The other 'good news' is that amitraz degrades very rapidly, and is quite insoluble in watery solutions like honey. If you try hard enough you can only dissolve 1 thousandths of a gram of amitraz in a litre water (1mg), compared to 300,000mg in the organic solvent acetone, so we aren't worried by amitraz being consumed by people eating honey. Many insecticides are transformed into active forms inside insects and amitraz is one example. Amitraz is quickly processed to produce the active metabolite DPMF, (2,4-dimethylformanilide). Although both amitraz and DPMF are potent Oct β 2R stimulants, DPMF is 11 times more potent than amitraz on the Oct β 2R from *Varroa* mites.

The 'bad news' is that these chemicals will bind to lipids, like beeswax (they, like most current miticides, are 'lipophilic'). In wax

amitraz itself also quickly disappears, breaking down during the course of a day into DPMF and two other compounds. DPMF was detectable for about a week and only one residue ('DMF') is detectable even after the wax has been reprocessed (Korta, 2021). DMF is not currently known to be harmful as far as bees, mites or people are concerned.

A recent report (Marti, 2022) from an extensive Swiss study of foundation wax produced by all their major commercial manufacturers (covering 321 samples) in 2019 found DMF in half the samples (in parts per billion, a maximum value of 32.1 μ g/kg). As Switzerland has never authorised the use of any amitraz products, the residue came from illegal use and/or imported wax. Switzerland has monitored its recycled wax for thirty years, and regularly detects residues from products that have been discontinued for years or never been authorised.

SO WHAT?

Now we know amitraz residues persist in wax, the obvious question is, does it matter? Can chemicals retained in wax affect the health of the bees and their offspring that live on it? Because, even if (a big if) amitraz has little to no effect as a mite treatment, what happens when we add it to the ever increasing store of contaminants bound up in wax comb? An often quoted US survey found 87 different residues in hive wax (Mullin, 2010). Switzerland is probably the only country in which the number of lipophilic pesticides and fungicides found in beeswax is decreasing. The effect of the simultaneous exposure to several residual medicines

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Another hive gets the Apitraz treatment, with the active chemical amitraz. Research has shown that the honeybee's receptor to amitraz is different to that of varroa mites, and thus ill effects on bees are seemingly minimal.

and pollutants in the form of widespread agricultural chemicals of all kinds may be just emerging.

For example, one of the few bioassays looking at the interactions between possible chemical combinations observed bees that had been 'pre-treated' with a small sub-lethal dose of amitraz found an Apistan application five times as toxic, even though a pre-treatment with Apistan did not make amitraz treatment more toxic (Johnson, 2013). Other studies have suggested combinations of miticides that lower sperm viability, egg-laying rate, and larval mortality, and so on, but the combined effect of these residual chemicals and their dose becomes extremely difficult to untangle. And remember, it's DMF persisting in wax, not amitraz, so that may not be a valid assay in any case.

When it comes to honeybees these days it seems we are all doctors, or at least pharmacists, so here is a little counsel from the experts. The modern, popular version of Medicine's Hippocratic Oath erroneously advises in Latin, "First, do no harm". The nearest actual source in the Greek medical texts instead suggests that you are either "to do good, or to do no harm". It may be a Hobson's choice, but do your best.

Dave Black is a commercial-beekeeper-turned-hobbyist, now working in the kiwifruit industry. He is a regular science writer providing commentary on "what the books don't tell you", via his Substack Beyond Bee Books, to which you can subscribe here.

References: Full list available in the online story. 🐝



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Calling on Kānuka Samples



With kānuka honey flowing into drums in recent months, The Experiment Company has renewed their call for beekeepers to supply honey samples for their ongoing research.

TEC's research to try and prove the immunomodulatory benefits of kānuka honey as well as form a chemical definition is ongoing (as outlined in *Making Kānuka Honey Great Again* in December 2022). The Auckland-based lab will need more samples of the native New Zealand honey to better progress their research though, with the end goal of improving the value to kānuka honey.

"We understand it has been a poor honey production season for many and we feel for those people and beekeepers caught up in Cyclone Gabrielle. However, for those beekeepers who have been able to harvest what they deem to be monofloral kānuka honey crops, we ask you to please undertake the simple task of putting a

sample pot in a courier bag and sending it off to TEC to aid our research," TEC founder Sri Govindaraju says.

"Because of the poor production season, we will possibly fall short of the number of samples we need to continue the research this season, however if beekeepers come to the party now we might just be able to get enough. They needn't be samples from this season, older kānuka samples would be great too, but we figure now is the time beekeepers will be sending samples to lab, so please include TEC in that mailout."

Kānuka trees will have finished flowering around New Zealand and thus researchers hope beekeepers can now provide honey samples to aid their work.

Mail samples of 100-200g or more can be sent to:

School of Science Reception (Attention: Swapna Gannabathula and Nazimah Hamid) Level 5, WS Building
Auckland University of Technology
34 Saint Paul Street
Auckland 1010

Along with sample please provide:

- Your contact details
- Floral type (approximate %s)
- Region/Location
- Land type (e.g. urban, bush, farm or orchard)
- Harvest date

Thoughts, feelings or other input you'd like to share?

We'd love to hear it.

Email your 'letter to the editor' to editor@apiadvocate.co.nz



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