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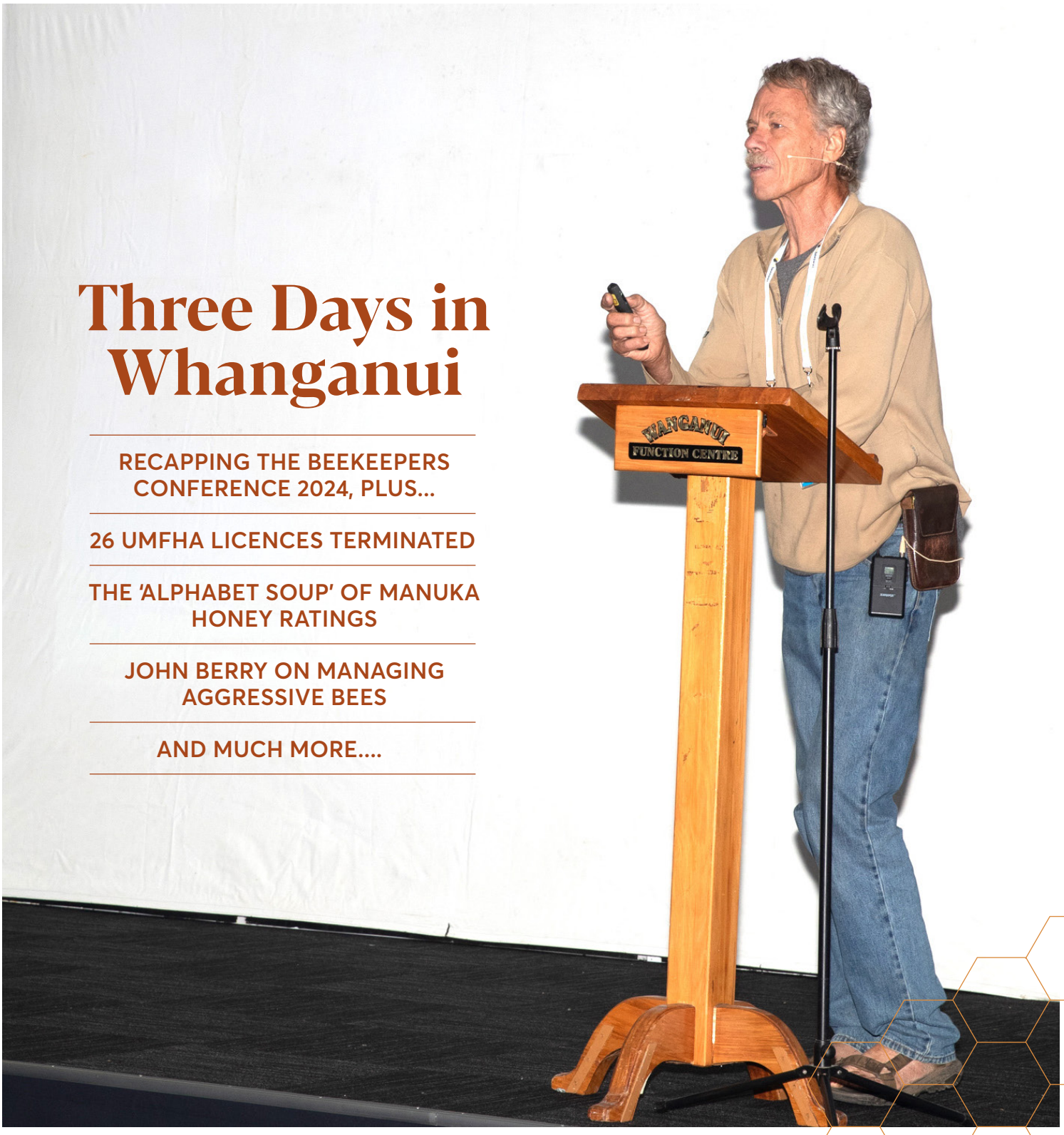
Apiarist's Advocate

News, Views & Promotions – for Beekeepers – by Beekeepers



Three Days in Whanganui

RECAPPING THE BEEKEEPERS CONFERENCE 2024, PLUS...

26 UMFHA LICENCES TERMINATED

THE 'ALPHABET SOUP' OF MANUKA HONEY RATINGS

JOHN BERRY ON MANAGING AGGRESSIVE BEES

AND MUCH MORE....

Talking Beekeeping in Whanganui

Varroa mite was a hot topic, among a wide range of beekeeping discussions over three days at The Beekeepers Conference 2024, August 11-13 in Whanganui. Hosted by the Southern North Island Beekeeping Group, there were a plethora of valuable insights offered from beekeepers, scientists, and industry leaders.

Around 100 people attended each day, with the vast majority coming from the lower North Island, but also a sizeable contingent from Bay of Plenty. At a time of year where brood rearing is building up quickly in hives, and with it varroa mites, the focus on the ectoparasite of honey bees was timely.

On that topic, visiting speaker and 'scientific beekeeper' Randy Oliver of California, who flew in for a whistle-stop trip to impart his knowledge, was a highlight. Beekeepers gleaned many nuggets of knowledge as he discussed the findings from more than a decade of in-hive trials. With a speaking slot on each of the three days, Oliver presented a range of varroa control strategies and tips, including detailing his business's success in breeding bees for varroa resistance, their numerous trials using organic varroa controls, and even his research into nosema. Observations from those talks are presented in *Randy Oliver's Greatest Hits*.

Oliver was far from the only apiarist to take to the stage though, with the likes of Wayne Fuller from New South Wales detailing small hive beetle, and veteran Kiwi beekeepers Russell Berry, Gary Sinkinson, Kevin Gibbs and John Berry also offering up some of their extensive knowledge. Apiculture New Zealand (ApiNZ) chief executive Karin Kos and New Zealand Beekeeping Inc president Jane Lorimer both gave their views on the future of the industry,

Randy Oliver of California, being presented with a pounamu necklace here by event organiser Frank Lindsay, was a welcome guest and presented on all three days of The Beekeepers Conference. Photo: Janine Davie, Wellington Beekeepers Association.

Gary Sinkinson talks varroa management on day one of the conference.

while event sponsor Egmont Honey detailed the honey markets through general manager James Annabell.

Here's some of the key takeaways from a busy three days in Whanganui…

- **One will do:** Now retired beekeeper Gary Sinkinson advised that, if a mite wash returns even one varroa, beekeepers should now be treating. He likes to use Formic Pro but noted "you need to have a plan for requeening" as some queens won't survive the treatment.

- **Milk & honey:** "We have a land of milk and honey here in New Zealand, with pollen coming in year-round. The down side? You have varroa reproducing year-round," Frank Lindsay explained, and encouraged beekeepers to find those resistance bees and breed from them.

- **Hidden vampires:** "For every varroa you can see, there will be 100 hidden," warned Ministry for Primary Industries scientist Richard Hall, who stressed the importance of more intensive mite monitoring than just looking for them on the backs of bees.

- **Thieves!:** "Some of your best hives are your best robbers, and you are breeding from them," pointed out Lindsay, who detailed how he conducted a trial by painting worker bees, only to witness them robbing out a nearby hive.

- **Getting tougher:** The 'LD50' (the lethal dose that kills 50% of varroa) of flumethrin (the active compound in Bayvarol) when tested in 2022 was 10 times greater than in 2003, stated Prof. Phil Lester. "Rotating treatments is the essential tool to slow the development of resistance – the evidence is clear," Lester reinforced and expressed concern at the 9% of beekeepers using only Bayvarol and the 11% using only amitraz treatments, as detailed in the 2023 Colony Loss Survey. "That can be enough to promote resistance out there." Treatment periods are essential too the professor stressed. "Follow the label and if it says take it out after eight or 10 weeks, then take it out. Otherwise, low doses lead to resistance."

- **Second-hand advice:** "We strongly recommend that, if you are buying second-hand equipment, you run a swab over it. There is a lot of AFB infected equipment out there," said John Mackay of his dnature Diagnostics and Research lab's Foster Method test. As for testing beehives, Mackay explained the benefit of pooling swab samples to save costs. "Then, even if you don't want to break down the positive pooled sample for further testing, at least you know which hives to monitor more closely."

- **Help needed:** Jane Lorimer explained how the Honey Characterisation Project will seek to better define New Zealand's honey by analysing nectar from honey bees' crop (foregut). However, around 1000 volunteers are needed, from all over the country, to catch and bag bees on target flower species. Plus, there is the age-old call for funding support from beekeepers. Lorimer pointed people to www.honeyorigin.co.nz to find out more.

Around 100 people attended each day of The Beekeepers Conference in Whanganui, August 11-13, where a wide range of topics were discussed, none more so than varroa.

- **Unique honeys:** "You have a lot of unique honeys here, and you should capitalise on that," Oliver advised Kiwi beekeepers.

- **FTA opening doors:** New Zealand's recently implemented free trade agreement with Europe is helping make our honey more competitively priced in some big markets, explained James Annabell, chief executive of conference sponsor Egmont

Honey. A recent deal with supermarket ALDI in Germany saw 90,000 units of low-UMF mānuka sold in two weeks. "If ALDI can do it, I know others can. So, we are seeing some real green shoots from the FTA."

- **Price outlook:** "At some point that supply and demand curve will meet again and I think they meet again pretty soon, and that determines price," Annabell said of the mānuka honey market in New Zealand, pointing to the bush honey price jump in recent years after a backlog was worked through.

- **70 years of wisdom:** Few, and maybe none, in Kiwi beekeeping can offer the level of experience of Russell Berry. The Arataki Honey owner addressed the conference in his usual to-the-point manner to impart wisdom. "Control your AFB. Certain countries will not buy AFB honey" … "Treat for varroa. We need to make sure we treat legally, so we can sell our honey" … "White comb is best for honey production, to keep down CFUs (colony forming units)" … "homogenise your batches. Three tonne batches are good." … "Drums – make sure they are clean and legal!" … Fermenting honey was a big issue last year Berry said, "keep it cool, don't let it get to 30 degrees" … On pollinating covered orchards, "beware you don't leave your hives in there too long. You are likely to lose most of your bees in 12 days." … But he led his sermon with perhaps the most important pearl of wisdom: "The no.1 thing you have to do is marry a beautiful young woman," paying homage to wife and long-time co-worker Annette Berry.

- **Hive shortage:** "I believe the kiwifruit industry is going to be very short of hives this season. Last year some of the second drops were a lot weaker than the first," Berry stated.

- **Formic professional:** Some older "ineffective" queens, and some "weaker, older bees" will be killed by Formic Pro treatments explained the supplier of the product NOD Apiary Supplies' Heather Broccard-Bell via video link from Canada. "Not every bee will fall into the optimal range of where it is fatal to the mite and not the bee," she said, while detailing how their organic treatments can kill both phoretic varroa and those under the brood cap.

- **Honey strategy:** "We are looking at what model we can present to our membership because, ultimately, our members will have to approve it to move to the next step," said ApiNZ chief executive Karin Kos on the topic of a new industry body. Planning, in conjunction with the UMF Honey Association is continuing as they look to "flesh out" how mānuka honey might fit into a "Horticulture Export Authority-type arrangement", with a longer term plan of a specific Honey or Apiculture Act and levy.

- **Not so fast:** Despite the enthusiasm of Kos for their plan, Lorimer reinforced her scepticism as president of fellow industry body New Zealand Beekeeping Inc. "We can't wait, we must act now," she stressed. "We should form a beekeeper organised group, working for beekeepers, by beekeepers."

- **AFB checks and balances:** "Clear, coherent and consistent policies are needed as to what is non-compliant behaviour," Lorimer said in relation to the AFB Pest Management Plan. NZ Beekeeping Inc have engaged legal advice to explore the legality of the use of the Biosecurity Act to swab spore test equipment and order destruction. "It's an extensive piece of work and we are only part way along," she explained of the lawyer's assessment.

- **Research Trust:** Fiona O'Brien of the host Southern North Island Beekeeping Group explained how they have taken matters into their own hands with regard to funding beekeeping research, having recently set up a Trust to create a "seed pool" of funds. O'Brien said they hope beekeepers and the honey industry will put their hands into their pockets to support the fund, with the potential for different sectors of the industry, such as honey production, queen rearing, or pollination, to have funds earmarked for appropriate research. Watch this space.

- **Bee Concerned:** New South Wales apiarist Wayne Fuller described the devastation that small hive beetle (SHB) can cause in their hives, putting New Zealand beekeepers on notice should it ever make its way across the Tasman. Stacks of boxes and frames have been burnt by Fuller and his staff after being "slimed out" by SHB. He says he used to fill his shed with 1500 supers before starting an extraction run, but now he has just three days to get them in and get the honey out. And it's not just the honey and hardware they devastate, with Fuller explaining they must get all requeening with caged queens completed prior to January, otherwise SHB will urinate on the caged queen in the hive and kill her. Yikes.

New South Wales beekeepers Wayne Fuller and Janine Rudder, owners of 4000 hive business Bee Services, were popular guests of the conference, with Fuller detailing pests small hive beetle and cane toads and the damage they cause hives in some areas of Australia. Photo: Janine Davie, Wellington Beekeepers Association.

- **Cane toad caper:** SHB is far from the only pest the NSW beekeeper is dealing with though, varroa is now on their shores and Queensland's cane toads are creeping south too.

Questions from the floor and general discussion were encouraged at The Beekeepers Conference, never more so than during several panel discussions, such as this. The dog didn't offer much insight, but other experts certainly did. From left, Kevin Gibbs, Wairarapa beekeeper, Pike Stahlman-Brown, author of the Colony Loss Survey, Randy Oliver, California, and Jane Lorimer, Waikato beekeeper and NZBI president.

The toads can consume up to 2000 bees a night by standing on each other's backs in an apiary to access raised hives, and then tap their tongues on the hive's outer wall until bees march out and are consumed. Yikes!

- **A worrying trend:** John Berry reported on hive losses he witnessed in autumn in Hawke's Bay. He is unsure of the reason for the sudden depletion of bees, but hypothesises "its probably nosema, tied up with varroa and viruses .. a whole mixture of things." However, he explained, "nosema is usually a stress related thing. These hives were not stressed, they were in wonderful condition." Berry sounded a warning to beekeepers "sooner or later this autumn decline will hit your hives" and the worrying sentiment was echoed by his uncle Russell Berry, "If you have escaped so far, you may not escape much longer."

Randy Oliver's Greatest Hits

The experiences and expertise which Californian scientific-beekeeper Randy Oliver shared were the undoubted highlight of The Beekeepers Conference in Whanganui, August 11-13. With three speaking slots, as well as Q&A sessions, the American doled out plenty of advice and information.

Oliver was quick to point out "all of this information is on my website". Therefore, you are encouraged to visit www.scientificbeekeeping.com for more comprehensive explanations of the below titbits.

TAKEAWAYS FROM RANDY OLIVER AT THE BEEKEEPERS CONFERENCE 2024

- The dedication of Oliver to not only seek answers to the many questions we have as beekeepers, but to go to the extensive lengths required to get them from trials in his thousands of California beehives, is inspiring. Over three days, the knowledge he has built up was frequently called upon whether he was on stage or in the audience, and his advice carried a high level of gravitas as it is so frequently backed by demonstratable "hard data".
- "I'm a beekeeper info sceptic," Oliver explained, saying people "just repeat things"… "Don't believe any beekeeper who doesn't say 'I don't know' often." … He also decried, "The worst thing that happened to beekeepers was the internet, because now every whack-a-doodle way of doing things is out there".

VARROA MANAGEMENT STRATEGIES

- "When you see a nice frame of sealed brood, that's varroa reproduction taking place," Oliver warned, saying that with a warming climate, California now has all-year-round brood in the hives and the mite increase is "off the charts", requiring a minimum of four treatment rounds a year if undertaking almond pollination.
- And Oliver would know too, with his presentations littered with evidence of his years of data collection in chart form. Among the benefits of those charts is a greater understanding of the exponential growth of varroa populations. "It's all based on your starting number. The greater the starting count the greater the growth and the steeper the growth curve". Therefore, Oliver advises against waiting for mite counts to get high before treating. "It's better to keep mite levels low all season – you get better bang for your buck."
- On that note, Oliver quoted fellow American beekeeper Russell Heitlzam who says, "I'm not treating because I have high levels of mites, I'm treating because I don't want to have high levels of mites".
- The higher proportion of eight-day-old larvae to adult bees in a hive, the more efficient varroa are at reproducing. When is that? "just before swarm season" and therefore proactive control of mites earlier in the season leads to healthier bees and easier control later on.
- Oliver is a huge advocate of mite monitoring, preferring soapy washes of 300 bees per sample. His business undertakes thousands every season and it is nothing for a team of two or three staff to undertake 400 in an afternoon. They aim for a mite wash "per minute, per man" in their well-honed system, at a cost of about US$1.50 per.
- Time of year must be considered when assessing mite levels. Low mite counts in early spring – when capped brood is first present in abundance and thus when most mites have entered the brood and departed their phoretic state – can hide a larger concern, Oliver warns. One to two mites at this time of year, should be the treatment threshold.
- Regarding late season bee/mite drift between hives, aka 'reinvasion', Oliver had some choice words. "Man I have heard that a lot since I got here, without one piece of evidence … If you are blaming all your varroa problems on mite immigration, the data does not support it," he says, having undertaken trials in his own apiaries where varroa-free hives were placed alongside, sacrificed, varroa-laded hives as the colonies collapsed. Almost half the hives maintained mite

counts of zero. "Mite immigration is not universal … every hive is different". "A drop from 95% treatment efficacy to 80% might still return you a 0 mite count off 300 bees, but the varroa mite growth is exponentially so much faster. That is why I am sceptical when Kiwi beekeepers blame reinvasion."

- Oliver says a management practice that "revolutionised" their varroa control was splitting all their hives in late spring, following almond pollination, and putting a queen cell in the split. During the colony's broodless period it is treated with an oxalic-acid dribble to greatly reduce the presence of phoretic varroa mites – which all should be when a colony is broodless.
- Varroa in America have been found to be 20 times more resistant to amitraz (the active compound in Apivar and Apitraz) than in the 1980s, Oliver reports. By continually using a highly-effective treatment, without rotation "you are running a breeding programme for resistant varroa" he warns Kiwi beekeepers, as the few surviving mites have a high level of resistance among what becomes a limited genetic pool. "Rotate your treatments".
- One drone can have as many as seven varroa mites on it and thus, if included in the approximately 300 bees in a wash, drones can totally throw off results and should be avoided. "Too erratic".

SELECTIVE BREEDING FOR VARROA RESISTANCE

- After about two decades of targeting breeding from colonies showing varroa resistance, Oliver says half of their hives no longer require any varroa treatment.

Randy Oliver is welcomed to New Zealand and Whanganui on day one of the conference. Photo: Janine Davie, Wellington Beekeepers Association.

- "We select for resistance, not tolerance," Oliver explained, saying decisions on what varroa resistant colonies remain in the breeding programme is made solely off mite counts during monitoring. "We don't tell them how to do the job". He further went on to explain that they are not searching for 'VSH' which results in non-reproductive mites, "whether the mites in the wash are reproductive or not, we don't care. If they got there, they got there somehow and we don't want them".
- Oliver has a remote area in California where he struck up a relationship with the few neighbouring beekeepers to supply their queen stock to help control drone genetics in the area.
- "If you don't already have resistant stock, you will need to bring it in", Oliver said, but then emphasized the importance of sticking with the stock once the programme begins. "The grass isn't greener". Essential for Oliver's programme was finding "Queen Zero", that being the queen of a colony that routinely returned zero counts during mite washes.
- Traits of gentleness, above average honey production, and freedom from disease are prioritised, alongside zero mite counts. They like to get mite counts of zero per 300 bees sampled five times in a row, over numerous months, before grafting from a queen.
- "You do not need to kill a single mite to control varroa, you just need to stop them reproducing," Oliver pointed out, saying cutting the usual reproduction rate of 1.45 in half "will solve your varroa problem".
- Drone genetics have a two year lag as their gene alleles come from their grandparents, and this can make genetic gains in bee breeding slower than anticipated, Oliver warned.
- Having trialled taking samples from all frames in beehives, taking bee samples from the first frame adjacent to the brood provides the best colony "average" mite count, while greatly reducing the chance of collecting the queen, Oliver reported.

Southern North Island Beekeeping Group stalwart and event organiser Frank Lindsay, left, travels extensively to international beekeeping conferences and his relationship with Oliver was the basis for bringing the American to the New Zealand event.

WAYS TO USE NATURAL MITICIDES

- Oliver says his beehives in California "have been off the pesticide treadmill since 2001", instead relying on his varroa resistance breeding programme and a range of organic treatments – extensively trialled.
- "You guys are lucky as hell," Oliver said of the "own use" clause in New Zealand's laws surrounding use of compounds in beehives. In California, he must apply for and receive dispensation to use many organic varroa control products. "Your government is smart. They know you are all cowboys and are going to do it anyway, so they don't make you criminals."
- Oliver stressed the need to assess treatment success with mite washes post treatment.
- Thymol treatments "just kicked butt" in their operation and in some hives took mite counts of 70 per 300 bees down to almost none in 21 days. However, they should not be used in the presence of honey supers. Oliver soaks "acoustic soundboard" (with 'Pinex' being the likely equivalent in New Zealand) in thymol and places it on the top bars of the hive, with a spacer rim.
- Formic acid "gives colonies a fresh start" Oliver said, resulting in healthy looking brood. However, queens can be susceptible to it and the hot weather in California results in variable efficacy.
- Oxalic acid liquid "dribbles" are used during broodless periods by Oliver, but he warns against mixing the acid with sugar water as he believes the nurse bees eat it and feed it to larvae, damaging the young bees. Instead, he prefers a 5:95 glycerine: water solution.
- He prefers extended release oxalic acid treatments over vaporising which he deemed "way too much work" and, having trialled a variety of extended release mediums, he concludes that the ratio (himself preferring 1:1 acid: glycerine) is more important than the medium.

NOSEMA

- "There is zero evidence that either nosema ceranae or nosema apis causes dysentery. It is a myth. Dysentery will help spread nosema spores, but nosema does not cause it," Oliver said.
- When testing for nosema – which Oliver does himself in the field under a microscope, having sampled bees – results should be taken from the total percentage of bees with spores present, not total spore count. "Spore counts mean almost nothing as a single bee can throw it out".
- His observation is, when pollen is not coming into the hives, nosema disappears, as Oliver could not find it present in any high level in late summer, but could in spring.
- "Beekeepers are absolute suckers for snake oil'," Oliver observed when discussing hive health products. "Ask, 'where is the evidential hard data?'… paid testimonials are not hard data. If something really works, you will see multiple replicated data from multiple trials… it's not that hard to run a field trial."

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UMFHA Terminate Licence Holders "Detracting" of Standards

As the mānuka honey price pinch tightens, 26 now former Unique Mānuka Factor Honey Association (UMFHA) licence holders have had their ability to use the UMF brand revoked, while the Association has upped its budget for testing honey in market, in an attempt to clamp down on non-compliant honey.

"In the last six months we have reviewed the quality of our membership and terminated 26 license (sic) holders we identified as detracting from UMFHA standards either due to quality, compliance or financial reasons," CEO Tony Wright stated in his annual report in May.

For the majority, it was the latter "financial" reasons that led to expulsion from the Association.

Around 130 UMF licensees remain, equating the terminations to between 15 and 20% of the total licence holders from six months prior.

"For various reasons some of our licence holders find their circumstances change and they struggle to pay their bills," Wright explained when further questioned on the matter.

"While we have sympathy for their plight, we cannot support a situation where they continue to enjoy the benefits of using the UMF mark, but not pay for it. To do otherwise would be unfair to their competitors who are paying their dues."

The struggle by mānuka honey sellers to pay the bills is unsurprising in an industry that has witnessed the value of New Zealand's most prized honey fall in recent years.

"Market conditions are expected to remain challenging for the next financial year," Wright states in the report.

"Feedback to the UMFHA from members and the markets also makes it clear that if brands continue to compete based on price without investing in demand and maintaining a premium proposition the risk of accelerated decline in returns is very high."

The UMF Honey Association has terminated the licences of 26 now former licensees for a range of breaches, from not paying their fees, to failing to meet compliance and quality standards.

Also detracting is the use of the UMF trademark on honey which does not meet the Association's quality standards. Wright did not elaborate on how many of the 26 terminated licence holders may have been shown the door due to "quality" or "compliance" breaches, but an increased budget for in-market international testing of UMF product is indicative of an ongoing concern.

UMFHA test all batches of UMF licenced product for compliance, earning it a 'UMF release certificate', before it leaves New Zealand's shores. However, what happens to the mānuka honey after that – which may alter its state, either intentionally or unintentionally – is outside their control, yet still a risk to UMF's reputation. That's where the need for testing of in-market product, either randomly or when they are tipped there could be a greater risk of non-compliance, comes in.

"We routinely purchase UMF-endorsed product from the market, return it to New Zealand under quarantine rules, and have it tested for compliance to the standard in an independent laboratory. The whole process is managed independent of us, and we have a good budget – $100,000 this year –to support the programme," Wright explains.

If the UMF release certificate testing in New Zealand is a fence at the top of the cliff, the "market quality testing" conducted offshore is akin to a police force operating at the bottom, but its powers are limited.

The UMFHA can bite – as some now former licence holders have recently discovered – but once non-compliant honey is offshore, there is nothing the Association can do to enforce its withdrawal from sale. Combined with honey's long shelf-life, consumers are potentially being exposed to inferior product for years if the licensee and their retailers do not act to withdraw the product from sale.

"Our initial approach to any breach of the licence agreement is to always seek constructive agreement with the affected licensee to fully remedy the breach in a timely manner," Wright explains.

"We also seek to understand what went wrong to cause the breach, encouraging continuous improvement with the licensee and in the processes managed by UMFHA. If we are not confident the breach will be addressed effectively or in a timely manner, then we activate a more formal process laying out the expectations and obligations. If further escalation is required, it becomes a matter for the Board to determine whether to initiate the licence termination process. We do not activate this step lightly, but there comes a point where the rights of the organisation and its wider membership must be protected."

CLARIFICATION

We refer to the article in Issue 61 headed *"A Ratings Disaster"*. In that article, a perfectly correct label of both a Manuka Doctor and Mānuka Health pot of honey was shown, we wish to make it clear that the images' use was only for the purpose of showing multiple mānuka honey ratings upon one label and it was not intended to imply that Manuka Doctor or Mānuka Health was incorrectly labelling its product and/or, was acting recklessly and outside the UMFHA rules.

CORRECTIONS

In our August edition (Issue 61) in the report *"UMF Mānuka Honey: Made in Japan"* in photo captions we referred to 100% Pure New Zealand Honey Ltd as 100% Pure Honey New Zealand Ltd (p 10) and the brand Honey Valley as Happy Valley (p 12). We regret the errors.

Straining the Alphabet Soup

A short history of the various rating systems for mānuka honey: TA / NPA / UMF / MGO / MG / MGS / AAH / Pollen Percentage / KFactor / MQS

BY BRUCE ROSCOE

THE EARLY YEARS

One honey type, 10 rating systems. And each is followed by a numerical value and a "+" mark, or a percentage sign. What to do? Luckily, we need understand only two of the above abbreviations. The others should then fall into – or out of – place.

Let's begin with the unlocking keys of the two abbreviations TA (total activity) and NPA (non-peroxide activity) and transport ourselves to the Waikato of the 1980s. This brief excursion will help us understand the issues besetting mānuka honey ratings today.

Two United Kingdom emigrants learned in Waikato in the early '80s that mānuka honey had uncommon antibacterial strength. One, Kerry Simpson, was a science teacher at Otorohanga College and the other, Dr Peter Molan, a lecturer in biochemistry at the University of Waikato. Although Dr Molan is known as the father of mānuka research, he is more accurately stepfather, for it was Mr Simpson who began the experimentation in Dr Molan's laboratory in January 1980, during the university's summer break.

The scientific method underlying the experimentation could be traced to the 1860s and cradled names such as Julius Petri (the Petri dish), Robert Koch (who isolated the species of bacteria that caused tuberculosis) and Louis Pasteur (who heated beverages to kill bacteria; *pasteurization*).

A common strain of bacteria would be placed on a glass dish and fed agar, a substance derived from seaweed, so that it would grow. Honey would be placed on the same dish. The area – called "zone of inhibition" – in which the bacteria did not grow would then be observed as proof of antibacterial activity.

Dr Peter Molan first quantified the antibacterial strength of mānuka honey in the 1980s and in the four decades since an "alphabet soup" of honey rating systems has emerged, including his own.

Mr Simpson and Dr Molan first conducted this test on mānuka and two other honey types. Mānuka honey was most lethal against the bacteria. This test result had shown the "total antibacterial activity" or TAA of the honey. TAA was shortened to TA. At this stage no numerical values (such as 5+ or 10+) were assigned to the result.

Mindful that nearly all honeys were antibacterial, owing to hydrogen peroxide content, Mr Simpson and Dr Molan conducted a second experiment. They neutralized the hydrogen peroxide content of the three honeys by adding the enzyme catalase. When they then repeated the first test they found that only the mānuka had retained its antibacterial strength.

They had discovered that there was SOMETHING ELSE in the mānuka honey. They described the antibacterial strength of the mānuka as non-peroxide activity, or NPA.

Excitement arose when in repeated tests some mānuka samples showed markedly high antibacterial strength. Too, the possibility loomed that while hydrogen peroxide as a liquid degrades when exposed to heat and light, the unknown active compound in mānuka could retain its strength over time, which later proved to be the case.

Research papers followed – among them the 1983 MSc thesis "Antibacterial properties of honey" by University of Waikato student Kathryn Russell; the paper *"A comparison of the antibacterial activity of some New Zealand honeys"* (Molan, Smith, Reid) in the Journal of *Apicultural Research*, 1988; and the paper *"Identification of some antibacterial constituents of New Zealand mānuka honey"* (Russell, Molan, Wilkins, Holland) in the *Journal of Agricultural and Food Chemistry* 1990.

A PRIVATE MEANING OF "UNIQUE"

The UMF Honey Association (UMFHA) registered UMF™, which abbreviates "Unique Mānuka Factor", as a trademark in April 1988. (The association itself would not formally register as the Active Mānuka Honey Association Inc. until September 2002; the name change to UMF Honey Association Inc. was recorded in July 2011.)

SummerGlow Apiaries Ltd as UMFHA member and licensee No. 1001 was present from the dawn. Founders Bill and Margaret Bennett lay claim on their website to having pioneered the "highly-revered and trusted quality trademark UMF" in 1988. Throughout, on the websites of members of the association, the sense in which the word "unique" is used is unexplained. Dr Molan had chosen the word. It was to say, "We cannot identify the compound most responsible for the antibacterial strength of mānuka honey and, until we can, we shall call it 'unique'".

For the next 10 or so years, until two research papers – one German in 2008, one New Zealand in 2009 – identified methylglyoxal as the "unique" compound, UMF licensees would print the trademarked UMF on labels while non-licensees had to settle for NPA. Still other producers or packers settled for the hydrogen peroxide test and labeled their products TA for "total activity".

Dr Molan, in 1995, had established the Honey Research Unit at the University of Waikato, which he would direct until 2013. The numerical values of say 10+ or 15+ that would become mānuka honey ratings were his creation as consultant to UMFHA, which he had joined. Using the bacterium *Staphylococcus aureus* in the diffusion assay, similar to that used in his laboratory in the summer of 1980, he measured the antibacterial strength of the common antiseptic phenol. He diluted phenol with water, creating solutions for example of 10% and 15%. He then repeated the tests using mānuka honey, and compared the results with those for phenol. If the mānuka result exceeded that achieved with the 10% phenol solution, the mānuka could be labelled UMF10+ (or NPA10+). And so on with 15% and higher phenol solutions which became UMF15+ and higher grades.

UMF UNDER THREAT FROM MGO

The methylglyoxal discovery threw a wallet of multi-sized spanners into the UMF works, and some of those spanners still cruise the air. Methylglyoxal content could be measured in milligrams per kilogram of honey and the lengthy name abbreviated as MGO. In the case of UMF, no one knew the object of measurement. They knew only that it was not hydrogen peroxide, hence the term "non-peroxide activity". It is more convincing to say what something is than what it is not. Too, MGO values easily could exceed 100 or 200 or soar to 800 or top 1,000, all followed by a "+" sign. With the exception of blood pressure and golf scores, consumers would eat up the higher numbers (exam results, bonus payments…).

Some packers, who seemingly did not understand that Mānuka Health New Zealand Ltd had trademarked only a polygon shape enclosing the letters MGO and not the abbreviation itself, out of misplaced fear began to use MG instead of MGO. Parenthetically, the registration by the Japan Patent Office of MGO as a

Comvita Ltd, New Zealand's largest manuka honey exporter, uses dual UMF and MGO ratings on product labels. The MGO rating indicates the content of naturally occurring methylglyoxal in milligrams per kilogram of honey.

trademark of TCN Co., Ltd, in January 2011 seemed unnoticed in New Zealand. The trademark – No. 5380195 – was renewed in July 2020. TCN is a Nagoya-headquartered importer and online seller of mānuka honey.

If UMF overnight had become less valuable as a measurement, it nonetheless continued to hold value as a widely recognized brand. Offshore companies still sought to become licensees. The logo remained a target of counterfeiters. Moreover, substantial investment in the brand had been made by bona fide producers, importers, wholesalers, and retailers.

UMFHA's response was to cry out for research that would correlate MGO with NPA values so that it could align its UMF10+ or UMF15+ values with MGO near equivalents. Which it did. Except there was a misstep.

Scholars of the University of Waikato responded to the call. Their timing evinced early access to the German and New Zealand papers published in 2008 and 2009. The Chemistry Department of the University of Waikato in November 2007 presented a paper to the journal Carbohydrate Research showing, in graphic and tabular form, a correlation between NPA and MGO values. This paper, *"Isolation by HPLC and characterisation of the bioactive fraction of New Zealand mānuka (Leptospermum scoparium) honey"*, would serve to re-legitimise the UMF rating system and protect the brand.

The speed to publication was breakneck, compared to the glacial pace that is usual in the case of scholarly journals. The paper, which had as many as seven authors, had been presented on 7 November, presented again in a revised version on 11 December, and accepted on 17 December. The authors and peer reviewers should have placed a higher value on sleep. All correlations in the key table matching UMF with MGO values had been miscalculated and required upward revision by a factor of 1.87. The subsequent paper of correction, seemingly disguised by the Latin term "corrigendum", is still cited in reports today by laboratories commissioned to conduct MGO analysis and reverse calculate to UMF (NPA) values.

DR MOLAN DESERTS UMFHA

As a result of argument over mānuka honey grading methodology Dr Molan, whom the University of Waikato had elevated to professor of biological sciences in 2003, ended his 15-year relationship with UMFHA in December 2008. The argument culminated in Dr Molan giving evidence in support of Watson & Son in the case UMFHA brought against that company in order to expel it from the association over the claim that mānuka honey products it exported to the United Kingdom were not true to their stated UMF rating.

Although UMFHA succeeded in its case, Dr Molan and Watson & Son responded by launching the Molan Gold Standard (MGS) rating system which would compete with UMF. This system comprises the four grades 10+, 12+, 16+, and 20+ which correlate to methylglyoxal content of 300, 400, 600, and 800 milligrams per kilogram of honey.

The "Molan Gold Standard" is a rating system used by Mānuka Collective Ltd on the Watson & Son brand of mānuka products. The standard, as published by the late Dr Molan, combined measures of non-peroxide activity and methylglyoxal content. The four-stage system began with the MGS rating 10+. After Dr Molan's death users of the brand expanded the grades to include MGS5+.

Dr Molan wrote in his article 'The true relationship of NPA and MG levels' in *New Zealand Beekeeper* (April 2015): "...the NPA rating starts at 8, not zero, a rating of 8 being the minimum level of activity that can be detected in the assay". In that conviction lies the kernel of his dispute with UMFHA, whose members of size had clamoured for UMF grades to begin at 5+.

An Edison investment report (August 2014) on Comvita noted that the UMF5+ grade was the company's "standard honey offering". Then, as now, Comvita was New Zealand's largest exporter of mānuka honey and also largest single source of levy revenue for UMFHA. While Dr Molan would have wished to bend the business to fit the science, UMFHA appeared to have bent the science to fit the business.

UMFHA on its website claims to have "founded the science of mānuka honey 25 years ago", thus expunging the contribution of Dr Molan over 20 years. Yet the site does place "Professor Peter Molan", who died in 2015, ninth on a list of 12 "key researchers".

Within two years of Dr Molan's passing Watson & Son had modified the MGS standard by adding a 5+ rating. Science again appeared sidelined for the sake of business, despite the guide to the standard stating: "If you are looking for the real thing, look for the Molan Quality Standard™ Quality Mark with a rating of at least 10+ and a methylglyoxal content of ≥ 300mg / kg on the label..."

THE REGULATOR INTERVENES

Mānuka honey ratings were conflicted from the outset. The numerical values indicated degrees of antibacterial strength which implied efficacy against medical conditions. But, unlike pharmaceutical products that in clinical trials had proved curative effect, mānuka honey was a food. A regulatory hammer would fall on both sides of the Tasman, but it fell hardest on New Zealand honey producers as each country unilaterally interpreted a bilateral standard.

Under standard 1.2.7 (see Section 8) to the Australia New Zealand Food Standards Code introduced in 2013, the Ministry for Primary Industries (MPI) ruled in July 2014 that claims such as "Non-Peroxide Activity", "Total Peroxide Activity", "Peroxide Activity", "Total Activity" and "Active" were to be removed from labels and advertising by January 2018 at latest.

UMF ratings, too, were viewed as non-compliant. Labels could show information only about the content of the honey. Which left no alternative than to bring MGO to the fore as methylglyoxal was expressed in milligrams per kilogram of honey.

For a time rumours were rife that MPI would outlaw the UMF rating system. MPI agreed to a UMFHA request to provide a letter confirming that the ratings could remain. "I write to confirm that the revised UMF grading system which is outlined on the UMFHA website...is in line with the 'Interim Labelling Guide for Mānuka Honey' and the legislation the guide is based on", Jenny Bishop of MPI's Food Science and Risk Assessment Directorate wrote to then UMFHA general manager John Rawcliffe on 9 April 2015. In addition to methylglyoxal, the association had added two compounds (dihydroxyacetone and leptosperin), whose content could also be measured in milligrams per kilogram of honey, to the UMF grading system.

Australian "manuka" honey producers faced no regulatory constraint in using words such as "Active", "Activity", or "Bioactive" on product labels or in advertisements.

OUTLIERS

Airborne Honey Ltd manuka product labels in the past have carried the abbreviation "AAH" followed by a numeral and a plus mark, which represented a hydrogen peroxide measure of antibacterial strength. Airborne most recently abbreviated AHH as "Airborne Active Honey", though one edition of the company's website stated AHH as "Antibacterial Antioxidant Honey". The now abandoned New Zealand trademark registration recorded only "Airborne AAH". In response to MPI's interpretation of Standard 1.2.7 Airborne discontinued its AHH ratings and introduced manuka pollen percentage values ranging from 30% to 85%.

MQS abbreviates "mānuka quality system" which is operated by Avatar Honey NZ Ltd. MQS combines MGO with pollen analysis.

KFactor™ is used by Wedderspoon for their South Island sourced mānuka honey, but the numerical values on the product labels are unexplained.

The latest laboratory reports posted to the Avatar website are dated August 2017 and the pollen type tested is recorded as "mānuka / kanuka".

KFactor™ is a brand operated by Wedderspoon Organic USA LLC. When followed by the numeral 12 the product is labelled as multifloral mānuka honey, while the numeral 16 is used on monofloral mānuka labels. Wedderspoon's website does not elaborate on the meaning of KFactor and the company has not responded to a query about its meaning. Without sighting a batch-specific laboratory report, it is not possible to understand what if any meaning KFactor may have beyond denoting a corporate brand.

Websites dedicated to the MGS and MQS ratings are inactive. MGS is used by perhaps no more than three brands whose underlying producers are undisclosed.

BEES KEEP SECRETS

MGO dominates mānuka honey ratings. UMFHA brand guidelines accommodate dual UMF and MGO ratings on labels. The size and positioning of MGO values has changed from small lettering on the back of the labels to larger lettering on the front. In many cases, if not most, when UMF licensees export bulk monofloral mānuka or retail pack product for private-brand use, the labels will show MGO values as UMF values cannot (or should not) be used by non-licensees.

Food testing laboratories now only rarely, if ever, use the agar diffusion method for measuring the NPA of manuka honey. Hill Labs first tests for MGO content. In reports Hill Labs states both MGO values and correspondent NPA values which it calculates according to corrected published research. UMF licensees rename the NPA values as UMF™, while non-licensees use them under the same NPA abbreviation. ALS's (formerly Analytica Laboratories) reports similarly state MGO and NPA values while noting that the calculated NPA values are not accredited by International Accreditation New Zealand. Awanui Scientific reports confirm that "NPA is calculated as % phenol equivalent from the measured MGO concentration in the honey". ALS adds that the peroxide activity (PA) test is still commonly used for high activity, non-manuka honeys such as kanuka, jarrah, and marri.

Methylglyoxal was described as the "dominant" antibacterial constituent of mānuka (Leptospermum scoparium) honeys from New Zealand in the 2008 paper produced by faculty of the Technical University of Dresden.

Scholars reporting to the American Laryngological, Rhinological and Otological Society in 2011 concluded that MGO was "only partially responsible for the antibiofilm activity of mānuka honey". There is still "something else" in the mānuka. Something unique. That "something" remains a secret to bees.

"The Early Years" section of this report owes much to Cliff Van Eaton's excellent book *Mānuka – the biography of an extraordinary honey* (Exisle Publishing, Auckland 2014).

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From Kyiv to Kiwi: A Scientific-Beekeeping Journey

Oleksiy Losyev's beekeeping journey is a testament to how passion, expertise, and meeting the right person at the right time can merge to shape a fulfilling career. Now in a pivotal apicultural role with Mānuka Health as apiary technical coordinator, based out of Te Awamutu, Jessie Trustum traces Losyev's journey from student, then professor, in his native Ukraine, to a more practical role – on the other side of the world.

BY JESSIE TRUSTUM

His story begins not as a young lad looking to rake in some hard cash over summer, but in the classrooms and laboratories of the National University of Life and Environmental Sciences of Ukraine in Kyiv, where he first encountered the fascinating world of the honey bee in 2003.

At the time, the university was the only in the country to have a beekeeping department. That gave it a unique advantage, not just for the academia, but for its generous set-up, complete with beehives and necessary equipment. It provided opportunity to combine theory with practice, allowing students like Losyev to delve into studying honey production, bee selection, and genetics.

It was in this environment – thanks to a certain Professor – that Losyev's initial fascination with honey bees evolved into a deeper commitment, in which both scientific theory and practical beekeeping have played an important role. The department's hands-on approach provided a practical understanding of beekeeping, and it was during these years that his passion for the field was set – like propolis between two frames.

Oleksiy Losyev quickly climbed the ranks at the National University of Life and Environmental Sciences of Ukraine in Kyiv, replacing his mentor as the department's professor, before setting his eyes on a beekeeping career on the other side of the globe.

WITH THANKS TO PROF. POLISHCHUK

All of this comes down to an encounter with Professor Viktor Polishchuk, the head of the beekeeping department at the time. Prof. Polishchuk had profound insights into the world of honey bees and their evolutionary significance which impacted the young man deeply. The professor's ability to explain complex biological and genetic concepts through the lens of bee behaviour and survival offered a unique perspective that resonated with Losyev and "opened his eyes to bee breeding, genetics and how it relates to life". He was taught bee biology and sociology alongside human versions of the same subjects, giving space to recognise similarities and take advice from the ways bees have learned to work together socially and how they tend to concentrate on their own "flight range".

Polishchuk's influence was pivotal in shaping Losyev's career path. The professor's belief in the untapped potential of beekeeping and his philosophical approach to understanding life through the evolution of bees inspired Losyev to pursue beekeeping as more than just a profession, but as a quest to strive for finding out the unknown.

A BLOSSOMING CAREER

After completing his studies, Losyev's career in beekeeping set off. He grew from an assistant professor to taking Polishchuk's place as the head of the beekeeping department at the University, earning scientific degrees and awards along the way. His work focused on improving colony productivity and expanding the range of products derived from honey bees.

During this time the department also created the "Khmelnytskyi" an interbreed of Ukrainian bees, which was officially recognized in Ukraine – a huge achievement in the field. This work signals Losyev's commitment in advancing beekeeping practices and enhancing the economic traits of colonies.

Alongside these contributions, he gained valuable experience in the commercial beekeeping sector in Ukraine. His roles varied from advisor to director of one of the country's largest beekeeping companies – 1500 hives, in a country where many businesses have

Oleksiy Losyev in his native Ukraine in an apiary of the BEEHIVE business, where he worked as director of their 1500 hive beekeeping department (one of the country's largest beekeeping operations) before emigrating to New Zealand.

only around 100. This hands-on experience in both organic and traditional beekeeping methods strengthened his understanding of the industry and prepared him for future challenges he was yet to meet.

A NEW CHAPTER: BEEKEEPING IN NEW ZEALAND

In 2018, seeking new challenges, the Ukrainian made the big move to New Zealand where he discovered a beekeeping industry quite different to that which he knew back home. The discovery of mānuka honey's unique properties had revolutionized the honey industry in New Zealand, presenting new opportunities and challenges that he had not had to work with or think about before.

"Even though their history of working with bees is long, beekeepers in Europe think they have a lot of experience and they can easily do it in New Zealand, but New Zealand is further ahead and has better processes in all aspects of beekeeping," Losyev says.

Working at Mānuka Health, Losyev has found a platform to apply his extensive knowledge and experience. As an apiary technical coordinator, he oversees a plethora of responsibilities, from mentoring beekeepers, developing Standard Operating Procedures (SOPs), to managing the breeding and queen raising programmes.

A DAY IN THE LIFE:

A typical day for the technical coordinator is a blend of many different areas. He engages closely with his team of beekeepers, providing guidance and support when he can, while striving for a well-rounded working environment. His role involves developing and refining SOPs to ensure compliance and efficiency within industry standards.

Moving to an English speaking country, when it is not your first language, is challenging and coming from a monocultural country there are many different cultural factors. However, Losyev says he found that reminding himself that he was/is a professor, and that

he is a good teacher, helped. Over time Losyev has learned how to be diplomatic, learned English steadily and put effort into learning how cultural factors influence people's decisions. Those lessons have all helped immensely, he says.

Collaborating with the likes of Mānuka Health's national apiculture strategy manager, Losyev ensures that hive management practices meet industry requirements. He is also deeply involved in the research and development of innovative beekeeping techniques, striving to enhance honey production and overall operational effectiveness with the focus being around "quality, quality, quality! And everything around quality queens".

MORE TO LEARN

Losyev's journey from Kyiv to New Zealand shows a commitment to striving for untouched waters and a strong passion for both the scientific and practical aspects of beekeeping, as well as the drive to establish unmarked ground and to improve the industry.

When the Ukrainian arrived in New Zealand, one of his first questions in beekeeping was "what are the exact species of bees here in New Zealand and what are their genetic characteristics?". He was surprised to find that there was a substantial lack of research done at that time and since then has taken the time to look into this extensively which, all going well, will be presented to industry in the coming years.

From its beginnings in a lab in Kiev, to Mānuka Health's thousands of beehives spread across two South Pacific isles, Losyev's story has been guided by his inspiration to blend scientific knowledge with practical beekeeping experience. And, as his continues to contribute to the success of Mānuka Health, the broader apiculture industry in New Zealand should follow, as it has in Ukraine.

These days it is New Zealand that Ukrainian beekeeper and scientist Oleksiy Losyev calls home, working as apiary technical coordinator out of Mānuka Health's Te Awamutu base.

Millions of Plastic Frames Saved from Landfill

The conundrum of what to do with plastic beekeeping frames when they are damaged beyond repair or, more commonly, it's time to turn to fresh wax, is an increasing challenge for the industry. New Zealand Beeswax is tackling that challenge head-on though, with a solution that not only benefits beekeepers and their bottom line, but the environment in a myriad of ways.

"Save time, save money, save the environment, why wouldn't you do it?" asks NZ Beeswax General Manager Nick Taylor when discussing the beekeeping supply company's Hamilton frame Wash & Wax plant.

The plant has been in operation since 2018 and with the onset of plastic frames over the last 20 years and in particular the last 5-10 years – driven by the mānuka story –a rapid increase in the total number of plastic frames in the market has resulted. Frames which are now reaching the end of their useful life, at least for "round one", Taylor explains.

"Traditional wooden frames can either be rendered, discarded or have wax removed and be re-waxed using techniques that have been around since the 1800s. Plastic frames, however, required some fresh thinking. That technology is out there now, we have refined it in our plant and, for many beekeepers, using it and markedly extending the life of plastic frames will be a no-brainer once the benefits are fully understood," Taylor says.

WHY DO FRAMES NEED SWAPPING OUT?

Beekeepers have observed that around 20% of frames in brood boxes and 10% in honey supers, require cycling out annually. The primary reason is to aid bee health, as beeswax that has been used repeatedly by the bees, especially for brood rearing, accumulates greater levels of contaminates, such as viruses, pathogens and residues.

Additionally, the cell diameter in old, heavy, black, brood comb can shrink from an accumulation of these materials, along with faecal matter and cocoon silk left behind by each emerging bee. A three-year field study from the University of Georgia concluded "Colonies full of old, dark, heavy comb will have smaller bees and fewer of them".

It was shown that, "On average, colonies with new comb produced a greater area of brood, a greater area of sealed brood, and higher weight of individual young bees." Also, "Bees reared in old comb may weigh up to 19% less than bees reared in new comb".

WHAT ARE THE OPTIONS?

"A big hole in the ground is not a valid option," Taylor stresses.

"It might be tempting to just throw away aged-out plastic frames and start again with new frames, but it doesn't make any sense. It is obviously horrible for the environment, but it is also increasingly financially a bad call."

Beekeepers have been known to refurbish the frames themselves, with some going to the effort to assemble their own small cleaning plants. However, for the most part it requires the laborious and triple-handling of scraping back wax, water blasting, then rewaxing.

Efforts to remove the wax with heat almost certainly result in warped frames.

"If ever there was a task to be outsourced by beekeepers, to specialists, this is it," Taylor says.

"The NZ Beeswax plant is continuously being refined, but after our six years and millions of frames through the operation we are at a stage where we can put through hundreds of frames an hour and return them almost completely devoid of old wax and with a fresh new beeswax coat."

LESSENING ENVIRONMENTAL IMPACT

While avoiding a huge amount of landfill or carbon release in burning is the obvious and most significant environmental benefit to recycling frames, there are many more. NZ Beeswax's frame washing plant has been designed to lessen environmental impact, compared to do-it-yourself processes:

- Water used is almost entirely from rainwater capture and storage from the roof of their Hamilton facility.
- The washer is set up in a specifically built room to reduce noise externally.
- An advanced filtration system is used, which separates the solids for composting. Beekeepers cleaning their own frames generally have limited

Old, dark combed frames go in...

...and cleaned frames come out, before being re-coated with clean wax.

means of dealing with the dross resulting in environmental impacts.
- Any water discharge is to municipal waste which provides 'sweet water' with active microbes, which are beneficial to the sewerage treatment process.
- Doubling/tripling, or even more, the life of a frame allows beekeepers to greatly reduce their carbon footprint. A project undertaken with Toitu estimated a reduced carbon impact of 58 – 87%, or approx. 1kg carbon per frame.

WHO'S IT FOR?

While it's hard to deny, given the choice, bees love wooden frames and beeswax foundation best; the use of plastic frames has become increasingly common across beekeeping in New Zealand, from the largest commercial apiarists, down to the backyard enthusiasts.

"It's no secret, the plant has been designed with the goal of putting through large quantities of frames, as that is where the biggest concern for our industry lies," Taylor explains.

"Those beekeepers putting through tens of thousands of frames or more, are saving significant amounts of money, while looking after the environment. With a minimum run size of 1500, what we recommend to beekeepers who don't have that many frames themselves which need washing and re-waxing is, ring a fellow beekeeper in your area and get as big a run as you can together. We have procedures in place to make sure the right frames go back in the right box, and thus beekeepers won't end up with their neighbour's gear.

"It's increasingly becoming a no-brainer decision for an increasing amount of beekeepers. We enjoy providing this service as the environmental benefits provide a feel-good factor, but also because – for most – it's a way to save beekeepers money over the alterative options out there," Taylor says, adding "we would love more beekeepers to get in touch and talk through the process, that way we can determine whether it will work for them and, hopefully, make their beekeeping operation that much better."

New Zealand Beeswax's frame Wash & Wax plant in Hamilton can process hundreds of frames an hour and has saved millions of frames from landfill since starting up in 2018. With it offering a solution to the problem of aged-out plastic frames that not only saves the beekeeper time and money, but protects the environment, using it is a "no-brainer" for many beekeepers and GM Nick Taylor encourages more to reach out to them.

John Berry on Aggression

BY JOHN BERRY

This subject is important to me. When I was young I was working a poorly sited apiary beside a road when a girl walked past. If I close my eyes I can still hear her screaming. She ended up in hospital and I ended up with a lifelong passion for breeding quiet bees and keeping my apiaries as far away from the public as possible.

There is nothing new about aggro bees, bees have been stinging us for as long as we have been collecting their honey. The average hive in New Zealand is pretty quiet although not quite as quiet as they were 10 years ago. That's partly because of hybridisation between Italian and Carniolan and partly because there are more beekeepers, many of whom aren't doing rigorous selection. 58 years ago when I got my first hive they were not as uniform when it came to temperament. There were some beautiful Queens and the best of ours came from beekeepers like Jasper Bray in the South Island.

It's so long ago it's hard to really remember just how quiet they were, but I can certainly remember just how unquiet the local *Apis mellifera mellifera* and their hybrids were. I remember Jack Landman telling me that when he used to work these with my father as a young man that they would put on their veils at the gate before entering the paddock with the bees and not take them off again until they were well down the road.

Jack left beekeeping to become a teacher, but after retiring he came back to work for my father part-time, mainly in the woodwork. I used to take him out for the day sometimes and he

John Berry, seen here working one of his Hawke's Bay beehives, has "a lifelong passion for breeding quiet bees".

just couldn't believe that we could put our veils on in the yard and take them off before leaving. That's what 50 years of intensive selection for gentleness can do.

I still get stung. Getting the odd sting is probably good for your immunity and most of what I get come from doing something stupid like accidentally squashing a bee when I take my veil off.

The worst night I ever had was when I had to cut the ropes on a truck load of hives to stop the truck rolling over and then put all the hives back together again. I reckon I got about 150 that night and definitely felt a little bit off the next day. That was with a full set of protective gear on and there were thousands of stings stuck in my clothing.

I select for a lot of traits in a breeder; production, health, non-swarming, frugal with winter stores, ability to defend from predators (other than me) and always temperament. I breed from two-year-old Queens that produced well above average for two honey seasons. With luck I ended up with half a dozen out of a thousand candidates and I would bring these to my home apiary where they would get one final test. That involves working them in, shall we say, suboptimal conditions, usually either very late in the afternoon or ideally on a cold, crappy, drizzly day. There are normally one or two that will fail this final hurdle.

A surprising number of otherwise gentle bees will lose it on a bad day. As a commercial beekeeper you often need to work bees when conditions are not perfect. This is unpleasant enough without being stung up every two minutes.

When you raise cells/queens from what is left they tend to be similar in temperament to the parent hives. Even if these new queens mate with some of the less desirable local stock their drones, which come from unfertilised eggs, carry only their mother's genes and in time your better genetics, will dominate.

A large part of the bees temperament comes from genetics but there are a myriad of other things that affect how bees interact with you.

Bees on a honey flow (apart from, for some reason, sometimes the first day of the flow) will normally be very mellow.

Old bees that have survived winter always seem to be a bit more cantankerous (and I don't care what the scientists say, their stings hurt more).

A weak hive will be less aggressive than the same hive at full strength.

Weather obviously has a big impact and high humidity generally does nothing to improve their tempers. Some areas just seem to have worse tempered bees on average and the place that I have seen this the most was the Coromandel. Something about the climate up there made even the best hive turn a bit nasty.

As beekeepers we should never forget that bee stings are painful and for some people can be very serious and even fatal.

Kowhai nectar doesn't seem to make the hives in general grumpy, but it does turn some individual bees into complete berserkers which will sting you on the eye without any warning or provocation.

Apple scented shampoo really winds the bees up, don't use it. I am pretty certain that some horticultural sprays can also wind the hives up and I have worked bees that were wound up like African killer bees to the point where it was scary. These normally placid bees were near a vineyard and spray seems the likely cause for their temperament. The next visit they were perfectly normal.

Aggression is something that will spread from hive to hive and having one stroppy hive in an apiary will upset the rest. Some beekeepers are also just better at keeping hives calm and I have worked with people that just didn't seem to be able to work hives without upsetting them and then their upset bees would come upset mine.

There is a way to working around bees that only the bees can teach you. Listen to them and learn. As a commercial beekeeper I wear a veil and gloves the vast majority of the time, but when I'm just mucking around at home on a nice day I am very happy to work without them. I would never breed from anything that you couldn't work without a veil, but beginner beekeepers usually benefit from wearing one at least until they become more experienced.

Apart from anything else, new beekeepers usually take a lot longer to do basic beekeeping jobs and the longer the hives are open the more likely the bees are to become aggressive. Reopening a hive shortly after you have finished with it is a really good way to get stung.

If you do open a hive and it just goes ballistic, for whatever reason, it often helps just to freeze for a few seconds. I don't know why but this will often defuse the situation, at least to some extent, and it can be surprising how quickly they lose interest in you.

Your smoker is always your first defence against aggression, but it should be used as minimally as possible and I have found on really nice days with a good honey flow you often don't really need it. I am not a fan of going around and smoking every hive before you start. Smoke is most effective immediately after use and from then on you have to use more smoke to get the same effect.

The less smoke you use the quicker the hives will return to normal after your visit.

I have always shifted hives without blocking them in and, except when we do this in the daytime on really cold winter days, we shift at night. The secret is to pick them up as soon as they stop flying and before dark. A quick puff of smoke and straight on the truck, they will normally be quiet all night.

Pick them up after dark and they will crawl out of the hives looking for something to sting, smoke often doesn't help and sometimes makes them worse. Gentle hives will be better, but if you are picking up hives by hand after dark you better have some pretty good gear on. Before dark I don't usually bother with any.

It can be difficult at times to get a really stroppy hive to accept a new queen. I would never euthanise a hive because of aggression, but I would certainly kill the queen and replace it with a cell from a good breeder. With a really angry hive, which is something I haven't seen for years, I might place the cell between two frames of brood swapped from a quiet hive.

It is always a good idea not to disturb a hive with a new queen until she has sealed brood, as disturbance can cause the bees to ball the new Queen and kill her. This behaviour is particularly prevalent with aggressive hives, but I have never come across a hive I couldn't win the battle with eventually.

I have only ever had two hives that were so unbelievably angry I had to mark them for special attention and both these were on the Coromandel Peninsula. Before I could requeen either of them one had stung up the local government apiary inspector who just happened to be the only one I didn't like and the other was subject to an attempted theft and I found it on the side of the road beside its apiary. I never caught the thieves, but those bees did.

I have heard all the arguments for keeping strains of bees with a bit of aggro, but I have found no truth in any of them. Aggro bees are no more resistant to diseases, wasps, cold or anything else than well-bred bees and in my experience they tend to be poor producers and often more prone to diseases like chalkbrood.

The one exception to this would be the odd really vigorous hybrid, but hybrids are no good for breeding from. All our bee stocks in New Zealand are of course hybridised to some extent and that is one of the reasons we can select, over time, for all those desirable traits that make beekeeping more pleasant, more profitable and – let us not forget – safer for everyone.

John Berry is a retired commercial beekeeper from the Hawke's Bay, having obtained his first hive in 1966, before working for family business Arataki Honey and then as owner of Berry Bees. He now keeps "20-something" hives.

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

Honey Strategy Update

The New Zealand Honey Strategy 2024-2030 was released in February by Apiculture New Zealand (ApiNZ), the UMF Honey Association (UMFHA) and Mānuka Charitable Trust, and it was discussed at length in the forum of the Honey Industry Summit in Hamilton four months later. Now six months on from its release, ApiNZ CEO Karin Kos and UMFHA equivalent Tony Wright share the latest on the Strategy.

BY KARIN KOS & TONY WRIGHT

Since ApiNZ and UMFHA jointly hosted the National Industry Summit in Hamilton in June, the leaders from both organisations have been taking the time to get feedback from commercial beekeeping communities on the NZ Honey Strategy, launched in February, and the focus of discussion at the Summit.

It's been an important step.

Both ApiNZ and UMFHA are committed to acting on the recommendations of the Strategy and want to make sure that the most immediate challenge – developing a stronger industry voice via a newly-formed industry organisation – reflects and represents the needs and wishes of beekeepers who remain invested in the industry's future.

Good conversations have been had in the past couple of months with beekeepers about their own challenges in this difficult operating and business environment.

Perhaps the most valuable outcome of these conversations has been a reminder that commercial beekeeper voices at a regional level need to be properly heard and represented if a new joined-up industry body is to be effective. Having beekeeper representatives on the new Board, with a mandate from the majority of their colleagues, will be critical to the new organisation's acceptance and success.

Value has been clearly expressed in having more opportunities for beekeepers and exporters to participate in regional meetings to exchange data, market knowledge and share respective challenges. More deliberate contact will open pathways to progress and innovation needed for the long-term success of all in the sector.

The various conversations have raised plenty of ideas for how commercial beekeeping operations can remain sustainable. But in general, the most frequently shared desire is for the conditions to re-emerge where a beekeeper can be more confident they'll be able to sell their crop at prices that allow them to remain in business. It sounds obvious, but if it's to be achieved, all component players in the New Zealand honey supply chain need to work better together.

That's why the Strategy placed immediate importance on creating a stronger organisation with a voice that incorporates beekeepers, exporters and brand owners, and with a plan to become securely funded.

Within this context, UMFHA and ApiNZ aim to increase the transparency of actions and decisions being made through this time of change.

Both organisations are keen to continue receiving feedback as we work through shaping the next steps in industry development. Please contact us at any time.

Tony Wright tony@umf.org.nz / **Karin Kos** ceo@apinz.org.nz

Control Varroa with the Power of Hyperthermia – No Strips, Staples, Pads, or Vapours

For beekeepers, battling the relentless Varroa mite is a necessary but often challenging endeavour, requiring chemical treatments, be they strips, staples, pads, or vapours. All can result in weak hives, loss of queens, contamination of hive products, and even exposure to objectionable chemicals when working at the apiary. Harnessing the principle of hyperthermia, a new device – Varroa Controller –now allows beekeepers to effectively and safely fight the Varroa mite.

Hyperthermia in apiculture, known since the early 1990s, is the targeted and controlled exposure of capped brood, without bees, to heat. In this bee brood the mite and the bee pupae are together, but the mite has greater sensitivity to heat and succumbs to it, while the pupae survive.

AN ESTABLISHED SOLUTION WITH ROOTS IN EUROPE

The Varroa Controller was designed, developed, and placed to the market in Europe in 2010 by the passionate beekeeper and managing director of Austrian company ECODESIGN Dr. Wolfgang Wimmer. Varroa Controller uses hyperthermia and The Bee Research Institute in Germany attested a 97% efficacy to the Varroa Controller in 2016. Now, this innovative device is available for pre-orders in New Zealand through Northland beekeeper Andres Villegas.

ANNUAL PLAN FOR CHEMICAL-FREE BEEKEEPING CONSISTS OF THREE TREATMENTS

With the Varroa Controller beekeepers can treat hives without chemicals, to keep the mite load below the dangerous threshold using an annual plan of three main treatments — spring, summer, and autumn is recommended.

SPRING TREATMENT: in spring 80% of the mites are in the capped brood, and thus can be eliminated with the heat treatment. Ideally one does the treatment when the brood nest consists of two capped frames. This way, in the 20 frame Varroa Controller, 10 hives can be treated in a cycle of 2 hours. This early intervention is crucial for preventing the mite population from escalating, because the mite population doubles each month. Learn more about this spring treatment by watching ***this video.***

SUMMER TREATMENT: The focus is on minimizing the number of brood frames by isolating the queen to lay eggs in only 2 frames. After 24 days these frames, containing the majority of the mites, are heat treated. Learn more about this summer treatment in ***this video***.

AUTUMN TREATMENT: like spring treatment, an Autumn treatment is done, to ensure the colonies are strong and healthy for overwintering.

With the Varroa Controller you can treat up to 20 brood frames at a time, from ten colonies, in just two hours.

In a world where beekeepers are increasingly seeking sustainable, long-term solutions to Varroa infestations, the Varroa Controller stands out by offering a chemical-free solution to keep bees healthy without the risk of residue in honey and wax, prevents the development of mite resistance, and can be used year after year. Moreover, the ability to treat frames on-site, even in remote locations with a portable generator, adds a layer of convenience that other methods lack.

CONTACT ANDRES:

varroacontrollernz@gmail.com
www.varroa-controller.co.nz

Phone 021 2899 060 to discuss how you can incorporate this device into your apicultural practices, to best protect your bees from mites while ensuring the purity of your honey and wax – no chemicals required. For additional reading the *Handbook of Hyperthermia* is recommended. ■

Zero Tolerance

In your everyday life you may take your ability to count for granted, but take a few (count them...) moments to stop and think about it and you will find determining quantity guides much of our decision making. Is it the same for bees, who live short lives full of decisions essential to their individual and genetic survival?

BY DAVE BLACK

By now, we shouldn't be surprised that honey bees count; by many accounts, lots of animals can. We can imagine an evolutionary advantage gained by being able to select numerically superior food sources for one thing. Being numerate makes all sorts of decisions, about reproductive strategies, social belonging, navigating, hunting, and so on, simpler and more effective — in evolutionary terms it has 'adaptive value'[1]. Maybe numeracy is even inevitable.

If we look at different animals 'counting' (using a medical imaging technique like MRI) we can associate specific areas (plural) of the brain with specific numerical states, the same kind of topographical 'map' that sensing other stimuli produces[2]. For small numbers of items counting seems intuitive, that's called *subitising*, a glance being enough to assess the quantity. For quantities of around five or more it seems to take a bit more effort, and we either 'count' a sequence or assess subitised groups to reach a total.

How we count depends on where we were born because, for us anyway, we think counting is a cultural, linguistic process[3]. MRI shows different brain region activations for English and Chinese speakers using the same numeral set[4]. Humans all around the world have very different ways to count, ways they have learnt from their peers. Language is what links the empirical presence of a quantity of items to cultural information about what that 'number' means and how it should be treated. For example, do we mean four cars (the cardinal, counting number), the fourth car, (the 'ordinal', positional number) or the 'No.4' car (a nominal assignment, a label). For humans, numerosity is not just a matter of empirical, objective, collective quantity, it is also an abstraction,

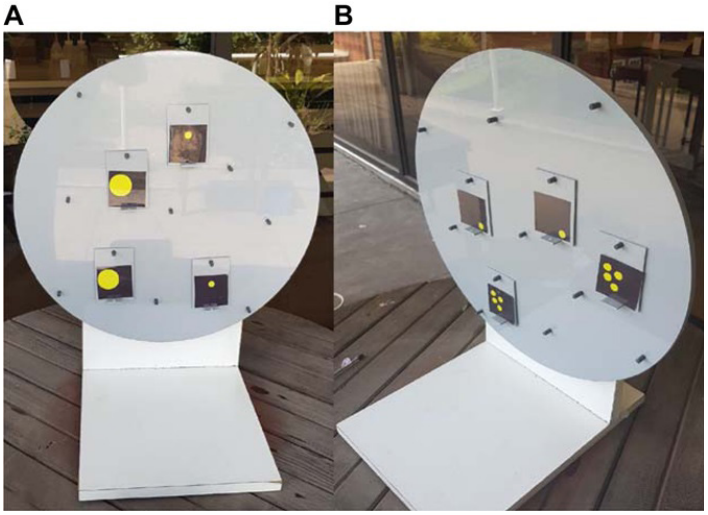
Australian zoologist Dr Scarlett Howard has determined that 'bees can perform basic addition and subtraction.

it involves a sign or symbol (a 'numeral') and relationships to other numbers (...greater than/less than etc.).

It's at this point scientists start to argue about 'bees counting. Sure, they can do the non-symbolic 'subitising' bit and maybe a little better, but can they make the symbolic abstraction that arithmetic depends on, or, does arithmetic depend on symbols at all? Is training them merely communicating the 'rules' they must apply to solve foraging teases? Surely the ability to count is not synonymous with the ability to understand numbers?[5] Is 'zero' cultural artifice or artifact?

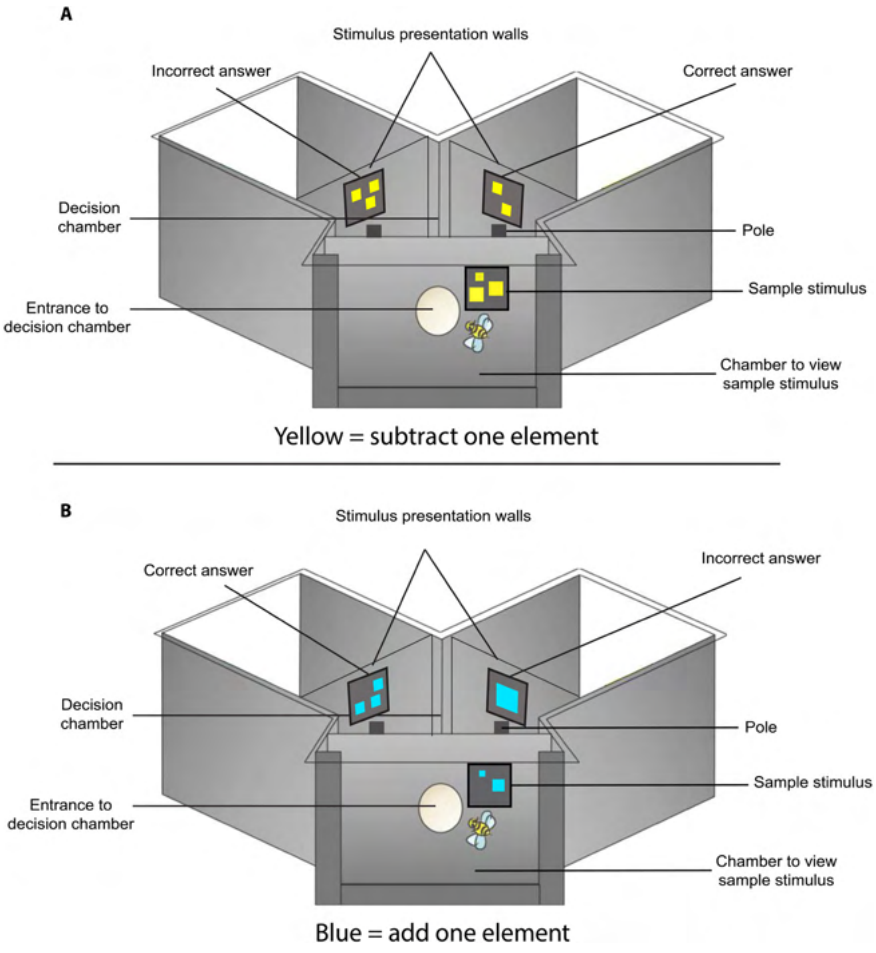
THE SIGNIFICANCE OF ZERO

The ultimate challenge must be the number '0', the number with no quantity. Five thousand years old and far from universal, it was just a placeholder, merely a punctuation mark, not a number. Essentially it meant, 'this position is empty', and it had to be written. In a conceptual leap two thousand years ago it became what we *think* of as a number, in Arabic *as-sifr*, 'the empty' (which gave us the word *cipher*), but it didn't become fundamental until the 17th century and the invention of graphs and calculus. We have to be taught the significance and rules for 'zero'. We understand it now as the set of things that contains nothing ('0'), which comes before the set of things that contains '1', in turn coming before the set containing '2' things, and so on, but that assumes you know what 'set' means, and what 'no-thing' refers to. Young children have to learn the contra-literal that 'nothing' *is* less than '1'.



A rotating screen with symbols used by Howard et al. to test spontaneous quantity discrimination in honey bees. Bees significantly preferred the higher quantity only in comparisons where '1' was the lower quantity and where there was a sufficient magnitudinal distance between quantities (e.g. 1 versus 12, 1 versus 4, but not 1 versus 2).

Zero must be the ultimate abstraction, a symbolic tool. It's nothing and everything. For you to imagine zero, there must be nothing, or at least nothing relevant. Zero is the absence of a stimulus, nothing for your senses to perceive. It's not entirely clear how we or anything else 'invents' nothing, the brain has to internally translate 'no stimulus' into a 'stimulus-absence' representation itself. Without zero, we'd have no computers, no



An experimental apparatus used by Howard et al. to train and test free-flying bees on their capacity to learn addition and subtraction.

calculus; no fancy engineering, no modern science. It therefore seems either pretty unlikely or pretty remarkable that 'bees make use of the concept 'zero'.

Scarlett Howard at Monash University in Melbourne has been using honey bees to untangle these ideas and provide some insight both into the capability of non-human animals, how and when this 'number-sense' developed, whether it always existed, or whether it's a skill arrived at separately over time by different species. Her work[6] doesn't just aim to tell us something about 'bees, but something about ourselves too. Howard shows intuitive and learnt number skills are not uniquely human. Motivated honey bees (it turns out motivation is important — who knew...)[7] demonstrate some ability to count and discriminate between different quantities[8], understand simple relationships between quantities[9], and understand no quantity, 'nothing', has a value less than any 'something'[10]. At the moment it seems unlikely they could spontaneously represent a quantitative value with a symbol they have chosen, and then use that symbol in other contexts, but they can associate some symbols we give them with a quantity or a task. In other words, for 'bees, sums are possible, algebra is not.

By studying honey bees, rather than, say, apes or parrots, Howard increases the evolutionary distance between 'us' and 'them', some 600 million years. That even this moderately complicated numerical facility is apparent in honey bees with a very different brain structure suggests that nature, 'evolution', has converged on a similar solution from different beginnings, rather than conserved an ability that existed for all this time. Honey bees may understand zero, but they must 'understand' it in a very different way.

When a bee flies from a hive she needs to be able to discriminate between various patches of flowers if she's going to forage effectively, although determining an incremental gain of two flowers to 251 flowers rather than 249 isn't likely to be significant. Choosing between twenty flowers and two hundred is the easy bit, she can just judge 'more', yet discriminating small quantities, small numbers, can be important. She also has to get there in the first place, and many observations show counting landmarks on her way there and back is something else she must 'keep in mind'. If she joins the dance-floor on her return, a sense of the 'quorum' for the dances might inform her next trip. There are lots of occasions when a 'bee might be 'conscious of' numbers.

Honey bees live short, complex lives. Their ability to synthesise a rich world-view from simple perceptions must be essential. Even if honey bees don't truly count, can't really accomplish mathematics, and must somehow conceive 'nothing' in some currently unimaginable way, the evidence that they can almost do it is surely astonishing.

Dave Black is a commercial-beekeeper-turned-hobbyist, now retired. 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.

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Food for Thought

The drone should never be a mere afterthought for beekeepers – including when they are in the kitchen – explains Aimz, who checks in amidst early season 'rounds' in the Bay of Plenty.

Who has a mother but no father, yet has a grandmother and a grandfather?

The Drone.

Offspring of an unfertilized egg, an essential genetic contributor or useless eater, varroa mite sink and furry bum fascination flying around children's bedrooms.

These stingless layabouts live their days for one shot at a virgin, the femme fatale, a quick thrill that will result in his organs ripped from his body as he plummets to earth, fulfilling his destiny.

Can also be used in a pinch as tasty hors d'oeuvres...

With proportionately more protein, and less fat than beef, bee brood has been eaten by humans for eons, at least since we began raiding colonies for honey.

Possibly, you could call them a superfood. Baby bees are full of vitamins A and D, magnesium, calcium, phosphorus, and potassium. They are soft, palatable, and easily obtained, and, unlike most other edible bugs, they have no uncomplimentary chewy or crunchy parts.

Occasionally, when I was a child, a frame of drone brood would end up in our kitchen. It was my job to pick the pupae out with a toothpick, the cappings having been removed with the scratcher tool. Mum would have her pan on high ready to go, and after a few minutes of sizzling and good smells, we were presented with an entrée to be fought over. Salty and buttery mmm.

So, with the spirit of memories and in the interest of making new ones to share with you, I brought home a partial frame of drone brood, (capped and between 13-20 days old) which had spent the night in the chiller – to share with my kids.

Sauté d'BuzzzeeBee aka fried drone pupae – a winner with Aimz's kids! Try it yourself…

Buzzin at the wheel… Having recently obtained a Class 2 truck driver's licence, Aimz will be behind the wheel for kiwifruit orchard hive deliveries in the Bay of Plenty this spring.

One child helped me extract the brood while two others claimed they "definitely wouldn't be eating *that*." Thankfully there were no mites to be seen (my back-up plan had been to disguise them with pepper). Collected, and a small batch thrown straight into a sizzling pan, those good smells soon arose. With a smidgen of soy sauce, the golden grubs were taken off the heat and tipped out on a paper towel. Lightly salted, close to dinner-time… what can I say, hunger and curiosity won them all over.

The verdict? I had to hold my four-year-old back so everybody else could try. Popcorn bees were a hit, an awesomely interesting treat, hoovered up in a matter of minutes. General consensus on the taste - a bit like chicken – and not at all like the sawdusty huhu grubs we fried and tried last week!

Would we do it again? Most definitely, bring on the party favours! In a months' time the drone brood will be bulging in the hives and it won't be quite as much work to procure a feed!

So, to my Mum, an inspiring, frugal, early pioneer of health foods, thank you for my acquaintance with this ancient human rite.

Nurture the propensity to gather and harvest that which we find in abundance and, you never know, maybe some of our readers may be encouraged to try their own *Sauté d'BuzzzeeBee*?

IN THE HIVES

Another month in the hives has seen activity picking up dramatically, tonnes of pollen and frames and frames of developing bees. We are adding brood boxes to any strong singles

with 4 or 5 frames of brood (the variables are incredible; seemingly heavy boxes have only brood frames and little reserves). The goal is 500 splits this year, and with the first order of queens coming early September the reality of busy times is fast approaching. We are finding the odd virgin queen and if she looks good, with brood in the hive to reference fertility, then we are leaving her to it, as drone numbers are multiplying with the increased daylight.

This will be my first season splitting hives and the spring build-up is already exciting. My head is whirling, and I am doing a lot of mental beekeeping even in my down time...

It does feel early, but the appearance of spring is all around us. Fruit trees on the Plains are beginning to flower, and the bees are working the golden acacia, along with Spanish heath and the immortal gorse. Wattles, five-finger, tree lucerne and some exotics and pasture weeds are also blooming as the pine pollen saturates us while we work.

There's even been the odd 'work-day' which has involved slow rocking on a boat 12 miles offshore (thanks boss). A stark contrast to the grind of pollination that is creeping up on us.

But I am gearing up for the season.

I have completed an AFB recognition course and test. Some good information and engaging discussions. The foul smell of AFB I can still remember from my childhood, as holes were dug and hives were burned. I have also attained my full Class 2 truck licence by attending an accelerated course. The class was invaluable, in much the same way as the defensive driver course I took as a teenager. Certain bits of advice will stick with me for life. Safer drivers, safer roads. There will be plenty of driving to do and I am looking forward to honing my skills by backing around kiwifruit orchards in the dark…

Until then, I hear the fish are still biting. Tight lines everyone.

Aimz

Tight lines… Getting a spot of fishing in before the spring rush is just good management.

Electricity Prices

BY IAN FLETCHER

High electricity prices this winter seem to be doing some real economic damage. Manufacturing under pressure, job losses, and of course retail prices likely to rise too. Meanwhile, warmer weather over the past week has sent wholesale prices down from around $1000/Megawatt hour to an average price of 1 cent as I write (I started on a warm Sunday evening). What should we think?

I should declare my interests: I led the team responsible for electricity and gas policy in the UK from mid-2000 to mid-2002. I am also a director of a technology spin-out from Massey University, Captivate Ltd, looking to commercialise a carbon-capture technology.

Electricity generation in New Zealand is dominated by legacy hydro systems. The last big scheme – the Clyde dam – was completed in 1993. It means we face a long-standing dry-year risk of low lake reserves. This is quite predictable. It always occurs in winter, when demand is high and rain is replaced by snow in the alps (so we get the water later, when it melts). In recent years, we've added more geothermal power, some wind, quite a bit of gas and the last-resort diesel plant at Whirinaki. Something over 85 per cent of our power is renewable (hydro, geothermal, and wind, in that order). Coal still plays a significant role, all burnt at Huntly.

Electricity demand is the big variable. Demand is growing with population, the electrification of transport, and improved living standards (more air conditioning and heat pumps). Demand is growing most around the north of the North Island, where most population growth is taking place. We know now too that the Tiwai point smelter will keep running for the foreseeable future. If it had closed, it would have taken a lot of pressure off the system.

Keeping the lights on in Auckland is getting more difficult, with the growing population putting a heavy strain on New Zealand's already stretched grid.

Not all electricity is created equally. The system needs steady 'baseload' power to keep it stable (managing the frequency, as well as keeping the vital high-voltage system 'lit'). It also needs lots of on-demand power to ensure the ups and downs of wind and future solar generation can be evened out minute by minute, together with ups and downs in demand. Hydropower is really good at all of this, but the days of big new hydro projects are probably over – too expensive, too commercially risky, and too environmentally controversial. Its importance will gradually fade.

So, we need to meet a lot of growing future demand from different kinds of generation. And we do it with a privatised system. Of course (as we've seen over the past fortnight), the system is also subject to a lot of political pressure and commentary.

Hoping for investment through a privatised system exposes an awkward truth: low electricity prices tell investors they should go elsewhere – there is enough power now. Only the prospect of higher prices, sustained over time, provide the signals to private companies that they can profitably invest.

Higher prices will also suppress demand (good in theory; less so if it's your job on the line). So, for consumers and workers today, low prices are good. But, for a better, sustainable generation mix, for less carbon emitted, and for a network big enough to meet future demand, high prices now are essential. In today's system, we can't say let's have high prices tomorrow – that would essentially mean rigging the market to ensure future profits.

This is a serious conundrum. The politics of today undermine the economics and environmental policies of tomorrow. Today will always win. So, expect continued dry-year crises, continuing use of coal, and (this government at least) encouraging more gas-fired generation. And expect continued political grandstanding whenever prices rise unexpectedly, as they surely will.

At least that will all keep the lights on. This is so-called security of supply: having enough extra generation on hand to meet

unexpected demand, or replace power lost through breakdowns, storms and so on. Generally, it means having to pay for more generation that we need in normal times.

Before privatisation, we did this by simply building dams ahead of demand, and investing in some North Island thermal generation (i.e. Huntley). After privatisation, this has been harder to achieve. The former reserve energy scheme has gone, and the Ministry of Business Innovation and Employment's website bravely says that security is provided by ensuring that market participants have clear incentives to manage risks. This is foolish: we know companies can only manage risks they can reasonably foresee, and can price. And of course, if an event strikes much of the industry at once, then the market will be overwhelmed by physical failures. No number of incentives, or penalties, or legal obligations can make electricity if the system is physically broken. Whatever the law says, the laws of physics always win.

The Clyde dam, the last big hydro scheme built by the government, completed in 1993. Hydro makes up the lion's share of the renewable electricity generation in New Zealand, and renewables around 85% of total electricity generation.

Cold dry winters will come and go. We cope with that. Windy politicians will come and go too. We cope with them. But if we are to keep the lights on, and meet some reasonable sustainability and zero-carbon goals, we will need to think again about prices, investment, security of supply, and the role of the government as regulator and as investor. The 1960s Ministry of Works beckons, at least a bit.

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.

Let's Strive for Integrity and Transparency

COLIN MCLEAN

Having come into the industry before the 'mānuka boom' one major change has been the growth of a number of corporate style businesses, some of them now foreign owned, who now dominate the mānuka honey export market. It is a significant structural change.

With high prices and high supply everyone was happy, but that has changed and will probably never return to what it was. One thing I'm seeing, for a number of reasons, is the reducing productive capability in the industry – it's an expensive industry to get into, so the attraction is no longer there.

Corporate style businesses thrive in boom times, but even now with the supply on the high side, they are struggling. So, when that balance changes, will there be the volume to compensate the reduced profitability?

I was a little puzzled that the UMF Honey Association, having been involved in the so-called Industry Strategy, was looking to take a lead and incorporate it under their own umbrella. This is a narrow focus on mānuka honey for export only and it would be hard to see where their interest lies beyond that. Are they trying to achieve a monopoly in determining outcomes and achieving their own goals? Are they prepared to share power?

The UMF logo was gifted to the association for the benefit of all beekeepers not just UMF members, however some of their members may act only out of self-interest rather than the good of everyone else. The risk in developing standards that suit an exporter is that it can compromise a producer, already buyer expectations are lowering the potential value and grade of my honey. Many beekeepers, and some packers, are very wary of power being put into the hands of a few who then seem to decide for themselves how things should be.

The Ministry for Primary Industries' relationship to the industry is not one of engagement in a democratic way, they have made a number of decisions that reflect this, but governments love export dollars and big exporters use this as leverage to further their own interests.

In my view, the productive base of the industry is facing a decline, if there are 500,000 commercial hives, with one person equivalent of 500 hives (it used to be more), that's only 1000 beekeepers, who are the backbone of the industry. Many are on the wrong side of 60, good labour is almost impossible to find, the challenges are greater than they have ever been and varroa is having a second wave of colony losses – already the impacts are being felt on pollination.

Unless Industry organisations, Government and big players, look seriously at how they are supporting producers then it will contract. The idea of a PMS for varroa is a red herring, a distraction, it will never happen as it won't work. Some people are focused on "big plans", rather than the nuts and bolts of how things work. What has been lacking for a long time is commercial beekeepers having a deciding role in decisions that affect them.

Integrity and transparency go hand-in-hand and the industry will never be united unless that exists. After all, the authenticity of mānuka honey is based on these principals.

Colin McLean is a beekeeper of 40 years' experience across Hawke's Bay and now Great Barrier Island where he owns and manages 450 hives.

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