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# APIARIST'S ADVOCATE



News, Views & Promotions - for Beekeepers - by Beekeepers

## Landmine Landscape

We review the mānuka honey landscape  
– where investors fear to tread...



**Note:** This report was first prepared for publication in April. *Apiarist's Advocate* has updated the original report in the sections that have been overtaken by recent events related to the abandoned takeover proposal for Comvita Ltd and decision by Nestle S.A., the Swiss multinational food and drink processor, to divest from Egmont Honey Ltd. A basic glossary of investment terms has been added, some financial terms have been explained within the report, and share prices have been updated to closing prices for 26 July.

# The Landmine Landscape of Honey Company Mergers and Acquisitions



While the economic challenges of operating a mānuka honey business at the ground level of the industry have become stark for beekeepers, multiple risks confront investors who hold stakes in exporters of the product. Share prices in listed New Zealand mānuka honey companies

Comvita Ltd and Me Today Ltd have plummeted 61.2% and 85% respectively in the past year. Writer, former securities analyst, and honey trader Bruce Roscoe reviews the 'landmine landscape' of an industry where investors fear to tread.

BY BRUCE ROSCOE

**Two honey companies are listed on the New Zealand Exchange. One, Comvita Ltd, received an unsolicited offer to purchase all its shares earlier this year, which was withdrawn in May. The other, Me Today Ltd, is soliciting offers to acquire what remains of its honey business.**

Comvita, the flagship NZ producer and exporter of mānuka honey and related products, has built tangible brand value. Though its global footprint is wide Comvita is a China-centric company in profit dependence, staff placement, and ambition.

As the largest listed play on mānuka honey in any market Comvita is a frequent target of speculative interest. A 2011 hostile takeover offer saw the company reach for the shark repellent. Not this time. Comvita engaged the NZ unit of a top-tier New York investment bank as advisor before the offer was withdrawn. For a few months at least, there was the possibility that, in the 50th anniversary year of its founding, Comvita would change hands.

Nor does this analysis conclude that Me Today can soon locate a buyer for King Honey Ltd, which it has all but dismantled since agreeing a NZD36m valuation in June 2021.

Me Today has closed four of five King Honey facilities, cut beehive numbers 90.1% to 1,700, and in its last full year lost NZD1.52 for every dollar of honey sold. If the company's estimated 480-tonne honey inventory cannot readily be converted to cash, Me Today's yesterdays are likely to outnumber its tomorrows.

Investors tread a landmine landscape in assessing publicly quoted honey companies which fit the profile of neither growth nor cyclical nor value stocks. Neither Comvita nor Me Today has peers that can serve as valuation yardsticks.

Data delayed by 20min | last updated on 27/07/2024, 15:20 NZST

<b>CVT</b>	Instrument Name	Comvita Limited Ordinary Shares
\$1.2200	Issued By	Comvita Limited
\$0.0000 / 0.00%	ISIN	NZCVTE000157
52 Week Change: <span style="color:red">-51.9200 / -81.13%</span>	Type	Ordinary Shares

Data delayed by 20min | last updated on 27/07/2024, 15:32 NZST

<b>MEE</b>	Instrument Name	Me Today Limited Ordinary Shares
\$0.0790	Issued By	Me Today Limited
<span style="color:red">-0.0010 / -1.25%</span>	ISIN	NZRLV000152
52 Week Change: <span style="color:red">-0.4480 / -85.01%</span>	Type	Ordinary Shares

*A loss of investor confidence in mānuka honey exporters Comvita, top and Me Today, bottom, has collapsed their share prices in the past 12 months. As share prices are indicative of future earnings prospects and as Comvita is the flagship mānuka honey exporter, the company's share-price performance can be seen as a bellwether for industry prospects as a whole.*

## GLOSSARY

### GROWTH, CYCLICAL, AND VALUE STOCKS

Growth stocks describe companies whose earnings show a promise or trend of growth; cyclical stocks characterize companies whose earnings reflect the peaks and troughs of economic cycles; and value stocks describe companies whose share price does not reflect underlying asset value.

### UNCAPTAINED "INDUSTRY"

Nor do they participate in an "industry" in the sense of companies united in purpose. The honey "industry", rife with factionalism, appears uncaptured and rudderless. As much was conveyed in the document "*New Zealand Honey Strategy 2024-2030 – Thriving Together*" released in February by Apiculture New Zealand (ApiNZ), to instant attack.

(For "honey" read mānuka honey, which in CY2023 at 8,420 tonnes and NZD319.3m – monofloral and multifloral retail pack and bulk total – accounted for 85.5% and 80.7% of NZ total honey exports by volume and value.)

ApiNZ's observations echoed those made 12 years earlier in the Coriolis Research report "Investment opportunities in the New Zealand honey industry". More opportunities exist now than then as producers seek to call time.

In 2016 and 2022 Melita Holdings Ltd (Havelock North) and Perry Group Ltd (Hamilton) consolidated several mānuka brands under collective-type umbrellas, but those examples are atypical. Decades of honey production and marketing expertise underpinned the brands.

Ngāi Tahu Holdings Corporation Ltd purchased a half share of mānuka producer Watson & Son in 2016. When later converted to a full share (less the medical honey component of the business) the investment had cost NZD110.1m.

As though blue-sky blind Ngāi Tahu then chief executive Mike Sang in 2016 told a Ngāi Tahu website writer that the venture with Watson & Son was "...\$30 million annual turnover at the moment.



*Falling share prices of New Zealand's two publicly listed mānuka honey exporters, Comuita Ltd and Me Today Ltd, and Egmont Honey publicly declared for sale just two years after last changing hands, signal a "landmine landscape" for prospective investors.*

When we're \$300 million, it will look different". In the seven years to follow Ngāi Tahu would disclose operating losses of NZD100.5m and net losses of NZD122.1m from the mānuka business.

(Actual losses were greater. Ngāi Tahu did not isolate Watson & Son-venture operating losses in one, and net losses in four, of the seven reporting years.)

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"We underestimated the risks and overestimated our ability to manage those risks", Ngāi Tahu admitted in its 2019 annual report. Due diligence had begun in earnest a year after the acquisition, when Ngāi Tahu came to distrust data relating to assets.

The Ngāi Tahu foray contrasted with the acquisition of Mānuka Health New Zealand Ltd by Pacific Equity Partners Pty Ltd, an Australian private equity fund manager. PEP funds bought Mānuka Health NZ in December 2015 for NZD110m and three years later on-sold the company to Guoco Group Ltd, a Hong Kong Stock Exchange-listed company majority-owned by Leong Company (Malaysia) Berhad, for NZD260m, according to Land Information New Zealand records.

Nestlé New Zealand Ltd's NZD375m acquisition of ORA New Zealand Ltd in August 2022 represented a package of three companies that included mānuka producer Egmont Honey Ltd. Later Nestlé New Zealand's owner, Nestlé S.A. of Switzerland, emerged as the ultimate 75.1 per cent owner of Egmont Honey for undisclosed value.

#### HAPHAZARD REGULATION

Those landmark cases aside, investors have not been seduced by whatever "investment opportunities" the Coriolis report believed it had identified in 2012. Regulatory, market, and valuation risk keep them at bay.

The honey industry is regulated haphazardly. The Ministry for Primary Industries (MPI) applies different regulations to the

home and export markets and regulations for export markets are not applied uniformly. Maximum residual agricultural chemical levels and the ministry's scientific definition of mānuka honey are examples. Confusion results and presents material risk.

MPI interprets the Australia New Zealand Food Standards Code to the disadvantage of New Zealand producers by disallowing the word "active" on mānuka honey labels, while Australia allows use of the word. "Active" is the term central to consumers' reason to purchase mānuka honey.

Industry failure to agree on a scientific definition for mānuka honey to defeat counterfeiting resulted in MPI imposing two definitions. Arguments continue.

The backdrop to regulatory shortcoming is that MPI officials view mānuka honey largely as a sunshine industry for shady people where, from a public service viewpoint, the risk/reward ledger has no counterweight in the reward column.

#### BRAND DILUTION

Market risk is two-fold. Online store discounting of mānuka honey by 50% or more has become commonplace and signals a commoditization that may not reverse. Brand dilution foreshadows the product value loss.

Mānuka producers, packers, and traders are submerged in a sea of "brands". The Unique Mānuka Factor Honey Association (UMFHA), which in licensing draws little distinction between Arataki Honey Ltd and Amway China E-commerce Co., Ltd, has "certified" as many as 200 mānuka "brands".

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*Me Today engages All Black Beauden Barrett – centre – as a brand ambassador (and Hannah Barrett, an accountant and Beauden's wife, is a Me Today director). However, the Barretts' efforts, along with those of chairman Grant Baker, left, and Me Today founder Michael Kerr, right, haven't stemmed the tide of losses for the publicly listed company.*

UMFHA licensee supply to offshore private-label mānuka sellers accounts for several score more "brands". Packers unaffiliated with UMFHA similarly export own-labelled or private-brand-labelled product, or naked jars for who-knows labelling offshore.

No one can count the "brands" fed by the 4,386 tonnes of bulk mānuka honey certified by MPI as "monofloral" that NZ exported in the five years to CY2024. In the oxymoronic (multiple/single) category of "multifloral mānuka" the final product appearance of the 2,448 tonnes sold in bulk over the same period is unknown.

On top of which Australian honey producers, emboldened by their defeat of all NZ attempts to secure a certification trademark for not a mark as such but for the two words "mānuka honey", have a sizeable presence online and in offshore retail. From that beachhead they launch other strongly antibacterial honeys such as jarrah.

It is against this ocean of dilution that we read the Me Today chairman's address to the shareholders' meeting in December 2022, the first such since acquiring King Honey.

"In terms of brands", said the chairman, "we now have three focus brands all of which have their own clear brand identity". The word "brand" occurred in the address no fewer than 62 times.

Me Today endeavors to relay brand value through website images of a former prime minister and an All Black and a story about the breast cancer of the wife of a co-founder. It advertises product certification by the U.S. Food and Drug Administration. Comvita holds FDA certification in the medical device category for mānuka honey wound dressings. No such products are found in the Me Today lineup.

If "brand value" signifies "added value" then in mānuka honey there is none. Bees have perfectly formulated the honey and the more it is processed the less it is worth, although post-harvest through controlled-temperature storage packers can grow the antibacterial strength of the honey.

Brand value rather accrues through product knowledge and the quality control and reliability in packing achieved over decades of dedication and experience.

The name "Comvita" in some China circles has become synonymous with "mānuka". It is a clear single-word brand and Comvita mānuka honey is known by no other name. Perhaps no more than five major NZ honey exporters operate brands of comparable clarity. Beneath which is a second-tier of perhaps no more than eight meaningful and recognizable brands forged by family-owned companies. Many, if not most, of the remaining hundreds of mānuka brands appear as all but dissociative paint splatter.

Which brings us to valuation. Industry disunity, and the absence of publicly quoted peers, retard due diligence.

Advisor reports prepared for Me Today capital raises contain no industry analysis which should accompany company analysis. Instead, they parrot template expressions such as "...the information...is sufficient to enable shareholders to understand all the relevant factors and to make an informed decision..."

#### THE CAPILANO COMPARISON

In the case of Comvita, however, we have the revealing example of Australia's Capilano Honey Ltd.



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Capilano, until November 2018, was quoted on the Australian Securities Exchange. Its delisting followed acquisition by a China-focused investment fund and private equity investor. (Capilano is now a unit of Hive & Wellness Australia Pty Ltd.)

Comvita and Capilano are bees from similar hives. They are each their home country's largest honey producer and boast 50 and 70-year histories. Both owe their expansion to mānuka. Comvita's medical honey business was begun by Capilano. Both companies have been equal partners in the mānuka venture Medibee Apiaries Pty Ltd since 2015.

In the year of its acquisition Capilano recorded sales of AUD138.5m (to June 2018; Comvita NZD178.5m to the same year-end) and net profit of AUD9.8m (Comvita, NZD8.2m). EBITDA (a crude cash flow value where depreciation and amortization are added back to operating profit) margins were also comparable: Capilano's 11.6% vs. Comvita's 11.5%.

Operational result and earnings measures, though, are where Capilano and Comvita diverge. ASX and NZX market valuations treated the pair as sushi and soufflé. Capilano traded at a price to sales ratio of 1.07x (meaning total share value or market capitalization approximated total revenue) at the time its takeover offer was announced. Comvita currently trades at a price to sales ratio of 0.37x. Which tells us that NZX does not understand Comvita.

(Honey company earnings are so hostage to weather and fickle foreign markets that the price to earnings ratios applied to growth companies do not assist valuation.)

Similarly on a price to net asset value basis, ASX recognized that Capilano deserved a premium. It traded at 2.2x NAV at the time of the takeover offer. Comvita currently trades at a 64.2% discount to NAV.

If Comvita were acquired today on the same terms as the Capilano transaction only six years ago, the offer price would be NZD4.80 per share (26 July closing price: NZD1.22).

Amid mānuka honey oversupply and retreating Chinese demand, Comvita's suitor likely was bottom fishing. But Comvita is not distressed and an offer even double the current price would unlikely impress its directors. Response to the hostile bid announced 14 October 2011 by the defunct Cerebos New Zealand Ltd (then majority owned ultimately by Japan's Suntory Beverage and Food Ltd) is instructive.

At a time of foundation laying for long-term growth, Comvita rebuffed the Cerebos NZD2.50 per-share offer as "opportunistic", saying it undervalued the company by a "considerable margin". In the target company statement it also disputed its advisor's valuation range of \$3.40 to \$4.00. Shareholders remained loyal to a company they viewed as woven into the fabric of NZ. (Comvita closed at \$2.10 on 13 October 2011, NZD0.88 higher than the 26 July 2024 close).

### A NEEDED QUESTION

Inventory presents a large valuation issue that should prompt investment advisors and auditors to seek knowledgeable industry input before they issue recommendations or approve financial statements.

Honey producers wear a brave face and gag about excess stock. "A truck laden with drums of honey hurtles around the bend", one gag goes. "Is it carting the drums to a secret location to hide them from liquidators? Or rushing them into cool storage to keep a lid on HMF values?" "Could be doing both!" is the off-stage line.



*The clear single-word brandname "Comvita" in some China circles has become synonymous with the word "mānuka". By contrast many of the hundreds of other mānuka honey brandnames appear unanchored and unrecognizable.*

### GLOSSARY

#### EBITDA

Earnings before interest, tax, depreciation and amortization. A crude cash flow value where depreciation is added back to operating profits to gauge the amount of cash a business is generating.

#### PRICE TO SALES RATIO

'Price' refers to the total value of a stock-exchange quoted company calculated by multiplying the number of outstanding shares by the share price. This value is called market capitalization. Sales refers to the total revenue generated by the company. Divide market capitalization by total revenue to produce the price to sales ratio. This ratio is a starting and rough benchmark for valuing a quoted company.

#### PRICE TO NET ASSET VALUE (NAV)

Market capitalization divided by net asset value (total assets less total liabilities). Usually expressed as a per share value. Divide NAV by number of shares. Compare that per-share value to the share price as an indicator of whether the share is under, or overvalued, relative to its asset backing.

HMF abbreviates hydroxymethylfurfural, a compound formed by the dehydration of sugars. HMF content in honey grows over time and can indicate heat damage. In its quality standard for honey the Food and Agricultural Organization of the United Nations limits HMF to 40 milligrams per kilogram of honey.

To which harvest years did the 500 tonnes of honey Me Today acquired from King Honey belong? Were any of the some 1,300 drums retested in order to confirm the inventory value Me Today's balance sheet records as a current asset?

Neither advisors nor auditors appear to query that value. Yet a honey packer will not always rely on the laboratory report that accompanies a mānuka seller's drum. The packer may commission a confirmatory test for HMF among other compound levels and, depending on the result, renegotiate price.

Investors must ask whether the current asset value is accurate, insofar as the honey component can be converted to cash within 12 months. After all a "current" asset is defined as a cash equivalent. If inaccurate, then working capital requires recalculation which will test the viability of the business.

Yet the hundreds of tonnes of honey Me Today counts as a current asset and the thousands of tonnes of honey the industry in sum is recording as "current" perhaps belongs in a different balance sheet section. For companies that lack sales it is more a long-term liability, a borrowing from bees upon which repayment will fall due.

High mānuka inventory is not necessarily a warning. Volume is needed for blending to meet MPI definitions, produce the grades

of mānuka that export markets require, and dilute high HMF content. For investors the key top-line measure becomes the ratio of revenue to current assets.

Those ratios for Comvita and Capilano in the year of Capilano's acquisition were 1.0x and 1.8x, the lower Comvita ratio reflecting higher inventory and by extension almost certainly a more mature mānuka business. For the year to June 2023 the Comvita ratio was constant at 1.1x and that of Me Today 0.4x. Me Today had become a metaphor for the industry: honey export volume / estimated inventory = 0.4x.

### MARKET RECKONING

ApiNZ had issued warning enough that a market reckoning was due. It wrote in March 2021: "...we estimate the total volume of honey stored in NZ to be in excess of 30,000 tonnes..." That should have red-flagged Me Today's planned acquisition of King Honey which was completed later the same year.

The stock of unsold honey equalled 2.4x total export volume for CY2020. (Export volume had nearly doubled to 12,761 tonnes in the 10 years to that peak year.) Expressed as exports/inventory the ratio was 0.4x. The per kilogram FOB price had more than doubled to NZD39.61 from the NZD15.01 recorded in 2010. Where mānuka stood some producers and traders had begun to see Dutch tulip bulbs, believing that all that was harvested could be sold at ever higher prices.

King Honey, a newcomer that had launched only in 2011, held no reservoir of experience from bad years. As markets fell away

Me Today was poised to catch a falling chainsaw, below which lay a growing array of mortuary tablets of those who thought that mānuka was easy money.

Me Today claimed King Honey failed to disclose unsold stock held by a Chinese customer. Legal action was mooted, but abandoned due to the complication of the King Honey owner having provided vendor finance. Painting King Honey as the bad guy was disingenuous. Me Today had recorded consecutive operating losses totalling NZD3.7m in the two years before the acquisition.

Reporting as ventures engaged in Chilean iron ore mining and Australian scrap metal exporting (ironically to China; "SCM" in Me Today's forebear's name abbreviates China Scrap Metal), the reverse listing vehicle that accommodates Me Today has recorded

### GLOSSARY

#### REVENUE TO CURRENT ASSET RATIO

Divide total revenue by the value of current assets. (A "current asset" as opposed to a "long-term" asset is one that is convertible to cash within 12 months.) A low ratio indicates a healthy company as current assets such as honey inventory are quickly being converted to revenue.

#### REVERSE LISTING VEHICLE

A stock-exchange quoted shell company that acquires or is acquired by a company that is unqualified to list on a stock exchange. After the acquisition, shares in the unqualified company can be traded on the exchange. The practice is called a 'reverse' or 'backdoor' listing.

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The mānuka honey industry is subject to haphazard regulation which limits investor confidence.

net losses in all but one of 15 full or adjusted reporting periods since its conception in December 2009. (The June 2012 year profit resulted from a foreign exchange transaction.) Operating losses were recorded for all reporting periods while funds were found to pay director fees of USD2.3m and NZD2.1m.

Me Today writes of "ring fencing" King Honey as though mānuka were a toxic substance. Although the term refers to reassignment of debt, observers will sense a thick nuance of fear. The advisor to the latest capital raise warned that liquidation was an alternative to subscription to a rights issue that would allow time for the shrunken King Honey to be sold.

Me Today plans more mānuka product launches without operating a honey business. It has learned what offshore honey companies and brand owners – particularly those in the United Kingdom – have long known. Which is that direct investment in a honey producer is not only risk-fraught on multiple fronts, but unnecessary when the raw material can be bought in drums at a small fraction of the cost of retail-ready product.

Even before Ngāi Tahu and Me Today retired thousands of beehives, threadbare beekeepers were exiting the gates of properties they would never own. "We all know that the industry has grown rapidly over the past ten years, but not all are feeling those gains", ApiNZ chief executive officer Karin Kos wrote in April 2022.

Registered beehive numbers have plunged 36.4% to 583,608 as of July 2024, from the 2019 peak of 918,000. There is now a danger of over-correction in an industry that knows no normal.

Capilano shareholders were able to exit at a 34.2% premium to the share price. After the acquisition Capilano would remain in Australian hands. Absent an offer as alluring as made in the Capilano case, the majority of Comvita shareholders can be expected to hold and wait. Their wait may be long.

Comvita's flagship status carries the danger that it will be viewed as a symbol of industry malaise. Moreover, its reliance on China as a pillar of earnings may relegate the stock to a China consumption recovery play.

Capilano recognized that it was unsuited to public ownership. Privatized it could make investments in developing markets without "having our results analyzed every six months", Dr Ben McKee, then managing director, told Fairfax Media.

Comvita appears inherently unsuited to stock exchange listing. In remarks following a call with investors in August 2019 Comvita acknowledged it was "under the shadow of a languishing share price" that undervalued assets. Little has changed.

Investment in Comvita should most reward management, employees, and beekeepers among other suppliers who understand the intricacies and risks of the business. A Fonterra-like structure and specially listed vehicle such as Fonterra Shareholders' Market would assure continued NZ ownership to the benefit of producer-shareholders.

Me Today may not even meet current NZX criteria for listing. Its market capitalization is 57.1% less than the minimum NZD10m that NZX "generally" requires. Moreover, the question whether a reverse listing vehicle should remain quoted on a stock exchange after reporting net losses in 10 consecutive years is unanswered.

**\*This analysis uses the 26 July 2024 closing share prices of NZD1.22 and NZD0.079 for Comvita Ltd and Me Today Ltd.**

**Bruce Roscoe is a writer and former director of research for Deutsche Bank Securities Japan. He also consults to honey traders, some of whom from time to time may compete with Comvita Ltd and Me Today Ltd.** 🐝

#### GLOSSARY

##### DIRECT INVESTMENT

Acquiring a majority holding in a company through direct share purchase from the company rather than by purchasing shares through a stock exchange.



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# UMF Mānuka Honey: Made in Japan



BY BRUCE ROSCOE & PATRICK DAWKINS

The Unique Mānuka Factor (UMF) brand has been synonymous with authentic mānuka honey since its inception in 1998 and an important part of that understanding is, product which displays the brand must – almost always – be packed in New Zealand.

A recent misstep from a UMF Honey Association (UMFHA) member which allowed Japanese filling of honey bags brings the Association's rules into scrutiny, at a time when UMF has very real potential to become the industry-wide mānuka honey standard.

## A Japanese honey company has imported UMF mānuka honey in bulk and poured it into beverage bags for sale online.

The company, Hands Trading Co., Ltd of Osaka processed the bulk mānuka honey, which it imported from 100% Pure New Zealand Honey Ltd, at its Kishiwada factory in the Osaka Bay area. Hands Trading processed the honey into three products, all poured into food beverage bags – creamed UMF10+ in the 120g size and liquid UMF10+ in the 120g and 300g sizes.

The offshore packing of mānuka honey bearing the UMF logo of UMFHA appears to violate a longstanding association rule that UMF-labelled mānuka honey can be packed only in New Zealand. UMFHA makes exceptions to this rule for products that

use UMF mānuka honey as an ingredient such as cosmetics or nutraceuticals where it can be shown that New Zealand lacks the capability for their manufacture or labelling.

Chief executive of 100% Pure New Zealand honey, Sean Goodwin admits he made a mistake in allowing the offshore packaging to take place, but that to his understanding the type of packaging is not available in New Zealand. He admits they should have sought approval from UMFHA though.

"The mistake I made was, I should have talked to Tony first up," Goodwin says, referring to UMFHA chief executive Tony Wright.

Production of the "Poured in Japan" UMF product began in late April, a Hands Trading spokesperson confirmed. The Kishiwada factory, which also processes a range of honeys imported in bulk from Australia, was custom built for honey storage and processing and completed in September 2023.

None of this bulk trade or Japan value-added processing is guarded as secret. Rather Hands Trading, under the corporate slogan "Better life, better self!", reveals the details in graphic images on its own, Amazon Japan, Rakuten, and Yahoo Shopping webstores.

"Visitors to our factory from 100% Pure New Zealand Honey gave us their taikoban (stamp of approval)!" says text printed over a photo of the delegation posed smiling in front of the factory.

The lead graphic for the beverage-bag UMF mānuka declares: "Affordable liquid type / New release of mānuka honey UMF10+ / Filled in Japan / UMF certified mānuka honey / New type / New Size / Honey Valley & NaTruly."

There is a longstanding relationship between 100% Pure New Zealand Honey and Hands Trading Co, with Goodwin saying they have been supplying the Japanese company with UMF branded mānuka honey for more than 15 years and that they are a trusted customer. Up until a request earlier this year, all honey had been packed in New Zealand.

"Earlier this year, they opened a new facility to help manage their honey, which includes types from various countries. They identified an opportunity to sell small pouches of various honeys, as starter packs to entice new consumers. They asked about the opportunity to pack a small amount of mānuka honey in these packs, to sit alongside other honey types," Goodwin explains.



The webstore graphic used by Hands Trading Co., Ltd of Japan to introduce the three UMF10+ products it packs at its factory in Osaka from bulk mānuka honey imported from 100% Pure Honey New Zealand Ltd.

Source: Rakuten.

### IN THE LONG SHADOW OF AUSTRALIA

Where the honey sits, in online trading stores, provides further context to how the breach of UMF rules has come about.

Hands Trading markets the three UMF10+ products jointly under its "NaTruly" (Natural x True) brand and the "Honey Valley" UMF brand of 100% Pure New Zealand Honey Ltd. E-commerce platforms Amazon Japan, Rakuten, Yahoo Shopping and Hands Trading's webstore are the retail outlets. Any belief, however, that this marketing and sales activity focuses on New Zealand mānuka honey is mistaken.

The three UMF products are a minority component of a 12-product suite. Eight of the remaining nine products are Australian origin and packed in the same-size beverage bags, and six of those are antibacterials that clash with New Zealand mānuka – "Premium Mānuka Honey MGO30+" (liquid type), "High Active Jarrah Honey TA25+", "Premium Active Jarrah Honey TA35+", "Wild Bush Honey TA5+", "Eucalyptus Honey TA10+", "Premium Active Marri (redgum) Honey TA35+", "Mānuka Blend" (a mix of the mānuka MGO30+ product and the wild bush TA5+ product), and "Leatherwood Honey". German "Natural Black Forest Honey" completes the suite.

Reinforcing the minority status of the three UMF offerings is the NaTruly gift set that selects five Australian origin honeys.

Moreover, New Zealand mānuka honey is leveraged in webstore product descriptions to give equal billing to Australian antibacterials – "The power and deliciousness of Premium Active



*The text over the photo reads: Collaboration across the seas. A new Mānuka honey made possible by Hands, the official distributor of Honey Valley mānuka honey. Representatives from 100% Pure New Zealand Honey visited our Kishiwada factory. We received their stamp of approval for our production of Honey Valley brand honey, latest filling equipment, low-temperature warehouse, and the technology we developed for our NaTruly honey products.*

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Jarrah Honey TA35+ is on a par with mānuka honey"; Premium Active Marri (redgum) Honey TA35+ is a "substitute for mānuka honey"; "Eucalyptus Honey TA10+ is in the same plant family (Myrtaceae) as mānuka".

How to explain TA35+, MGO30+, and UMF10+? All three rating systems appear in Hands Trading's antibacterial honey lineup. The company knows better than to test the attention span of online shoppers with terms such as peroxide activity, catalase, non-peroxide activity, dihydroxyacetone, methylglyoxal, leptosperin, and hydroxymethylfurfural. Or wade in other pseudo-scientific swamp. So, keeps it simple. High numbers win: TA35+ is "the world's highest level" – of antibacterial strength.

The 10 in "UMF10+" as the lowest of the three values requires a different selling point. Hands Trading invokes Wellington: "UMF is the first official New Zealand government grading system to guarantee the purity and quality of Mānuka honey". And cites scarcity: "New Zealand produces only 1,700 tonnes of genuine Mānuka each year". (StatsNZ data record monofloral mānuka honey exports of 6,363.3 tonnes – the combined total for retail pack and bulk – for calendar 2023.)

For its MGO30+ Australian mānuka honey Hands Trading references First Nations people: "Mānuka...has been treasured as a sacred tree by Aboriginal people since ancient times". (No mention can be found of Māori language or heritage in any product description.) And repeats the boast that the company "...overturned the image of mānuka honey by producing a liquid type".



画像にマウスを合わせると拡大されます

*A Happy Valley 120g bag of mānuka honey bearing the UMF brand – packed offshore in breach of UMFHA rules. 100% Pure New Zealand Honey chief executive Sean Goodwin says Hands Trading Co has been told to remove the brandmark.*

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### RATING SYSTEM FAILURE

100% Pure New Zealand Honey is a staunch believer in, and supporter of, the UMF brand – and long has been – Goodwin says, and that it was a desire to do-right by UMF and simplify a confused market place that led to the misstep of allowing use of the UMF brand to offshore-packed honey.

"I said to them, 'we want it to be UMF'. It is already a confusing enough market and when you go and put MGO on one Honey Valley product alongside another UMF Honey Valley product, I don't like it ... The alternative would have been to use an MGO rating. However, I felt that was not appropriate and itself would be a breach of our UMF licence agreement, by promoting an alternative rating system under the same brand," Goodwin says.

### A QUESTION OF ASSURANCE

But can the UMFHA assurance of purity and quality attach to UMF10+ products processed from imported bulk and poured into bags at the Kishiwada factory in Osaka? After all, mānuka honey is thixotropic or gel-like. Yet Hands Trading is retailing it in a liquid state.

"We are confident that the finished product being sold under our brand is authentic, based on the 15-year relationship we have with this customer and their business integrity," Goodwin says.

"We supplied UMF-tested honey and they have used that batch to provide assurances to their consumers. Over many years, this customer has invested in building a positive reputation for quality and authenticity."

What assurance does the UMFHA have that the Honey Valley UMF bags meet the standards required to carry their mark? Their chief executive was not willing to answer questions specific to the 100% Pure New Zealand Honey/Hands Trading Co arrangement.

"Sean and I have had a chat about it and have come to an agreed resolution on it," was all Wright was willing to say.

Regarding offshore packing of UMF branded honey, Wright says it is "not something we readily endorse".

"There have been products, it is not so much normal honey, but when the honey is being used as an ingredient in something else. That is when the technology or processing capability doesn't exist in New Zealand to get the honey into the final product it needs to be. So, we have had a few cases where we have said 'yeh, OK, that makes sense', and the operators at the other end we have had confidence in. The instances I am aware of and have had involvement in, they are not processing any other types of honey, or they have had really good segregation systems which gives confidence it is not going to get mixed up with something else. The capability is there, it is a tiny part of what gets endorsed by UMF though."

The UMFHA chief executive says he is not aware of any previous breaches to the offshore packing rules, such as 100% Pure New Zealand Honey have made.

Goodwin says they have told Hands Trading Co to remove UMF branding from the Japan-packed product.

UMF mānuka honey that is jarred in New Zealand for export is double-tested to assure it is true to the UMF value printed on the

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label and meets the relevant mānuka honey scientific definition operated by the Ministry for Primary Industries. Samples from the drum are first tested and those tests are repeated for samples from the jarred product. UMFHA issues a certificate to the licensee upon satisfactory completion of the second set of tests.

It seems unlikely that the second set of tests, which most protect consumers as it is the final product rather than the raw material that is tested, can be conducted outside New Zealand. The question becomes, how can UMFHA, which says its grading system "assures purity and quality", certify the UMF10+ product poured in Osaka?

**Note:** Honey Valley originally was a brand of Honey Valley New Zealand Ltd, one of the eight Stephen Lyttle / Carolyn Ball honey companies that were amalgamated into NZ Mānuka 2022 Ltd in 2022 which ultimately is majority owned by Perry Group Ltd of Hamilton. 100% Pure Zealand Honey Ltd was among those eight companies.

*Bruce Roscoe is a writer and former director of research for Deutsche Bank Securities Japan. He also consults to honey traders, some of whom from time to time may compete with 100% Pure Zealand Honey Ltd* 🐝



*Hands Trading online store graphic describes UMF as a "quality assurance system approved by the New Zealand government".  
Source: Yahoo Shopping Japan.*

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# A Ratings Disaster



Why did 100% Pure New Zealand Honey provide honey to an offshore packer and then allow them to use the Unique Mānuka Factor (UMF) landmark on that product, as detailed in *UMF Honey: Made in Japan?* A well-intentioned effort to maintain the standing of UMF, so says the chief executive, highlighting the convoluted environment which competing honey 'rating' systems have created.

**"What I should have said, in hindsight, was, 'just put MGO on it and don't worry about it,'" 100% Pure New Zealand Honey chief executive Sean Goodwin says of their dealings with a Japanese honey client earlier this year.**

In an effort to maintain a uniform rating systems on all their Honey Valley products – both those packed in New Zealand and the new product filled in Japan – the decision was made to allow use of the UMF landmark, alongside a MGO rating

Many UMF licence holders display both UMF and MGO ratings on their mānuka honey, in an apparent effort to appeal to more consumers. It is those that market multiple labels in the same country, but use different ratings, which most frustrates Goodwin though, and is what he wanted to avoid.



*The UMF logo which licence holders display on their mānuka honey labels, but which some are not using universally.*

"They have exactly the same label in one market with UMF on it and another with MGO on it. What is that? That is pulling down the UMF credibility in the market. Why are they doing it? It is completely against the rules," Goodwin says.

The use of MGO, or any other rating system, diverts potential income from the UMF Honey Association (UMFHA), reducing their ability to undertake industry-good.

"When those companies skirt the rules, not only do they skirt the rules, but they take money from the organisation because that company that was trading as UMF is now trading has MGO. They don't pay a royalty on it and therefore nothing goes back into supporting the certification trademark efforts or the legal protection on mānuka."

So, what is UMFHA doing to prevent licence holders from actions which undermine their very value? Chief executive Tony Wright says, if the product doesn't have a UMF label on they don't follow it up, even when they know it is coming from one of their licence holders.

"We provide a licence to use a trademark, if the trademark is not being used, then the licence doesn't apply. That is my view. If people want to debate that, we can have a debate. But simply, if you are not using the licence, you are not subject to the licence agreement," Wright says.

With the New Zealand honey industry going through a restructuring of industry bodies, which could lead to stricter export standards, there is a path for some improvement.

"The opportunity with all of this is to highlight how much better we could be, collectively, if we agreed on how we are going to market ourselves and this product, at a base level, coming from New Zealand and going into international markets. We might actually head off some of the confusion that consumers have to suffer through. Maybe we will actually do better at selling product and having a better show in market," Wright says.

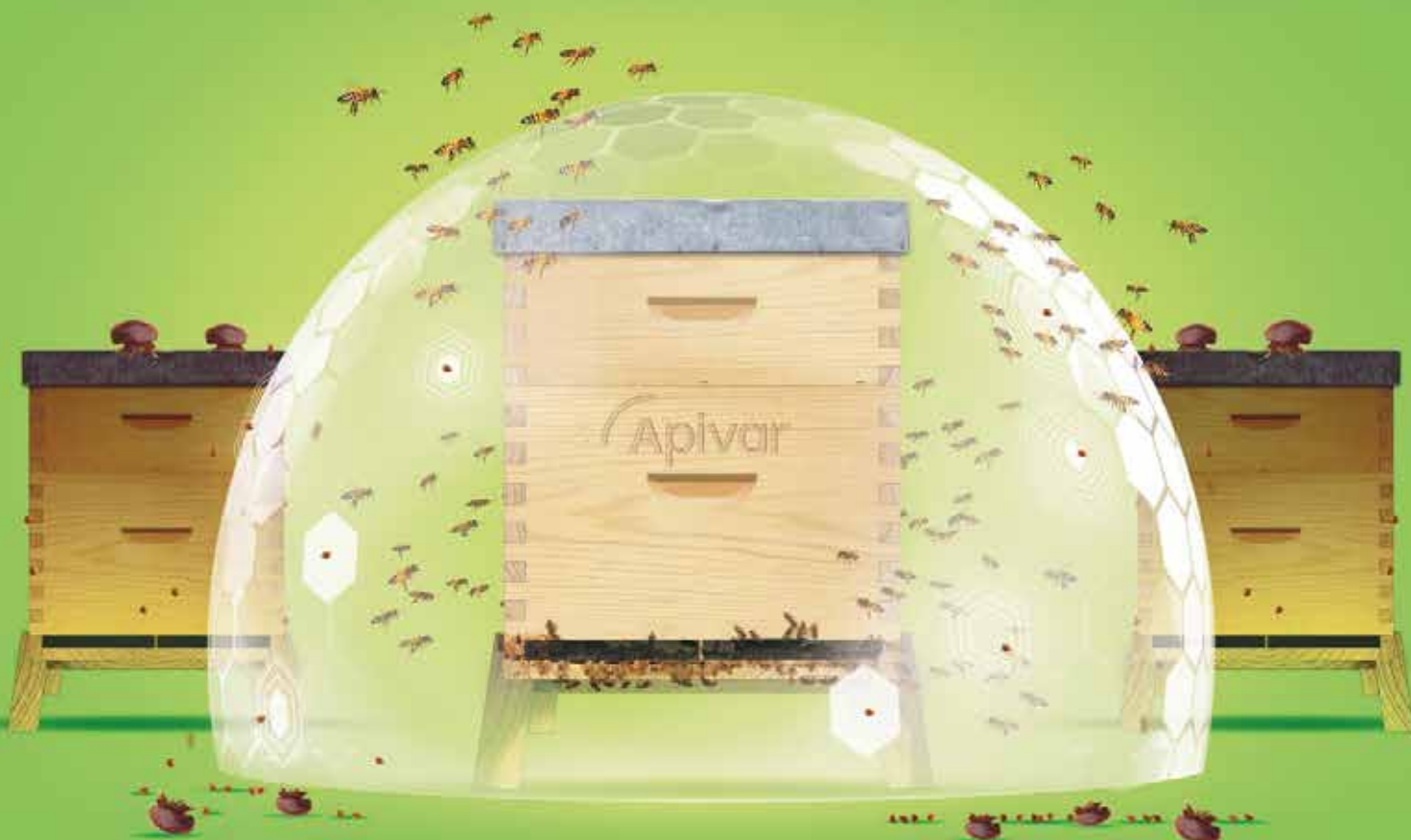
Despite his staunch belief in UMF, Goodwin admits it is "not perfect by any stretch right now, given an unwillingness to enforce guidelines and the fact some of those guidelines are a bit wishy-washy at times." However, the honey exporter believes a single, industry-wide, mānuka honey ratings mark must be achieved.

"How do we ensure that, if we are going to move forward as a unified industry – if that is even possible – that we respect the purpose of having a single mark?" he asks, adding "Educating consumers, and fighting the fight against opposition honey, i.e Australian honey, is what we should be about." 🐝



*Mānuka Health and Mānuka Doctor and two of the more prominent mānuka honey brands which use the now widespread practice of displaying both UMF and MGO ratings on their labels, in a "confusing" market place for consumers.*

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# Queen Breeders Feature



It's fast getting to that time of year again, when hives are being opened for the first time coming out of winter. Many beekeeping tasks await in the next few months, but prime among them is ensuring the queen at the heart of each colony is fit to perform.

With that in mind, we thought it prudent to take this time in late-winter/early spring to create a space where those at the helm of some of New Zealand's leading breeding programmes can provide further details to inform what each of their businesses is about. Whether it is the biology and mechanics of the breeding programmes themselves, the people calling the shots, or what's on offer, it's all good information for beekeepers to consider if they are 'in the market' for queens, cells, or nucs.

Come spring there can be a lot of people looking to sell queens, all of varying levels of dedication, skill, experience and expertise. So, we hope this feature can help potential buyers make informed choices around what they are getting from a breeding programme, and who they are dealing with.

Afterall, successful beekeeping involves not just getting the hive queen-right, but finding the right queen for your needs.

***\*This is an advertising feature – all copy, advertising and text, is supplied by the advertisers.***

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Years ending in 0 or 5      Years ending in 1 or 6      Years ending in 2 or 7      Years ending in 3 or 8      Years ending in 4 or 9

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# Mana Queen

## MARLBOROUGH

**While Mana Queen has been in existence since 2015, owner Raf Augustyn has been beekeeping for nearly quarter of a century. After its beginnings as a small experimental apiary, by 2018 Mana Queen had become a second income business and then a stand-alone queen breeding operation by 2022.**

Augustyn started beekeeping in his homeland of Poland in 2000. Over the next two decades—plus his extensive training has covered theory – graduating as a Technician Apiarist from Apiculture School in Poland – and then a vast practical learning journey.

“I spent a decade traveling through several continental and island countries around the world to gain experience working with bees in distinct climatic conditions and diverse operations, targeting different beekeeping outcomes. These include my home country, Poland, plus Germany, Scotland, Hungary, Italy, Norway, USA, Canada, Thailand, and New Zealand,” Augustyn explains.

Hawaii, home of the world’s biggest queen breeding operations, is where the idea of Mana Queen was born.

“While working for one of the giants of queen breeding world-wide, I dreamed of one day having my own queen breeding station somewhere in Polynesia. The significance of the mana concept in Hawaiian and Māori culture felt felicitous to my breeding and stock improvement endeavours, so it stuck in my head.”

Coming to New Zealand in 2010, Augustyn worked for Comvita in Northland, Wairarapa, and established a Waikato queen unit, managing it for five years, then in 2018 he moved to the South Island to set up a honey operation and queen unit for King Honey.

Soon after the dream of Mana Queen was realised.

### WHAT DOES MANA QUEEN STAND FOR?

Now Mana Queen runs 2000 mating nucs in Marlborough and Arapawa Island in the Marlborough Sounds, producing top performing open-mated queens from strong and genetically diverse stock. The breeding program has a focus on disease resistance and mite tolerance. Foundation stock has been accumulated over the years through sourcing and selection of outstanding *Ligustica* queens from South and North Islands. Different control groups are run for the selection of the next generation of breeder queens, achieved through comparative testing, assessment of behavioural traits and performance evaluation.

The primary and largest control group encompasses one-thousand units assessed for hygienic behaviour. The best performing queens are tested with Harbo assay to determine if hygienic behaviour they express is in respect to varroa resistance. This coming spring Mana Queen will be the first breeding operation in New Zealand to incorporate into their selection process UbeeO – a groundbreaking new tool designed to accurately predict colony abilities to self-control mites and disease.

Great attention is also directed at drone stock, to provide reproductive quality to reared queens. As a control group they also present the opportunity for evaluation of characteristics like overwintering abilities, colony growth, swarming tendencies and honey production.

Both control groups are maintained according to organic principles and from spring 2024 Mana Queen is offering certified

organic queens, bred and mated in separate BioGro accredited nucs.

### SURVIVAL OF THE FITTEST

“During the honey flow I move drone stock hives and some mating nucs to Arapawa Island to produce certified organic honey and to mate a generation of queens within my own genetic pool. Last summer, in an isolated part of the island with support from Arapawa Gold and dedicated landowners, I established another control group. In this remote place, far from managed colonies, 100 units will be exposed to natural selection ‘survival of the fittest’. Bees that successfully overwinter in the presence of mites, with no treatments, will become hardier with each new generation that passes this strong selection pressure, eventually resulting in robust, reliable, genetic material adopted to harsh coastal conditions with unpredictable weather,” Augustyn explains.

“Watch this space, because at this point I do plan to move more mating units to Arapawa to mate queens for distribution within the apiculture industry.”

The Mana Queen owner is excited for the future of the open-mated breeding programme and where it might help take the industry,

“While instrumental insemination can achieve varroa resistance a lot faster, as it is a very effective tool for reproductive control in genetic selection, it does not result in queens of superior genetic quality for commercial purposes,” he says, adding, “A professionally maintained, geographically isolated, natural mating site provides a powerful alternative on the way to breed varroa resistance into a population of bees. And more beyond...”

# MANA



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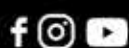
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# Betta Bees Research

OTAGO

**Betta Bees Research's breeding programme comes with a difference. Largely utilising instrumental insemination of their queens, they provide queens for the purposing of entering beekeepers' breeding programmes as the breeding stock on which they can expand.**

They are New Zealand's premier producer of Instrumentally Inseminated Italian type breeder queens.

Betta Bees Research has now been in operation for 20 years, after South Island beekeepers submitted their best queens to begin the programme back in 2004. They influence the genetic makeup of around 30% of New Zealand's bee stocks.

In December 2022 the company was sold to Honeybee Breeding NZ Ltd, owned by Frans Laas and Rob Waddell, and now runs a new business model. Instrumentally

inseminated breeder queens are now available to all beekeepers rather than being only available to the old company's shareholder base. The breeding programme still runs out of the Invermay Agricultural Research Centre near Dunedin and has ready access to the various genetic and diagnostic facilities close to their office.

Laas says they are continuing the breeding programme with some significant operational changes to streamline the evaluation programme and provide a more diverse range of breeder queen options.

"Our queens are selected for gentleness, good brood patterns and good spring growth rates as well as hygienic behaviour and reduced varroa mite growth rates. We also select on a uniform Italian type appearance with any queens producing dark drones and very stripey workers being eliminated from the final selection," Laas explains.

"Now that we have stabilised the breeding programme, we will be expanding our varroa resistance selection process in collaboration with a number of other entities. Over time this will speed up the selection process for varroa resistance and significantly impede mite growth rates and help in reducing the requirement for the increasingly expensive chemical inputs."

Three different grades of queens are offered for sale by Betta Bees. Gold queens are instrumentally inseminated, ensuring the best genetics of the breeding programme. Silver queens are queens selected from the top of the programme and open mated alongside the top drone hives. Bronze queens are bred from the top queens, and open mated alongside a larger pool of Betta Bees drone hives.

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# Kereru Queen Bees Ltd

HAWKE'S BAY

**Nestled in the foothills of the Ruahine Ranges, three sisters and their families operate a queen breeding programme that has been AFB free for nearly 40 years – Kereru Queen Bees.**

Their Bee Team manages 1000 hives in Kereru, rural Hawke's Bay, including over 100 specialised breeders and cell raisers. Breeder queens are selected for desirable traits such as top honey production, hygienic behaviour, friendly temperament, and overwintering success

"Our goal is to advance these genetics even further by evaluating our best performing queens for Varroa Sensitive Hygiene using methods refined by Rae Butler," says apiary manager Amy Dunn.

Before grafting, larvae are assessed for optimal age and royal jelly, and before sale

every queen cell is checked for virgin size and quality. Large mating nucs are used in which each queen can lay up to nine standard  $\frac{3}{4}$  depth brood frames.

"We prefer using larger nucs" Dunn explains, "because we can more accurately assess laying patterns, brood quality and hive health. We use supers on our mating nucs so excess honey can be harvested, while also leaving good stores for them to overwinter strongly."

Queens are left in their hives for at least four weeks so their capped brood can be examined before sale.

Building upon the legacy of their father John Dobson - creator and manufacturer of the iconic Carricell portable incubator - the sustainability of Kereru Queen Bees Ltd stems from the high quality of their queens, customer satisfaction and word of mouth.

"We don't have a website and generally don't advertise. This is our first time in *Apiarist's Advocate* and we're excited to be involved in the focus on Queen Breeders!"



*The Dobson clan have established themselves as breeders of quality queens in Hawke's Bay, whilst also maintaining their strong family relationships.*



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# Lion Apiaries

## AUCKLAND

**Lion Apiaries is currently taking orders for over-wintered queens, to ship during September, and new season's spring queens from October 1.**

Owner Dallas Russ says their queen rearing team is 100% focused on producing quality, open-mated, Italian queens all season long.

"Our queens lay good, healthy brood. We maintain diversity in genetics and select for pleasant natured bees that build up strong beehives and work hard," Russ explains.

Beekeepers should feel free to plan in advance and place orders with confidence in Lion Apiaries 10+ years' experience of queen production.

"I look forward to working with you to supply the queens you need, when you need them," Russ says.

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# Pyramid Apiaries

## MARLBOROUGH

**Performance, Reliability and Commitment are the three qualities that drive Pyramid Apiaries breeding programme in Marlborough, supplying mated and virgin queens throughout New Zealand and queen cells and nucs for locals.**

### PERFORMANCE

Performance of queens is key, with selection of breeding queens coming from the top performing honey producers which then over-winter strongly. Like most breeding programmes, hives with poor temperament are ruled out. Italian-type bees are sought by selecting on colour where possible, such as ruling out hives with a high proportion of black drones. However, attributes that are more likely to boost productivity are prioritised over colour, per-say.

"The laying ability of our mated queens is also closely assessed, with all of our queens mated in full-depth units which provide good opportunity to evaluate their production ability before being caged and supplied to beekeepers," owner Laura Dawkins says.

### RELIABILITY

Pyramid Apiaries goal is not to be the biggest supplier of queens to the industry, but the most reliable.

"We work with some regular core clients to provide them with queens, cells or nucs and we really enjoy effectively being their business's queen breeding unit. We take this job seriously, doing our best to supply orders when the beekeepers need them. Communication is key, and understanding and working in with our fellow beekeepers is hugely motivating for us," Dawkins says.

### COMMITMENT

Pyramid Apiaries work is almost all carried out by husband and wife owners Patrick and Laura, with casual staff, albeit skilled and experienced, used only infrequently.

"We find the whole process of running a breeding programme enjoyable, so are committed to ensuring the end results – the queens, the cells, the nucs – are top-notch."

While many of the Pyramid mated queens are booked out in spring, there is still opportunity for beekeepers to snap some up, especially if they pre-order. Virgin queens are also available all season.

"We have a core group we supply, but also really enjoy talking with any new beekeepers to see if the queens we have on offer suit their needs," Dawkins says, adding "those beekeepers should reach out – we would love to have that conversation."



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# Adams Gold

## CANTERBURY

**At Adams Gold we breed well rounded, strong, healthy queens resulting in good brood build, who are gentle to work, and have a good honey yield.**

Our bee stock genetics are from AI Gold Better Bees breeder queens. We also have VSH genetics in our bees. This involves selective breeding involving a trait that helps fight against varroa in the hive.

We have over 13 years' experience in commercial beekeeping throughout New Zealand. As a family owned and operated queen breeding business, we have a real passion and are incredibly dedicated to beekeeping.

We overnight courier our queens throughout New Zealand (minimum order of two) and, with additional ventilation, we overnight courier our five frame nucs all over the country also. Courier for North Island \$71, for South Island \$15-\$30 - depending on your location.

- Jacob & Annemarieke Adams

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# Wanganui Beekeepers Conference Boasts Packed Programme



What started as an idea to help fill the beekeeping information and events void this winter, has morphed into a three-day conference set for Wanganui, August 11-13 where beekeepers, scientists, equipment suppliers, honey traders and leaders of industry bodies will drive discussions on a wide range of topics. We dive into the programme set for The Beekeepers Conference 2024, hosted by Southern North Island Beekeeping Group (SNIBG), to find out what attendees can expect.

**Last month conference organisers opened registrations and announced that Californian scientific-beekeeper Randy Oliver would headline The Beekeepers Conference, and weeks out from the event held at Wanganui Racecourse the full programme has rounded into shape.**

Oliver's expertise will be well utilised, with speaking slots for him all three days, on the topics of 'varroa management strategies', 'breeding for mite resistance', and 'ways to natural miticides and a dive into oxalic acid'. The American, whose hives have been free of synthetic miticides for 14 years and who has a breeding programme resulting in half of his hives not requiring any varroa treatment, will also front various group and panel discussions throughout the event.

Around those sessions, there is plenty more to entice beekeepers to the conference, at which discussions around varroa management will play a leading role. Complimenting Oliver's experience in that area will be Kiwi beekeepers' reports of what is and isn't working for them, Victoria University of Wellington professor Phil Lester discussing mite resistance, an exploration of whether we have "resistant" bees in New Zealand, NOD Apiary



**MPI scientists Hayley Pragert and Richard Hall will update beekeepers on their latest work.**

scientist Heather Broccard-Bell via video-link on formic acid, and Russell Smith of Beequip NZ on oxalic acid treatments.

Varroa is far from the only concern for honey bee health, and so Australian beekeeper Wayne Fuller will provide education and warning about small hive beetle, John Berry will address nosema and John Mackay from dnature will detail their Foster Method for detecting American foulbrood, among others.

Egmont Honey has come on board as event sponsor and chief executive James Annabell will take the opportunity to address beekeepers around honey markets.

With the honey industry in the midst of developing a new strategy, as proposed by Apiculture New Zealand and criticized by New Zealand Beekeeping Inc, leaders of both those groups – Karin Kos and Jane Lorimer respectively – will address the conference. Continuing the theme of looking to the future, Fiona O'Brien will tackle the tricky topic of funding research for the apiculture industry.

The programme also includes Ministry for Primary Industries scientists presenting their work, with Hayley Pragert offering 'How commercial beekeepers are using miticides', and Richard Hall on their hive monitoring project.



**Egmont Honey are sponsoring The Beekeepers Conference in Wanganui and chief executive James Annabell will be among a busy three-day programme of speakers.**

Conference organiser Frank Lindsay says, as of late July, they had about 80 attendees registered for each day. Now, with the introduction of a full programme and nearing closer to the event, they are hoping that number will rise steeply. They are hoping to create an environment where beekeepers come along not just to listen to speakers, but to contribute to discussions.

"We would like to have an interactive conference where beekeepers can ask questions and add to the information if they have something to contribute. It's all about exchanging knowledge," Lindsay says.

"We have assembled a great line up of speakers, some you may never see in person in New Zealand again. With the cost per day to attend less than a replacement nuc, it's a great investment, especially considering one thing learned at conference can pay back for years."

For a registration form email [beeconference2024@gmail.com](mailto:beeconference2024@gmail.com)

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# American Foulbrood: A Personal History



Recently-retired from a full working career of commercial beekeeping, but still tending “about 20” beehives, Hawke’s Bay apiarist John Berry reflects on his history with American foulbrood (AFB). From identifying and managing the bacterial disease of honey bee brood, to some of the colourful characters met along the way while doing so, there’s plenty to impart.

BY JOHN BERRY

**When I was young it was just called foul brood. There was even a period when we were officially told to call it *BL*, or the *bacillus larvae*, as it was thought the name foul brood gave a negative impression.**

It was a serious problem then just as it is now.

I got my first hive which I shared with my brother when I was eight. We burnt that hive when I was nine. 100% AFB is not a good start to a beekeeping career, but it is a very valuable lesson.

I have found hundreds of infected hives over the years working for my family business Arataki Honey, doing official inspection work, and in my own hives.

Arataki always had some AFB, not because they were no good at finding and destroying it, but because they were constantly buying up other beekeepers’ hives and gear and while I am sure that they did buy some outfits that had no AFB, I personally can’t remember any that didn’t have some.

The first hives I ever brought when I was about 16 were from a guy that had been pretty keen and had several quite big apiaries spread around the district. I don’t know why, but he lost interest and just walked away from the hives. The ones I bought had been abandoned for several years and were clean, but some of his hives near town had been infected when abandoned and multiple neighbouring apiaries had to be destroyed including all the hives



*Hawke’s Bay beekeeper John Berry has been diagnosing and dealing with AFB in beehives since he was nine years-old. “100% AFB is not a good start to a beekeeping career, but it is a very valuable lesson”.*

the monks ran at the mission. Nothing much has changed over the years and someone else's neglect is still the biggest cause of the outbreaks amongst well-looked-after hives.

When I was young we had apiary inspectors. They were locally based and worked for the government, but that's all I remember about their job. Our local inspector was called Sid and I remember one thing he told me about beekeepers. To put it into context you have to remember in those days the vast majority of them were one-man operations. Sid told me there were two types of beekeepers – the religious-type and the sex maniac-type, and that you could tell the difference from the type of reading material they had in their trucks. He reckoned that the lonely life led them in one direction or the other.

We always ran 1000-plus hives per person and never had much time for any kind reading let alone any other type of extracurricular activity. I hope I didn't miss out on anything...

We next moved onto the era of apiary advisory officers who worked for the Ministry for Agriculture and Forestry. They actually wore many hats, but my dealing with them mostly concerned with disease control. Ted Roberts, Byron Taylor and Murray Reid were the ones I had the most to do with and they became my lifelong friends and advisers. I still miss Ted greatly.

Ted worked under the old Apiaries Act and although he was a real gentleman, if you pushed him hard enough he would push back and I once helped him burn hundreds of hives belonging to a non-compliant beekeeper.

In the 20 years that I ran hives with my brother we had 21 AFB hives and in the seven years when I ran hives alone I had another 10.

#### WHERE DID THEY ALL COME FROM?

Well, for the first few years we had a smattering and we are pretty sure they came from old excluders which had come from another beekeeper. In those days we only used them to separate the two brood boxes when requeening in the autumn. Giving them all a full AFB treatment in the paraffin plant (160°C for 10 minutes) solved that problem. After that there was only one hive that I have no idea where it came from. So, that is three probably from contaminated excluders; two from scorched boxes; 24 from neighbouring beekeepers who had known infections and that one lonely hive that I have no idea.

The scorched boxes is an interesting one. Until recently I thought they must've come from hives that Arataki had bought over the years, but my mother informs me that she remembers my father scorching boxes when they were first married. This practice has been illegal for longer than I have been alive and for good reason. My guess is the contaminated boxes were in excess of 40 years old and possibly quite a bit older. We never had many of them and after getting AFB in hives with scorched boxes we burnt every single one we found.

In 14 of those 27 years we had no infections and by far the worst was 2020 when I burnt seven hives from one apiary. I notified the

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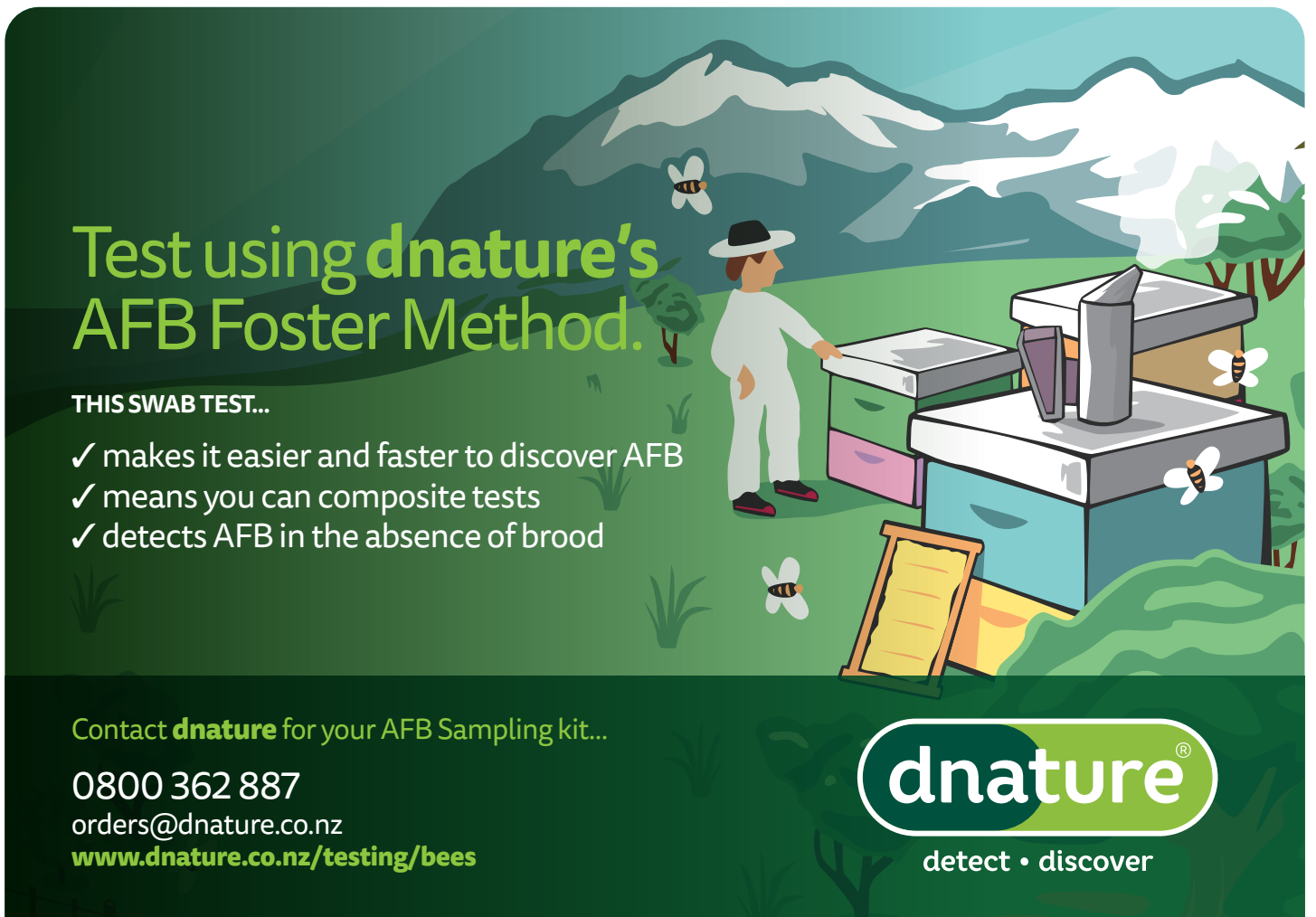
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management agency straightaway and dead and robbed out hives were found in a nearby apiary. I still don't know who those hives belonged to or exactly where they were. I would love to take a civil action to recover my costs. I do however understand why such information is confidential.

I'm not perfect. I have made mistakes with AFB. One day many years ago I was bringing an absolutely chocka four story hive home from Coromandel and I didn't rope it down well enough (we didn't have load straps in those days). It smashed all over the road. Fortunately, we were the only beekeeper up there in those days and there were no hives anywhere close. I cleaned it up as well as I could. Another time I was trying to burn a six high stack of AFB and it just wouldn't light. I tried a bit of extra petrol and blew the bloody things to pieces. My mate who was watching said that I disappeared in a ball of flames. I was very lucky to only get singed. There were bits of hive spread nearly 10m in every direction.

Have I ever missed an AFB? In 50 years, I'm sure I have. Nobody is perfect.

#### SO, HOW DO I CONTROL AFB?

Unless I know there's a problem in an apiary, I only do a quick check of one frame of brood which I take from the centre of the brood nest. I am not overly concerned if I miss a very light infection as I will pick it up next time before it has much chance to spread. I believe it is much more effective to do a quick check every time than to do one or two complete brood checks a year. My hives get checked on average about 10 times a year.

You really need to look at at least one frame of brood anyway to assess what the queen is doing.

I feed frames of honey back to my hives. We have always done this and I know it's frowned upon, but if it's clean it's fine and, if it's not, then your extracted frames will be just as big of a disease risk. I regularly even up hives by swapping frames of brood, but I never take anything from a hive without checking for disease.

I never use untreated second-hand gear.

I teach other beekeepers how to identify and destroy AFB. It helps.

I am ultra careful and do much fuller brood cheeks for two years in any apiary with an AFB history.

#### SO, WHAT HAS CHANGED IN THE WAY THAT I CONTROL AFB FROM WHEN I FIRST STARTED?

In my own hives, almost nothing, except that we now use petrol to kill hives and in the old days we used a spoonful of granular cyanide which was kept in a 5lb honey tin (probably with a honey label on it!).

I now understand a lot more about the science of AFB spread, but I really don't do anything differently because what I was taught all those years ago by my grandfather and father still works. However, everyone should be aware about the new Foster Method tests for AFB from dnature. You should still be able to detect AFB without them, but they can be a very useful tool and especially so in the case of a rob-out event. In that instance they can be used to identify highly infected hives before they become clinical. This reduces both your risk and the ongoing work involved in destroying hives multiple times for one incursion. If you really must buy second-hand gear, then a few swabs could also save you a lot of grief in the long run.

I have also taught hundreds of people how to find and eliminate AFB from their hives both before and after DECA came along. And if you're wondering, I had to sit my DECA as did my father. It didn't matter how experienced you were and I agreed with that ruling. I certainly knew plenty of experienced beekeepers who were not good at controlling AFB.

I observed over the years that, no matter how well I taught, it still takes time and experience for people to really understand AFB and these days I tend to concentrate on teaching what healthy brood looks like and what to do when you find something that isn't healthy. That being, call someone who knows what they are doing – unfortunately there are a lot of people out there who only think they know what they're doing.



*Care should be taken with how much petrol to use in destruction of AFB infected equipment John Berry warns, following a close scrape he had years ago... "My mate who was watching said that I disappeared in a ball of flames. I was very lucky to only get singed."*

Healthy brood is after all what you see most of the time, but if you never see chalkbrood, sacbrood, drone layer brood et cetera in your hives, then the chances are you won't see AFB when and if you get it.

Shake the majority of bees off the frame. Absolutely you should look for sunken slightly darker brood cells with irregular perforations, but also look for normal looking brood which hasn't emerged when everything around it has. Uncap the worst looking cell on the frame. If you do this gently with a hivetool you can



*John Berry inspects yet another beehive, as part of an education session at his Hawke's Bay property in 2020.*

leave the exposed brood unharmed and it will be fine. As long as you see a healthy pupae looking back at you, that's all you need to see. If you are learning it would probably pay to look for the worst half dozen on each side of the frame you're inspecting and you can also scratch the caps off a line of brood using the corner of your hivetool.

Apparently it happens, but I have never seen AFB in drone brood, so only check worker brood. There is a very good app for diagnosing anything that doesn't look right. Remember that most hobbyists and some commercial beekeepers go through their entire lives without ever having a problem with AFB. I hope most of you will never become an expert like I am, but you should all learn to be experts at what healthy brood looks like.

Ultimately I believe the secret to eliminating AFB in your own outfit is to find it before you spread it.

To do that you have to find it and that requires looking for it, recognising it and surprisingly, acknowledging it. I have known many beekeepers who fail on this third step. They look, they see something they don't like and they put the frame back in the hive without further checking. I have felt the urge to do this myself. It is insidious and not uncommon.

If you miss a case of AFB and the infected gear you took off gets spread throughout your outfit, then that is when you have a real problem.

Dr Mark Goodwin is quite right when he says that AFB is not that easy to spread... Unfortunately, there are some beekeepers out there that have become experts. 🐝



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# Talking Points from Mānuka Orchard Open Day



Some of the most pressing issues facing beekeepers were presented and discussed at an open day hosted by honey storage and trading facility Mānuka Orchard on July 26, and owner Logan Bowyer tipped at a business plan to help beekeepers, and New Zealand, best realise honey's value.

Paengaroa Community Hall in the Bay of Plenty was once again the host venue for around 70 of Mānuka Orchard's beekeeping clients and supporting businesses, for the third consecutive year. Given the event's location, in the heart of kiwifruit country, it is unsurprising that pollination was a large talking point, along with the honey industry.

A wide variety of experts addressed those gathered, including Bowyer detailing the work of his facility.

Mānuka Orchard currently has 3200 drums of honey stored on site, although they have consistently had about 4000 on site at any one time in the past year. In that period, over 2000 drums of honey have been processed through their various services. Currently 75% of honey on site is stored at 4°C, which was the same as reported at the corresponding event in 2023.

Perhaps lost somewhat in a busy day of industry chatter was Bowyer unveiling his plans for a beekeeper-owned business which he hopes will take honey to the consumer. "Beekeepers need a stake in the retail product margin," he explained. Details were few, but Bowyer was at pains to point out the value that is not being realised by not just beekeepers, but New Zealand as a nation, when bulk honey is shipped offshore.

The need for a "national honey stocktake" is the number one priority in the honey industry which needs action, the day's host



*Around 70 beekeepers and Mānuka Orchard supporters attended the Bay of Plenty honey facility's open day at Paengaroa Hall on July 26. Photo: Mānuka Orchard.*



*Just some of the honey samples from stock held at Mānuka Orchard greeted those entering their open day, along with promotional boards they took to Apimondia last year to promote New Zealand honey.*

also stressed. Without a clear picture of how much honey is in storage around the country the industry is actually at risk of dropping below a critical supply threshold, Bowyer warns.

"If we get that stocktake, we can all work with better advice and make better decisions. Perhaps we could come up from the current market drop without a sharp spike," Bowyer said.

The issue of C4 sugar levels in mānuka honey limiting its value is another huge issue for New Zealand to tackle, with improved testing methods required, Bowyer believes.

Outside of that analysis from the Mānuka Orchard owner, some of the key points raised by others were:

- While beekeepers might often feel put out by the Ministry for Primary Industries, Dennis Collins of their new On Farm Support division (which has 44 people on the ground across the country) made a strong showing in Paengaroa by detailing their desire to better understand beekeeper needs and present them to Wellington, all while acting as a contact point for the rural sector to MPI. "It's the Ministry for Primary Industries, not the Ministry of," he reinforced.
- "If you can create a brood break, it is absolutely awesome," Russell Smith of Beequip NZ said of oxalic acid fogging of hives to control varroa. He offered advice around the use of oxalic treatments, advising use of their Beequip strips for a six to seven week period, maximum, before replacement.

- Trade expert at the European Union Delegation to New Zealand, Diane Lacoste presented via video link and detailed how honey, and in particular mānuka honey, is the big winner in the NZ-EU free trade agreement which began on May 1 with immediate removal of the 17% mānuka tariff. Germany, Poland and – perhaps surprisingly given its comparatively small population – Belgium are the top consumers of honey in the EU, which imports 40% of its honey needs. There is more potential for collaboration between NZ and EU scientists going forward, with Lacoste pointing to the huge €53.5billion (2021-2027) Horizon Fund to which New Zealand researchers now have some access... Could that help honey scientists tackle some of our "compliance" issues to the EU?
- Results of the High Value Nutrition Study were reported, where various forms of research into honey consumer preferences were undertaken. Bowyer summed up their presentation with the conclusion "consumers are in their infancy of understanding honey". The same might be said of us all, with new research into the oligosaccharide content of honey presented by Ag Research scientist Karl Fraser. The compound is elevated in honey and can significantly reduce gut bacteria. What is the corresponding improvement on gut health? Well, that will need more pricey research Fraser says, and at present that funding is not in place.
- Honey bee foraging activity is reduced the day following feeding of both sugar syrup and protein supplements, but

- increases significantly in the next two days, according to research presented by Ashley Mortensen of Plant and Food Research. Manipulation of the colony, such as simply opening/working the hive, also reduces foraging on that day.
- Approximately 140,000 placements of beehives into kiwifruit orchards took place last season, with some hives working two placements, said Shane Max of Zespri. 50% of those hives were in the Bay of Plenty. There is 15,600ha of kiwifruit orchard in New Zealand, with hives usually stocked at 8-10/ha. "There is nothing nearly as cost-effective as the bee," Max said in comparison to artificial pollination practices.
- Hives that are placed on the edge of an orchard do not penetrate to flowers in the middle of that orchard as well as those further in, despite potential for better orientation, Melissa Broussard of Plant and Food Research detailed. In netted blocks, gaps in the nets above hives help improve pollination effectiveness, as does higher nets to allow greater flight space; providing ready access to water; and supplementary feeding, particularly carbohydrates (i.e sugar).
- Seeka reported cropping a lot of undersize green kiwifruit in 2023. After 58 orchards' beehives were audited, 24 were found to have "substandard" hives.
- "If we leave it for someone else to figure out by themselves, it doesn't always end well," was the potentially life-saving advice of Rural Support Trust facilitator Malcolm Fluker on the topic of opening up tough conversations with people under stress. 🐝

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# AFB Education and Self-Sufficiency Aspirations



Last month we met Bee Supplies Otago owners Murray and Heidi Rixon and explored their honey extraction setup and beekeeping operation. There's more to their work within the apiculture industry though, with Murray a very active American foulbrood (AFB) AP2 hive inspector and beekeeping education a big part of the couple's motivations, along with growing the sustainability of both their business and lifestyle. Maggie James delves deeper into their story.

BY MAGGIE JAMES

**I followed my visit to the Rixons' beautifully situated Taieri Plains property in June by attending a monthly gathering at the Dunedin Beekeepers Club (DBC) in the city. There Murray Rixon presented an informative session on American foulbrood identification and management.**

Whilst Rixon is not a member of the Club he is frequently a guest speaker to AFB workshops.

He's a good fit for the role too, having held AP2 (Authorised Person Level 2' under the National AFB Pest Management Plan) status for nearly 10 years. Most of the AP2 work is for the Management Agency south and west of Timaru, Oamaru and Invercargill areas, and sometimes Wanaka, Te Anau and Queenstown. In autumn Ministry for Primary Industries Exotic Pest Surveillance work is also undertaken from Dunedin to Invercargill and Queenstown.

Rixon, who is privy to seeing a lot of AFB, arrives this June day with numerous props, which in this instance (having received approval from the Management Agency) include AFB brood frames recently retrieved from two apiaries in Waimate, South Canterbury. Fortunately, Rixon and a collaboration of commercial and hobbyist beekeepers appear to have found the primary source of infection.

"In the beehive I am primarily looking for characteristics of the AFB disease that are different in characteristics to other brood disorders," he explains.



*Murray Rixon (left) leads a Dunedin Beekeepers Club hands-on AFB talk, with five-year-old Morgan, an avid beekeeper with one hive, inspecting this AFB infected frame. Photo: Maggie James.*

An important part of his AP2 work is identifying where AFB infections have likely come from, such as the joint effort in Waimate, and while finding AFB and destroying hives and equipment is no joy, there can be some satisfaction in stopping further spread.

"I am lucky to have the privilege of hunting out AFB trails in the landscape. It's the beekeeper's worst day if I find AFB, and my worst day if I find nothing," he says.



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At the Club meeting indoors, and under Rixon's supervision, approximately 35 spellbound members wearing disposable gloves receive an educational experience getting close, eyeballing and handling full-depth brood frames heavily riddled with AFB in various stages. The group inspect, sniff and poke wooden matches in frames, and photograph with mobile phones, whilst grasping Rixon's words.

It doesn't take long for the air to be rank with the intense smell peculiar to the presence of advanced AFB infestation.

Rixon explains that often there is not a smell with AFB and the stench is often only exacerbated on a warm day or a heavily riddled frame, plus a new infection often does not have a smell. Rixon believes many beekeepers have problems diagnosing AFB because they have never encountered it, and a textbook AFB photo is only a snapshot.

Furthering the education, he urges the attendant audience to use their mind's eye to help imagine a clinical AFB infection. A loss of body segmentation among brood is the earliest indicator, and the larvae then becomes off-white, similar in colour to a cup of tea with lots of milk. It then progresses in colour to that of a cup of coffee with milk.

Whether it's a cup of milky tea, or dark milky coffee, there is consistency of the same texture in any AFB cell no matter the colour. Rixon has a delicious analogy to add to the menu here too, likening the roping to a square of caramel filled chocolate, squeezed and pulled apart! He emphasises that the texture is uniform at all stages, and if you are using a matchstick for diagnosis, ensure that the wood is rough to enable the sticky AFB to adhere to the surface.

Rixon further describes the pupal tongue, another form of visual AFB identification, which is only seen in a fully formed bee, and what the beekeeper sees is the cartilage of the mouth with the protuberant tongue.

Dunedin beekeepers are very proud in having the least AFB cases in New Zealand over the last six to seven years. The city and surrounding area, which does not have many migratory hives, is doing really well with near zero AFB. If someone were to buy a hive or used woodware from elsewhere and bring it into the area, Rixon



*AFB roping out with a match. Note how the AFB is shiny and adhering to the match. The colour is coffee like. The texture can be described as similar to Caramello chocolate.*

*Photo: Murray Rixon. <https://afb.org.nz/afb-photo-gallery>*



*Murray Rixon likens AFB infected brood's consistency to caramel chocolate filling, such as this.*

*Photo: Maggie James.*

emphasises that this luck could change overnight from zero to multiple infections.

As well as furthering the AFB education at the Club, Rixon also volunteers alongside Dr Otto Hyink in helping run the Club's annual spring beginner beekeepers' training course, and then there is his own educational programmes.

### **EDUCATION, SUSTAINABILITY AND THE GOOD LIFE**

Because of the educational component of their business, the Rixons' contract extraction plant needs to be free of bees as it doubles as the teaching room. The couple believe in supplying something good, for free, to the Dunedin city and outer regions. Thus, they deliver free talks for school groups, ranging in size from a half dozen, up to 40 kids.

From spring to late summer, these talks are also offered to paying cruise ship passengers, and honey varietals can be purchased on site.

While the energy of the beekeeping couple might power those lessons, it's solar power that they look to harness to keep their whole facility running.

They have 20 solar panels, producing up to 10kW per hour in good weather. The aim is to produce all the power required for their home and business including the honey extracting enterprise and electric cars and they hope to soon double the number of panels to achieve this. The Rixons have recently completed a pair of dual axis rotating solar panel structures which automatically follow the sun daily, like a sunflower. The motor mechanisms were ordered from China and while waiting on their arrival, Rixon fabricated steel pedestals and designed the aluminium superstructure to hold the panels.

Currently, power produced heats three electric cars, the family house, and the honey house. The latter two have battery storage, and to allow for poor weather conditions at times are still grid connected.

To further aid the family's aims of self-sufficiency, their excavator is being used to install large wooden poles for what will be a suitably impressive 90m<sup>2</sup> polycarbonate green house. They relish the opportunity of planned weather protection to grow all their own vegetables and tropical fruits and the sale of their fruit and veges on site will be a natural progression of their business philosophy. To top it off, they also produce some of their own meat.

*To discuss any aspect of this story with Murray or Heidi Rixon, email [beesuppliesotago@gmail.com](mailto:beesuppliesotago@gmail.com)*

# Our Energetic Engineers



While you – the beekeeper – likely read this from a warm, winter abode, science writer Dave Black nestles into the cluster of your honey bee colonies to help us understand how we study their use of energy...

BY DAVE BLACK

**For a long time no-one really appreciated the sophistication of honey bee's control over the energy they use, what we now think of as 'thermoregulation'. Individual bees were 'cold-blooded' poikilotherms, meaning they could not regulate body temperature. If they were social bees they could rely on a collective 'colony-level' response to temperature change. Things have changed...**

## RE-THINKING THE 'CLUSTER'

In the 1960s this simple view began to unravel. Scientists like Harald Esch were measuring the body temperatures of honey bees and describing quite clearly metabolically induced temperature changes in lots of different circumstances, but the knowledge was taking time to disperse. Perhaps that was because, well, "*Über die Körpertemperaturen und den Wärmehaushalt von Apis mellifica*" took a bit of translating. I remember my father, a geological scientist at the time, was expected to be able to read German, but...

In 1971 the United States Department of Agriculture published a 'Technical Bulletin' (No.1429) by Charles Owen based on 1,200,000 temperature readings from thermocouples installed in a full-sized Langstroth beehive – a proper 'colony-level' study. Still work relevant today, it reflected a view that we might need to revise.

Owen's study began by describing a winter cluster like this:

"The bees form a cluster, clinging tightly together on the combs in the hive. The outer bees form an insulating shell that prevents excessive loss of heat. Within the cluster the warmth permits normal cluster activity such as rearing the young and consuming food. However, the precise nature of the cluster, its temperature,

size, movement in response to external temperature, and ability to survive extreme cold for extended periods have not been investigated in detail."<sup>2</sup>

The cluster was *described* by that study, but not *explained*, but nevertheless it informed the conventional view of an over-wintering colony.

## A BOX FULL OF VENOMOUS INSECTS

Since then, people like E.E. Southwick, James Simpson, and Anton Stabentheiner have gradually been filling the gaps. Anyway, by now we have much better information about how individual bees can control their body temperature, some information about the hive environment, but almost nothing about natural honey bee nests. Still, the idea of a warm winter cluster covered by an insulating 'mantle' of 'bees persisted.

Derek Mitchell is a mechanical engineer (with a MSc in microelectronics) studying at the School of Mechanical Engineering at the University of Leeds<sup>3</sup>. By sheer chance he got interested in beekeeping. As an engineer he thinks of a hive as a building, one that hasn't changed much, and one where the occupant hasn't had much input into the design. Hives are designed for beekeepers, portable, easily examined, simple and cheap to make. The air-conditioning experts inside haven't had much of a say. He puts it this way:

"It is clear that heat transfer inside and to the outside of the nest is integral to the life and success of honeybees. But almost nothing is known about it. This is partly because the expertise is associated usually with non-biological concerns and partly because it is difficult to study or measure heat flow in a box full of venomous insects and even more difficult when those insects are deep inside a massive tree."<sup>4</sup>

## AIR-CONDITIONING ENGINEERS

In taking a slightly more holistic perspective, just as a spider needs its web, a cavity-dwelling bee needs its enclosure. Biologists talk about 'extended' organisms (an 'extended phenotype') in that the organism isn't complete without these physical (and cognitive) extensions to its life. It doesn't really make sense to study them in their absence. Honey bees are air conditioning engineers and sugar refinery workers and they are not that without a suitable dwelling; the nest architecture is part of what makes them who/what they are. They harness the nest structure to flourish in tropical environments, arid deserts, and severe winters. They precisely control several temperatures in different parts of their nest, and engineer close to 80% relative humidity near brood, but only 50%RH where they desiccate nectar for honey.

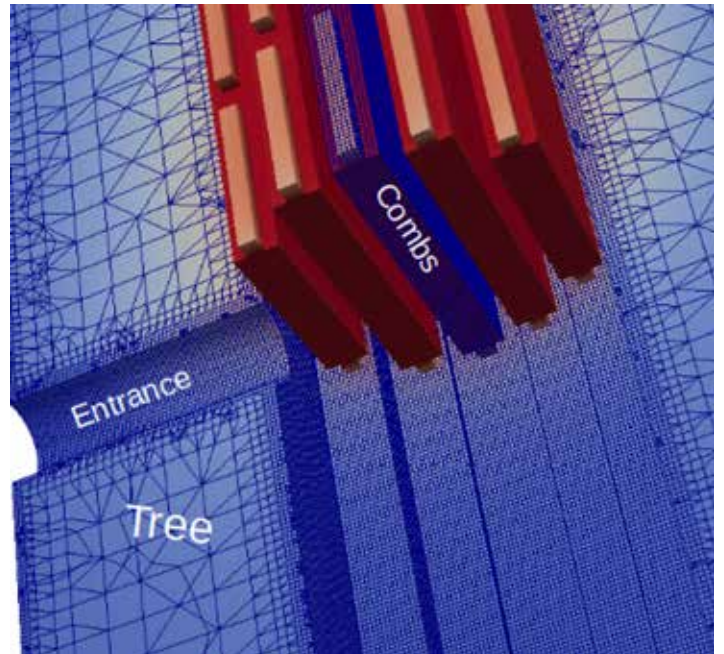


A Typical tree nest and wooden hive compared.

### THERMOFLUID ENGINEERS

Studying heat transfer, thermal energy, and the behaviour of liquids, gases and vapour, is a branch of science and engineering blending thermodynamics and fluid mechanics known as 'thermofluids', and Mitchell has produced several challenging papers on the topic as it applies to honey bees in recent years. For example, 'Honey bee cluster – not insulation but stressful heat sink' (2023)<sup>5</sup>; 'Are man-made hives valid thermal surrogates for natural honey bee nests' (2024)<sup>6</sup>, and culminating in January of this year with his PhD submission, 'Thermofluid Engineering of the honey bee nest' (2024)<sup>7</sup>. As he puts it, "Our core hypothesis is that the nest enclosure is an intrinsic part of the honey bee colony, which uses nest properties to manipulate the thermofluids within, which have in turn shaped the honey bee. This has not been understood in either academia or agriculture and has led to adverse consequences in both the study and husbandry of this important pollinator."

It's not just that we haven't really understood what overwintering behaviour and cluster formation are all about. When it comes to this aspect of bee husbandry, have we even been studying the right thing? Mitchell again says, "...new research into honey bees now needs to: first, carefully validate whether the conclusions they arrive at are innate honey bee behaviours that would occur in their natural nests or are anthropogenic i.e. artefacts of the conditions in man-made environments; second, have a clear understanding of heat transfer and the heat transfer implications of their experimental treatments and controls..."



Cut away section of CFD geometries of a tree nest viewed obliquely from below, showing the entrances combs, cavity and enclosure.

### THERMODYNAMIC ECONOMY

Nor is it just about hive materials and design. Thermodynamics is fundamental. It makes no more sense to ignore principles of thermofluids than it would to deny gravity, or believe in a different kind of chemistry. It affects everything. Thermal efficiency has a role in determining how far bees forage, what they forage for, even on colony size. Foraging efficiency is key to a colony's very survival.

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We identified the Leptosperin marker with funding provided by the UMFHA

Brood nest temperature has been implicated in pupal mortality, brain development, short-term memory, pesticide tolerance, the behavioural performance of adults, and the age structure of the colony. *Varroa* seldom reproduce successfully under high humidity. Temperature control is also a factor in chalkbrood proliferation.

There is a useful interview with Mitchell and Dr Jamie Ellis with Amy Vu available in a podcast episode, from the series 'Two Bees in a Pod' produced by the Honey Bee Research and Extension Lab at the University of Florida<sup>8</sup>. It provides a helpful synopsis of his argument. For one thing, considering the 'physical' thermofluid properties, a wooden hive is nothing like a tree cavity, and it's possible the behaviour we see in a wooden box may only be a way of coping with the profoundly different thermodynamic circumstances they find themselves in.

Second, he points out that a dependency on foraged sugars, and the concentration of these by evaporation, makes the thermal energy efficiency of the whole process highly significant for a honey bee colony. A matter of life or death in fact. To an engineer or physicist, a honey bee is in the business of collecting and storing energy which they will then use later, and like businesses, the economy matters.

### COMPUTATIONAL FLUID DYNAMICS

Mitchell brings a new empirical perspective and rigour to studying the honey bee and its nest. Much of his work is in measuring their physical properties as carefully as possible and using mathematics to solve the complex equations that describe the physics of moving fluids and gases. The resulting data is then compared with the real world.

It's a field of study known as Computational Fluid Dynamics (CFD). Thanks to burgeoning computer power these models reliably predict fluid flows and the associated physical properties, such as velocity, pressure, viscosity, density, and temperature. CFD is a commonly applied design tool in aerodynamics, weather forecasting, marine engineering and so on – think F1 car design, SpaceX, or America's Cup yachting if you like.

### A NEW LANGSTROTH?

Beehive design has remained unchanged for a considerable period of time. Moveable frames date back to Wiltshire's John Aubrey in 1683, although in a more modern sense to Augustus Munn (1834) and L.L. Langstroth in 1852<sup>9</sup>. The later's particular innovation was to extend the use of the bee-space to the horizontal plane which allowed boxes to be tiered and separated, but which also created spaces above the brood nest that increase thermal transmission. Practices such as the use of queen excluders and the supering of honey boxes plausibly constrain the colony's natural thermoregulatory behaviour, increasing the energy expenditure of the colony and exacerbating colony stressors.



*Lorenzo Langstroth invented the modern beehive design, which has served beekeepers well for more than 170 years, but it could be serving the honey bees better say findings from a new field of study related to thermodynamics – Computational Fluid Dynamics.*

Could the Langstroth hive be improved or superseded to allow the bees to optimise the colony's thermal gradient?<sup>10</sup> I'm not convinced Mitchell is too optimistic about that, and I am even less convinced New Zealand would be leading the way on any change.

**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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# PPE and Mum's Endeavour



Bay of Plenty beekeeper 'Aimz' continues her accounts of a fledgling career in the hives with analysis of protective equipment in use at her workplace, and a look back at life growing up with both mother and father toiling on the hive tool.

**Beekeeping, like any other industry has its PPE requirements. Personal protective equipment. Not highly regulated, as in the case of roading, engineering and forestry. For the most part beekeepers are free to implement the level of gear they see fit.**

Choose from full suit, half suit, vented/non, veil only, gloves (leather, nitrile, etc.) footwear, (gum boot variety, sandshoe, steel capped), back brace, knee brace... you get the gist.

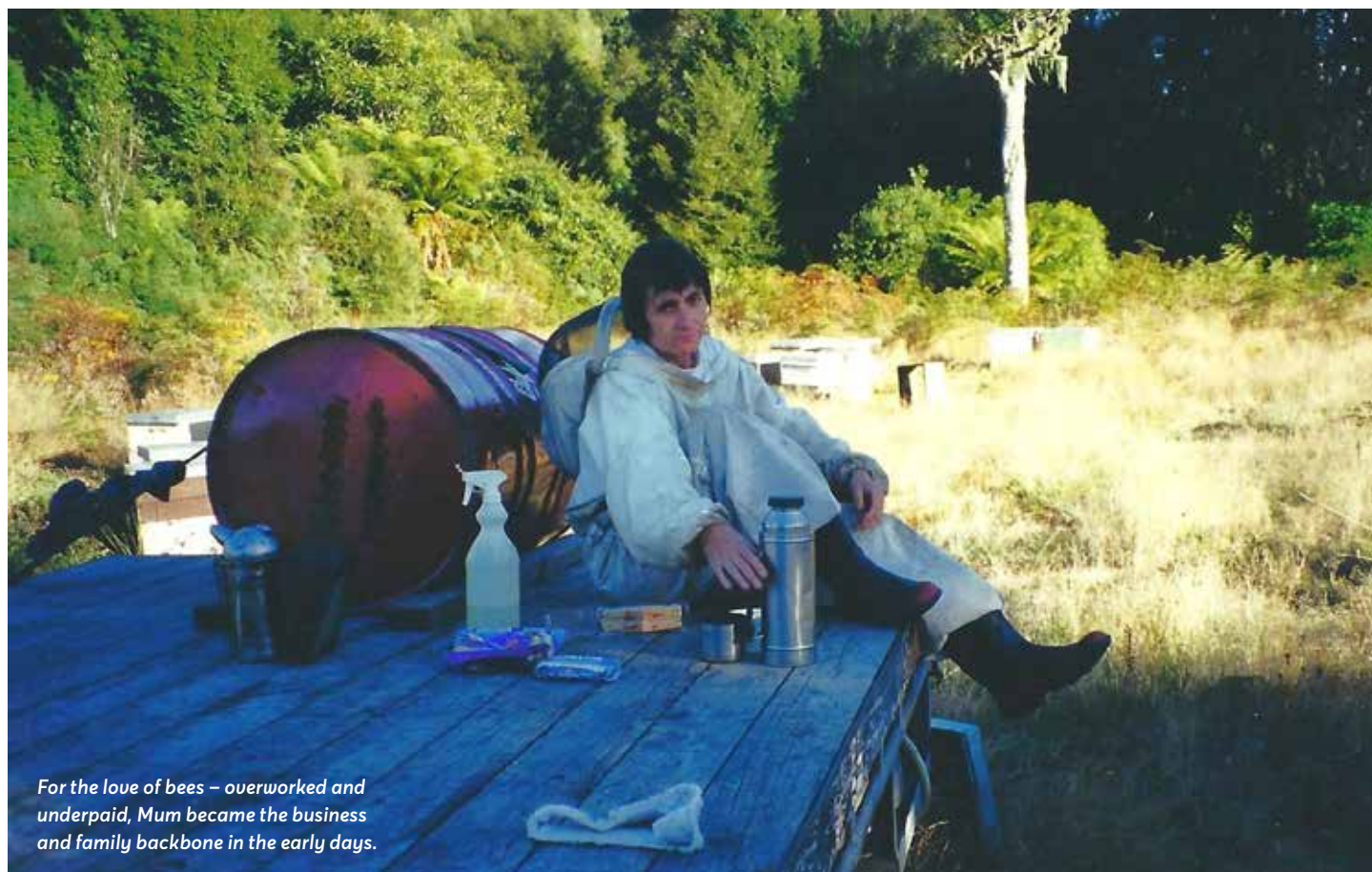
You can choose any time of year to sport a full suit, or not even wear a veil. Gloves are optional, and long pants can be too – as in my mother's case.

My Mum, Queen keeper, hard toiler, her dedication drove this business forward. Feed runs before school and late nights scraping

propolis to pay the mortgage. Uncannily like a bee working, head down, bum up. She hand-chucked hives and she drove trucks.

She also used to do a large amount of her beekeeping in a smock and veil, paired with shorts and red band gumboots. There came a fateful day when that 'one' hive had it in for her. The attack came swift and fierce as she cracked into the box. That whole damn hive swarmed her with stings. Black bees, got her real good, hundreds all over her legs as she ran and hid down a drain until the onslaught subsided.

She is tough, my mum. With so much adrenaline in her body she was bawling as she drove the station wagon home, got dressed up in her thickest woollen clothes with a proper bee suit over top, then straight back to the site where this savage hive stood, still open to



*For the love of bees – overworked and underpaid, Mum became the business and family backbone in the early days.*



*That's Dad doing it his way ... not recommended for all! Personal protective equipment is not highly regulated in beekeeping, and some choose to celebrate this.*

the elements. In an act of revenge good management practice, mum went through those frames until she found that black 'b' and ended her reign once and for all.

Aggressiveness is a trait we try to minimize; I have written "a\$#hole" across the lid of one hive where they were unusually feisty. Without bandying around anthropomorphic traits I do however wonder if maybe they were just having a bad day? Second round on that hive and I couldn't really fault them...

If minimizing stings is your strategy, then gear will play a crucial part, unless...

...You have a brother like mine - someone that would set the brother-in-law up. Holey gloves and a holey suit on first time honey runs. Wonder why good staff are hard to retain?

But really, now, these bees are pretty good, mostly content, not a lot of robbing at this time. We have been swapping out all bases for dry, clean, sanitized boards. It feels like I'm doing a good deed, some of these bases are completely damp through and I can't help but think it must be like putting on a dry pair of gumboots! It is also a proactive measure we are taking to minimize any chalkbrood spores on the base, and the quick lift gives us an indication of the hive weight as we progress through.



*Well at least one of them is wearing work boots...*

Hence the back-brace. We are fortunate to have a 'human crane' on our team, young and fit, as big as the rest of us combined. An asset to be sure, but we are all aware of 'back health' and encourage cycling through roles as necessary.

And the knee brace... Dad has just had his knee replaced with something stronger than bone, and as I write this, he is already back doing it and keeping the labour force on their toes.

I don't know if PPE is something my dad bee-lieves in. His practical beekeeping gear most of the time extends to an open neck shirt, jandals, and a straw hat. When he turns up on a site in summer everybody else feels rudely overdressed.

But regardless, I want to learn as much as I can, and with the bee guru back in action I can only hope to question everything more. ("Why was that hive light and starving that you came across? Did it have a hole in the feeder?")



*Growing up, almost every day was 'take the kids to work day'... Our whole family lived and breathed beekeeping.*

Overall, I am feeling more like a beekeeper. Every day I sit in that truck, not quite white overalls pocked with propolis, I look down at my knees and I see the embodiment of my mother, countless hours spent at her side, or on her lap, my entire childhood wrapped up in that suit.

Beekeeping is hard on the body. She would lay on her back on the wooden floors at night to take the strain, and some evenings would barely make it to her bed, laying back in suit and boots only to wake under alarm and do it all over, before the domestic morning routine began.

As a side note, I want to add arthritis. Osteo is a common enough occurrence due to wear and tear on the body. Also rheumatoid, and for a story that may help someone. My mum, under a great deal of stress, was told by her doctors the swelling and pain in her fingers was rheumatoid arthritis. They said, at the rate she was going, she would be in a wheelchair within three months.

Being Google savvy, I looked into her plight and was pointed in the direction of gluten intolerance. She did the hardcore elimination diet, and her problem disappeared. To this day she is able to check that arthritis feeling in her hands by watching what she eats.

Talking about food, check back here next month as I am going to try my fish-eyeball-eating children on pan seared drone brood in butter. Thanks mum, meeting ends was hard - but they were delicious as a kid. Stay tuned to see what the next generation thinks... 🐝



# How Hard is it to Run a Health System?



BY IAN FLETCHER

Former head of several national and state departments, Ian Fletcher explores a pressing national issue – the health system and the government's role in it.

**It's been quite a time for the health system in New Zealand. The Health NZ Board quit, then the recently appointed chair was 'promoted' to be Commissioner, then the PM announced that he would chair a special committee to oversee Health NZ's budget. It will, he says, focus on cash flow forecasting. There has been a steady flow of blame directed at Health NZ's management for misleading Ministers on the budget (also with a focus on cash flow).**

And there's the little local difficulty in Dargaville, where the hospital seems, awkwardly, to have no doctors at night. Ministers express furious confidence in each other. And clearly top management is about to be thrown under the bus.

Meanwhile, I'm reliably told that Health NZ is indeed struggling with money, and has had to go to Treasury for cash top-ups to meet payroll. This may explain the PM's focus on cash flow. Of course, while the Treasury can look like a cat's bum when asked for extra money, the truth is that they can literally never run out of New Zealand dollars – they just get them from the Reserve

Bank, who make them up. So, while cash management is very good discipline in government, it doesn't matter the way it does in a private company (PM, take note). Cash flow problems are a symptom, as they say. But not a cause of death.

How should we think about the health system? It's complicated. This is literally, mathematically true. I've written before about the excellent article "*Is the National Health Service at the edge of chaos?*", written about the UK's National Health Service and published in the Journal of the Royal Society of Medicine in December 2001. For ministers, it is an easy read (ignore the algebra; focus on the explanatory stuff).

The conclusions are clear: mathematically, health is a complex system. That means it has important properties: firstly, scale invariance – so small features or problems and big features or problems are likely to be the same. So, if Dargaville has too few doctors, it's worth checking how bigger places are going.

Secondly, resistance to change – the system copes with pressure really well, which means it doesn't respond much to government decrees either. That means if you cut staff, the remaining people



*Health minister Shane Reti, front, and Prime Minister Christopher Luxon are painting Health New Zealand's ailments as primarily a 'cash-flow' problem, but Ian Fletcher says cash flow problems would be a symptom, but not a cause of death.*





will try extra hard to still treat the sick. Conversely, if you chuck in lots more money, results won't get that much better quickly, unless it's really a lot more. Squeezing cashflow will save cash, but outcomes won't change. Staff and patients will get grumpy, and go to the media, as is starting to happen now. Remember, patients and their families see nursing and medical staff as heroes. Cost-cutting is not a medical procedure.

Thirdly, maximum efficiency. Systems like this are demonstrably optimal in resource use. It's real value for money. So, Ministers should be careful about tinkering.

So much for the maths. What about the people? Health systems are full of intelligent, dedicated, educated folk who want to do a great job. That makes it really hard to manage them. Doing what the boss says is very low on their agenda; doing what they see as right is what drives them. They cooperate well with each other, but not with the system. This means they work best in an environment where there is real delegation, trust and a local or community focus. Centralisation (an endemic Wellington disease) is just doomed to fail in this culture.

What should the PM do? Relax about cashflow. Relax the centralised system and require a high level of delegation to local health systems, and proper consultation with clinicians. Fund primary care properly (to take the pressure off hospitals and Pharmac). This is where I would focus any extra money, because it's the normal gateway to the system, and the more people can be sorted at the start of the health journey, the better. Provide robust IT that allows for a high degree of local cooperation and innovation. A bit more money, yes, but a plausible chance of actually helping things. It's investment, not expense.

And accept two big facts: we have a growing and aging population. We haven't built new hospitals for decades, while the population has grown and aged. The system is thus just overloaded physically (I don't count the rebuilds in Christchurch and Dunedin). And medical science is in the midst of a dramatic revolution. It's getting better. New Zealanders will want access to better care. That means having the political conversation about how that better care is to be paid for, through taxes, insurance, co-payments and so on. That would look like leadership. Today's focus on cash flow and tax cuts looks like a group of middle



*Dargaville Hospital – if you are looking for a doctor 'after hours', you might be waiting more than a few hours.*

managers wildly out of their depth. We deserve better.

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

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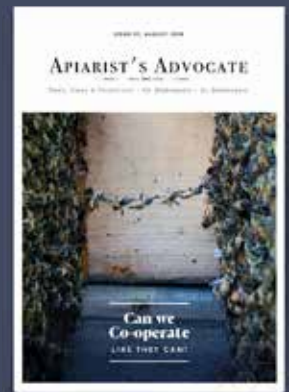
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