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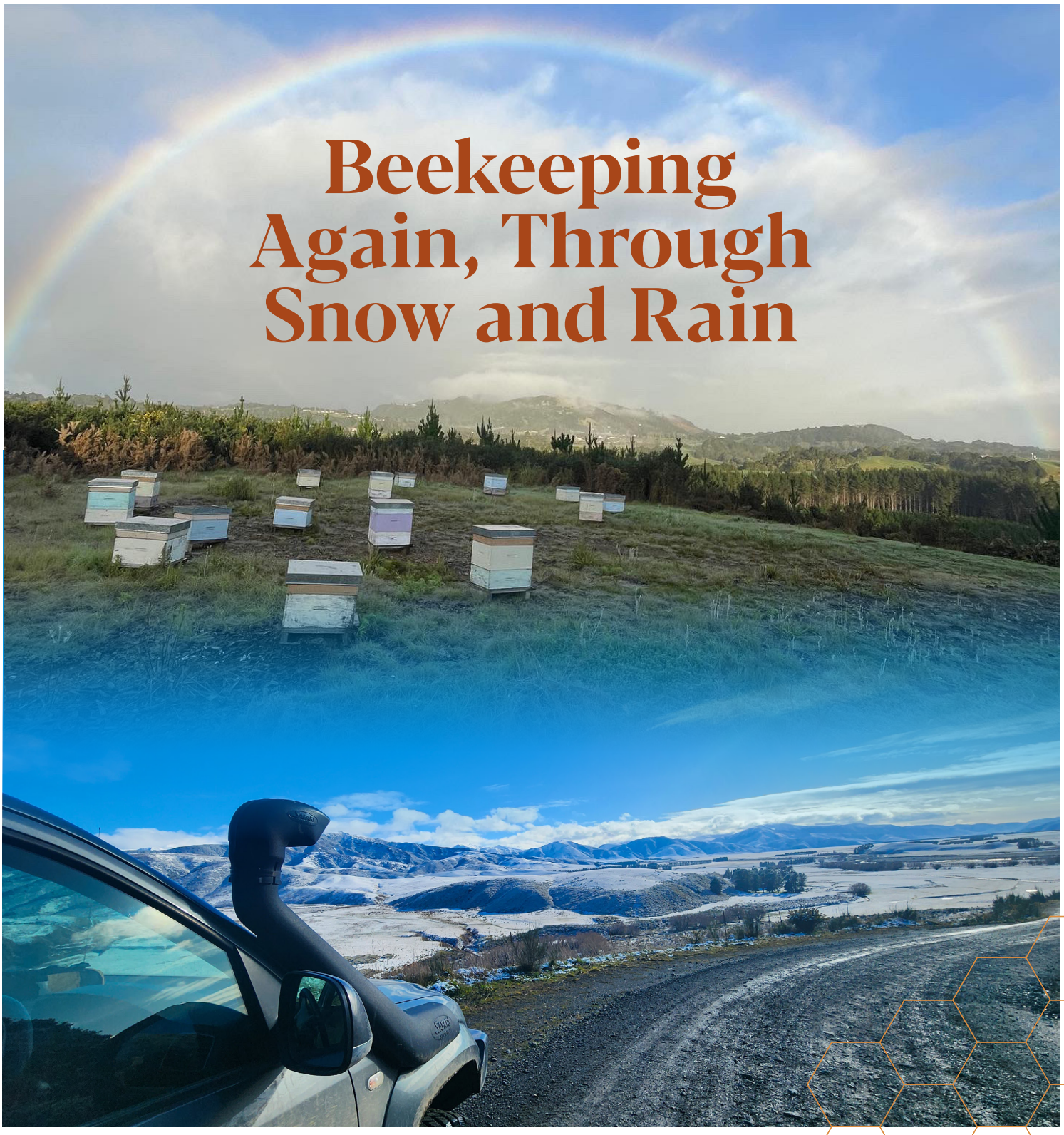
Apiarist's Advocate

News, Views & Promotions – for Beekeepers – by Beekeepers



Beekeeping Again, Through Snow and Rain

Beekeeping Again, Through Snow and Rain

August is always a crucial month for Kiwi beekeepers, as many hives get their first thorough look over of a new season, but weather can be fickle. We check in with beekeepers at the top of the North Island, some who have seen a record setting wet period, and some in the colder areas of the South Island who have experienced early-spring snow dumps, to find out what the conditions mean for beekeepers and bees.

Beekeepers at the extremities of the country are reporting good bee health despite some wet and cold conditions through August. While the threat of varroa is constant, and some damage from the mite is being reported, the main concerns are getting enough warm and dry weather to open up hives, as well as to dry out the land to allow vehicle access.

In Northland, Whangarei Bee Club president and Mattersville Ltd owner Nick Watkins' hives are not long off entering avocado pollination, then kiwifruit and berry pollination work later in September. He says it is "incessantly wet" in the Whangarei area and he is having to walk sugar syrup in to some sites to ward off the bees' hunger and aide colony build up, because vehicles can't make it.

The sun shines through rain clouds over these Gavins Apiaries beehives in Northland. Incessant rain has marked much of the past year for Northland beekeepers. Photo: Liam Gavin

"Even sites you normally have good access to all year round, we are struggling to get in to. It is unbelievable. I haven't seen a season like this before," Watkins says.

"NIWA is predicting El Nino (weather pattern) and things are going to dry out, but I haven't seen it yet. I look out the window most days and it's wet."

Not far away orchardist and hobby beekeeper Paul Martin's rain gauge tells a soggy story. An average year provides 1800mm of rain and, to date, 2023 has them at almost 2300mm already. More alarming, going back 12 months to August 2022, Martin has tipped 3500mm from his gauge.

"For the year to date we are sitting at 20% of average sunshine hours. It is ridiculous. Nothing is growing, nothing is flowering properly. It is freezing cold. I have been in Northland almost 20 years and this is the coldest winter I have experienced and a lot of long-time locals are sharing the same thoughts," Martin says.

Despite the big wet proving troublesome for some, Liam Gavin of Gavins Apiaries is comfortable with where their hives are placed, both physically and in their performance. In most of their hives they are building towards a mānuka flowering in November in central Northland. Right now, Gavins Apiaries' colonies are probably "too strong" Gavin says, with them becoming a hunger risk, especially if the sun doesn't shine. All up, the wet winter has not been overly burdensome, with hives wintered down healthy and not needing much winter attention, plus hives largely sited where vehicle access has still been possible in August.

"We've had a heap of rain, don't get me wrong, but until now we haven't had to go into the hives. If you don't get this weather in winter though, you will get the same thing we have had in many of the last five years of too dry of a summer. If we don't get a cold wet winter then the plants don't stop growing and they don't flower properly. They try to flower in the middle of winter. They do all sorts of silly things. Yes, it's wet, but it needs to be wet and cold, you just have to work around it," Gavin says.

In the very far north some mānuka plants are starting to flower already and Tahi beekeeper Lenny Stone, who manages 200 beehives, has his fingers crossed for the sun to breakthrough in the key month of September, so they can try and make up for a dismal honey season just been.

"It looks like it will be an early season. There is flower already and a lot of bud to come. We are on a narrow strip of land up

here, but, if we can get some good weather, it could be quite a good season," Stone says.

SOUTH ISLAND SNOW

While it might be the big wet in the North, it was the big cold for stretches of August in the South Island high country, following on from an otherwise milder-than-usual winter.

Steve Wootton manages Taylor Pass Honey Company's thousands of hives across Central Otago, with many destined for cherry pollination in late September.

"The clusters are still tight and winter stores good. They haven't eaten much to get them moving forward. We are giving a stimulus feed at the moment, but not too much, just enough to try get them going," Wootton says.

While there were still some hard frosts hitting in late August, Wootton says it is a matter of making the most of about five hours in the middle of the days to get out and check hives. Snow dumps in August are no concern for their operation.

"You just do a bit of shed work and go out in the hours you can. It does not greatly impact on the beehives because, traditionally, it is such a long time before our honey flow down here. Sometimes the colder it stays for longer the better. It is almost welcome in our high-country areas because it means we don't have to go and strip them as early for varroa. As long as they have the food stores you have no issues," Wootton says.

Further up the Mainland in Hawarden, North Canterbury, Heathstock Apiaries owner Mark McCusker is another who saw

Steve Wootton takes advantage of the sun shining to visit this Taylor Pass Honey Company apiary on the shores of Lake Hawea, Central Otago.

snow settle around their hives in August, but it's just business as usual and site selection, to allow adequate vehicle access, is crucial.

"August has been cold, but June and July were mild. We didn't have any significant snow on the hills until the end of July," McCusker says.

Bee populations are high in their hives, but the queens' laying is perhaps less than in a 'normal' season due to a slow-down in August.

"As soon as they get some stimulation that queen will kick in with some laying. They are opening the season about as good as they can though," McCusker reports.

Down the road at Springbank Honey in Cust, owner Steve Brown also reports strong hives following their visits, between some big August snow dumps. Because of the later winter, managing hunger in the hives over the next month or two will be crucial.

"The hives look good and they are ahead of normal. It's like we are in spring, but then we are not. A southerly comes through and they chew through more food and you can't get out to them for a while," Brown says.

Beekeepers are largely managing through any weather disruptions early in the season and up in Northland, Gavin encapsulates what is likely to be many beekeeper's sentiments, coming off the back of a poor honey season.

"A wet winter makes getting out in the hives tough this time of year, but it is a lot better than a wet summer," he says.

Springbank Honey venture out following a big snow dump in Lees Valley, North Canterbury, in early August. Photo: Maz Brown

The Pragmatic Beekeeper

This spring is the first for 26 years that Tauranga beekeeper Dennis Crowley will not be in the business of bees, having sold his "couple of hundred" remaining Bay Bees hives. Beekeeping since the mid-1990s he's rode the highs and lows of the mānuka honey industry, witnessed the boom of kiwifruit orchards in his area, plus *varroa destructor*'s emergence, while serving more than 10 years on the board of national industry groups – all hallmarked by a pragmatic approach to overcoming obstacles, both within his own business and wider industry.

BY PATRICK DAWKINS

Once he made the decision that beekeeping was the occupation for him, even total destruction of all his hives and hiveware was not going to stop Dennis Crowley. Yes, the successful Bay Bees business he built from 1996 to 2022 was initially decimated by American foulbrood (AFB) after Crowley bought 400 beehives from a Bay of Plenty (BOP) beekeeper in December 1996.

"I remember about three months after buying them I bumped into a very old beekeeper who introduced himself. I told him I bought 'this guys' hives," Crowley picks up the story of a tough time early in his beekeeping journey.

"The first thing he said to me was 'Oh, he's got rid of his AFB problem then'. My heart sank."

That autumn, and into the following winter, he was routinely burning a third of the hives in each apiary as they came down with AFB. Eventually all the hives and equipment ended up in the firepit.

After 26 years as a commercial beekeeper in the Bay of Plenty, Dennis Crowley has retired, having sold all but two of his Bay Bees hives.

"It was very demoralising, very hard. And also, very hard to tell your wife that the money we borrowed against the house was going up in smoke," Crowley says.

However, a pragmatic approach, which would come to hallmark Crowley's time in apiculture, led he and wife Heather to reach for the cheque book again and get back into bees.

"I knew I had a good business, with the honey sites and the pollination contracts. So, it was just a case of having to work our way through it. We got rid of the dross and ended up buying some more hives with extra pollination and honey sites and carried on."

'I'LL NEVER BLOODY TOUCH BEES AGAIN'...

That resiliency would result in many more years at the helm of Bay Bees, which fluctuated in hive numbers, going as high as 1200 at one point, before selling "a couple of hundred" and equipment to Katikati couple Campbell and Louise Langley this year to wind up the business. However, Crowley's first foray with bees gave no hint of a decades-long career to come.

It was 1982 and Crowley was living in Paengaroa, BOP, the home of Comvita which, at the time, was but a "tiny little alternative health company".

"Rob Walker was their beekeeper and one night he said 'come and help me shift some hives'. I had no gear, he had no gear, and he said 'It'll be alright, we will just smoke them, be quick, unload them and off we go.' Well, I wasn't alright! I got stung up to bits and I thought 'I'll never bloody touch bees again'," Crowley says.

More than a decade of travelling and working followed, but, back living in the BOP and working as a builder, a beekeeper friend once again came calling.

"After work one night I helped him shift 1000 hives into pollination. I quite enjoyed it, because this time I had gloves and a bee-suit. That was November, then, the following spring, he asked me if I'd like to come work for him. I wasn't really enjoying building, so I thought, 'yeah, why not?'"

Clearly taken by bees that spring, by December the Crowleys had made their first hive purchases of their own, and they were off.

POLLINATION

Well before the mānuka honey boom, kiwifruit and avocado pollination was the reliable earner for many BOP beekeepers each spring. It was no different for Bay Bees and Crowley says he saw the second generation of families take over some orchards, having held their pollination contracts for the length of his business.

Early on he could see the value in putting more structure around the beekeeper-grower relationship and so Crowley was a supporter of the short-lived Kiwifruit Pollination Association (KPA) which saw pollination hives audited to ensure their suitability.

"The idea was to keep providing decent service to the orchardists and you could charge more than the non-members. That didn't last long though," he says.

As more and more orchards were planted, beekeepers wanting more and more of the work undercut the pricing of the Association members and it fell by the wayside as support from growers waned too. When the Gold kiwifruit variety came to the Bay it was an opportunity for beekeepers to get better value for their services, as its earlier flowering meant hives could be used in Gold orchards, then Green.

"My thinking was, as an industry, we should be charging twice as much because the Gold was producing twice as much fruit and growers were getting paid twice as much per tray for the fruit. You also have to work harder to get the hives up to strength a month earlier, to meet the same target. I couldn't understand why beekeepers were undercutting everyone else and we certainly never dropped our prices," Crowley says.

Kiwifruit pollination was an essential part of Dennis Crowley's business for over two decades, which included having to work through the Psa crisis.

When *Pseudomonas syringae pv. Actinidiae* (Psa) established itself in New Zealand in 2010 it was an anxious time for the kiwifruit industry, and thus for many beekeepers in BOP. Zespri were worried about beehives assisting in the spread of the bacterial disease of kiwifruit plants, and so initially they wanted to prevent placement of hives in orchards. However, Crowley says they had developed a good working relationship with Zespri through the KPA and so he and Neil Cameron, a former member of the Association who was then working for Zespri, were able to talk the growers around.

"Everyone panicked and wanted to shut their orchards up, but we were pretty sure we could still do it and bees wouldn't spread Psa. We told them, 'at the end of the day, it's not going to affect us beekeepers greatly. We will just leave our hives on honey and get paid for honey anyway, but the orchardists won't get very much income if they don't get their plants pollinated.'"

So, over a busy week, beekeepers and Zespri determined what was safe to pollinate and when and what movement restrictions would need to be in place to slow Psa's spread. They got through that pollination season but then, a year later, tensions were high again when growers began to use the spray streptomycin without warning beekeepers.

"We didn't know what issue that was going to have on honey sales. You imagine streptomycin showing up in mānuka honey. We told Zespri, 'you can't just do that without letting us know'. So, I pulled together a meeting between growers, beekeepers and top scientists in the Paengaroa hall and didn't let media in. We needed to be able to speak freely."

The outcome was trials were run on beehives in orchards sprayed with streptomycin to determine its impact on hives, and rigorous restrictions were put in place around its use and ultimately, "we worked it out" Crowley says.

GETTING CLUED UP ON VARROA

By the time varroa came to New Zealand in 2000 Crowley had four seasons beekeeping under his belt, but was still learning plenty and he knew there was a lot to learn about the newly-arrived parasite

"When we first heard it was in New Zealand, I didn't know what it was, or how bad it was, but the older beekeepers around me were concerned and I knew them well enough, respected them enough, to know that, if they're worried, I should be worried," Crowley says.

The alarms got louder when a beekeeper of European origins, and so with experience of varroa, alerted authorities to the mite's presence in his East Cape hive. It wasn't the presence of the mite just down the road which concerned Crowley though, rather that it turned out to be a false alarm and a pollen mite.

"I thought, if this guy had seen it before and he can't tell if it's in his hive or not, I don't have a show," Crowley says.

Therefore, he volunteered himself to help the Ministry for Agriculture and Forestry (MAF) with delimiting surveys around Auckland.

"So, I got to see what varroa was and got to talk with the MAF guys and really respected what they were doing, and how, for our industry. That's the thing people forget. People jump up and down about them but, actually, they were doing it for us and paying for it all. The industry wasn't paying anything. So, I had a lot of respect for them for doing that. Now, they're not always good angels, but that was good."

Once varroa had made its way to 'the Bay', new challenges lay ahead, but there were silver linings as it improved communication between beekeepers greatly, from a well subscribed email chain, to physical get togethers, all which made for better beekeeping.

"I remember we set up a field day here in the Bay of Plenty, not long after varroa came, and we had people come from all over the

Bay Bees hives under a slow-release sugar syrup bucket feeding system for hives while in orchards.

country to have a look at it and discuss. It was fantastic. Those were good days," Crowley reflects.

Over the past two-decades-plus of dealing with varroa there have been good years and bad, but about 10 years in stories of beekeepers who were not practicing integrated pest management plans by alternating miticide treatments were leaking out.

"By that time, the mānuka was really starting to take off and we were seeing a lot more hives and in places that didn't previously have hives, and more congregating together."

The hive intensity, along with the mixture of varroa management plans and timeframes, have exasperated the problems the parasite brings. Now, with increased virus loadings in the hives, managing varroa is much more onerous.

"When we first started with varroa you could crack the box and, if you saw mites between the two boxes, you should get a treatment in soon. Now? If you see that, you're too late and the hive is on its way out. You have to use a mix of organic, non-organic chemicals, but the main thing is, you need to be looking in your hive regularly to see what is in there."

HONEY UPS AND DOWNS

Anyone who has been beekeeping in New Zealand since the 1990s has been on a roller-coaster ride of honey prices and Bay Bees "did very well for a while there" Crowley says.

"I remember my first bit of honey, I think I got $2.40 for it. Admittedly costs were down then and I thought that was good. Then someone offered me $3.10 and I was over the moon. Then we got involved with the mānuka. The first season, the revenue from the mānuka honey was almost the same as what I had just paid for my house."

Things have changed now, since the introduction of a standard for the export of mānuka honey in 2018. Those new rules, whether beekeepers like them or not, were much-needed Crowley points out.

"One year I got $17 for pasture honey. There was no way on God's earth there was a pasture honey market out there for $17 to the beekeeper. We all knew what was happening. It was going to be blended up and sold off as mānuka and, for a short period there, every man and his dog was doing it."

When the fall in honey prices came in 2018, Crowley says they took a pragmatic approach at Bay Bees and reshaped the business to suit the new environment, regardless of the mānuka standard's accuracy.

"I tend to err on the side of 'okay, if I can work with that, then what do I need to do as a beekeeper to produce a product that will fit with that system?' That is how I've looked at my businesses: how can I make money out of it? Not in the sense of being greedy, but in the sense of, I've got a business, it's got to pay its way. For me pollination is a no-brainer, because I'm right smack bang in the middle of the pollination area. That's part of it. Then, what honeys do I need to get that are selling and what quality of honey do I have to produce to, hopefully, get a buyer?"

INDUSTRY REPRESENTATION

Given the BOP beekeeper's experiences with beekeeping adversity and the pragmatism in which he responds, along with his ability to bring various stakeholders together constructively, it is perhaps not surprising that Crowley has spent considerable time on the Board of the National Beekeepers Association (2012-15) and then from 2016 to present with Apiculture New Zealand (ApiNZ). Crowley has thus represented commercial beekeepers on the ApiNZ board since its inception and is currently serving as the ApiNZ

representative on the AFB Pest Management Plan Board. He firmly believes beekeepers, honey packers and marketers working together as a representative body is what is required.

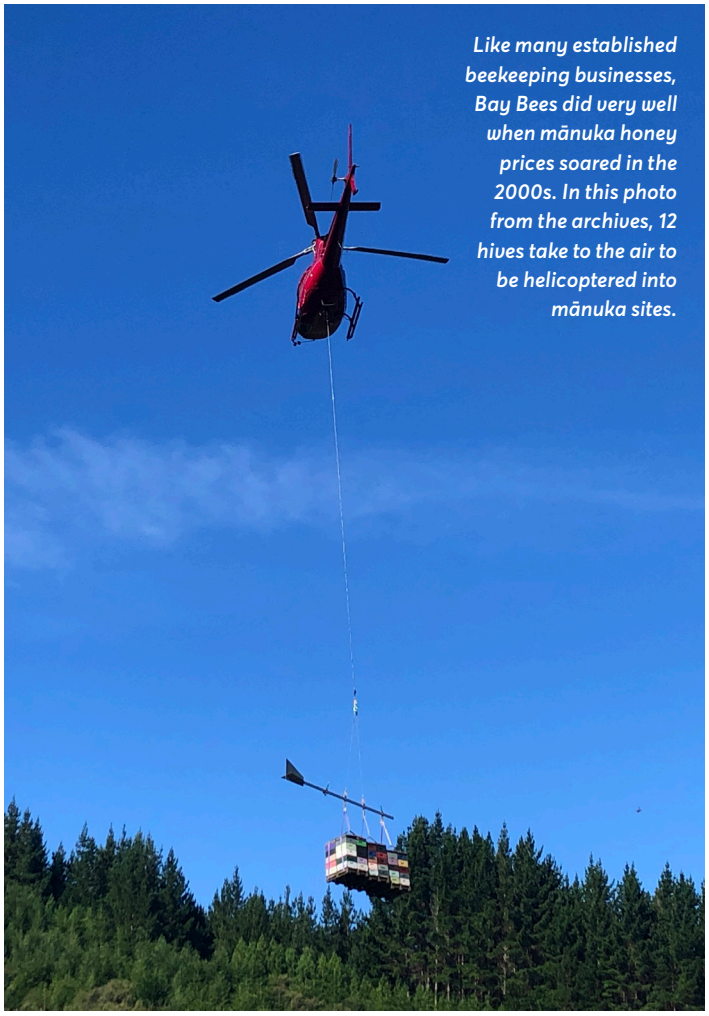
"Beekeepers and packers are two sides of the same coin and we actually need each other. The industry, in total, is from flower to supermarket shelf. As a beekeeper that's where we get paid, we get paid from people buying honey for the family, not from the packers."

The one-time dairy farmer points to other primary industries, such as dairy or kiwifruit, as having the blueprint for success when it comes to industry representation, where a fully industry representative body sits above other groups.

"You can have individual beekeeping groups that just want to focus on the beekeeping, and also packing groups that just want to focus on the art of packing but, individually, they are dead-end groups. They need each other. ApiNZ is more industry wide.

"As an industry with only about 1000 commercial beekeepers, we are too small to have 10 different little beekeeping groups all wanting their say, or wanting money, or wanting to go talk to the government, all wanting their own little flag on the hill. The government don't want to talk to 20 different little groups, they want to talk to one body that represents the groups. That's the place for ApiNZ.

"A house divided by itself will not stand and so, at the moment, the bee industry is not standing because it's too divided," Crowley believes.



Like many established beekeeping businesses, Bay Bees did very well when mānuka honey prices soared in the 2000s. In this photo from the archives, 12 hives take to the air to be helicoptered into mānuka sites.

WIN LIKE WINE

It is the wine industry that could provide the best model for the honey industry to replicate, with the retiring beekeeper envious of how viticulture has banded together to promote New Zealand wines internationally. The big honey packers cannot be relied upon to force open doors to new honey markets, because they are not going to divert their attention away from putting mānuka honey in pots when it is worth so much more than other varieties, he believes.

"They have their own direction, their own targets that they're hitting, so they are not going to do it for a wider New Zealand industry. They've got their people talking to them, and they're going to work their people. So, we need a top body, like the wine industry does, to promote New Zealand honey overseas. It will always start with mānuka, because it is what gets New Zealand honey noticed overseas. So, let's use that, then go in with other honeys."

Beekeepers voted down ApiNZ's proposal to collect a honey levy in 2019, but the industry needs to consider funding some sort of collective action to take an advocacy role for New Zealand honey, the board member maintains.

"It's not just paying this guy that used to sell cars and getting him to go around the world. It's got to be wider focusing and smarter than that. It costs a lot of money and it takes time. It's not going to happen overnight."

If it doesn't happen, and strong industry representation isn't funded, Crowley warns that many beekeepers will be left behind.

"Whether we like it or not, there has to be a levy of some sort, somehow, somewhere, if we want to grow. The producers have to be involved in that. Otherwise, we will just carry on as we are and the guys with deep pockets will continue to roll forward regardless. The bigger boys will become the de facto industry, just because they can ring up the Minister if they want to and have a visit with him, or hop on the plane with the Prime Minister to go on a trade envoy. So, if we're not careful, that's what will happen and the de facto industry will end up being five big players."

TIME FOR THE NEXT STEPS

The warning comes as Crowley looks to step away from his ApiNZ Board position at next year's AGM, having already left behind all but two beehives, located in the backyard of his Tauranga home. Despite his exit, the business of beekeeping was thoroughly enjoyable right to the end for him.

"As far as working the bees, I still love that. Ninety percent of the stuff that I was doing I enjoyed every moment of it. I enjoyed the lifestyle and I enjoyed not having to be told when I have to turn up, when I can have a cup of coffee or not."

Not having hundreds of hives to tend to has now afforded him the time to take a month-long early-spring holiday to Cairns, Australia, to visit one of his three children. So, while his calendar might be opening up a bit more in spring time, there has always been a freedom from 'time', Crowley says.

"When I started beekeeping – and typically we didn't have cell phones back then – I took my watch off, because I wasn't set to eight to five. I was set to whatever the bees were doing," he explains, adding, "I loved that part of it the whole time."

Bay Bees hives being flown into manuka honey sites.

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Quarterly Honey Market Chat - September '23

The Quarterly Honey Market Chat is a space for 'honey buyers' to connect and inform honey producers – the beekeepers. Here's what James Annabell, John Smart and Logan Bowyer have to say about the markets as we head into a new production season...

Egmont Honey

James Annabell

Chief Executive

Last update, in June, I forecast some large export orders to come for Egmont Honey, since then we have been working on some major new supply agreements. So, heading into a new season, our demand for certain types of honey will be stable.

An exciting new relationship is with Costco in China, whom we sent our first consignment to in August. They are a big retailer in a big country – so the potential to grow export volumes there is very real. The same goes for the UAE market where our mānuka honey will soon grace the shelves of their largest pharmaceutical chain, Life Pharmacy, who have just opened their 400th store. We have growing confidence in the UK market too, where our major retail partner, Holland and Barrett, just extended our range of products, from 7 to 9, over their full 800 stores.

All-in-all, it gives us great confidence in the demand for New Zealand honey under the Egmont label. That's a good thing, but I'm sure what you really want to know is, what will the price to the beekeeper look like? As it sits, we still have a large stockpile of MGO500-700/UMF 15+ in both our Egmont storage and in the NZ market place. In the short-term we will have more demand for lower grade manuka and bush/pasture honey and so pricing should remain, at least, stable there. This past season we received good supply of clover and darker pasture honey out of the South Island, where North Otago beekeeper Shane Rawson has been sourcing honey on our behalf. It has been great to establish new relationships and we will be back again for more in 2024.

While it may currently be tough going, especially for higher-end mānuka producers, my recommendation to beekeepers considering shutting down operations is, don't sell off everything. If you really need to shut down your business, is it possible to just put it into hibernation? Give yourself a road back. For Egmont Honey, we have no desire to significantly grow our own hive base. We strongly believe in the value of forming long-term partnerships with a circle of great beekeepers. I can see the other end of these tougher times. We are only one more bad production season away from clearing the backlog.

Best of luck for the coming season. As always, the phone is on, you are always welcome to give myself, Nick Walker (procurement) or Shane Rawson a yell any time.

Airborne Honey
John Smart
General Manager, Sales

I've spent the last couple of months fielding calls from beekeepers asking for a price for their honey. It's been a very unusual year beginning with the atrocious weather in the North Island fuelling speculation that honey was going to be in short supply, followed by what a appears to be a good honey crop in the South Island, depending on who you talk to. For Airborne Honey, our sales are up and demand is strong, however we are working hard for sales amidst hot competition for consumers' attention, from both other honey brands and other spreads. With this in mind, the latest year to date (July '23) export data shows honey value down 14.5% and volume down 7.30%.

The good news is domestic consumption is up 6% and the value is up 13%, as at July 23. The shift in the honey category in New Zealand and offshore supermarkets is toward multifloral mānuka. Consumers are switching from polyfloral and clover blend honey to mānuka blends. This is driven by the very competitive retail prices for mānuka and the perception the honey is healthier than non-mānuka honey. The other trend in the market is honey being sold in a more convenient, useable format.

With this information in mind, the advice I am giving to our beekeepers is continuing to be a demon on costs while maximising production based on the most cost-effective honey crops. In other words, focus on volume rather than value, **but not at the expense of quality**. We are seeing increased numbers of samples with high HMF levels and more concerning high HMF honey being packed and sold in retail packs, including honey labelled as 'raw & unfiltered'. I am aware of two private organisations monitoring HMF levels in honey. Both beekeepers and packers have a duty to protect consumers and our industry from unscrupulous actors. It's worth remembering the HMF in fresh honey is almost always below 3mg per KG. The CODEX standard for HMF is 40mg per KG. The closer the honey is to 3mg/kg in the retail pack the better.

So, what's the price for honey? This is something we are monitoring, with what appears to be reasonable stocks of unsold honey and the financial strain many beekeepers are experiencing, we need to ensure the price we offer is in line with market prices being offered to retailers. From a honey packer's perspective, we need stability in the market and want to avoid a decline in retail price, otherwise we have no choice but to respond, resulting in lower honey prices.

Mānuka Orchard
Logan Bowyer
Owner

First the good news – the bulk market enquiries for mānuka honey are strong in the lowest and highest grades at the moment, with consistent, good pricing. In the middle MGO ranges pricing continues to be wide and varying depending on the buyer, the urgency of the deal, and required level of compliancy.

Fully tested and 'A-grade' honey continues to get the best offerings. For older, non-compliant honey, blending is the best option to enable a better value sale and beekeepers sitting on this stock should seriously consider it.

All other honeys (i.e compliant non-mānuka varieties) are in short supply at the moment with stable, sustainable pricing being offered.

Beekeeper's questions to us this month have been focused around what honey they should aim to produce this season. On average New Zealand exports about 10,000 tonnes of honey annually and it is my belief we will only need to produce about 30-40% of that this coming season, because the mānuka stocks are so high. A reduction in mānuka honey production, because of poor weather/flowering, beekeepers targeting different crops, or just less hives, will help reduce the existing volume of mānuka in stock.

For bulk producers, the focus should be on 300MGO honey. No-mānuka honey should be targeted if you have a sustainable price indication and volume required from a buyer beforehand.

With reduced hive numbers this season and – potentially – many beekeepers choosing not to target mānuka, it remains to be seen if reduced hive pressure increases the kgs per hive. Of course, the weather is always outside our control and who knows what will happen there.

Looking longer term, if we are using 40kgs of honey per hive as a target at production and if export sales are consistent at 10,000T nationally p/year, then 300,000 to 400,000 hives (12,000-16,000T production) is a sustainable national target going forward once domestic sales are factored in. From that point, we can then grow sustainable sales channels to increase hive numbers again as an industry, if required.

What every honey investor needs now is a fair price for their honey in order to level the industry at a sustainable place, so we don't go below the line of stability of supply. As we are finding now, it's not just about producing mānuka honey, but about ensuring we have the right balance of 'mature' and 'fresh' honey to supply the markets. If we overcorrect, and stability of supply is not ensured, the result could be worse than the current state, for all involved.

Titbits from a Beekeepers Day Out in Waikato

BY DAVE BLACK

For the second year running an informative, social and well-organised field day was hosted by New Zealand Beekeeping Inc in Waikato on Saturday August 19. Around 100 beekeepers attended the 'In the Beehive' gathering at Hautapu Hall near Cambridge where the early arrivals could have a cuppa with New Zealand's only EV ute, the four-door LDV EV T60. Beekeepers congregated amidst a small collection of trade displays or checked out the honey tasting competition and a variety of expert speakers presented.

It's well worth a visit next time and you have a better than average shot at winning a raffle prize. Here's some of the key titbits I picked up…

NEW RMP TEMPLATE EXPLAINED

Byron Taylor (AsureQuality) provided an overview of MPI's new Risk Management Plan (RMP) template for honey exporters. These need to be in place by November 1. At 157 pages for the Bee Product template and 87 pages for the Honey Storage, these appear quite daunting, but the size is due to a new 'Know, Do, Show' layout with all the various modules and their guidance in one place, rather than anything else.

I thought it was quite helpful, and I'm sure Taylor was thinking 'don't shoot the messenger'! He described the scope of non-conformances with the plans to date, which largely centred on documentation and traceability. For example, monitoring audits and reviews might have been carried out, but they were not recorded, or product recalls were potentially inoperable. As usual, there was a surprising (to me) amount of 'off-topic' discussion about trade, exporting, non-compliances, and so on.

Around 100 people made their way to Hautapu Hall in the Waikato for the 'In the Beehive' event hosted by NZ Beekeeping Inc on August 19, where experts presented on a range on topics relevant to beekeeping. Photo: Orini Honey Packers – Hamilton.

TALKING POLLINATION

Plant and Food Research scientists Ashley Mortensen and Melissa Brousard presented recent studies into more efficient pollination of orchards using honey bees. Mortensen has been wondering about the trade-off beekeepers make when considering the use of colonies for honey production or pollination. As seasons and market requirements change, we need to think about the trade-off again. By using a 'foragers/frame of bees' unit of measure, we know that smaller colonies perform better in some circumstances. We should also think about 'shook swarms' for pollination. Swarms have a high motivation to forage (to gain carbohydrates for energy and lipids for comb construction), but have no brood to service and don't need to spend much time regulating temperature and humidity in their hive. Artificial swarms (like shook swarms) also provide benefits for varroa management for an Integrated Pest Management system. I think the next step has to show precisely what kind of pollination unit will be effective for the various pollination scenarios and revisit the industry's pollination standards and audits.

In the run-up to lunchtime a recorded presentation by Brousard presented her research regarding pollination under covers. Openings above the hive location seemed to be helpful in reducing bee losses, but it is a complex problem and one without a clear solution. Robin Barker-Gilbert from Zespri outlined the future growth in kiwifruit crops, the early 'RubyRed' and Gold increase being the most notable developments (Waikato has a large proportion of the Red). The ideal stocking rate was still assumed to be 10 hives/ha, but it was pointed out that Zespri could be facing an industry with 30% less hives this year, and pollen for application was liable to be a) expensive and b) in short supply so the price for pollination hives might be increasing. That's all another reason for re-examining the pollination standard.

MORE TITBITS – AFB, VARROA, HONEY MARKETS & GOVERNMENT

Dwayne Hill (the AFB Management Agency's Northern Region Operations Manager) had some mildly encouraging local statistics on AFB hot-spots in Waikato and Bay of Plenty and noted that a replacement for Clifton King had been appointed and would soon be formally announced. Ian McDonald, Business Development Manager for P&B Group, (an agent for Hyundai Trucks) provided a beginner's guide to 'green' truck engine developments, specifically battery EV and hydrogen fuel cells. Mark Godwin and Jane Lorimer reminded us of the Honey Origin project, which now has a **website** to refer to.

After a hearty lunch for everyone Michelle Taylor worked to persuade us there were plenty of effective options in the varroa management 'toolbox'. The most important thing was monitoring, not just to see the effect of your treatment, but actually to see when to treat next. At the moment there is no getting around the need to treat, but you can choose what to use, what to use next, and when to do that.

Professor Phil Lester of Victoria University of Wellington talked about the iRNA gene silencing treatment fed in sugar syrup, still under development, but promising.

Ian Fletcher was thinking out loud about MPI's intransigence and its failure to resolve the mānuka definition for Northland beekeepers (issues which he has **well covered in *Apiarist's Advocate's*** pages too). Kiwifruit growers have already found out how difficult it is holding the Government to account for its own incompetence, and there didn't seem any prospect of that changing. He discussed some options, which led nicely into open discussion about marketing honey with Russell Berry from Arataki, and Logan Bowyer of Mānuka Orchard. These two companies operate in different markets, Arataki generally supplying packed honey to end-users while Mānuka Orchard broker bulk honey to packers.

Scientist and varroa expert Michelle Taylor told beekeepers there are plenty of effective treatment options in their "toolbox" still.

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Dunedin's Scientific Beekeeper

Last month we met Dunedin beekeeper Otto Hyink and learned of his family's strong beekeeping connection, his expertise in the use of oxalic acid hive treatments, and learnt about the Otto's Bees breeding programme. This month, Maggie James continues her profile with a look into how Hyink has built his small beekeeping business around his family and school hours, a niche product he produces for fellow beekeepers and how he stays connected to the scientific community.

BY MAGGIE JAMES

While Hyink's father Gerrit has now been a commercial beekeeper In the Bay of Plenty for 40 years following the family's emigration from Holland, for Otto science was the career choice. As an 18-year-old he arrived in Dunedin to study microbiology and in 2004 graduated with a PhD in virology, the study of viruses, from University of Otago. In 2009 Hyink commenced work for over five years at the university with Professor Peter Dearden, Head of Department of Biochemistry.

"This is one of my favourite photos of our children," Otto Hyink says. "I display this at beginner courses. It is a great example of how a good stock, gentle, Italian bee can generally be managed by all age groups."

Prior to the arrival of children, both Otto Hyink and wife Lyn Wise worked for salaries, and it was then the appeal of self-employed beekeeping arose.

"I found that undertaking research work projects didn't work for us and I was constantly having to negotiate time away, as experiments are not necessarily undertaken 'nine to five'. The decision was made for Lyn to work full time, and my beekeeping would fit in with school hours. Our thinking was, we didn't have kids for others to raise them," Hyink says.

His own apiaries are no more than a 20-minute drive from home, and this helps to ensure that all beekeeping can be undertaken 9.30am to 2pm.

Gradually, hives have been built up as can be afforded and Hyink runs between 100-150 hives focusing on queen rearing. Honey produced is extracted at a local NP1 facility.

INTRODUCTORY BEEKEEPER COURSES

Hyink has plenty of beekeeping knowledge to share and so each spring the Dunedin Beekeepers Club offers an introductory course for those new to beekeeping. The tutors are Hyink, plus local commercial beekeeper and AP2 Murray Rixon.

"For general, basic introduction my advice is that learning about bees is a handful, and I generally recommend that newcomers use miticide treatment that they know will work well, such as Apivar and Bayvarol. However, it does depend on the individual. Some are fine with organic treatments, particularly those that are scientifically minded and if they have the time to monitor populations," Hyink says.

BUFFER SOLUTION

The scientist-beekeeper also spent two years working with breeding programme Betta Bees, who utilise a lot of instrumental insemination. It's a process Hyink still supports from afar with his niche market in the production of honey bee buffer agent solution, supplied to a few New Zealand instrumental insemination operators. This solution requires formulation in a laboratory using a sensitive set of scales allowing optimal adjustment of pH solution. Small amounts of nutrients and antibiotics are added.

When harvesting semen from drone bees, the few nutrients help keep semen viable, and the antibiotics stop bacteria killing

Dunedin beekeeper Otto Hyink has gone from a career as a virologist to that of self-employed beekeeper, building Otto's Bees to have between 100 and 150 hives to supply hives and both Italian and Carniolan type queens to fellow beekeepers, while keeping his hand in with the scientific community.

semen, aiding sperm longevity. The solution makes semen runny and can also be used to clean any surfaces that might come into direct contact of collected semen, such as syringes.

KEEPING IN WITH THE SCIENCE COMMUNITY

With the advent of *Varroa destructor* and other bee diseases in New Zealand in the 2000s, plus the disappearance of most feral colonies, Kiwi beekeepers were concerned about the potential for loss of genetic diversity in honey bees, and resulting decreased stock viability. Therefore, working for Peter Dearden at University of Otago, to test sex alleles, Hyink called for drone samples from throughout the country. He presented his findings at the 2013 National Beekeepers Association Conference in Ashburton.

"When it comes to honey bee genetics in New Zealand, we found plenty of variety out there and if you are getting poor brood patterns, this is unlikely to be due to a lack of genetic diversity," he concludes.

As part of another project, for a couple of seasons Hyink trapped pollen samples from 21 sites around Dunedin. The pollen was then subject to DNA sequencing to determine what the bees were foraging on. The concept was that, if there was a new invasive plant species in the area, honey bees may find it. Hyink enjoyed this work, which analysed what the bees were foraging on at different parts of the season.

The university is quick to shoulder tap their former student and employee when they need an experienced, hands-on beekeeper for any such projects, and it's an arrangement Hyink seems to enjoy.

So, while the business operation may be small in hive numbers at 100-150, Hyink's contribution to the beekeeping community has been, and will surely continue to be, significant, from research projects, to oxalic acid, queen breeding, mentorship at the club and even the buffer solution in the insemination lab!

To discuss any aspect of this story with Otto Hyink, email otto.hyink@gmail.com

Varroa: Out of the Frying Pan and Into the Fire – Tips from a Supplier

By Nick Taylor, general manager New Zealand Beeswax

Varroa management is not what is used to be five, 10 or 15 years ago. That's a statement everyone agrees with, but it's in the actions taken to tackle this new reality where beekeepers diverge. The frying pan is getting hotter, with 100 different factors influencing your varroa levels during any given season; overstocking, climate, weather, cyclones, warm winter, neighbours' inaction/sub-par treatment choice, treating too late, reinvasion, miticide tolerance, the list goes on. As always, it comes down to choice. Focus on what you can control, starting with: **Core 1st tier treatments in spring and autumn at full dose, for the full treatment period; alternate chemical class; monitor, monitor, monitor; add 3rd tier suppression tool(s) throughout the year.**

Alternatively, hop into the fire; only using 3rd tier soft/flash treatments, underdosing, not alternating, spot treating only, skipping or delaying a round because they 'looked good' etc. It's important to acknowledge the immense pressure beekeepers are coming under through a poor crop for most, honey prices and cashflow constraints.

Nick Taylor, general manager New Zealand Beeswax, recommends beekeepers focus on what they can control when it comes to managing varroa, and that starts with getting their 1st tier treatments right, before all else.

Historically, health and nutrition spend was the non-negotiable for cost cutting, knowing how critical it is for bees to thrive and ultimately produce honey the next season. The reality of the last one, two, even three seasons makes the gamble worth a try for some. Unfortunately, not a week goes by without multiple emergency calls to help firefight varroa flames after the gamble has gone awry. Don't take our word for it, the latest MPI Colony Loss Report on page 43 shows the stark contrast of real-world outcomes: Alternating core chemicals (eg Apivar & Bayvarol) and supplementing with oxalic between, has the lowest over-wintering loss rate, with the least variability. In contrast, Oxalic-only regimes have dramatically higher over-winter losses (2x worse) and painful variability (up to 55% loses).

These survey results perfectly mirror the feedback we receive. There are always exceptions. It is heartening that most prefer to leave Russian Roulette to the movie screen, where it belongs.

The Colony Loss Survey 2022 also revealed that out of the largest beekeepers in NZ (3001+ hives) only one of the 26 sited ineffective products as a factor explaining their varroa winter loses. Reinvasion, winter weather, did not treat at right time, and ineffective dose were cited by the other 25.

All varroa treatments in New Zealand (and globally) have the same weakness: the higher the mite load going into the treatment, likely the higher mite load coming out the other end.

What are the treatment trends that are working more consistently across the motu?

1. Get the core sorted. That's '1st tier' treatments such as Apivar and Bayvarol. Whatever you do – time it right, monitor and adjust as/when you need to. Two weeks can make a huge difference with a mite that grows exponentially.
2. Varroa management requires a 12-month strategy. Utilise suppression tools with the goal of slowing varroa build-up. That's incorporating '3rd tier' treatments in-between the core spring/autumn.

'3RD TIER' OPTIONS

There are a wide range of varroa suppression options, all candidly come with their own unique pros and cons. Some being: low treatment cost but high labour/travel cost, pain to install and remove, hard on both the mites and the bees, variability in efficacy, temperature constraints, hard on bee gut health and beekeeper health etc.

Ultimately each beekeeper needs to weigh up these pros and cons, and how to integrate one or more of these into their operation. Options include:

- adding another traditional strip treatment
- Formic acid (e.g. Formic Pro)
- Oxalic acid (vaporising, with glycerine, or trickle method)
- Thymol

Seek advice from your fellow beekeepers and/or a trusted supply company, take that advice with a pinch of salt and, remember, none of the 'cons' are as bad for the bees as doing nothing at all.

SOMETHING ELSE TO CONSIDER...

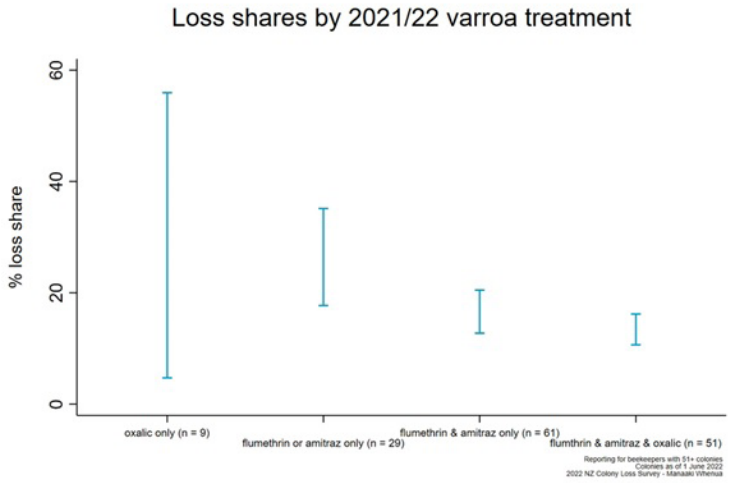
The rapid colony growth in spring hides a multitude of sins. It's the autumn switch that is most likely to reveal issues. The snowball effect of 12 months decision making (and a multitude of variables) rolls towards the autumn and the exponential wave of mites overwhelms the tapering population of adult bees.

This can hit like a light switch. I've lost count of the times I've heard 'they looked good two weeks ago, but...'. The most common solution offered by beekeepers is to use a quality treatment asap after honey supers come off, and utilise a suppression tool during the summer to minimise the build-up in the first place.

ONE MORE TIP

Here's a simple tip to boost your strip treatment efficacy... Let's get back to the basics: the leading strip treatments work by contact only. The more bees that get in contact with the strips, the more active ingredient they will collect from the surface. That is why the strips always need to be placed in the centre of the brood: this is where we can observe the highest activity in the hive, resulting in the highest number of potential contacts, and it's also here that varroa mites will emerge from the brood cells.

During a long action treatment e.g. 6 to 10 weeks for Apivar and 6 to 8 weeks for Bayvarol, it is not rare to see the strips covered by wax and propolis after several weeks. However, the propolis/wax will decrease the accessible surface on the strips for bees and therefore reduce the number of potential contacts. Moreover, after a few weeks, the bees' cluster may have moved within the brood box. Thus, during your site visits, we advise scraping the strips systematically at mid-treatment (with a hive-tool) and repositioning them in the centre of the bee cluster.



The 2022 Colony Loss survey shows a combination of '1st Tier' and '3rd Tier' varroa treatments is most likely to prevent hive deaths.

Don't just take my word for it... in France a study (by ADAPI, the French Association for the Development of Beekeeping) found this simple habit of cleaning and repositioning strips resulted in a 1 to 4% improvement in treatment efficacy. Any varroa mite modelling will tell you, the hive health and honey production gains resulting from a 99% vs 95% efficacy result, is well worth achieving. ■

Dealing with MPI – A Small Business Perspective

BY BILLY MULCARE

Few of us would dispute that our industry is going through difficult times. No matter where we sit in the supply chain (beekeeper, processor, marketer), if you are a small honey business and not well diversified, then life is not easy.

As a small business operating in this difficult environment, we had already cut every ounce of non-essential expenditure. We are now looking long and hard at our RMP and MPI compliance costs. The export levy of $2,951 (incl GST), coupled with the semi-annual audit costs, brings the cost of our RMP to approx. $5,000 p.a. Is it worth this for us? No, I'm afraid not.

CRIPPLING BUREAUCRACY

MPI's export levy increase of 150%, coming as it does on the back of a pandemic, may arguably be construed as price gouging.

Many in our sector have lobbied local MPs and Ministers regarding the Ministry of Primary Industries (MPI) and their failure to listen to the beekeeping industry. But nothing changes. MPI as a Ministry pay lip service only to consultation with industry and their Treaty partners.

MPI Executive Management and the Ministers in charge of MPI have allowed this organisation to run without sufficient imperative to budget correctly and adequately control expenditure within their organisation; and to then arbitrarily pass their accumulated overspend on to industry members in a manner that is manifestly inequitable.

Essentially, they have invoiced small honey businesses to subsidise the large players. Because it is easier.

Billy Mulcare, a partner in Taitokerau based Kāre Honey, has recently cancelled their RMP registration in the face of rising compliance costs which are unsustainable for their small business.

DAVID VS GOLIATH

While MPI concede 'that there is significant merit in moving to a 'volume based levy' they have still seen fit to take a one-size-fits-all approach to passing on the overspend, by charging a levy per operator irrespective of size or production. This, at a time when small operators are experiencing extreme financial pressure, hardship and likely deteriorating mental health.

According to the data in MPI's 92-page document 'Stage 2 Cost Recovery Impact Statement' 2022, the Ministry acknowledge by electing to pursue an operator levy as opposed to a per-tonne levy for the current year that:

- Small honey businesses producing or selling less than 2.5 tonnes p.a. are being overcharged $2,500 p.a.
- Small honey businesses producing or selling less than 25 tonnes p.a. are being overcharged $1,600 p.a.
- Larger honey business producing or selling 250 tonnes p.a. are being undercharged more than $9,200 p.a.

Small businesses are the backbone of the New Zealand economy and have been the lifeblood of our industry. It is difficult to fathom why they are being penalised in this manner.

ROCKET SCIENCE

MPI have stated that they will be looking to switch to a per-tonne levy in the next year or two. But too many of us have listened to MPI Executive's superficial assurances in the past to now trust that they will actually do the right thing.

I acknowledge that additional work is involved in switching to a volume based levy. Certainly, it's not as easy as simply dividing your overspend by 300 operators and sending out an invoice. (Which begs the question, why did it take eight months after the clock has started ticking on the 2022/23 annual levy to send out a formal invoice?).

Charging based on volume is not rocket science though. For illustration, MPI's current rough estimate of a per-tonne levy for bee export would be around $47.20 per tonne of honey exported. If you exported two tonne of honey between 1 July 2022 and 31 June 2023 then your export levy is $94.40 for the year. Not $2,566.08. Not rocket science, but far more equitable.

MPI - STIFLING INNOVATION

Is there an alternative to being an RMP holder for our business?

Well yes, but it is not for everyone and regrettably it comes at the cost of innovation and new product development.

We have cancelled our RMP and will revert to our earlier business model which worked something like a bee hive. Our core business (mānuka honey for export and gift markets) remains unchanged. The key is collaboration and co-operation. We never felt the need to control our entire supply chain. Rather than set up competing hives and production facilities we always worked closely with friends who are beekeepers and processors in our region.

The driver for setting up our own RMP production facility was it enabled us to readily develop new products and undertake small production runs for niche products. Essentially, our facility enabled us to innovate. We have always believed the key to successfully competing alongside larger honey businesses was to add value to honey (particularly lower activity mānuka honey) rather than as a commoditised product in a jar. We actually believe it is essential for our industry as a whole that new formats, new recipes and new uses are found for New Zealand honey if it is going to compete internationally as anything other than a commodity.

Jenny McEntee, partner and operations manager at Kāre Honey, with some of the niche products produced at their small processing facility in the Bay of Islands.

Our small facility enabled us to produce niche products such as our Super Honey range, our sampler range of mānuka honeys in small formats, animal wound care products such as our Veterinary Mānuka and Equine Mānuka in syringes. This year we had been working on a range of canine supplements with lower activity mānuka honeys as the carrier for other New Zealand bio-actives.

Cancelling our RMP and removing the time wasting frustration of dealing with an organisation that has lost sight of the fact that it is there to serve the public and industry has now given us a feeling of relief. We've made a stand on behalf of our business and other small beekeepers and we can maintain our core business.

But it is with significant regret and sadness that we hang up our number 8 wire.

Billy Mulcare is a partner and CEO of Northland honey business Kāre Honey, specialists in single source mānuka honey and hive products for both table consumption and wound care, operating since 2004.

Home, Sweet Home

BY DAVE BLACK

Have you ever thought about the ecology in a honey bee's hive? Bees are usually the biggest inhabitants, but they are not the only inhabitants. Occasionally there is the odd reveal when something goes wrong but, day-to-day, we are blind to most of the space's tiny occupants. The overwhelming majority of this microcosm does not harm or even interact with the bees, but sometimes some of it does...

A honey bee colony's home is a deliberately stable environment suitable for all sorts of organisms to inhabit, not just bees. The daily stream of foraging bees provides effective transport in and out, and the availability of eggs and larvae, aging adults, stored protein, and carbohydrate is an irresistible attraction for both pathogenic and non-pathogenic opportunists searching for a share.

A QUESTION OF SCALE

If metres and kilogrammes are a reasonable scale to measure human beings with, we need one three orders of magnitude smaller for bees: millimetres and grammes. It's difficult to imagine life at the scale of a bee. A honey bee, say 15 millimetres long, weighs 160 milligrams. Those 'big' (varroa) mites you see, are about 1.5 to 2 millimetres across. If we measured them using a scale three orders of magnitude smaller, still we would use microns (1500-2000µm). Most mites are about half to a quarter of that size, pollen grains range roughly from 5 to 100 microns and trypanosomes (Lotmaria and Crithida) are 5 - 30 microns. AFB bacteria measure 3-5 microns and their spores about a single micron.

Looking at things smaller than a bee that have to be measured in fractions of a millimetre – fractions we call microns – gets tricky. The structures in our eyes we use to detect the light coming from such tiny objects are too big to resolve things smaller than about 100 microns apart, so many of the organisms honey bees live with are too small to see.

DISCOVERING THE TOOLS

For a long, long time we have used lenses to magnify small things.

The wonders of modern microscopes. This longitudinal freeze-fracture image, taken via low-temperature scanning electron microscope, reveals a cross-section of a Varroa mite (red) in between the abdominal segments of a honey bee. (Photo credit: USDA-ARS, Electron and Confocal Microscopy Unit, Beltsville, Maryland).

The first 'lenses' were observed in nature, things were seen through a water droplet, or in fish or animal eye lenses. There were natural clear 'reading stones', used for magnifying text in the 9th and 10th century (we polished them up a bit first). Then, as we learnt to work with glass, spectacles and microscopes were developed in the 13th century. Lenses can change the angular incidence of the light from small objects so that they appear larger, but it wasn't until the 17th century that we started to get both 'bigger' *and* 'clearer', the sharpness or 'resolution' of the larger image depended mainly on the quality of the lenses improving.

NEW HORIZONS

Lenses as used in microscopes, good enough to discern something measuring around one-thousand microns (1mm), were a practical proposition for 'naturalists' (people studying Natural History) by the middle of the 17th century. They were a hot topic at the newly created scientific group, the Royal Society in London, and its members were fascinated enough to foster the publication and distribution of Robert Hooke's *Micrographia*, which collected the painstakingly detailed, larger-than-life drawings the author had made of everyday subjects, cheese mould, bits of plants, fleas, and so on[1]. It was the first time images like this had been seen, and they were as impressive and 'other-worldly' as images from the James Webb telescope or scanning electron microscopes are today. It was the year 1665 and we could discern the detail in objects we could barely see.

Only a few years later it was another man, who corresponded with the Royal Society at the time and Hooke's closest 'competitor', that has become known as the 'father' of microbiology, Antoni van Leeuwenhoek. In 1676 he sent the Society the first observations of an organism that had a single cell and was scarcely believed. People had guessed that there were disease transmitting agents that were too small to see a long, long time ago, and had even given them a name - 'animicules'. Leewenhoek's meticulous early microscopy had revealed detail at the scale of a single micron, an invisible world discovered 2000 years after it had been imagined.

REVEALING THE DETAIL

The work to explore and describe these other worlds in the 17th century has interesting parallels with our 21st century images. If you have struggled with your pollen grains, even under a modern microscope, you'll remember that the sample preparation matters. Lighting and aperture control are often beyond manageable, and focus is finicky. In the 17th century you had to be able to draw (photography is 200 years in the future), and your drawing would be re-constructed by someone else and wood-cut, engraved or etched so that it could be printed.

Drawings from *Micrographia* are composites, made up from many samples and viewing different parts at various angles and focus planes and took days, at best, to create. They were then recreated as prints from etchings in copper plate. Underlying the skill was a desire to reveal the perfection of God's creation, *Micrographia* is both Art and Science.

In the years that followed we learnt to improve the contrast between one part and another with coloured stains, we got more skilled at managing light, but eventually our need to 'see' smaller

with more detail exceeded the utility of light itself. We have to probe with X-rays, or electrons, and computers compose, 'false-colour', and interpret our images; it's the art of science.

A HIVE'S MICROCOSM

And what else have we seen living in beehives? Depending where you are, in roughly descending size order there are of course, beetles (Coleoptera), spiders and pseudoscorpions (Arachnidae), moth larvae (Lepidoptera), earwigs (Dermaptera), silverfish (Thysanura), and ants (Formicidae). Down at the near-impossible-to-see scale, the flies Braula and melaloncha (Diptera) are found. At least 83 mite species (Acari) have been associated with honey bees, both resident and hitchhiking, 13 are fairly common. It wouldn't be surprising for there to be seven times as many individual mites as bees in a hive, although with near constant doses of mite-lethal 'varroacides' who knows. With good light microscopes nematodes (Mermithidae), flagellates (Lotmaria, Crithidia), other protozoa (Gregarines, Amoeba, Variomorpha), fungi (Ascophaera and Bettsia), and algae just come in to view, but for a really detailed picture you need to go beyond light. With electron microscopes, many bacteria, including spiroplasmas, and a suite of viruses are discovered.

WHAT'S NEXT?

Powered by advancing nanotechnology investment, it's not a matter of increments of scale anymore. Modern electron microscopes are already examining molecular scales another three orders of magnitude smaller than microns (nanometres, 10^{-9}) researchers can see images of folded proteins less than 10 nanometres across. Scanning Probe Microscopy includes types of microscope that use a fine probe to scan the surface of a specimen with electrons tunnelling between the tip and the sample to create ('reconstruct' might be a better word) high-resolution, three-dimensional views at the picometre scale (10^{-12}) of atoms. Computers control the microscope and correct, enhance, segregate, and classify multiple images in real time, potentially in living samples. We are fast approaching the point where, not only do we see a honey bee virus particle, we can imagine watching the physics of its chemistry.

Our understanding of the microscopy of the beehive has come a long way in the last 400-odd years. So, next time you're peering into your hive, be aware it's a comfortable – or uncomfortable – home for much more than the honey bees you're managing.

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

1. You can see, and turn the pages on a wonderful copy of *'Micrographia: or, some Physiological Descriptions of Minute Bodies made by Magnifying Glasses, with Observations and Inquiries thereupon'* digitised by the Royal Society at https://royalsociety.org/blog/2020/07/micrographia-online/

China – a Warning

China matters to New Zealand but, as a market place for our products, it is faltering. We need a plan to respond, but politicians appear asleep at the wheel, warns Ian Fletcher in this month's *Views from Outside the Apiary*.

BY IAN FLETCHER

China matters. Not only globally, and regionally, but also specifically to New Zealand as it's our largest export market. Australia is in second place (taking roughly half the value of our China trade). China is also Australia's largest market, and Australia's the place where New Zealand's surplus workers go to find work. On the specifics, World bank figures tell a familiar story for our exports to China – dairy products, beef and unprocessed logs top the export tables, with horticultural products next. On the services side, tourism and foreign students from China add billions more.

Now, China seems to be mired in a growing economic slowdown. There's a lot of evidence and lot of commentary. But for New Zealand the key indicator has probably been the recent slide in dairy prices.

Generalisation about China is always risky. Indeed, when I studied Chinese history in 1981 (it seems like yesterday...) I was told on the first day of the course that the teacher (Dr S A M Adshead, the cleverest man I ever met) had only one objective: to show "that anyone who says 'China is…' is wrong. China is too big, too complex, and too internally diverse for that sort of generalisation to ever be safe".

Adshead was right. But at a macro level there is such a thing as the Chinese economy, and there does seem to be such a thing as the Chinese population. We know the economy is spluttering; we see quite good evidence that the population is lower than we all thought and probably falling more quickly than expected. Birth numbers seem to have dropped sharply after 2017 – before covid – according to Peter Zeihan, a well-informed US commentator.

China seems mired in an economic slowdown and, as New Zealand's leading export market, that is a major concern for the New Zealand economy.

A falling population will need less of the stuff we export, even if the Chinese economy recovers quickly. China is also making efforts to produce more of its own food, generally. This is where New Zealand needs to wake up. The Chinese boom years may well be drawing to a close for our products. We're probably going to find ourselves poorer than we thought. We need a plan.

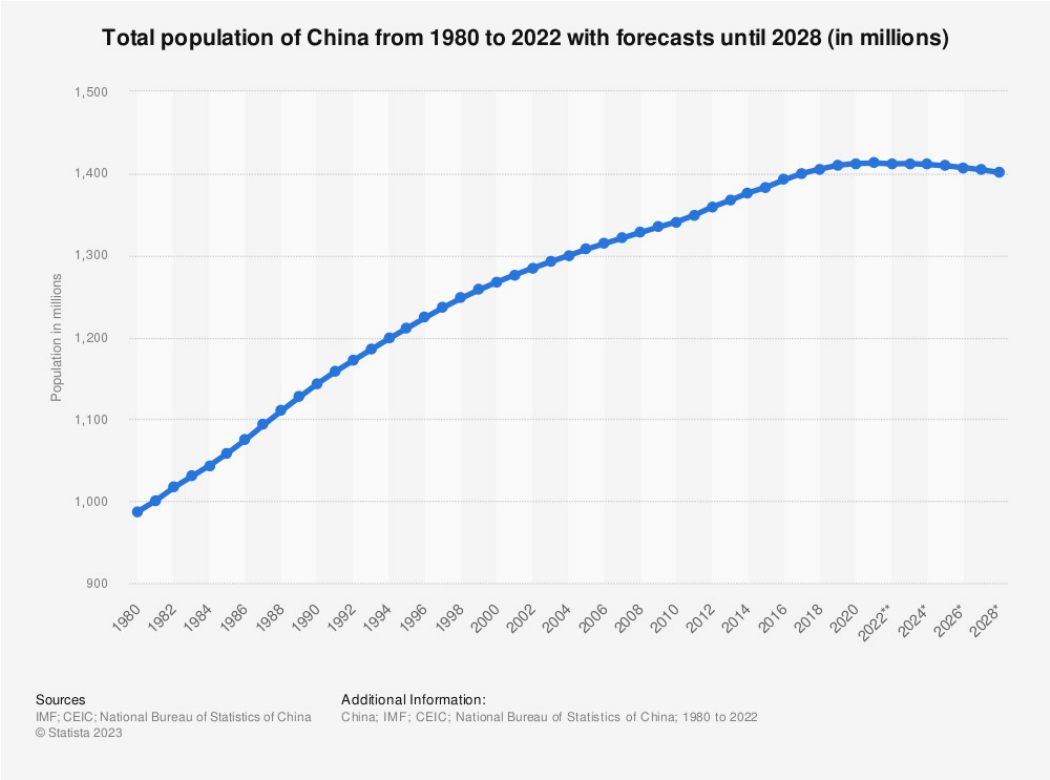
The elements of any plan aren't hard to identify: find other markets, find other products, and improve productivity so we get more economic output per unit of input. What is hard is getting New Zealanders to see that this is serious, urgent and unavoidable.

Productivity improvement is the big opportunity. But it's also the hardest to do. Productivity improvements scare governments because it means investing more in skills, infrastructure, and effective competition. That means higher taxes, and reforming the public service so that actual delivery and management gets a lot better. The debacles of the recent health reforms and the polytechnic merger show just how adrift we are in our ability to actually get things done. In any case, the politics of productivity is always awkward: the benefits accrue in the future; the costs are now.

New markets? There may be scope to do better in India and South-east Asia, and that may help. New products? Tricky, as we produce temperate proteins in bulk. Only so much we can do, quickly. Getting genuine research done into new, better uses for wool and sheep meat would be a good idea, for example. But, like dairying, these sectors are demoralised. The policy of converting land to forestry is a dead end too, especially if log prices fall, and as the appalling environmental costs of harvesting are added to the equally appalling social cost of forestry conversion as rural communities are gutted. New thinking needed, quickly.

Are we up to it? History suggests not. A former head of the Fire Service once said to me that while Australians prepared for disasters, New Zealanders only responded. Every event was an unfair surprise. We need to change that mindset.

Last month I set out some of the domestic issues I thought politicians ought to be thinking about. On the basis of this analysis, I'd like to add productivity to that list, and some



A smaller population in China will mean less demand for New Zealand exports, with dairy prices falling back recently.

effective innovation policies. Importantly, the consequences of China's normalisation (so it grows like other economies) and underlying population fall leads to a domestic productivity and innovation issue for New Zealand, not a foreign policy issue.

What's lacking is a sense of urgency, and a sense of inevitability. The Chinese boom years are ending for our products – it's inevitable. And that shift has started. We don't have time. What will happen? Nothing. There will be an agriculture-led recession, land prices will stay high (immigration) and productivity will stay too low. Public services will stagnate. A lot of skilled younger people will leave (Australia faces the same challenge, but will master it better and sooner). A reforming government may eventually come along, but only once things are grim. There's likely to be a lot of social upheaval along the way.

In the 1970s, when this happened (the UK joined the EU, closing our biggest and best market, and the Yom Kippur War triggered the energy crisis, inflation and recession), the sterile Muldoon years eventually gave way a decade later to the Lange/Douglas reforms (some of which were an equally sterile, doctrinaire mistake). But that's the path we're on. As I said last week, today's politicians don't even understand there is a question, let alone grasp the answer. It's going to be quite a ride.

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.

An agricultural-led recession and low productivity has New Zealand on a path to similar 'sterile' years such as in the 1980s when prime minsters David Lange (depicted on left) and Robert Muldoon (right) struggled to gain control over rising inflation and unemployment, Ian Fletcher warns.

Back in the Hives

BY PATRICK DAWKINS, OWNER

Inside Pyramid Apiaries is a monthly insight into operations at Marlborough commercial beekeeping business Pyramid Apiaries. This month – the rubber hits the road as we get back into the hives and dust off the sugar syrup tank as well as the grafting tool...

Here we go again! Winter can't last forever and, like many beekeepers, August is the first real look back into the hives at Pyramid Apiaries in Marlborough. It's a gentle build in to the season's workload, but with around 120 hives destined for pollinating cherry orchards in September to bring up to speed, and the smaller mating units to be maintained, August is always the month where the rubber hits the road.

The trusty Pyramid Apiaries ute undergoes a flat tyre change following a visit to bush sites.

Snow fell on the ranges, and even around some of the beehives, in Marlborough in August, which made finding time to get into all the Pyramid Apiaries hives more difficult than an 'average' August.

Speaking of that, there's also the hives over-wintered in bush sites to check and that's where the road slashed my trusty ute's rubber during first round visits. You have to keep an eye on the weather forecast and pick the right day this time of year to go and 'heft' the bush hives to asses their weight. So, I did that, and, after getting around all 70 hives and feeding a bit of raw sugar and honey frames to the lighter colonies, I felt very productive as I bounced out along the 4WD track through the bush by 3pm. That was until a rear tyre – and with it my mood – was deflated.

We use thicker-walled (8-ply by memory) all-terrain tyres on our vehicles, but sometimes they just aint strong enough for a jagged rock when under load. My spare tyre was up to the job and so were all my accessories for the change. Well, all but a block of wood to prop up the jack with which, given the location of the vehicle on a rocky 4WD track, was very much needed. With chainsaw on board, a nearby mānuka stump provided a big enough ring for the job though – mānuka the beekeeper's friend!

When not winding on a jack I have been getting around both production hives and mating-units. The later have come out of winter very well, a relief as most only have three frames (in 3-way full depth box) to get them through. However, they barely need the lick of sugar syrup we are giving to help bring them up to speed for when over-wintered queens are caged and new-season cells go in.

On that note, this past week has seen us dust off the grafting tool and get back into the breeder queens and cell-raiser hives to get the new-season of cell-raising underway. Our first over-wintered queens will be caged and sent out to beekeepers in September, with new-season queens coming on stream in October, and we still have some place for mated queen orders from mid-October on if you are in need.

That's a while a way now though and there is plenty to do between now and then, including assessing more queens for breeding potential, plenty more grafts, a decent amount of hives into cherry orchards, and hundreds of queens to cage – let's talk about some of that next month…

3-frame mating units with over-wintered queens, such as this, have come out of winter strong for Pyramid Apiaries in Marlborough, which is always a relief says owner Patrick Dawkins.

Apiarist's Advocate is brought to you by Patrick & Laura Dawkins, Marlborough beekeepers.
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