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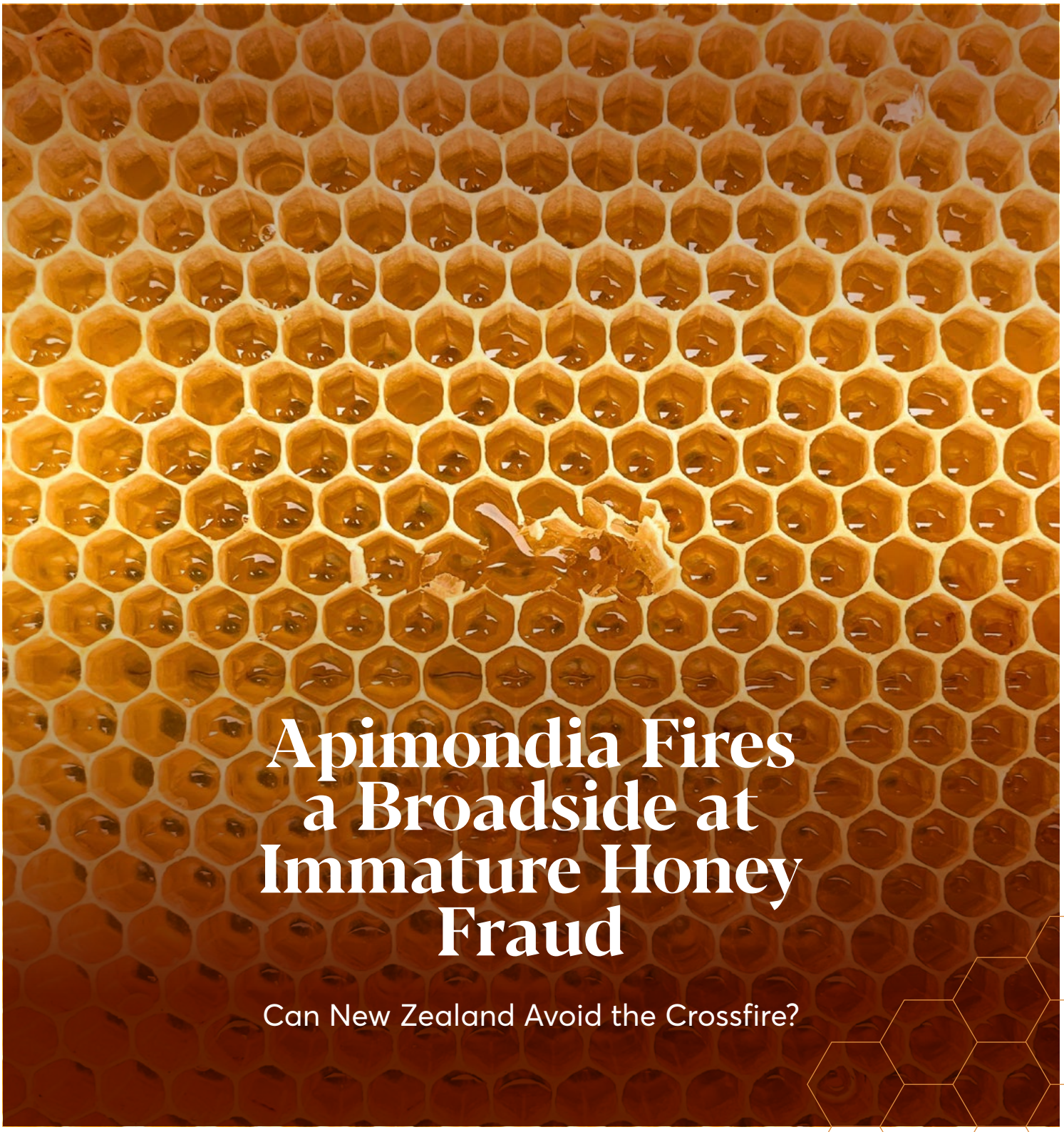
Apiarist's Advocate

News, Views & Promotions - for Beekeepers - by Beekeepers



Apimondia Fires a Broadside at Immature Honey Fraud

Can New Zealand Avoid the Crossfire?

Friendly Fire from an Apimondia Broadside

In recent times a new type of honey fraud has emerged, which involves systematic 'drying' of high-moisture honey – or perhaps more accurately, *nectar* – and recently the Internation Federation of Beekeepers' Associations (Apimondia) took aim at it with release of the *Apimondia Statement on Immature Honey Production.* With honey moisture reduction common practice among the New Zealand honey industry, some of the statement's wording risks tarnishing methods designed to improve honey quality while protecting beekeepers, honey traders and consumers alike.

"We want to protect you and all honest beekeepers around the world," explains Norberto Garcia author of Apimondia's statement as the chair of their 'Scientific Commission on Beekeeping Economy'.

"This publication by Apimondia is not targeted towards New Zealand and honest beekeepers. We know perfectly that you have a very honest and well-developed beekeeping industry."

Instead "many Asian countries" are the only areas specifically outlined in the four-page statement as home to beekeepers using fraudulent immature honey production techniques. However, the statement calls into question the use of vacuum dryers of honey, a practice used in New Zealand, even stating the consequence of their use is 'the product does not comply with the recognized regulations and therefore, may not be called honey'. Honey 'dehydration' by storing of honey in boxes and frames in a hot room prior to extraction where 'the honey in combs may lose a slight fraction of its water' is permitted in the statement. However, there is no such exemption for 'dehumidifying' of honey *after* it has been extracted, which – along with the alternate method of 'vacuum drying' – is also undertaken in New Zealand.

Apimondia is the International Federation of Beekeepers, who advocate for honest honey production and trade, and their latest statement on immature honey production as a form of fraud is broad enough to include practices used in New Zealand despite fraud not being the intent.

THE REAL TARGET

Apimondia's statement begins by describing the 'Biology of Honey Production', a process involving passive and active methods of nectar dehydration.

'Active dehydration occurs when worker bees concentrate droplets of regurgitated nectar with movements of their mouth-parts. Passive dehydration of nectar occurs through direct evaporation of water from nectar inside the beehive,' the statement reads, before later concluding 'Hence, removing water from nectar is part of the maturation and ripening process that results in honey – it is solely achieved by the bees and is an all-natural process'.

Why is it important bees carry out this process, without human intervention?

"Honey in conception is a product of the interaction of the plant kingdom and the animal kingdom," Garcia explains.

"Honey has many qualities that can originally be found in the nectar of the flowers which the bees visit but then – and here comes the interaction – the bees have substances of their own and the chemical reactions with them produce particular substances which may be found in the honey, that were not found in the nectar. For maturation to occur you have to give significant time to the bees to do that."

However, Apimondia contends the bees are not being given the time or space to do this by some beekeepers in many Asian countries.

"The bees are simple collectors of nectar, but once they bring that nectar into the hive the process is fastened by the beekeeper harvesting every day or two days and the hive is just in one box, so there is no space to mature that honey. The rest is done in a factory where they dehydrate the nectar. The quality of that honey is not the same, it should be called dehydrated nectar, which is not honey," Garcia says.

NEW ZEALAND'S METHODS

New Zealand beekeepers are in the fortuitous position of selling the world's most valuable honey, mānuka, and thus beekeepers strive to separate their mānuka crops from other floral varieties in an effort to ensure purity, or as close to it as practically possible.

Then, there is the New Zealand environment and climate, which can challenge the bees' efforts to dry their honey.

"Apimondia's intent is to protect honest, hardworking beekeepers from wholesale, industrialised food fraud," says Tony Wright, chief executive of UMF Honey Association whose members export around 70% of the country's packed mānuka honey.

Some beekeepers in Asia are undertaking honey fraud by harvesting freshly stored nectar from hives and vacuum drying it in factories to create what Apimondia calls "dried nectar".

"So, if a beekeeper needs to pull their frames off earlier because they are going to lose a high value crop due to it being diluted out by pasture honey, well then it is a similar sort of argument. It is the practicalities of beekeeping."

This practice can result in honey being removed from hives when frames are not 100% capped with the wax lid which honey bees apply when they are satisfied with their moisture reduction efforts, and they wish to prevent it from taking on any further atmospheric moisture.

The internationally recognised Codex Alimentarius definition of honey requires moisture content 'not more than 20%' for all except heather honeys, for which the limit is pushed to 23%. At those levels fermentation is a serious concern though, and Apimondia's statement includes a table which details 'tendency to ferment'. Greater than 20.1% is 'always a danger to ferment', 18.1-20% is safe if yeast counts are less than 10g, 17.1-18% is safe if yeast is less than 1000g and below 17.1% is said to be safe regardless of the honey's yeast levels.

IS THERE A RIGHT TYPE OF DRYING?

At Mānuka Orchard in the Bay of Plenty they see a lot of honey, collected from all over New Zealand. Alongside extraction and storage, a honey drying service is offered. This is essential to protecting both beekeepers, honey buyers and end consumers from the risk of fermentation says director Logan Bowyer. They test the moisture content of all honey and aim for 17% because between 18 and 20% they "can have issues".

"There will be seasons where the honey is capped, every frame or very close to it, and it still won't be 18%, and sometimes nowhere near it," Bowyer explains.

"That is not scientific, but I have seen a lot of good honey coming down the line where moisture content tests out above 18%".

For that reason, dehumidification is used to reduce moisture counts of extracted honey from around 20% to closer to 17%. Technically this falls afoul of Apimondia's position though, which only allows dehumidification of honey while it is still stored in frames, prior to extraction. Bowyer believes this position, in New Zealand's case at least, is inconsistent with creating the best quality, traceable and authentic honey.

Norberto Garcia, chair of Apimondia's Scientific Commission on Beekeeping Economy and author of their statement on immature honey production has confirmed New Zealand is not a target and amendments could be made.

"When you are drying in the box you have no idea what moisture level you are starting with and you are also drying your boxes and pallets, along with a large amount of air flow in the warm rooms. Therefore, you have no idea how much moisture has been taken out of the honey," the honey drying expert says.

"With honey only you measure the moisture content before starting, you know exactly how much to take off, and I can clearly state the honey was honey before we started, because it is not 25% moisture or something ridiculous."

And those starting moisture levels count, Garcia says.

"A 20% honey with risk of fermentation can be reduced to 18%. It is not the same to reduce a couple of points as it is to reduce 10 percent," the statement's author clarifies.

"The aim of the honest beekeeper is to avoid fermentation, not for economic gain."

LEAVE US OUT

Indeed, one of four criteria required to constitute food fraud – as stated by the European Commission in 2018 and repeated in Apimondia's recent statement – is 'economic gain'.

"In New Zealand we remove moisture from honey not for economic gain, but to avoid economic loss, because if you don't take it out the honey will ferment. It actually costs money to take it out, but it protects it from fermenting and blowing up," Wright says.

"We are not talking about crazy high moisture levels in New Zealand, it is not economically motivated, it is consumer and product protection."

The UMFHA CEO says he understands "where they are coming from", but would like assurances from Apimondia that New Zealand is not the target of the latest broadside.

"They are trying to protect their industry and beekeepers from what they see as a threat from foreign producers basically harvesting nectar and turning it into honey. I totally get their intent and it makes sense from their point of view. But from our point of view, the detail around it is not quite right," Wright says.

While the statement itself sets no regulatory standards to any markets, given the weight of Apimondia as a federation of many international beekeeping groups, it has potential to influence rule makers, honey traders and even the end consumer.

"It would be good for us to get it confirmed we are not the target of this document. I don't think we are, but the way it is written it seems as if they are saying we can't do what we are," Wright says.

READY TO LISTEN

Garcia's spoken words since the release of the statement have made clear that New Zealand's honey industry is not the target, but he stands by the need for a written position of Apimondia on the issue of immature honey – or perhaps more accurately *nectar* – harvesting and drying.

"Sometimes beekeepers with the best intentions may surpass the limits. The limits sometimes look unfair, but are necessary," the Argentinian professor of apiculture says.

If the moisture content of honey is not managed appropriately, by either bees or humans, fermentation is a risk and thus honey drying is practised in New Zealand.

"We represent beekeepers around the world and there are thousands of honey types and conditions. It is impossible to set a rule which suits every situation, every type of honey and region."

If the New Zealand honey industry wishes for a clarification or addition to be made to the statement, "to remove misinterpretation" he says Apimondia "would be pleased to discuss it".

"There may be exceptions, but those exemptions must be well surrounded by technical and scientific work," Garcia says.

Should New Zealand's honey industry wish to help tighten up the statement, Garcia says he will happily take the call.

"These statements are dynamic, not eternal. There is no final proof," he says, adding, "there may be new conditions that make us change things".

Comvita & the Legacy of Debt

Overloading of bank debt and a collapsed share price opened the door for Florenz Ltd to plot a takeover of Comvita Ltd for NZc80 per share or NZD56.4m. Both Comvita and Grant Samuel, the adviser it appointed, have warned that shareholder rejection of the offer could result in receivership of the mānuka honey industry's flagship company. Bruce Roscoe weighs Comvita's legacy of debt and critiques the adviser's report to shareholders.

BY BRUCE ROSCOE

From the outset, the Comvita saga has revolved around how it could repay its crippling bank debt. The apocalyptic question has now become, if shareholders do not approve the takeover at the meeting in Auckland scheduled for 14 November, what becomes of the company? The answer is that its banks may tip it into receivership or that it will voluntarily wind itself down and repay the banks as asset sale proceeds come to hand. Comvita, and Grant Samuel alike, admit as much in documents uploaded to NZX on 15 October.

Image created by ChatGPT

(The documents were bundled into a 143-page PDF file titled "Comvita Scheme Booklet and Notice of Meeting". The booklet includes the Grant Samuel report of 72 pages. "Scheme Agreement" and "Scheme of Arrangement" are terms applied to friendly takeovers where the target company cooperates with the bidder and introduces the bid to its shareholders and recommends acceptance. Such schemes are administered according to a rigid legal framework through to High Court approval for protection of all involved parties.)

RECEIVERSHIP OR VOLUNTARY ADMINISTRATION

Comvita chair Bridget Coates, in her "Dear Shareholder" letter in the booklet, warns: "If Comvita continues to trade at a loss, the likelihood of receivership or voluntary administration increases". Like a late-night TV shop channel that repeats product-plug loops, this warning is repeated four times in the booklet – twice by Comvita and twice by Grant Samuel.

Corrections and a Clarification

We advise two corrections and a clarification to our report *Comvita & the Bonfire of Shareholder Equity* which appeared in our October 2025 edition.

1. The report misstated the NZD46.8m difference in inventory between Comvita balance sheet dates June 2024 and June 2025 as a "write-down".
2. The report misstated that Comvita did not apply accounting standard NZ IAS 36 in the June 2020 year. A note to Comvita financial statements for that year shows that the standard was applied and that no impairment resulted.

We regret the misstatements.

We clarify that "…the erasure of NZD183.6m of shareholder value over the balance sheet dates of 30 June 2024 and 30 June 2025" refers to value loss between the 30 June 2023 and 30 June 2025 dates.

Although we write that the Florenz offer amounts to NZD56.4m, the outlay will more than double that amount as Florenz, as new Comvita owner, will bear responsibility for repayment of NZD59.0m of Comvita bank debt before April 2026, and repayment of NZD24m of that total falls due before February. Comvita faces "material refinancing risks and … uncertainly around its ability to fund operations beyond early 2026" if the takeover does not proceed, chair Coates has cautioned.

THE ERASURE OF COLLATERAL

Multiple covenant breaches to date aside, Comvita's debt repayment schedule now appears non-negotiable due to the erasure of collateral. In effect, the marking down of asset values through "impairment" to reflect "market values" has caused most Comvita bank debt to become unsecured.

Comvita said in its June 2025 year annual report that the NZD94m "syndicated facility" (read: loans too large for one bank) with Westpac New Zealand and ANZ Bank New Zealand is secured by assets of Comvita Ltd and five other Comvita units (one in New Zealand, two in Australia, and one in UK).

Trouble is, Comvita at 30 June stated its shareholder equity – which equates to net asset value – at only NZD54.9m, compared with NZD74.0m in bank debt. Banks had already witnessed Comvita's shareholder equity plunge from NZD238.5m at June 2023 to NZD156.7m at June 2024. That a further NZD101.4m could evaporate between the June 2024 and June 2025 balance sheet dates would have stunned.

Take just the example of "Property, plant and equipment", which reduced in book value from NZD72.0m to NZD28.7m between balance sheet dates 30 June 2024 and 30 June 2025. Too, it is no secret industry-wide that current assets are "current" only nominally, insofar as mānuka inventory in many cases could not be converted to cash within one year.

Reflecting a virtual partial consummation of the takeover, Florenz had already directly negotiated a "stay of enforcement action", with Comvita's banks before the takeover proposal was announced.

As the accompanying graph "Comvita Trend in Net Debt and Net Debt Equity Ratio" shows, in the past 14 years Comvita has accelerated bank borrowings in two periods — the years building up to the 2020 market peak, and again building up in the years of the market decline.

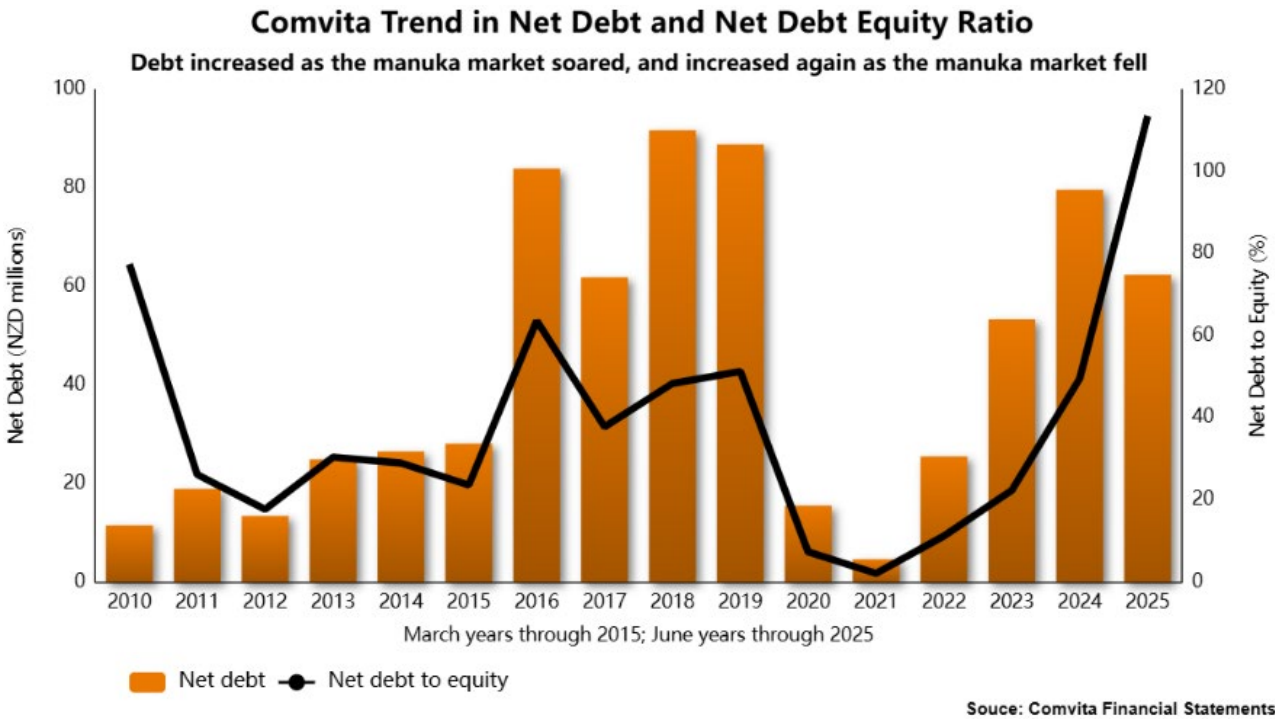
THE SNAKE IN THE PIT

The Grant Samuel report, intended to assist Comvita shareholders in their decision whether to sell or hold their shares, may have freed a snake from a pit. It states: "…with the Florenz offer at $0.80 per share providing the most appropriate reference point for the fair value of the business".

A valuation normally provides a referent point for the amount a buyer is willing to offer. In Comvita's case, the order appears reversed. Comvita may have originated the admission that the Florenz offer provided a "reference point" for its "fair value" considering that chair Coates used almost identical wording in her release of Comvita results for the June 2025 year to NZX on 29 August.

> *In FY25 impairments and write-downs totalling $72.5 million were made. The extent of impairments and additional provisions reflected the requirement to present net assets at fair value, with the Florenz offer at $0.80 per share providing the most appropriate reference point for the fair value of the business.*

The above text is excerpted from page 20 of the Grant Samuel report that advises Comvita shareholders on the Florenz takeover bid. It implies that Grant Samuel may have referenced the NZc80 per share offer in determining "fair value" for Comvita.



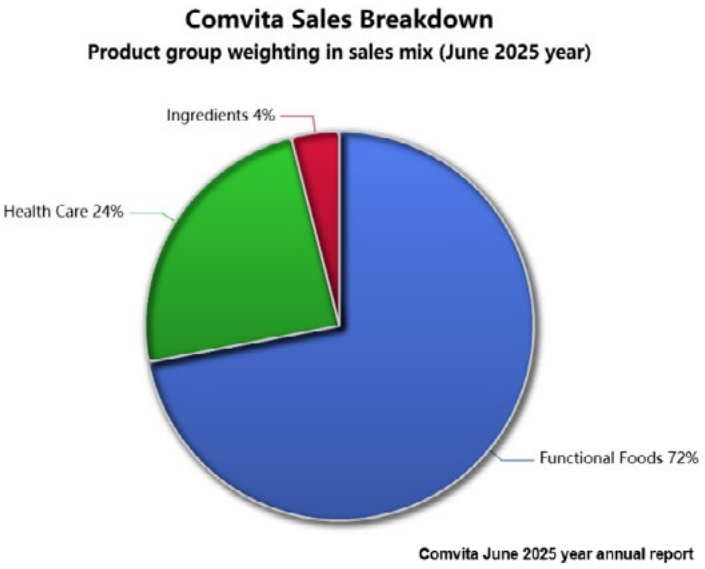
Souce: Comvita Financial Statements

Grant Samuel valued Comvita in a range of NZc70 – NZc92 per share. The midpoint of NZc81 rises above the Florenz offer by NZc1. This extraordinary precision – when considered in light of the Grant Samuel opinion that the Florenz offer provides "the most appropriate reference point" for Comvita's value – invites conjecture that Comvita may have marked asset values down to a level that would meet the amount of the takeover offer.

Coincidentally, Comvita's shareholder equity, mainly as a result of savage asset impairments, sank to NZc78 per share. 78, 80, 81. A cynic could be forgiven for thinking, "This is too perfect".

EVERYTHING WILL BE BETTER NOW

Grant Samuel produces an earnings forecast for Comvita for the years to June 2026 and June 2027. In the forecast, rays of sunlight dispel the gloom of losses past. For the current year, sales, gross profits, and net profits are forecast to increase 10.5% to NZD212.6m, 13.1% to NZD110.6m, and from red ink NZD104.8m to black ink NZD6.4m. The good news does not stop. In the same categories in the year following, sales are projected to reach NZD222.7m (up 4.7%); gross profits, NZD117.9m (up 7.9%); and net profits, NZD10.2m (up 59.4%).



The first difficulty with the forecast is that no companion balance sheet forecast is supplied. The second omission is a description of Comvita's business which shows the main product segments and their weighting in the sales mix. Comvita has published that information in the form of a chart for seven product categories with weightings expressed as a percentage of total sales. We have converted those percentages to sales values in the table "Comvita Sales Breakdown 2020-2024" that accompanies this report. Four of those categories were honey or derivative products which, in total, accounted for 84.0% of sales (in the June 2024 year). After 50 years, despite fashionably advertising as a "health and wellness" brand, Comvita has remained a honey company.

Comvita's latest (and perhaps final) annual report discloses only three vague product groups — "Functional foods", 72%; "Health care", 24%; and "Ingredients", 4%, which we show in a pie chart in this report. The word honey is not seen. Nor has Grant Samuel been able, or permitted, to expand that cursory description. It is as though Comvita already is in private hands.

THE "DRAFT" REPORT

Apparent misstatements are highlighted on pg 9 in 'The "Draft" Report' to impress that the report reads as though a panicked production. It reflects a marathon effort conducted over a porthole of time as limited as may remain for public ownership of Comvita. If the takeover proceeds, it may also become the last such report that is made public.

LEGACY

The word "legacy" recurs throughout Comvita reports to shareholders. It is used interchangeably to code the desirable and the undesirable.

"We focused on performance culture and meaningful connections to build an impactful legacy" — June 2023 year annual report. "Turnaround has carried material costs given structural complexity and legacy issues" — investor presentation, August 2025.

Amid such convoluted and polar usage, it seems assured that the enduring legacy Comvita bequeaths will be the legacy of debt.

Bruce Roscoe is a Japan-resident researcher and former foreign correspondent and securities analyst.

Notes

1. The "Comvita Scheme Booklet and Notice of Meeting" report is downloadable under "Announcements" under the CVT symbol on NZX. www.nzx.com/companies/CVT/announcements
2. Grant Samuel Associates Ltd is a New Zealand-registered company whose three shareholders are New Zealand domiciled, according to the New Zealand Companies Register. The Grant Samuel report discloses no relationship between this company and the investment advisory units under Grant Samuel Group Limited of Australia.

Comvita Sales Breakdown 2020-2024 (NZDm)

Categories	2020	2021	2022	2023	2024	% total
UMF manuka	119.5	126.5	144.2	161.5	132.8	65.0
Honey	11.8	13.4	10.5	11.7	12.3	6.0
Olive leaf extract	15.7	13.4	8.4	7.0	6.1	3.0
Propolis	9.8	7.7	14.6	16.4	14.3	7.0
Winter wellness	--	--	--	--	2.0	1.0
Lozenges	7.8	7.7	12.5	16.4	16.3	8.0
Medihoney	13.7	11.5	10.5	11.7	10.2	5.0
Oral care	--	--	--	--	2.0	1.0
Other	17.6	11.5	8.4	9.4	8.2	4.0
Total	**195.9**	**191.7**	**209.0**	**234.0**	**204.3**	**100.0**

Notes:
(a) Years to June.
(b) The "% total" in the last column applies to the sales breakdown for the year ended June 2024.
Source: Calculated from Comvita annual report data.

The "Draft" Report – Misstatements and Data Conflicts

Grant Samuel & Associates Ltd has issued two reports that advise Comvita Ltd shareholders whether to sell their shares in response to takeover bids. Both reports, billed as "independent", were commissioned by Comvita.

The first report, dated November 2011, responded to the takeover bid launched a month earlier by Cerebos New Zealand Ltd. The second report, dated September 2025, addresses the Florenz Ltd takeover bid announced on 18 August.

Below are 10 examples of apparent misstatements or data conflicts that inhabit the second report. It is difficult to escape the impression that the report is a draft. (I did not set out to proofread or fact-check. The examples sprung from the pages and jarred as I read.)

1. Three Australasian and four North America companies are listed in a table titled "Comparable Listed Companies" yet in preceding text Grant Samuel states: "There are no other listed honey companies that are directly comparable to Comvita".
2. "King Honey / Me Today" is included in a table showing "implied EBITDA multiples" (a cash flow valuation measure) while a note elsewhere in the report records that Me Today Ltd put subsidiary King Honey into receivership in July 2025.
3. In a table showing acquisition values in the "Australasian Honey Sector", Grant Samuel states that Manuka Health New Zealand Ltd in September 2018 was sold for an "implied enterprise value" of NZD363m. Land Information New Zealand, whose website publishes the detail of decisions made by the Overseas Investment Office, records the value of this acquisition at NZD269m and dates the approval to December 2018.
4. Comvita changed from March to June financial years from the year to June 2016. Grant Samuel's second report, which should therefore use June years, continues to use March years in the table stating cash flow data for "YEAR END 31 MARCH" 2023, 2024, and 2025. The template used in the 2011 report for the table "Comvita - Statement of Cash Flows (NZ$ millions)", which states cash flow values for 2009, 2010, and 2011, appears to have been overwritten in the second report.
5. Grant Samuel writes: "In FY25 impairments and write-downs totaling $72.5 million were made" yet in a report table this category is extended to "Impairments, provisions and other asset write downs" for the same amount in the same financial year. (Comvita financial statements for the year to June 2025 record total "impairments and other asset write-downs" of NZD53.9m.
6. The report states that "Comvita has been successful in… extracting higher value from its honey raw material by incorporating it as an ingredient in higher value products, such as medical and personal care products". Conversely, Comvita's sales in the "Medihoney" category declined 25.5% to around NZD10.2m in the four years to June 2024 and Comvita did not publish sales data in this category for the year to June 2025.
7. Gross profit on sales in Japan "is forecast to improve driven by reduced duty and foreign exchange". What does "reduced foreign exchange" mean?
8. Two graphs and a table "Overview of New Zealand Honey Exports by Category for Year to June 2025" equate total monofloral mānuka honey exports with products certified as UMF™ (which is the trademark of the UMF Honey Association). The association has recorded its licensees' share in retail pack monofloral mānuka honey exports at 68.0%. Further, the monofloral mānuka honey export total (7,546 tonnes) for the June 2025 year includes bulk honey, which does not qualify for UMF™ certification.
9. The report contends that "UMF" (Unique Mānuka Factor) and "NPA" (non-peroxide activity) are different manuka honey rating systems whereas historically they are identical. The same formula is used for both when reverse calculated from the volume of methylglyoxal present in the honey. UMF licensees use the UMF trademark and non-licensees use NPA.
10. Comvita's chief regulator, the Ministry for Primary Industries, is three times misstated as the "Ministry of Primary Industries".

At the end of the report, Grant Samuel advises: "Advance drafts of this report were provided to the directors and executive management of Comvita. Certain changes were made…as a result of the circulation of the draft report. There was no alteration to the methodology, evaluation or conclusions as a result of issuing the drafts".

Comvita chair Bridget Coats, in her "Dear Shareholder" letter that introduces the "Scheme Booklet" (which includes the Grant Samuel report), counsels that shareholders should read the booklet "carefully and in its entirety".

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ApiNZ-NZBI Talks Continue, Attempt to Overcome Philosophical Differences

Attempts between current groups Apiculture New Zealand (ApiNZ) and New Zealand Beekeeping Inc (NZBI) to form a draft structure of a new national level industry body for beekeepers continued through October, but as the calendar turned to November each has identified sticking points which are slowing progress.

"Neither participant is going to flounce out of this, says NZBI advisor Ian Fletcher.

"This has to be made to work. Failure is not an option."

The bullish attitude comes as the two beekeeping groups fall behind on a proposed timeline released together last month which hoped to have a potential structure outlined in October, with input then to be sought by an industry "advisory group", before heading to the wider industry for consultation in the remaining months of 2025.

The efforts follow several rounds of beekeeper consultation by both groups over several years with the intention of determining how New Zealand's apiarists wish to be represented. Despite those meetings, it is years-old philosophical differences between the two industry bodies that are once again a stumbling block – primarily the role and influence of corporate beekeeping enterprises.

"We have had a lot of engagement and made a lot of progress, but there are still a couple of issues to work through before we go out to a wider industry group," ApiNZ CEO Karin Kos says.

ApiNZ CEO Karin Kos – "It is the role of groups outside of a membership organisation and how they work together … That is the big remaining point for us".

Kos and Fletcher have been in regular communication as they flesh out the draft industry body structure, backed by their respective boards/executive groups.

"There is a lot of common ground and we have made really good progress. It has been worthwhile having ongoing discussions to get this document in a good place … I think we are 90 percent there, but you know what it is like, it's always hard to get that last 10 percent," Kos says.

The ApiNZ CEO identifies "how affiliated groups work within the overall membership" as the key area of contention for their group.

"It is the role of groups outside of a membership organisation and how they work together. For us it is a matter of making sure there is a place, but that the governance still sits with the membership. That is the big remaining point for us," Kos says.

NZBI are coming to the discussion from the point of view that the existing work of groups shouldn't be overlooked and they should be able to maintain their "identity".

"We can't compel anyone to join a new national-level beekeeping organisation and so you have to make it as easy as possible for people to want to join," Fletcher says.

"I have been working on the basis that those already in a group should be able to find a way into a new structure through

ApiNZ/NZBI Proposed Timeline

STAGE	TARGET DATE
Draft structure prepared	Early October 2025
Input from advisory group	October 2025
Wider industry consultation	November–December 2025
Final proposal confirmed	End of December 2025
Approval (hopefully)	Q1 2026

affiliation. You would want to guard against it being a free ride so their terms of membership didn't mean they were getting benefit that they hadn't contributed to financially. That is reasonable."

The other sticking point is the role of large corporate businesses in which beekeeping is just part of a vertically integrated operation, such as Comvita and Mānuka Health. Those two, and others, have been members of ApiNZ, whereas NZBI takes a more beekeeper-centric approach.

"There is no question the big corporates keep bees and so are beekeepers," Fletcher explains the discussions.

"They may not see their businesses principally as beekeeping though. So, do they find their home as full members where they would end up paying quite a bit of money and have a big seat at the table, or do you have a structure where they end up as a kind of associate member and the people whose primary business is the keeping of bees are in the driving seat?

"That is a legitimate area of discussion and it is possible to have two valid points of view."

Both groups' leaders hope to have moved past the current impasse by the first or second week of November, and move to that next step of testing the draft structure on a small group of beekeepers.

"Let's get something we are both comfortable with. If it takes a bit longer than planned, that is not entirely unexpected. It has been good discussion," Kos says.

NZBI advisor Ian Fletcher – "There is no question the big corporates keep bees and so are beekeepers … Do they find their home as full members where they would end up paying quite a bit of money and have a big seat at the table, or do you have a structure where they end up as a kind of associate members?".

Despite the stumbling blocks, built on long-help philosophical differences, Fletcher says there is commitment to ensuring the current process gains beekeepers a structure they can seriously contemplate.

"We have to work it through to narrow the choices as much as we can, then engage the beekeeping community," he says, adding "I think we can do some more narrowing".

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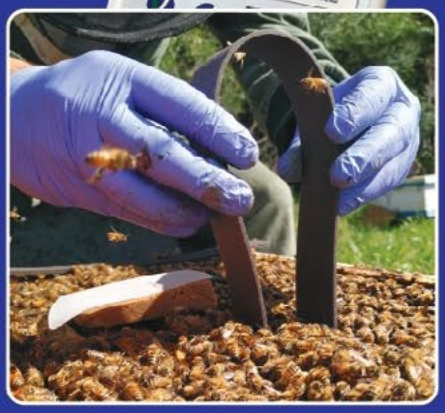

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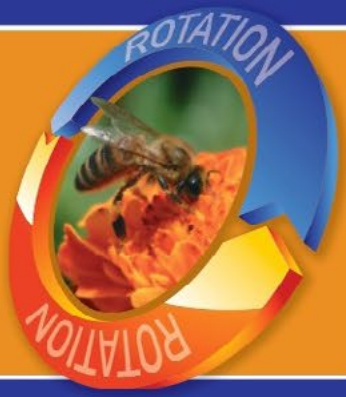

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Hornet Incursion – What's the Risk and How to Help?

Last month three yellow-legged hornet queens were found and removed in Auckland, following on from the discovery of two male hornets in different suburbs of the city in June and July. The presence of both male and female of the species is a "considerable concern" says invasive species expert Prof. Phil Lester.

Prior to this year the yellow-legged hornet (*Vespa velutina*) had not been detected in New Zealand, but is found widely across Southeast Asia and has been introduced to Europe and the USA.

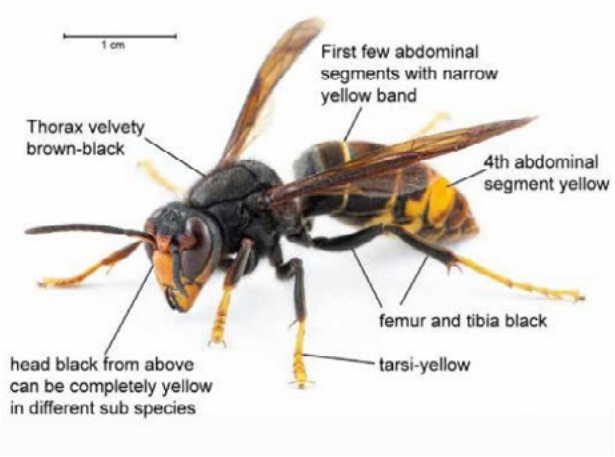
Finding invasive insect species early is critical to elimination and while Lester, a Victoria University of Wellington Professor of Biology, stresses at this stage very little is known about the incursion, what is known is "worrying".

Biosecurity New Zealand first received two separate notifications from members of the public of male hornet sightings – one in late June from Grafton and the second in early July, 16km away in Albany. More recently in Glenfield, a suburb between the two where the male hornets were located, a queen was found in the early stages of nest building and was removed on October 17 then within 2km two more queens were discovered in the last week of October.

The male hornets may have come from a shipping container and dispersed themselves around Auckland, but given the distance between their locations a greater risk could exist.

"It's hard to believe it is just an incursion from a shipping container when there are separate times and multiple locations, some distance apart, which seems to indicate there is a nest, or multiple nests in the area," Lester says.

"The presence of the males, if they haven't come off a container, suggests there was a reproductive event. A viable nest that has survived and reproduced. If that was the case, there is likely to be multiple queens produced as well as the males, which could have flown off and established."



The public of Auckland are asked to be on the lookout for yellow-legged hornet and report sightings.

Just hours after Lester made these comments, news of the two further queen hornets being found in Auckland broke.

Biosecurity New Zealand is appealing to the public to be vigilant and report any sightings of yellow-legged hornets, which are not classified as a notifiable or unwanted organism under the

Figure 2. Yellow-legged hornet (left) compared to species established in New Zealand: (from left to right) German wasp (Vespula germanica), Asian paper wasp (Polistes chinensis) and Australian paper wasp (Polistes humilis).

Biosecurity Act 1993, but are considered a biosecurity concern due to their potential impact on honeybee and wild bee populations.

"It is a highly adaptable predator with a broad diet, primarily feeding on bees, wasps and flies, but also ripe fruit and flower nectar, posing a risk to growers. It may compete with native insects and birds for food, and it has a painful sting," explains Mike Inglis, Biosecurity New Zealand's commissioner north.

Figues 3. A primary nest is created by a yellow-legged queen hornet at the beginning of the spring season.

Lester says the yellow-legged hornet has a wide climate tolerance, meaning there is potential for it to establish in many parts of New Zealand, and it is "a serious concern for beekeepers".

"One of the things it'll do is hover outside honey bee hives and wait for returning workers and pounce on them, kill them and take them back to their nests. The workers are substantially affected by that," Lester says.

This limits honey bee foraging behaviour and contributes to colony loss.

HOW TO HELP & WHAT TO LOOK FOR

"We don't know at this stage whether there is a local population, which is why we are asking Aucklanders to keep an eye out and call us if they suspect they have seen this hornet or its nest," Inglis says, noting "the most effective method for surveillance is through public involvement".

Early embryo nests can be as small as a tennis ball and may appear within just a couple of days. Eves of buildings and trees are common locations. Biosecurity New Zealand advises not to disturb the nest, but to take a photo, and report it to them.

The yellow-legged hornet is large, 2-3 cm long, with a black head and a yellow face, black thorax and legs with black femur and tibia and yellow tarsis. The wings are a smoky brown colour and not transparent like other common wasps.

If a possible nest has been found, or if a specimen or photo of the yellow-legged hornet is taken, Biosecurity NZ's pest and disease line should be phoned, 0800 80 99 66, or it reported online at https://report.mpi.govt.nz/pest.

The Indian Honey Market – Opportunity with Obstacles

The biggest food trade show in the most populous country on earth, World Food India, proved an eye-opening experience for the UMF Honey Association (UMFHA) in September. Marketing manager Campbell Naish reports on what we know about a potentially huge honey market and why – at least to this point – it has gone largely untapped by Kiwi honey producers.

BY CAMPBELL NAISH

The New Zealand government is working hard to forge a Free Trade Agreement between New Zealand and India. To support the efforts, UMFHA was one of a group of New Zealand Food Associations to attend World Food India in New Delhi September 25-28 hosted by New Zealand Trade and Enterprise, the Ministry of Foreign Affairs and Trade (MFAT) and the Ministry of Business, Innovation and Employment.

The event was also a fact-finding opportunity in the one great economic market yet to be established by mānuka honey exporters.

The event in the Indian capital and the world's second most populous city became an excellent opportunity to explain the differences between mānuka honey and other honeys and the benefits to India and New Zealand for our apiculture industries to work closer together.

The UMFHA stand had four busy days educating attendees about mānuka honey and learning about what considerations are important for anyone looking at India as a market. Here's some of the key insights…

- Currently honey from New Zealand incurs a 65% tariff when imported. MFAT negotiators are working hard on clarifying why mānuka honey is not a threat to Indian producers. Honey has a history spanning thousands of years in Indian food, health and agriculture. It is regarded as an important product for helping rural populations grow their wealth, therefore the inclination to protect their producers will be hard to overcome.
- Mānuka honey is still out of reach of all but the wealthiest consumers. For example, 250g of Indian multifloral honey online could cost INR 35 (NZD0.70) vs a UMF 5+ on the same marketplace costing between INR 2,100 – 4,600 (NZD 42-80).
- UMFHA estimates the current market for mānuka honey at 14.5m people who will be spread across India's eight tier-one cities.
- Indian has its own healthy honey culture so New Zealand brands entering the market need strong market entry plans that identify clearly what their point of difference is to Indian honey health propositions and how their brand will communicate with the top 1% of the market.
- Other considerations
  - The Indian climate means identifying a supply chain and retail solution that can take care of your mānuka honey is essential.
  - The market is complex so identifying proven market partners to help identify and navigate opportunities and logistics is vital.

UMF Honey Association marketing manager Campbell Naish, left, talks mānuka honey at the World Food India event in New Delhi in September.

- A lot of Indian honey is legally diluted with sugar and water for the local market. There is appreciation of the quality of New Zealand honey and quality systems.

With or without tariffs, the current opportunity in India is about growth. While the target market may be small initially, India is the fastest growing major economy in the world and demand for quality goods and natural products is beginning to rise.

There is an opportunity for New Zealand mānuka honey brands to build our strongest natural health market yet by investing in taking a single high quality, New Zealand health proposition, under the world's best standard, to Indian consumers and making it a household staple.

For further information regarding what was learned in India, or how UMFHA can support honey exporters through education, partnering with officials, researchers and the honey industry in India, Campbell Naish can be contacted via email, enquiry@umf.org.nz.

The UMF Honey Association was among a team of New Zealand food associations to attend the World Food India event in an attempt to increase trade to the world's most populous nation.

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John Berry on Apimondia

This year marks John Berry's 60th as a beekeeper and, knowing there is still plenty for him to learn, for the first time the Hawke's Bay lad headed off to the World Beekeeping Congress that is 'Apimondia'.

BY JOHN BERRY

Hosted by Denmark, but jointly run by Norway and Sweden as well, the main event of Apimondia was in Copenhagen 23-27 September. However, my learning started with a pre-tour bus trip beginning in Bergen, Norway's second largest city.

There was a re-jigging of tour plans as the awful weather for which Bergen is renowned rolled in, so first up we enjoyed an illustrated talk on beekeeping in the local area. Pollination of mainly apples, and some cherries, is an important source of income early in the season, followed by most of the hives being moved away from the coastal rain belt.

Once the weather cleared, a bit, we went up the funicular railway where we saw two hives perched on the side of a mountain followed by my first taste of halibut. Our next stop was to learn about the local mellifera mellifera bees, and in this area near Stavanger you are only allowed to keep these bees. It was an interesting talk about the politics and genetics involved, but nothing will ever convince me that these nasty little monsters have any place in modern beekeeping. I have too much history with them.

A home with a view. It took a funicular railway to pull John Bery this high up the mountain, but this is the permanent home to two beehives in Norway's second largest city, Bergen.

If I have any complaint about the tour it would be that there was too much travelling and not enough beekeeping for, although the Norwegian countryside is truly stunning, you can only take in so much. Once we got to Denmark we did get to spend a lot more time in different honey houses and apiaries.

John 'the Drone' Berry and some "queens" found at Apimondia. "I was enjoying it until one whispered in my ear 'winter is coming'."

Throughout the trip we were hosted, and often fed by, local beekeeping groups. Denmark is a lot flatter than Norway and the farms are bigger. However, commercial beekeeping is struggling because of huge imports of cheap and often fake honey.

If anything struck me as being totally different from beekeeping in New Zealand it was when we were taken to a wax rendering plant where we saw beautiful virgin combs put into a steam chest for rendering. The wooden frames themselves are reused after

boiling in caustic soda. We used to do this in my youth, but it is a dangerous process. I'm not against a little bit of excitement in my life, but I wouldn't touch this process with a 40-foot bargepole. The long winters in certain parts of Europe make nosema a pressing concern and the regular wax rotation helps them lower spore counts.

I made a conscious effort to try and move around the bus and sit with different people and ended up making some really good friends which, for me, was the absolute highlight.

APIMONDIA ITSELF

Apimondia itself is huge. Endless rows of trade displays and it was difficult to work out which talks to attend because, with at least three different sessions running at the same time, there were so many. Some of the science was way over my head and a lot of it, while interesting, was not all that relevant to practical beekeeping.

I'm sure I missed out on some stuff I should have seen, but you can only take in so much and I spend a lot of time just networking with new and old friends. It's amazing who you meet at these places, from scientists that have been to New Zealand in the past to old friends like Joe Peeters. There was one person who mistook me for my uncle Russell Berry. I guess I'll just have to grow my beard even longer!

There was no honey competition this year because fake honey has just become so ubiquitous and so difficult to distinguish from the real thing. To somewhat compensate, they had an international honey bar and I got to try some really interesting and often very nice honeys, including some pineapple honey from Fiji. I can only taste so many samples at once, but really enjoyed what was going on there. So I ended up volunteering to help with the New Zealand section.

Apimondia makes for a great social occasion says John Berry, here making friends with a Hungarian delegation.

Questions and talk were constant and it was really amazing to meet so many people from so many different countries. I had already tried some buckwheat honey from the USA and didn't like it at all, but when I asked someone from Lithuania what I should try on their stand they insisted I should try their buckwheat. Second time around, once you get past the smell (and it is not easy), you really get to taste what they're talking about.

The closing ceremony may have been a teeny, tiny bit too long, but on the plus side I will be able to use the memory as a soporific for years to come.

Sacrilege to Kiwi beekeepers, but at this Danish wax rendering plant virgin beeswax comb is rendered down.

BUCKFAST BEES

I finished up with a final, one-day tour to a breeder of Buckfast bees, Keid Branstrup. I have worked with his bees in the past in Devon and know just how good they are. He was a close friend of Brother Adam (aka Karl Kehrle, the Benedictine Monk of Buckfast Abbey in Devon who bred the strain of honeybee named for the Abbey) and an absolutely fascinating talker. I have to admit I don't completely understand why they are still adding new genetics to this bee and would love to have more time working with him. He would make a really good guest speaker next time we have a conference.

I made a lot of friends, brought a few widgets, and will have a close look online at a few more now I am home. I don't think I heard a cross word the whole time I was there and it was wonderful to be amongst people with a shared passion.

Fake honey seems to be the biggest concern overall and it is certainly causing major financial problems for beekeepers all over the world. Tropilaelaps mites are spreading into Europe at an alarming rate and they make the varroa look like a picnic. Asian Hornets are out of control through much of Europe and are probably the biggest current threat to New Zealand beekeeping. If they get here and we don't spot them very quickly we will have real problems. We need a publicity campaign starting sometime last year.

FROM SATIRE TO MAGNETISE

There was one talk I really regret missing, and only found out about it when I was talking to other people… They say that fact is stranger than fiction and many years ago I wrote an article for an April (1st) *New Zealand Beekeeper* about how I was putting little metal discs on my queens and then when I wanted to catch them just inserting a magnet into the hive. The idea has now been patented by someone else. Perhaps I should go back to my other April project of breeding my short sting bees before someone else does!

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

Biosecurity – What Does the Colony Loss Survey Teach Us?

With a recent hornet incursion in Auckland, biosecurity is the topic-du-jour within apiculture and so Colony Loss Survey author Pike Stahlmann-Brown explains what last year's survey results indicated about beekeepers' preparedness.

BY PIKE STAHLMANN-BROWN

A queen *Vespa velutina* (Asian hornet or yellow-legged hornet) building a nest was discovered in Glenfield on Auckland's North Shore in mid-October, then two more later in the month. This species of hornet – whose native range stretches from Afghanistan to Malaysia – preys on insects including honey bees returning to their hives from foraging. Yellow-legged hornets hunt for protein (honey bees, other insects etc.) to feed their larvae. Predatory pressure outside the beehive reduces honey bee foraging activity, increasing stress in the colony and leading to depletion of stored honey, making colonies susceptible to starvation. The effects can be significant: yellow-legged hornets invaded France in 2004 and were estimated to have weakened between 30% and 80% of beehives following the initial detection.

Biosecurity New Zealand responded quickly and destroyed the Glenfield nest, but the emergence of a new threat to honey bees is understandably concerning for beekeepers. As Radio New Zealand reported, Comvita's chief executive Karl Gradon said "This could not have come at a worse time".

The 2024 NZ Colony Loss Survey included questions about new pests and diseases establishing in New Zealand. Specifically, the survey asked, 'If an exotic bee pest or disease did arrive in New Zealand, how confident are you that the biosecurity system could detect it before it has a chance to spread widely?'. Among commercial beekeepers, 8% reported being "Very confident" that a new pest or disease could be detected, 55% were "Somewhat confident", and 37% were "Not at all confident".

The survey also asked beekeepers to evaluate their own ability to identify signs of four pests and diseases that are **not present** in New Zealand, namely small hive beetle (*Aethina tumida*), European foulbrood (*Melissococcus plutonius*, EFB), Tropilaelaps mites (*Tropilaelaps* sp.), and tracheal mites (*Acarapis woodi*).

Small hive beetles are black beetles around 5–7mm long. They scatter quickly when hives are opened, with their 10mm larvae burrowing through comb transmitting a yeast which causes the honey to ferment or "slime out". EFB produces spotty brood patterns as well as dead, discoloured (often yellow), and sometimes twisted larvae in uncapped cells. A hive infected by EFB can smell like ammonia. It can often be difficult to distinguish from American foulbrood (*Paenibacillus larvae*) in the field. Tropilaelaps mites are reddish brown and one-third the width of varroa; they are very active and can be spotted mostly in the brood. Tracheal mites produce K-deformed wings and darkened trachea on adult bees; however, positive identification requires laboratory diagnosis.

If you suspect any of these exotic pests or diseases in your hives, call the MPI Exotic Pest & Disease Hotline on 0800 80 99 66.

Among commercial beekeepers, 51% were either "Somewhat confident" or "Very confident" that they could detect signs of small hive beetle in their apiaries. 46% were at least somewhat confident that they could detect signs of EFB, and 32% were at least somewhat confident that they could detect signs of Tropilaelaps mites. In addition, 29% were somewhat or very confident that they could identify signs of tracheal mites.

While confidence in identifying new honey bee threats is encouraging, several beekeepers who attended the New Zealand Honey Bee Research Symposium in August noted that overconfidence in one's own ability can have serious implications for the wider industry. With some pests and pathogens being fast-spreading, even small delays in detection can have serious consequences for the wider industry.

The 2024 survey also asked, "How confident are you that the biosecurity system could eradicate exotic bee pests and diseases from New Zealand?". Among commercial beekeepers, 2.5% were "Very confident", 22.5% were "Somewhat confident", and 74% were "Not at all confident". While the responses suggest a cautious outlook, they reflect the complexity of the challenges involved in eradication.

These biosecurity questions were a special topic in the 2024 NZ Colony Loss Survey. In addition to its usual focus on varroa management and over-winter losses, the 2025 survey includes special topics on wasp management and sources of advice about beekeeping (as well as trust in those sources). The 2025 survey also paints a fuller picture of pollination.

The 2025 survey will be open until 28 November. If you haven't completed it yet, a reminder with your unique survey link will be sent on 3 November. If you don't receive the email, send your Apiary Registration Number to surveys@landcareresearch.co.nz and I'll send you a new link.

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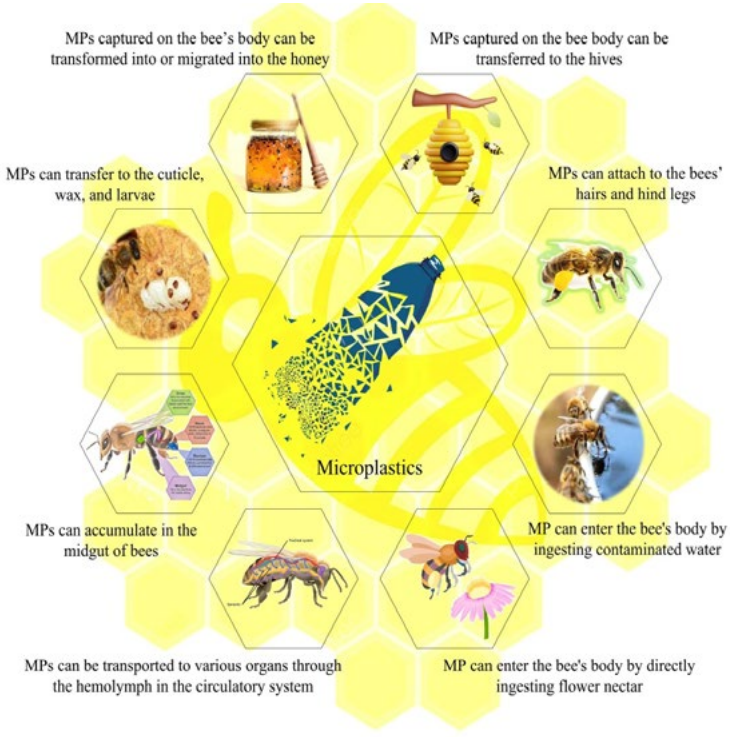
Plastic's Fantastic – Unwrapping the World's Largest Unregulated Clinical Trial

By now we are aware that tiny plastic particles are all around us and, as humans, can't help but ingest them. It's the same in the animal kingdom and for the humble honey bee. Science writer Dave Black examines what that means for their health, and ours, and the food we both consume.

BY DAVE BLACK

At the turn of this century Paul Crutzen, a Dutch atmospheric chemist, wrote a couple of essays introducing the idea of the 'Anthropocene' epoch to most of us[1]. It was a daring but controversial idea, not least (for me) because of the sense of 'mansplaining' to geologists what an epoch was —my father was a geologist. It's now quite common to hear people in science and media talk about the 'Anthropocene', by which they mean, the Time Of Man, the human 'epoch'.

Epochs are not defined by biology, or oceanography, or atmospheric science, interesting though they may be. Nor by human hubris. For Geology an epoch is precisely defined as a period of time characterised by the geological records made of rock strata and sediments, the physics, chemistry, and processes of the solid parts of the earth. There is even a committee (The International Union of Geological Sciences) that considers these things. Understandably, the geoscientists rejected the idea, at least for now, and continue to describe the geological epoch we are in as the Holocene.



Transmission of microplastics from the environment to honey bees and hive materials. Source: Gilani et al. 2025.

A SENSE OF SCALE

In describing the 4.5 billion years (4,540 million years) of Earth's history a few hundreds of thousands, or millions, of years that occupy an epoch are loose change, there are 37 epochs. The first insects appear around 320 million years ago, 20 epochs ago. Almost all of human history falls within one epoch; modern humans (*Homo sapiens*) are only 300 thousand years old. If we were to decide, without the benefit of knowing what may happen in, say, the next 300 thousand years, that the last 75 years of human history was so significant that it marked a new and distinct geological epoch what markers in the geophysical record should we choose? In 500 million years' time what fossil could indelibly and permanently mark a global transition from 'Man, a natural ape, to 'Man' the super-natural power?

There are a few such 'timestamps' being debated, some more likely to produce a clean geological 'signal' than others, none of them a legacy we could be proud of. They include the significant increase in sedimentation and erosion, an altered carbon cycle evident in ice cores and sea acidification, and radionuclide 'fallout' of uranium and plutonium suddenly carpeting the globe from the 1950s. There are also materials and compounds being produced now that have never – will never – originate from natural causes, half the concrete ever made, the most abundant material in human history, has been produced in the last 20 years[2].

Possibly the most significant of these new materials is plastic. The rapid growth in the production of plastics that has taken place since WWII has only been outdone by concrete and steel, which has been in production for considerably longer. In 2017 a group of researchers attempted to quantify the manufacture and fate of all the plastic that has ever been made, which came to 8.3

billion tonnes by 2015, of which 79% has already accumulated either in land fill or 'loose' in the environment[3]. Less than 10% was recycled. The cumulative amount produced is already more than enough to have wrapped the Earth in a layer of cling-film[4], and by 2050 there'll be enough for six layers of cling-film[5]. This isn't the Anthropocene or the Holocene, it's the *Plasticene*.

FRAYED AND AGED

The reality of our plastic is not a suffocating sheet though. Unmanaged plastic in the environment mostly exists as small fragments, fibres, and granules that result from the photochemical and physical degradation of larger plastic objects and materials that are disposed of incorrectly; from cosmetic products where they used as exfoliants; and from the wear of synthetic textiles subject to the abrasive action of washers and dryers. These particles, between one nanometre and five millimetres long, are commonly what's known as 'microplastics'. They are very mobile, last an eternity, and have been found everywhere scientists have looked[6]. That's the plastic problem, the sheer scale of an unprecedented, profound, global change.

Honey bees have been used as environmental samplers for a long time, routinely testing for pollutants, pesticides, even explosives. As expected, they are the perfect dust-wand. A recent Danish study (2020) showed microplastics on the bodies of bees from all 19 urban, suburban, and rural apiaries in the study. Data in the scientific literature from China, France and Germany indicate a rate of microplastic precipitation from the atmosphere in the order of tens to hundreds of microplastic particles per square

The routes of exposure in apiculture practice to microplastics. Source: Gilani et al. 2025.

meter every day[7], there to be collected by bees. A German paper in 2015[8] considered 47 honeys from supermarkets and from small-scale local beekeepers and the flowers from 22 flowering plants in the region and concluded, *"These data suggest that the global environment is affected to a large extent by microplastic particles either from direct inputs or from fragmentation of macrolitter."* Microplastic fibres are taken up by adult worker bees in their cuticle and digestive tract, and are transferred to larvae, honey, and wax. However, it's completely unclear whether that matters.

KNOWING WHAT WE DON'T KNOW

It surely follows that as all the air and water contains micro- and nano- particles of plastic so do bees, so does our food, and so do we. So far, in a significant review paper[9], microplastic contamination has been pointed out in honey, salt, sugar, beer, tap and bottled water, canned sardines, sprats, and fresh seafood, from hundreds of locations in countries all around the world. There is obviously some interest in finding out if the particles are harmful. At the moment almost every study so far is merely 'exploratory', and different, so there are no standardised methods or agreed definitions, which means no assessments of exposure or risks make any sense at all.

The size of the particles vary, the type of polymers the plastic is made of can be one of dozens, and there may be special additives or they could be contaminated with chemicals or microbes. The physical size of the particles can determine where microplastics end up. In the case of bees, if they are big enough they can be removed by the proventriculus. Smaller particles should be contained by the peritrophic membrane in the gut and eliminated from the body. Only the tiniest particles might be relevant in terms of systemic exposure or tissue damage to the bee. 'Nanoplastics' are therefore likely to be more hazardous, but that is not to say they are.

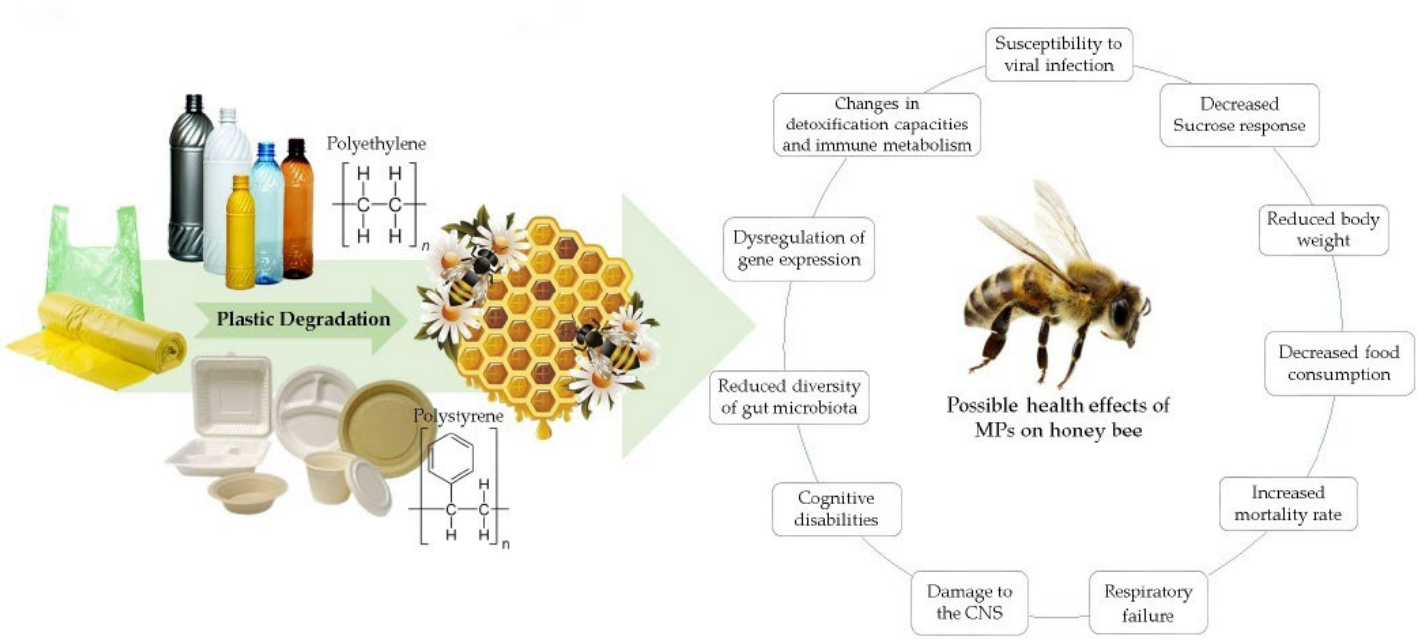
EARLY INDICATIONS

The few peer-reviewed studies to date that specifically relate to honey bee health suggest we might want to give the matter some thought[10]. Al Naggar et al. (2021)[11] conducted a study where they exposed honey bees to small (27 ± 17 µm) and large (93± 25 µm) polystyrene microplastic fragments over 14 days. Survival of the bees was unaffected, but body weight reduced.

Ferrante *et al.* (2024)[12] examined the oral toxicity of polystyrene (4.8–5.8 µm) and polymethyl methacrylate (1–40 µm) microspheres, separately and in combination, observing their effects on the immune system and the survival of the workers. The found the spheres worsened the survival and immune response of the bees, and led to changes in their cuticular profiles. (Bees would not normally encounter spheres, their greatest exposure is to air or water borne textile fibres and fragments.)

Part of the Ferrante team, Pasquini *et al.* (2024)[13] analyzed the effects of oral exposure to spherical particulate microplastics on cognitive capacity and examined accumulation in the brain. Fluorescent microspheres (1–5 µm) were used to determine whether microspheres of this diameter can penetrate the blood–brain barrier of bees. All treatments impaired learning capacity and memory, with polystyrene causing the most severe effects. The imaging analysis revealed that microplastics measuring 1 to 5 µm penetrated and accumulated in the brain after just three days of oral exposure, predominantly in the optic lobes.

Wang *et al.* (2022)[14] sought to assess the possible influences of polystyrene particles of different sizes (micro and nano-plastic) using microplastics with a diameter of 100 nm, 1 µm, and 10 µm, as well as fluorescent-labeled polystyrene microplastics (10 µm) traced in the bee gut. Particles with a diameter of 100 nm significantly decreased body weight and survival rate, induced abnormal growth of the intestinal cells and decreased the relative abundance of Lactobacillus and Bifidobacterium. The treated



The possible health effects of microplastics on honey bees. Source: Gilani et al. 2025.

honeybees became more susceptible to the pathogenic Hafnia alvei, leading to a mortality rate five-times the controls.

'FORTUNE FAVOURS THE BRAVE'

The warning signs might be there, but it's not yet enough evidence to reasonably evaluate whether microplastics are really hazardous to bees (or humans), and, if they are, we can't say whether they are more or less hazardous than all the other hazardous things they deal with. If microplastics — nano-plastics — are harmful for honey bees, what practical steps could limit exposure?

And what about us? At what point do we worry about consumer safety, real or perceived; business risk or human health? In one attempt this year to quantify the human consumption of microplastics from the available data, such as it is, a French study looked at the very tiny particles we inhale (<10 µm, a similar scale to diesel particulate matter in exhausts) and has estimated that in cars and indoor spaces, we breathe in 68,000 bits of plastic every day[15]. In another, the Canadian authors concluded that, from all sources (consumed and inhaled), an average American adult man ingested 114,000 particles of plastic annually[16]. Of that, the honey consumed was estimated to contain 70 fragments. Do those 70 fragments matter?

Welcome to the world's largest unregulated clinical trial.

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Heavy Metals in Honey

Among several New Zealand labs' suite of honey tests are those designed to detect heavy metals. Hill Labs scientists Kyle Snare and Sukhjeet Singh explain how the heavy metals make it into the sweet stuff and why the testing is needed.

BY KYLE SNARE & SUKHJEET SINGH (HILL LABS)

WHAT ARE "HEAVY METALS"?

Heavy metals refer to trace metals that occur naturally in the Earth's crust and are toxic to organisms at low concentrations. Heavy metals can become concentrated through various human activities, including industrial processes, mining, agriculture, and transportation[1]. Overseas purchasers of honey may have an interest in finding out the concentrations of heavy metals in honey. Lead and Zinc are the most widely requested heavy metals for testing, but other heavy metals that Hill Labs frequently tests in honey include Mercury, Cadmium, Arsenic and Chromium.

HOW DO HEAVY METALS GET INTO HONEY?

Heavy metals can make their way into honey in various ways. When natural cycles are disrupted, heavy metals can accumulate in water and soil in both rural and urban areas[2]. If the soil or water near beekeeping areas is contaminated with heavy metals, plants can absorb these metals. Consequently, bees collect pollen and nectar from these plants, transferring the metals into the honey. Industrial processes and mining operations can also release heavy metals into the air, which then settle on flowers and plants[3].

Certain pesticides and fertilisers can also contain trace levels of heavy metals, and overuse of these can lead to accumulation in crops where bees forage. Bees kept in urban environments may be exposed to pollution from traffic and industrial zones. Because of this, there is the risk that honey from urban areas can contain elevated levels of heavy metals[4].

The storage of honey is also important to consider, as containers made from metals that leach can cause contamination. This is especially true if the equipment is old or poorly maintained[5].

A Hill Labs technician sets up the ICP-MS machine to run honey samples to detect heavy metal levels.

WHAT ARE THE IMPLICATIONS OF HEAVY METALS IN HONEY?

Heavy metals in honey can have various implications across health, environmental, and economic standpoints. Heavy metals like lead, cadmium, and mercury are toxic even at low concentrations. Long-term exposure can have negative effects and cause neurological and developmental issues as they accumulate in the body, especially in children and vulnerable populations[4].

Environmentally, honey can serve as a natural bioindicator of environmental pollution. Traditional methods of environmental pollution monitoring can be expensive, time-consuming, and often reliant on samples from different geographic areas. Bees forage over wide areas and can bring back pollutants into the hive as they collect nectar, pollen, and other materials[6]. By analysing honey, pollution sources can be traced, and the overall health of ecosystems can be evaluated more effectively.

Economically, honey contaminated with heavy metals can lose market value. Consumers and importers expect purity and traceability, and countries with strict food regulations could reject honey imports that exceed heavy metal limits[7].

Honey from New Zealand generally shows low levels of heavy metals, frequently below international safety limits. This is largely attributed to environmental regulations, clean agricultural practices, and comparatively low industrial pollution. New Zealand honey is often used as a benchmark for purity in global markets[4].

HOW ARE THE METALS DETECTED?

The technique employed by Hill Labs to measure heavy metals is Inductively Coupled Plasma – Mass Spectrometry (ICP-MS). In ICP-MS, a liquid sample (e.g. acid-digested honey sample) is introduced as an aerosol into an argon plasma. The plasma operates at approximately 8000°C, a temperature hot enough to break down molecules into individual atoms, then ions. The positively charged ions are directed into a vacuum chamber, containing a quadrupole mass analyser, where ions are separated into their mass-to-charge ratio. An electron multiplier is used to amplify the signal from incoming ions, and this response correlates to the concentration of a given element.

While ICP-MS is a highly sensitive technique, the main challenge faced by trace metals laboratories is environmental contamination. When looking at elements in such low levels, dust and other airborne particles can pose a contamination risk. To overcome this challenge, Hill Labs utilises positive pressure, Highly Efficient Particulate Air (HEPA) filtered environments to minimise the risk of external contaminants that may interfere with analyses.

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I Wanna Rock!

When the kiwifruit vines begin to flower, beekeepers need to be 'ready to rock-n-roll' in the Bay of Plenty. Aimz sure is...

Life is a highway. Being on the road is a big part of keeping bees, and this last month of Rock-tober had its fair share of travel. At times like these, the sound of silence in the truck has given way to plenty of rock-n-roll – coz I like it.
Let the good times roll. We have been under pressure these last few weeks, but now our hives have been levelled up, strapped down, and are in the pipeline for kiwifruit pollination.

Late in the evening, bees are on the move all around the bay. To the orchardists, nothing else matters more.

From off the highway, to back roads where the streets have no name, the hives are in the gold. I'm walking on sunshine with morning feed runs, a peaceful easy feeling compared to the week that was. Really though, we've only just begun.

Dawn-time day tripper and clocking off after midnight. Beeing on call is hard work. Dazed and confused and comfortably numb, here I go again. But the memory remains from last year, and I feel I could do some of these orchards all by myself.

Pokey ag-beams, combination locks, and lookalike canopies are easier to navigate in the daylight. Mornings, I get around, in headlands or under cover, feeding watered down sugar-syrup to help convert nectar gathering bees into pollen gatherers.

Just yesterday, I watched with satisfaction, our bees taking care of business, flooding through their entrances loaded with pale yellow kiwifruit pollen. Under the vines the flowers were bouncing with bee traffic. Consistent commendatory feedback from the block managers has been a pat on the back for all our time and effort building hives to pollination standards.

Within the orchards I am aware and making mental notes. I have no fear of the dark, but things at night can mystify me. Our pink tape marks the best sunny, sheltered drop spots, like a rainbow in the dark, and I take account of higher ground, rows I tell myself I won't back down, and obscured openings where we can break on through to the other side of tall shelterbelts. At the end of the day, I wouldn't want to be down in a hole - I still gotta get out of this place.

The next phase will be a juggling of right moves and night moves, as hives are trucked out of the gold and into the green. A mid-season hiatus will give us time to check and work apiaries, and after, they will be on the road again, to honey sites further afield.

For those about to rock... Aimz gets ready to roll during Rocktober, the noisiest month in the Bay of Plenty beekeeper's calendar

Just drive. Fortunately, all the orchards we pollinate are pretty much on our doorstep. We supply over one thousand pollination units to our local community. A small percentage of them go to service watermelons and avocados, and it's not unusual to get an interesting small batch honey in the end.

Ch-ch-ch-changes are afoot, with real long-range plans to over-winter a percentage of our own queens for next spring. Having a strong queen bank is important when the local economy is struggling to keep up with demand. Sad but true – because of an ordering mix up, we struggled to find extra queens when we needed them most. We won't get fooled again, next year we'll be one step ahead. Everything will come together with a bit of faith. It's going to be epic.

Don't stop thinking about tomorrow. Good times, bad times, every mistake is an opportunity to learn something new.

All right now, for now, I've reached the end of the line. Rock steady readers. I am taking it easy for a day or so before we carry on the Helter skelter, all day, and all of the night. As the light fades to black, I'll be out there, following those white stripes into the great wide open.

Pollination and Rock-tober 2025 – homage paid. For those about to rock, we salute you.

Aimz

Aimz is a second-generation commercial beekeeper in the Bay of Plenty who took up the hive tool fulltime at the end of the 2024 honey season. Formerly a stay-at-home mum to four kids, she has now found her footing in the family business.

It's a beautiful day. Aimz gets around kiwifruit orchards in the Bay of Plenty.

NCEA Overboard

BY IAN FLETCHER

What to make of the most recent government tinkering with New Zealand's secondary school education system? Ian Fletcher weighs in with why getting it right is so important, but also so complex.

Education is big business. The Government proposes to replace the current NCEA system for assessment (testing) in senior secondary schooling (Years 11-13) with a new qualification framework. This is potentially a big deal: our kids usually only get one shot at a basic education. It matters for individuals, families, the economy and society into the future. Young people in schools now may have 60-70 years of work ahead. So how should we think of these proposals?

The Government's argument is that the current NCEA system has become too credit based, too flexible, and lacks coherence and clear public understanding. Basically, standards have fallen and the current qualifications are said to have been devalued.

Is this true? Very likely: there is a system called PISA (Programme for International Student Assessment) run by the OECD every three years to test students against global benchmarks. The OECD is a group of generally more developed countries; the OECD itself provides policy advice and testing in a lot of areas, including education. PISA test scores are well regarded.

New Zealand's scores are deteriorating. In all the test areas (maths, reading and writing) our scores are falling and the gap between well-off kids and kids from poorer backgrounds is widening. This suggests many of our kids are being short-changed by a system that should be doing better.

The most obvious comment is that changing the assessment system won't necessarily change what young people are taught, nor how they are taught. Nor will it change the social and cultural context of education – for example, greater use of phones and screens means attention spans are falling.

Here, the decision to ban phones from schools is a good one (I'd go a lot further), but we have to be realistic: young people are exposed to a whole lot of changing influences and pressures outside of school. The corrosive effect of social media, especially on girls, is well-established. But there's no serious attempt to tame these forces.

New Zealand's secondary school students are falling down the rankings in maths, reading and writing according to at least one globally recognised student assessment programme.

The government's ideas for a new testing system won't fix any of this. What it will do is create a system with more focus on the basics (reading and maths) at the start, and create (or return to, for those of us old enough to remember) more of a pass/fail system at more senior years.

The stuff kids are taught is set out in the curriculum. Here, the idea that there should be a solid base of foundational maths, reading and writing is sensible. How that is actually structured will be the hard part. There are already controversies about changes to, and claimed errors within, the maths curriculum.

My view is that education (like health) is a complex system, but also with an astonishing scope for schools and teachers to make things up as they go along. This

is where education and health diverge sharply: if a doctor makes up a procedure and the patient dies, the system asks questions, mostly. If a child fails to learn, the failure unfolds slowly, and there are lots of excuses.

So having a clear assessment system is important to impose some consistent standards and accountability. I think the NCEA system has become devalued, and both easily gamed and hard to understand. But here a big tension emerges: a rigorous assessment system might help keep teachers and schools on track, but it might not give a good insight into young peoples' development, which is likely to be more nuanced, and affected by home/family, media and other factors. The result may indeed be rigorous, but not insightful and certainly not very fair. This matters, because there is good evidence that fairness is a genuinely shared value across the whole country. Any assessment system has to be accepted as fair if it is to be accepted at all.

I also think that changing assessment and changing big bits of the curriculum at the same time is a risk – better to change one, then the other.

As well as assessment and the curriculum, the other big variable is how young people are taught – the way teaching is done. Here, I am not an expert, but there is expertise available. To state the obvious, teaching needs to capture, trial and improve the fruits of current research in ways that help young people learn better. This is especially, urgently important as digital technology (not just AI, but that's part of it) changes our lives and rewires our brains. Current research really matters in a changing world.

This is really important for the whole system: fixing formal assessment without tackling the way teaching is done is a dangerous distraction, and it's very unlikely to make things better. If we want our kids to learn better, we need to teach them better.

That means better teachers, better paid, and better supported. It means parents who get involved as intelligent customers on our children's behalf, learning about education, child development and so on, asking the right questions and expecting serious answers, child by child.

Finally, it also means being clear as a community about the values we want the education system to impart. Culture is the piling up of preferences – views about the things we think are good, or bad. Education is a powerful tool for transmitting these choices to young people (and always has been). But there seems to me to be a big risk if we leave it to the professionals. This is not irony: educational professionals should be experts in how to teach, but I want a say in what gets taught. But, again, that means getting involved. Delegation leads to abdication.

"Delegation leads to abdication" warns Ian Fletcher, and thus parents should take active involvement in their children's education to achieve the best results.

None of this is seriously reflected in the new assessment system or the hapless tinkering we see with the curriculum. But both will provide the distractions, the media circuses, and the excuses we will probably use to avoid facing up to the real challenges of giving our kids a decent start.

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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