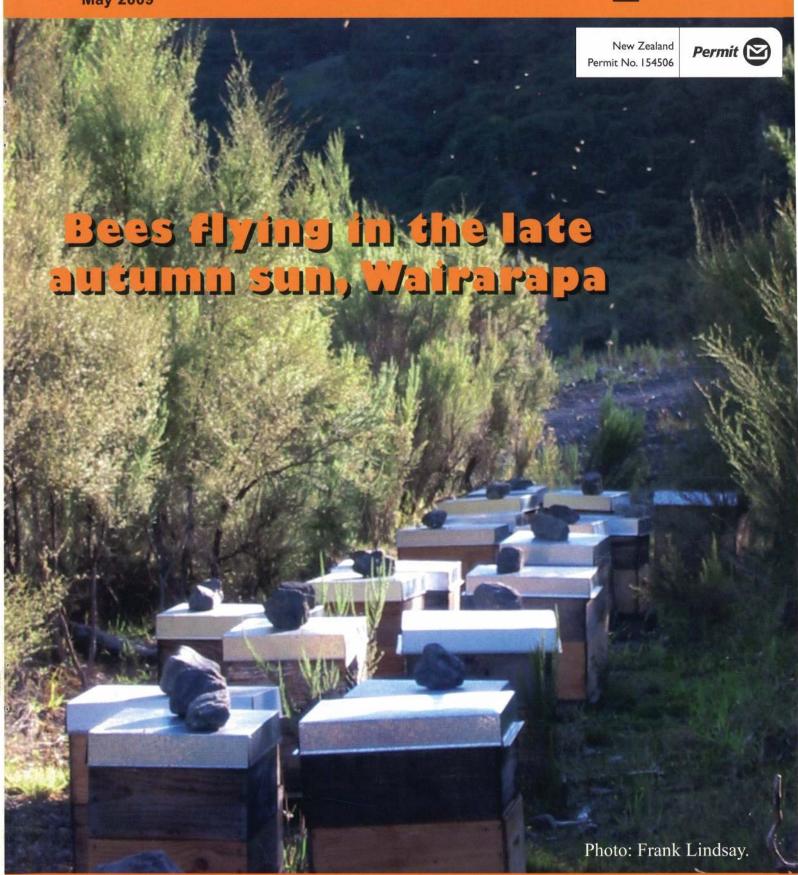


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Deadline for articles and advertising

July issue: 26 May August issue: 23 June

All articles/letters/photos to be with the Editor via fax, email or post:

Nancy Fithian email: editor@nba.org.nz (See page 2 for full details)

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President's Report

Bee Week, 4-8 May 2009

Around the time that this journal will be delivered to the members of the NBA, Bee Week will be underway.

The NBA and Horticulture NZ, which are both funding this exercise in association with Plant and Food Research and Organics Aotearoa, have organised a one-week promotional exercise targeting politicians and the media. The aim is to increase the awareness of politicians, especially the urban ones, about the vital importance of bees for the wellbeing of New Zealand's economy and ecology. Minister of Agriculture David Carter is an enthusiastic supporter of Bee Week and will be involved in some of the activities. Ruud Kleinpaste will act as the master of ceremonies at the function to be held at Parliament on 5 May.

Our Secretariat has been very busy helping to organise the various activities and has done a sterling job in getting everything together to make this a great success. Executive Council member Barry Foster seeded the idea of a Bee Week and Executive Council member Maureen Maxwell has also contributed some ideas for the promotion. There will be quite a bit of media coverage over the week starting with Radio New Zealand, which is preparing an 'Insight' programme about the problems associated with bees in general.

Primary industry and the "Better Biosecurity" Group meeting

I have been invited to attend a meeting of Primary Industry Organisations on 5 May. The purpose is to encourage engagement of primary industry and the "Better Biosecurity" Group. Unfortunately only one representative from each primary industry group will be allowed to attend, so other members of the Executive Council who are in Wellington for Bee Week will miss out.

Invitation to Caucus meetings

Recently our CEO Jim Edwards has received an invitation to attend the National Party Agricultural Caucus meetings. This is a significant



development as it indicates that the current Government is interested in hearing the views of the beekeeping industry at the highest level. While we may not always agree on certain issues, they are at least prepared to consider our views.

This invitation is a prime example of the value of friendly diplomacy achieving positive gains. The table thumping, aggressive approach to try and influence Government thinking really does not work in most situations these days. In fact it is often counterproductive. Working through issues in an intelligent and restrained manner with the people you deal with can often achieve more than by making them angry, defensive and obstinate.

Indian honey saga

Recently the 'Target' programme on TV3 brought up the issue of "Indian Honey" being sold in stores. Honey was given to Biosecurity New Zealand to check whether the honey was New Zealand honey rather than illegally imported honey from India.

The claim by the store owners was that it was actually New Zealand honey repacked and sold as Indian honey. They provided invoices from New Zealand suppliers to back their claims. Biosecurity New Zealand staff surprisingly accepted this and declared the honey legal without doing any physical checking of the honey. The store owners publicly admitted that they were making false claims to their customers, an offence against the Fair Trading Act. The honey was not even labelled and contravened the regulations requiring the correct labelling of food products and also an offence. Why would any Government official, faced with some strong evidence of false representation of the honey, accept

those sales receipts at face value without taking the logical step to test the honey to prove whether it was actually honey produced in New Zealand? We are now asking Biosecurity New Zealand to justify their actions and provide adequate assurances that they have acted properly in this case.

Biosecurity New Zealand has come in for some criticism from within the Government recently, which is of no great surprise. The role of providing adequate biosecurity for New Zealand is a relatively difficult task and is not entirely foolproof. However the failure in the simple things is of great concern to us, and I believe that the "Indian honey" and the Auckland beehive incidents are clear examples of not doing the simple things right. Last year I discovered some American honey that had slipped through the mail surveillance system. The Biosecurity New Zealand staff I

dealt with openly admitted that there were weaknesses in their systems that allowed this honey to get in. If a weakness has been discovered, why isn't the problem dealt with? Clearly Biosecurity New Zealand needs to sharpen up their act if they are to provide the country with a more robust system to protect our country from unwanted organisms.

- Frans Laas

[Editor's note: Please refer to the NZFSA media release dated 27 March 2009 http://www.nzfsa.govt.nz/publications/media-releases/2009/2009-3-25-beekeeper-fined-forselling-poisoned-honey.htm where recently NZFSA laid a range of charges under the Food Act, one relating to the incorrect labeling of honey. We trust that NZFSA will pursue the "Indian honey" with the same determination.]

Indian honey import investigation

he TV3 'Target' programme has uncovered the possible importation of Indian honey into Auckland shops. The Target team had been following up on a similar case three years ago.

Three shops had been found to be selling "Indian" honey on this occasion, although the shop that had previously sold Indian honey was not involved this time.

I was interviewed and when told that they had found some honey, I emphasised the need to report it immediately to Biosecurity New Zealand to ensure that any importation was investigated and that the health of our industry was not put at any further risk of disease. Biosecurity New Zealand was informed and has been into the stores, and we are continuing to monitor the situation.

The honey was being sold in unmarked jars and it was unclear whether the honey was imported and decanted into small jars, or whether the honey came from New Zealand and was being sold as "Indian Honey" to their Indian customers.

You can see the report from the Target programme at: http://www.tv3.co.nz/Target-1010/tabid/742/articleID/60529/cat/478/Default.aspx starting at 4min30sec.

Biosecurity New Zealand staff went into the shops a few days after they and the shops were informed about our findings. The shops then produced invoices from New Zealand suppliers. Based on this, Biosecurity NZ concluded that there was no illegal honey and ended its investigation.



NBA CEO Jim Edwards being interviewed for the 'Target' programme. Photo: Pam Edwards.

It would appear no country of origin testing was done and it seems none is planned. Target told the NBA that they have little confidence in these findings, given that the shops told them it was Indian honey at the point of sale, and in light of MAF/Biosecurity NZ's own statistic that 40,000 kilograms of illegal bee products were seized at the border, in the year to last July.

We are now asking Biosecurity NZ why their investigation has concluded and for assurances that the honey was not imported.

- Jim Edwards Chief Executive Officer





The Hon. Kate Wilkinson, Minister for Food Safety, meets with NBA President Frans Laas and NBA CEO Jim Edwards, 4 March 2009. See the President's report in the April issue for a report of the meeting. The Minister will be attending part of the NBA Conference—see pages 12-13 for details. Photo: Pam Edwards.

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Helping our precious Honey Bee National Bee Week 4th–8th May 2009

"Are there fewer honey bees around than there used to be?" This is a question we are frequently asked here at the Arataki Visitors Centre, says centre manager Anna Bland. To which the answer is "No, but until two years ago the honey bee population had been on a steady decline since the introduction of Varroa mite to New Zealand in 2002. It was only through the good management practices put in place to control this and other parasites that honey bees in New Zealand now remain in good numbers".

The introduction of pests and diseases into the country, and the effects of sprays used in the agricultural environment are on-going threats to New Zealand's honey bee population. A population that supports an estimated \$100 million honey industry and through pollination a \$2 billion horticultural industry.

May 4th to 8th is National Bee Week, a National Bee Association (in conjunction with HortNZ and Organics Aotearoa) initiative. This year's theme is "The Honey Bee cannot survive without human intervention". To show our support for this initiative, here at the Arataki Visitors Centre we will be highlighting to our visitors what we at Arataki are doing to protect the honey bee, and how they too can help protect this valuable creature of ours.

Each one of our 18,000 hives in Hawke's Bay and Bay of Plenty are individually treated and checked by our bee keepers for Varroa mite, and other pests and diseases, throughout the honey bee season. We are also careful to ensure there is continual dialogue between our beekeepers and those we supply hives to for pollination, in the horticultural and agricultural industry, to try and reduce the impact of pesticide on the honeybee.

Our visitors too can help protect the honeybee population; by not bringing back honey or other bee products from overseas holidays, watching what sprays are used in the garden and most of all, encouraging the honey bee to visit by planting lots of lovely flower plants for the honey bee to collect yummy nectar from.

To hear more about National Bee Week visit the friendly team the Arataki Visitors Centre, 66 Arataki Road in Havelock North.

About Arataki Honey

Arataki is New Zealand's leading beekeeping enterprise and favourite honey brand. The family business started 64 years ago and is the largest fully integrated honey producer – direct from hive to pot.

Now in its fourth family generation Arataki employs 40 staff in Hawke's Bay based at our Havelock North factory and another 40 based at our other North Island factory at Waiotapu (near Rotorua). Arataki also employs staff at a Greenvale factory near Gore in the South Island where they look after a further 3000 hives of bees.

For more information please contact Anna Bland, Manager – Arataki Visitors Centre 06-877 7300

Over the past year the Arataki Visitors Centre has been running a well-received school holiday programme during the second week of the school holidays. The most recent programme had a day focusing on the honeybee and a second day on pollination. According to Anna Bland, "we are finding the kids get a real buzz out of them & if we can pass on a little knowledge each time they attend a session I feel we have done our little bit for the environment, and a lot for our much undervalued honeybee!"

The photo below was taken at the January 2009 school holiday programme, and supplied courtesy of Arataki Honey.



As well as the Bee Week events that will take place at the Arataki Visitors Centre, Arataki Honey will be running a radio competition on the Classic Hits station.

Articles published in *The New Zealand BeeKeeper* are subject to scrutiny by the National Beekeepers' Association publications committee. The content of articles does not necessarily reflect the views of the association or the publisher.

'Bee Day' in Christchurch

'Bee Day' was held as part of Science Alive, Christchurch, Sunday 22 March 2009. The day was organised by Maggie Yanbaojing, an Events student at Christchurch Polytechnic. Among those attending was Adam Wei, a scientist who has studied varroa.

Bee Day was very well attended, with more than a fourfold increase in normal Sunday numbers for the Science Alive exhibition. Maggie Yanbaojing sent posters to all libraries in the area and told children about the day. Children could enter free if they brought one pot plant for each child attending. Many family groups visited throughout the day.

Besides the Botanica displays, activities included face painting, honey tasting, hive management, honey extraction, queen raising and varroa displays.

NBA members and the Christchurch Hobbyist Club were actively involved, as can be seen in the photos below.

NBA Executive Council member Trevor Corbett reports that Botanica at Science Alive has been very successful and is due to finish on 10 May 2009, after the conclusion of National Bee Week.



Kevin Gates, Trevor Corbett, Maggie James.



Above and top right: Kevin Gates and Trevor Corbett with a future beekeeper?





Front row: Adam Wei, Maggie Yanbaojing,. Back row: Maggie James, Trevor Corbett, Kevin Gates, Jeff Robinson.

Photos: Maggie Yanbaojing.





National Beekeepers Association of New Zealand Incorporated

Notice of 2009 Annual General Meeting

The AGM of the NBA will be held at the Millennium Hotel Rotorua Wednesday, 10 June 2009 commencing at 8.30 am

Jim Edwards Chief Executive Officer



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How not to start a hive

It was mid March when we received a call to say there was a bees' nest in a bush opposite the Botanical Gardens in Spencer Road, Napier. Sure enough, there was a nest that must have been building up for a couple of months, so there was a massive mixture of brood comb and honey comb, all intertwined with the fine branches from which it was hanging. All of this was about three metres above the footpath.



We positioned the ute under the nest, set up cones to warn traffic and quietly started to cut twigs out of the way. At this stage the bees were very quiet and stayed that way all through the operation. Next we positioned a washing machine cardboard delivery box on the top of a two-metre stepladder, as the last of the support was cut away. The nest, which must have weighed about six kilograms, landed in the box with a thump, nearly knocking it off the ladder. Fortunately, there were three of us involved in gently lowering it to the deck at the same time as we moved the ladder out of the way.



As it was just after 5.15 pm, one member of our party stayed until 7.30 pm, by which time most of the flying bees had joined their mates through a small opening in the box.

At 7 am the next morning we cut the box away, in preparation to hiving the nest. This was when the real problem started. Normally it would have been a simple matter to cut away each comb and tie it into a frame. In this situation we faced a jumble of brood and honey entwined in the fine branches. It was difficult even to pick which was the top, so that we could fit the comb the right way up.



Most of the combs finished up in four three-quarter boxes and by evening, all but the last few bees had taken up residence. We didn't see the queen, but hope she was in there to welcome the other bees.

If anyone has a better way of tackling this type of situation we would be glad to learn of it, realising that at some stage the mess in this hive will have to be rationalised.

- Ron Morison



Universiti Sains Malaysia is organising a 2nd International Conference on the Medicinal Uses of Honey on 13–15 January 2010 to be held at Malaysian Agriculture Exposition Parks Serdang, located just outside the city of Kuala Lumpur. The details on the conference are available on http://www.honey2010.kk.usm.my/

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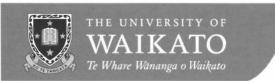
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Waikato researchers find source of MGO in active manuka honey

Researchers at Waikato University's chemistry department have discovered a compound in the nectar of manuka trees which converts to the antibacterial ingredient that active manuka honey is known for.

"We have known for some time that the unique antibacterial activity of manuka honey is associated with the presence of methylglyoxal, or MGO," says Waikato University Associate Professor Merilyn Manley-Harris. "But until now the origin of methylglyoxal was not known. It's well-known among beekeepers that the MGO increases with storage, but there was no research to underpin this belief."

A test to predict the potential for a drum of honey to develop antibacterial activity during storage has now been patented by the university's commercialisation arm, WaikatoLink, and will be available to industry within coming weeks. "Storage is money for a lot of producers," Dr Manley-Harris says. "With this test they can immediately tell if that batch of honey is going to mature into active manuka honey – if it's not going to become active, they may as well sell it as table honey."

The research from Waikato's chemistry department shows dihydroxyacetone, or DHA, is present in young honeys shortly after bees deposit it in the comb. As the honey ripens, the DHA converts to MGO, the component which gives the manuka honey its antibacterial activity.

During the research, young manuka honey was stored for 120 days and showed a strong correlation in the drop-off of DHA, and the increase in MGO over that time. Because DHA is not antibacterial like the MGO is, the antibacterial activity increases as the honey matures.

The honey was kept at 37 degrees Celsius, but storage at warmer temperatures is not better, Dr Manley-Harris says. Researchers tried to accelerate the conversion of DHA to MGO by heating the manuka honey. However, at warmer temperatures, not only did both the DHA and MGO disappear, but it also created an undesirable hydroxymethylfurfural content. Hydroxymethylfurfural is formed by the breakdown of sugars, and many countries limit the amount of it allowed in foods.

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Phone Steve, Apiflora NZ Ltd 07 543 0984 027 4923 937 Dr Manley-Harris says once researchers realised the DHA was the precursor to MGO they set about finding out where the DHA came from. They discovered it when they tested the nectar in manuka flowers from various trees around Hamilton and the Waikato.

By testing the nectar of the manuka flowers it is possible to identify which trees will produce highly active manuka honey when harvested by bees. Those trees could then be bred and planted as a high value crop – a type of designer scrub, mass planted on marginal land where bees could do the hard work of harvesting.

The chemistry research has recently been published in the journal Carbohydrate Research. Waikato University's chemistry department is ranked top in New Zealand under the government's Performance Based Research Fund. The university is also home to the Honey Research Unit, which researches honey for medicinal purposes.



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From the colonies



Bay of Plenty Branch

Well the hives are all home, and we're wintering down, It's been a long season, but no reason to frown. Not much sign of varroa, seen up our way, Bees looking good, and the crop has been...OK?

Conference 2009 is really coming up fast So all come along...don't wait til it's past. There should be something for all, whether you're established or new And Conference Dinner, should be a good Do.

The Millennium is awesome, with plenty of space For a great Conference, we think it's the place. We have speakers galore, from near and from far Come check out our sponsors, ...or meet in the bar?

Our team is working hard, to see that it's all done 5 are off to Aussie...but there will be no time for sun. We are checking out Small Hive Beetle, and even EFB, In case they should arrive here, ...be it by air or by the sea!

So take up our invite, we'd love to see you there June 7th-11th
There will be plenty for you to hear!

- Jody Mitchell

Hawke's Bay Branch

It's quite difficult to find something new to write about at times, and this is one of them.

So...weather: green, drought, farmers not very happy. Honey crop: mixed. Some beekeepers happy (honestly some beekeepers are happy sometimes). Autumn: little or nothing in the way of any autumn honey flows, many hives hungry, price of sugar way up, beekeepers less happy (normal). Hunting: bluffs, scrub, cliffs, two nights of perfect weather sleeping under the stars, a pack full of venison carried for eight hours (bluffs, scrub, cliffs, etc.) and at least one happy beekeeper.

- John Berry, Branch President

Annual Disease Returns

Make sure to post your ADR before 1 June or else you will be in breach of the Biosecurity Act.

Get it away quickly.

Nelson Branch

Nelson has had a near perfect autumn weather-wise, more like an Indian summer with practically no rain, lots of sun, and very cool nights.

The wasps are probably worse this year than they have been in recent years, but the hives are at good strength and only weak hives succumb to their aggression as usual.

The second week in April has brought a cold blast in the form of snow on the surrounding mountains and the first frost is probably not far off.

Beekeepers hopefully are following the example their hives will be giving them at this time of the year—they have harvested and stored food and wood for the winter, their outings to work are mostly recreational and toiletry in nature, they are throwing unproductive staff out the front door, and the boss is shutting down and looking forward to a long-deserved break.

- Merle Moffitt



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BK69

National Beekeepers' Association Conference 7-10 June 2009

Millennium Hotel, Rotorua Cnr Eruera and Hinemaru Streets, Rotorua, 07 348 1234

Sunday 7 June

Small and New Beekeepers' Forum

8.30 am

Registration

All entries to the honey competition must be received by 9.15

Morning session programme begins 9.30 am

- Starting out: Bee biology/plant recognition/registration of hives
- Queen selection
- Comparison of Carniolan and Italian bees
- Varroa control options
- Practical demonstration on organic treatment of hives for varroa
- Honey competitions

Afternoon session begins 1.00 pm

- Hobbyists selling honey and complying with the law
- NPMS hive registration
- Exotic diseases and reporting AFB, DECAs
- Tutin
- Storage of equipment when not in use

Expected finish time: 3.15 pm

Specialty Group Meetings

9.30-10.30 am Organics (To be confirmed: please check website for confirmation) 11.00 am-12.00 pm NZ Queen Producers Association: This is an open meeting

NZ Honey Bee Pollination group: This is an open meeting 1.30-3.00 pm

3.30 pm

AMHA: This meeting is for members of AMHA only

Outside Forum

3.30-5.00pm Displays and demonstrations outside

Evening

6.00 pm Conference opening 6.30-8.00 pm Mix and Mingle

Monday 8 June

Morning session begins 8.00 am

- Neonicotinoids (This is a discussion session with three key speakers and plenty of time for questions)
- Surfactants and fungicides (Dr Mark Goodwin)
- Predicting Weather (Ken Ring)

Afternoon session begins 1.00 pm

- Artificial Pollination (Shane Max)
- Pollination of kiwifruit, similarities and differences between Hayward and Hort16A (Dr Mark Goodwin)
- Pollination Paradox in NZ and the Global Pollinator Decline (Dr Linda Newstrom-Lloyd)
- Small Hive Beetle (Dr Christian Pirk)
- Big Boys and their Toys Outside Forum

Finish 5.00 pm

Elective workshops

1.00

Business management in tough times

2.15

Trucking and driver regulations

Evening

Sponsors' night 6.30-8.30 pm

Tuesday 9 June

Morning session begins 8.00 am

- PMS
- Conference Photo
- The Hon. David Carter, Minister of Agriculture and Minister for Biosecurity
- Tutin

The Hon. Kate Wilkinson, Minister for Food Safety, will be present from 10.15 am -1.00 pm

Afternoon session begins 1.00 pm

- Mandible Clipping of Queens (Dr Christian Pirk)
- Foot and Mouth Biosecurity Incursion (Byron Taylor)
- Antioxidant Honey (Professor Peter Molan)
- CCD (Jerry Hayes, Chief of the Apiary Section of the Florida Dept. of Agriculture and Byron Taylor, Apicultural Officer, AsureQuality Limited)
- Closing Address

Finish 5.00 pm

Evening

Conference Dinner 7.00 pm-midnight

Wednesday 10 June

AGM 8.30 am-3.00 pm Field Trip to Comvita and Arataki 10.30 am-5.00pm

As you can see, the programme is a full one with several very important discussions to be had. There will be plenty of time for questions during the neonicotinoids session, so bring along an open mind and your questions that need answering on this subject, which seems to crop up more and more these days.

There will also be a discussion on tutin and where to for the future, so a good topic to discuss amongst yourselves and at branch or club meetings prior to conference.

The 'Big Boys and their Toys' Outside Forum will be well worth a visit on either Sunday or Monday afternoon. Instead of sitting all day, the last session of the day will be outside with demonstrations of a variety of equipment related to beekeeping. Commercial Autos will have a number of vehicle options. There will be a variety of loading options to see, from cranes to nifty four-wheel-drive loaders, trolley jacks and drum lifters, plus a whole lot more.

Remember that we also have three competitions running during conference:

- the Roy Paterson Trophy for your innovative ideas
- · the photography competition for those great shots

 the quintessential honey competition to determine just which is the best.

We are also having a peoples' choice honey competition for small and new beekeepers on Sunday. You need to register for this competition prior to conference so the rules can be clearly outlined to you. Honey must be with the organiser by 9.15 am on Sunday 7 June. No late entries please.

Sort out your entries and get them in early, then you can check out the competition throughout conference and maybe taste success.

The timing of conference is earlier than usual so if you want to extend your time away, head off to New Zealand National Agricultural Fieldays® (Mystery Creek, Hamilton, 10–13 June).

We look forward to seeing you there.

- Conference Organising Committee, Bay of Plenty Branch



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Honey producers, consumers winners in new testing method

Consumers buying manuka honey for its medicinal purposes will soon find it easier to identify the best products.

Waikato University's Honey Research Unit, which created the world-wide standard to test manuka honey for its unique antibacterial activity, is about to launch a better and more reliable test, complete with its own trademark.

This will allow consumers to easily identify products that have been reliably tested by an independent authority, and rated for the antibacterial activity that is unique to manuka honey but not present in all honey sold as manuka honey.

The move means honey producers can get more accurate testing on the antibacterial rating of their honey, potentially earning them thousands of dollars more per drum. And because the test will be widely available, it will create a bigger and more competitive market for certified honey.

The unique type of antibacterial activity in manuka honey was discovered in research at the University of Waikato in 1982. Evidence shows manuka's special antibacterial properties are effective at healing wounds, but research also shows that this activity is present in only some manuka honeys.

Professor Peter Molan, who heads the internationally renowned Honey Research Unit at the university, says the existing test compares manuka honey's antibacterial properties with different concentrations of a standard disinfectant and gives a ranking of 10–30.

However, Prof Molan considers that this test, which has not been upgraded significantly since its inception, throws up too many variables. Many producers have lost money because of the old test, he says. "We know of drums of honey where the margin of error has been worth more than \$1000 and the honey producer has missed out on that because variables mean the rating was wrong."

The new University of Waikato test, developed over the past couple of years, eliminates those variables, and guarantees the batch tested has an activity that is above the stated rating. "It's far more accurate, far more scientific and is quicker for the producer. It's going to be quite clear what you are buying. At the moment consumers could be buying a ranking of 15, but in fact it's less than 13," Prof Molan says.

The revised test will be commercially available to all honey producers who are selling the genuine active manuka honey. They will now be able to credibly advertise the effectiveness of their honey and that, in turn, means a wider market for consumers, Prof Molan says.

University of Waikato Vice-Chancellor Professor Roy Crawford says Prof Molan is the most experienced person in the world regarding manuka's antibacterial properties. "Peter created this industry – he took what was essentially a waste product – and his discovery and research have made this a \$100 million a year industry."

Prof Crawford says the university did not hesitate to back Prof Molan and the Honey Research Unit's new test and its trademark because it will further benefit the industry and consumers. "With Peter's reputation alongside the University of Waikato, consumers and producers are guaranteed quality in the testing regime."

And Mark Stuart, Chief Executive Officer of WaikatoLink, the university's commercialisation arm, says that reputation is an important factor. International feedback about manuka honey reinforces just how much of a demand there is for Prof Molan's expertise and his recommendations, Mr Stuart says. "We know of hard-headed international businesses who are interested in manuka products only because of Peter's reputation."

The Bee Products Standards Council says it wants to see a robust management system to give the consumer confidence in the manuka product range and will work with the industry to achieve that. Chairman Jim Edwards says the industry "needs to re-affirm its direction for marketing manuka honey".

The new University of Waikato test is expected to be ready for use in coming weeks and negotiations to licence the test to an independent registered laboratory are nearly complete. Mr Stuart says the new test will be more efficient for the laboratory because the new method removes the need for repeated tests.

He says income generated from industry use of the test via a commercial laboratory will help support further research that will return significant value to the industry.

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Queens available for delivery throughout the North Island

Finding how MGO gets to be in manuka honey

Professor Peter Molan Honey Research Unit, University of Waikato

There has been mention in the news of the findings reported in a paper recently published in *Carbohydrate Research*: 'The origin of methylglyoxal in New Zealand manuka (*Leptospermum scoparium*) honey', by Christopher Adams, Merilyn Manley-Harris & Peter Molan. This culminates 26 years of research seeking to explain the unique property of manuka honey (and possibly other Leptospermum honey) of having a high level of non-peroxide antibacterial activity. This article outlines how this last step in the research was achieved.

This last step follows the serendipitous finding of high levels of MGO in manuka honey in research done at the University of Dresden ('Antimicrobial and cytotoxic effects of dicarbonyl compounds in honey - risk or benefit?', by Mavric et al., COST-IMARS Joint Workshop, Naples, 2006) raised the proposal that MGO was the substance responsible for the antibacterial activity in manuka honey. This proposal was subsequently proved to be true by research carried out at the University of Waikato ('Isolation by HPLC and characterisation of the bioactive fraction of New Zealand manuka (Leptospermum scoparium) honey', by Adams et al., Carbohydrate Research 343(4):651-659, 2008). But having found the identity of the component responsible for the nonperoxide antibacterial activity of manuka honey, attention was then turned to explaining why MGO occurred at high levels only in manuka honey, and how it got to be there.

The possibilities considered were that there are high levels of MGO in manuka nectar (but not in the nectar of other types of plants), or that MGO is formed by a reaction in manuka honey that occurs to a much lesser degree, or not at all, in other honeys. The latter was realised to be much more likely to be the case when we analysed some very old manuka honey (a positive benefit of not tidying my office!) and found that not only had the non-peroxide antibacterial activity increased from 12 to well above 30, but its content of MGO was extremely high. Since Adams et al. had reported that there was an approximate correlation between the level of MGO and the level of non-peroxide activity, it could be concluded that the MGO level had increased on storage, and that this would be the explanation for the increase in nonperoxide activity on storage of manuka honey that honey producers experience.

But still an explanation had to be found for why this occurs only in manuka honey. MGO is known to be formed in the Maillard reaction: reaction between sugars and proteins that occurs on storage or on heating. It was thought that manuka honey may have a higher level of protein than other honeys, because its unique thixotropic properties have been attributed to protein. But when we actually measured the protein content it was found to be the same as other honeys.

Another idea was raised by a finding from the HPLC (high-performance liquid chromatography) separation of the components of manuka honey to isolate and identify

the active component (MGO). It was noticed that there was a peak close to the MGO peak, which did not have antibacterial activity but was not found in honeys other than manuka honey. On examining the HPLC results from various samples of manuka honey, it was found that there was a correlation between the size of this peak and the level of non-peroxide antibacterial activity, although not as good a correlation as with MGO. This peak was isolated and its molecular structure determined by NMR (nuclear magnetic resonance spectroscopy), which allowed it to be identified as dihydroxyacetone (DHA). This is a type of sugar (half the size of the glucose/fructose molecule), and is known to lose the elements of water from its molecular structure under acidic conditions to form MGO. This raised the possibility that the MGO found in manuka honey is formed by such a reaction.

To test this hypothesis we studied nine samples of freshly produced monofloral manuka honey from various sites that were scooped from the comb soon after deposition by the bees before prolonged ripening had occurred. Analysis of these samples on receipt showed that they contained low levels of MGO and very high levels of DHA. We then incubated these honeys at 37°C for four months, carrying out further analyses on samples of them at intervals throughout this period of incubation. The results showed that the levels of DHA decreased as the levels of MGO increased. Addition of various levels of DHA to a clover honey gave similar results over the months of incubation at 37°C.

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To further test the hypothesis that the MGO in manuka honey came from DHA collected in the manuka nectar, we collected nectar from manuka flowers by briefly rinsing the flowers in water. This was done with manuka trees in Northland and in various places around Hamilton, including some ornamental cultivars. Some kanuka nectar was collected also, for comparison. Analysis of the collected nectar showed that that there was no detectable MGO present in any of the nectar samples, but very high levels of DHA were present. In proportion to the other sugars present, the level of DHA varied between the different samples of nectar, with the highest levels being found in the samples from the pinkflowered varieties. There was no detectable DHA in the nectar collected from kanuka, a finding in line with kanuka honey not having any non-peroxide antibacterial activity.

Assay of the amount of DHA in a very young honey could be done to find the potential of that honey to develop MGO. However, there is only about half as much MGO formed as there is DHA disappearing on incubation. This could be because some of the DHA reacts with components of honey such as hydrogen peroxide or amino acids or proteins. But it looks more likely that the DHA does form MGO and then it is the MGO that reacts with these components. This because although the DHA disappears at a fairly constant rate over four months of incubation, the rate of formation of MGO is rapid at first; then as the level gets higher after a month or so, the rate of formation markedly slows. At this point it would be hard to predict how much more MGO could be produced, although knowing that there were still some DHA present would allow it to be known that some more MGO could still be produced. But this would have to be balanced against the knowledge that keeping the honey longer would give rise to formation of HMF and other undesirable changes which would decrease its quality.

Acknowledgements: This research work was funded by WaikatoLink Ltd., the University of Waikato's company for commercialisation of IP arising from the university's research. We are very grateful to Watson & Son Ltd. and Waitemata Honey Co. Ltd. for collecting samples of freshly produced manuka honey from various sites to make it possible for us to carry out this research, and to Watson & Son Ltd. for collecting nectar from manuka flowers in Northland.





Bay of Plenty Queens

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Letters to the Editor

Responses to letters in April issue

[Editor's note: In the April issue we published letters from Cameron Martin (President, Waikato Branch), regarding tutin testing costs to producers, and from Gary Jeffery, who advocates reinstating an Apiaries Act. Following are responses to these letters.]

Response to Cameron Martin

Regarding the letter from the President of the Waikato Branch, it appears that the writer has not read my comments correctly in the context they were written.]

My comments related to passing on costs of extra testing to the producer were referring to those individuals who supply batches of honey where there is significant variation between drums in that batch. As a consequence any samples provided are unlikely to be representative of the batch. This is obviously a problem for the purchaser of the honey, who rightfully expects that all drums in a batch are very similar in makeup.

If beekeepers have systems in place to ensure batch uniformity then there is no problem.

I am not sure how to interpret what is intended in the second to last paragraph, so I request the writer to clarify that directly with me.

The last sentence brings up an interesting issue. Who pays? Are we referring to food producers in general or specifically honey producers here?

Obviously there is an obligation for food producers to supply food that is both true to label and safe to eat. There is also a requirement for governments to have some regulatory mechanism to ensure that consumers are getting what they pay for. In fact, there have been food hygiene regulations in place for over a thousand years in Europe, and probably even earlier, and some of the penalties for infraction of the rules were rather interesting.

The writer feels that honey producers should not have to bear the brunt of regulatory charges that ensure that the consumer is getting a fair deal. However, there is no suggestion as to who else should share that burden directly. With the current political philosophy of user pays (not necessarily user says), we are stuck with having to pay these costs. It is then up to producers and packers to pass these costs on and recover them from the consumer. What are justifiable or fair costs is another story which I won't debate here, except to say that the NBA has expressed considerable dissatisfaction to the Minister of Food Safety concerning the costs of compliance with the NZFSA systems. With the new Government's stated policy of improving efficiencies in the Public Service sector, we wait with interest to see if they can deliver.

Regards, Frans Laas President

Continued on page 22

ADVERTORIAL

Would you like to store drums of Honey in the Waikato under a RMP?

RMP WHP3 also EU listed Exporter.

We are researching this business opportunity and your response to the following is welcomed.

It is proposed:

Drums would be stored under cover and available for testing as required.

Drums could be held for beekeeper producers, NZ Honey packers and or overseas buyers who require NZ drum storage, prior to export in bulk or for the supply to a NZ honey packer etc.

The independent storage of drums gives control to the producer who might release drums as they are paid for or as test results are known.

Other services being investigated are:

Melting of honey drums.

Mixing of honey into 10 drum batches.

Mixing drums for compound dilution or activity blending and then re-drumming for storage or delivery.

Repacking drums from old to new drums with filtration. Perhaps old drum to new drum with no other honeys added. The opportunity to join in pool sales of bulk honey with container loading at McGhie Road, Te Awamutu, or transport to a port or a NZ customer is a possibility.

Moisture removal from honey.

The Company is able to handle single drums, drums on pallets or by Pallecon.

We could also arrange transfer documentation, packaging and freight to nominated purchasers.

If the above opportunities are of interest to you, please reply to bryan@activehoney.co.nz with an indication of what services appeal and the number of drums that might be involved on an annual basis.

The results and enquiries resulting from this survey are confidential to Waikato Honey Products Ltd.

Bryan Clements Waikato Honey Products Ltd bryan@activehoney.co.nz PO Box 98 Te Awamutu Phone WK 07 8701226 Fax 07 8701256 0274 873272

Bee hives for sale

Sited at National Park for removal this autumn. Single hives. Full depth box and an internal feeder. Good sound gear.

RMP storage for drums of honey

At 124 McGhie Road, Te Awamutu. Access for ongoing sampling. Independent storage of honey prior to sale. Let your packer draw on the honey as it is paid for.

For terms and conditions please contact Bryan Clements

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About the Apiary

utumn is now upon us. Deciduous trees are starting to drop their leaves, days are getting colder (yet within the city, the bees are still flying well from 10 am–2 pm) and it's possible to see bees fanning at the entrance, so they are bringing in a little nectar to pack around the brood nest.

Out in the countryside around Wellington, it's a different story. I came across a split I had made in the spring with bees all out the front—dead, as it had run out of stores through beekeeper neglect. A quick check of last year's spring splits and hives that had swarmed showed that they were also now very light. These hives had produced a super of honey during this year's short, dry season (no manuka and hardly any kamahi) but this was now just about gone—consumed producing brood. My bees don't shut down as there's always a dribble of nectar coming in that stimulates the bees but isn't enough to store. Without feeding they will not survive the winter.

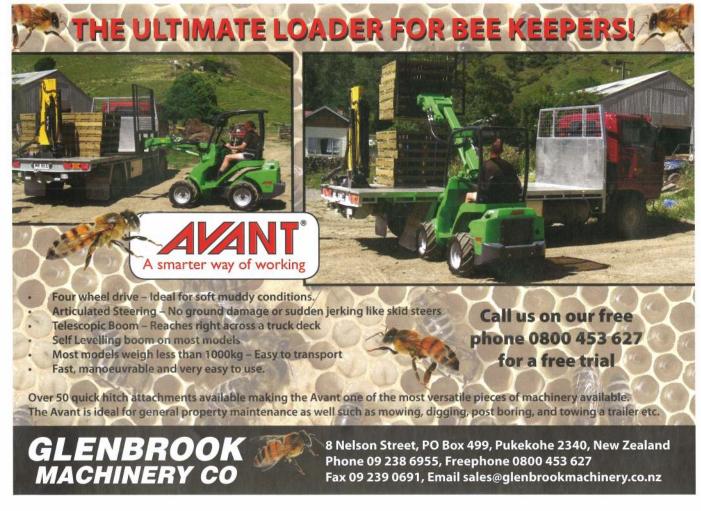
As a quick solution I have put a three-quarter super of honey on each (not something you would consider doing if there were diseased hives in the area), and will add a couple of scoops of raw sugar to the top feeder so the bees have a little extra should they need it in the early spring.

This reminds me of why I have my hives spread over quite a distance. Yes, I could have them all close to home but when it's cold or wet in one area it's normally warmer and drier in the other, so during a season like we have just experienced at least I'll get some honey.

Some of the nucs I had made in the autumn were also in the same weakened condition, yet others were still full of bees and had a frame of honey. It's interesting to note that the bees in one hive will find and work a source of nectar while the hive beside it doesn't and runs out of food, or is it that perhaps these bees are just good at robbing another hive? Whatever the cause, they tend to be survivors and that to me is important.

I have started putting these nucs into full-sized supers (with additional frames of honey) and stacking them one on top of the other between split boards, each with an entrance facing a different direction. Combined into hives four high, they can keep each other warm and hopefully all will come out of the winter with a super full of bees. While I was doing this there were bees everywhere and I found it necessary to block the entrances with grass to stop robbing.

Robbing season has gone on for ages, and hopefully with this cooler weather it will end and then I can start doing the final disease check for the year. I check three frames of brood, paying careful attention to cells that are still capped amongst cells where the bees have already emerged. This final check is important, especially if you or other beekeepers in the area are finding the odd diseased hive. If missed and the hive dies out, this one diseased hive could spread AFB to most of the other hives in your apiary, as well as to some of those within a couple of kilometres (depending upon the weather). As you may already know, AFB doesn't always appear straightaway in hives that have robbed out a diseased hive. I would rather do this extra work now than go through a quarantine exercise for the next 18 months.



Scolypopa and tutu

Following on from last month's article, I'm still checking the odd tutu bush, although contractors have cut back a few when clearing the road verges. Most bushes in the open only have one or two adult passion vine hoppers per spike. The cooler weather has gradually seen them disappear. On the poroporo bush (see last month's photo on page 46), there's still the odd bunch of adults and even some spots of honeydew on the leaves that are protected from rain by an overhanging tree. Next year it will be interesting to record actual numbers as I don't think they get anywhere near the levels quoted in the NZFSA article (see page 25 of the April issue).

Wasps

Happily for me wasps don't seem to be a big problem this year. Plague years are generally followed by a year of low wasp numbers; however, I know of other beekeepers who are having trouble with them. At one of my apiaries last month, there weren't any bees flying. All hives were crawling with wasps and the bees were guarding all entrances. I reduced entrances and plugged a few holes to make life easier for the bees.

What a change this month. All the hives had bees flying and hardly a wasp in sight, that is, until I checked a back hive. This had gone queenless (no brood and lots of pollen stored in the frames) and it was crawling with at least 100 wasps stripping out the last of the honey frames. Obviously their attentions had been diverted to the easy pickings from this hive and were leaving the other hives alone.

So after working the bees I went for a little walk through the open scrub that surrounds this apiary. Thirty metres to the west, I spied wasps coming out of some bracken fern so tiptoed up to the entrance, moved the fern and some blackberry aside and tipped a couple of tablespoons of insecticide power directly into the entrance, and withdrew quietly. On the other side of the apiary about 10 metres away, I spied a lot more wasps amongst some blackberry. The entrance to this nest was the size of a rabbit hole and wasps were coming and going in great numbers. I put a larger amount of insecticide powder into the hole and out came lots of queen wasps covered in powder. I had caught this nest in time perhaps to stop any further hives being killed and the nest reproducing. It's most satisfying to get one back on wasps and well worth the time I spent wandering around the property.

Things to do this month

Collect your records and count your hives so you can get your Annual Disease Return (ADR) in on time: it's due 1 June. Don't forget to amend addresses and the names of the property owners that have changed.

Winter down hives: make sure they are still heavy—some may need feeding. Commercial beekeepers: sell your honey crop to provide a cash flow. Look after the honey supers, as they are a valuable asset. Grade and sort combs into brood, extracting or damaged (some beekeepers do this while extracting). Check that those honey supers stored early are still free from wax moth. Some commercial beekeepers shrink wrap pallet loads of supers and freeze them for a few days to kill off wax moth eggs at the local coolstore. A lot more are now purchasing shipping containers to do this job. The deep freeze works for hobbyists. Check for wasps and control growth around hives so there's airflow under them during winter.

Do one more check of varroa numbers. This year some areas seem to have fewer mites in the hives but then again it could be too early to determine what the levels will be during the winter, as feral hives tend to collapse later and these generally start killing your hives from June onwards, well after the strips have been removed.

For those in the South Island, a winter honey flow is an indication that feral or untreated hives are collapsing. If this happens, treat your hives quickly as your bees will be bringing back up to 200 mites per day. With a high mite loading, it doesn't take long for your hives to start collapsing.

- Frank Lindsay, NBA Life Member



NIWA's climate outlook: April to July 2009

In the New Zealand region, mean sea level pressures are likely to be higher than normal to the east and south of the country, and lower than normal to the north of New Zealand, resulting in more northeast winds than usual, especially over the North Island.

Air temperatures are likely to be average or above average in all regions.

Rainfall is likely to be normal or above normal over the north of the North Island, below normal along the east coast of the South Island, and normal elsewhere. Soil moisture and stream flows are expected to be normal or above normal in the northern North Island, normal or above normal in the south, west, and east of the South Island, and normal elsewhere.

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American Foul Brood (AFB) in South Africa

o, it has nothing to do with the possible connotations with the growing epidemic of America's obese and (to lesser degree) intellectually challenged kids. It has to do with the invasion to the Cape Area by the spore-forming *Paenibacillus larvae ssp. larvae* (formerly classified as *Bacillus larvae*). It is regarded as the most widespread and destructive of the bee brood diseases.

Suddenly our boasts that contrary to other places anywhere on earth, we in South Africa do not need to treat our bees at all with antibiotics or otherwise, may not hold water any longer.

According to the latest deductive point of view, it seems that at least a consignment of imported honey must have not been irradiated. Perhaps there are now contaminated discarded bottles or buckets, even possibly drums with foreign honey being 'cleaned' by local bees, and so starting to infect Africa's bee population with such terrible spores.

The question that comes to mind is if the Government through its Agricultural Agencies will have the vision and the will power to use major drastic means to try and stop in its tracks such threat as early as possible. The infected hives of the very few apiaries so far affected must be eradicated and the apiarists paid for it, so that in other possible future cases there will not be the usual reluctance in cooperation.

In the mist of obvious stress and even an early bit of panic, like finger pointing and making the first victims as some sort of despicable rogues, the Cape Beekeeping Industry leadership has been proposing a number of possible solutions, together with meeting and asking help and advice from officials of the Agricultural Department. As expected, from Agriculture's equally "collective" leadership not much is coming out and on the beekeepers side the proposed solutions are a bit contradictory.

One scientist basically proposed to let nature take its course by allowing the survival of the fittest. This eventually would permit the bees to develop immunity to AFB, not like the "over pampered" (as he puts it) American (European) bees, which have almost no disease resistance at all. His suggestion was for the immediate destruction (burning) of the very infected hives and to let nature take its course in the less contaminated ones, and in this way gradually allowing them to build resistance.

Another great fear is that the wild population will be decimated by it. If this was going to happen, such catastrophe would cause a most negative and wide spread rippling effect. It will be not only to nature itself, but also the pollination of (fruit) crops in the Western Cape by commercial beekeepers. If this happens, they will no longer be able to source by trapping the many thousands of swarms that are required every year to replace the "worked out" ones. It must be said that this is a most contentious issue, as with its passing year they have to

go further inland on "raiding" missions, as it should indicate that in large areas the swarm pool has already been drained out, with all its terrible consequences.

In reality this problem can easily be resolved by beekeepers by simply putting a bit of effort into breeding their own queens, or at least to purchase them from a breeder. Personally I can't see a great difficulty with that. Can you? In time, a clever fellow may even be able to come about with more resistant and even harder working strains à la Buckfast. Who knows? Anyhow, in any circumstance they have to stop draining the numbers and with it the gene pool of the wild population.

It may sound a bit contradictory, but some recent research from overseas is pointing out that AFB is almost non-existent in wild swarms but quite prevalent in beekeepers hives. What does it mean? That AFB is just a beekeepers bees' disease?

There is a couple of centuries old trick that seems to work out. It basically consists of shaking out the bees from a seriously infected hive and re-housing them in a spore free hive, in which frames with new wax foundation have been placed.

Not long ago there were big concerns raised about the arrival of Verroa [sic], those horrible virus carrying mites from Korea and China—into South Africa. Somehow and in a relatively very short period of time the local bees must have found very efficient ways in dealing with them, as they seem to no longer pose a menace.

This is in contrast with their European cousins, be it in Europe, North America or elsewhere, where virtually every single wild (feral) swarm was wiped out and beekeeper bees were only kept alive thanks to regular and systematic treatments.

There is a question that I would like to ask around: if our sister bees, the so-called "killer bees" are doing so well in the Americas [sic] wilds and also in beekeepers hives and if it is taken into consideration that it is exactly the same area where the AFB is endemic and as the name suggests, from where it originates, somehow they must have not only developed strong immunity to it, but in a relatively very short period of time? If it happened there, shouldn't we expect that basically the same scutellata bees will not do the same here?

Some Cape beekeepers with their "freakish" (my words) capensis bees are rather upbeat about their charges' abilities to cope with the new threat. 'Haven't they not only found immunity against other recent threat (Verroa) [sic], but in record time?' They boastingly ask, just to carry on:

'What about their enhanced "Hyg" (hygiene gene) that forces them to unrelentingly clean out anything from their hives that they may perceive as not fitting perfectly their strict and unbending norms?' Basically, who can doubt that they have a winner in their hands, so to speak? The same beekeepers also claim that their worker bees "freakish" ability to lay fertile eggs without ever having been inseminated, should come to their rescue "once again".

This "once again" is my personal contention, by reasoning that similar and extremely rare "gifts" of Nature usually happen in extreme cases of genetic bottlenecks, when one or more individual member of a given species that faces imminent extinction, suddenly and by some random and unexplainable mutation(s) were able to keep their numbers alive.

Those same beekeepers' reasoning on their species survival abilities is that even if some queens succumb to a new threat, some of their workers should be able to acquire some form of resistance. Normally they should able to pass these to their worker (female) offspring that was born from their own eggs. In time, this newborn should also not only be able to increase their own (new disease) resistance, but also to pass it to their newly created and proper queens (and inseminating drone pool), if they so wish.

But then again, who knows what the future may bring and by not doing the "right" thing now, in time could be seen as no more than criminal negligence? I will keep you posted.

- Kim Morgado

Source: Written by Kim Morgado of Johannesburg, South Africa for The Honey Bear 'Of Bees & Honey' newsletter, www.thehoneybear.co.za. Thanks to Neil Furness for providing a copy.

Continued from page 17

Editor's response to Gary Jeffery

Your letter of resignation from the NBA that you sent to the Editor has been forwarded to the Executive Secretary of the NBA. Since you are no longer a member, the President will not respond to your letter published last month.

Going to Apimondia in France?

Valerie and Noel Trezise are journeying to the Apimondia congress, which will be held from 15–20 September 2009 in Montpellier, southern France. If any other beekeepers are planning to attend Apimondia and would like to share accommodation or information, please contact Valerie and Noel on trezise@xtra.co.nz

For more information on Apimondia, visit their website http://www.apimondia2009.com/pages/?all=accueil&idl=22



Have you registered for conference and booked your accommodation? See the conference insert in the April issue and act now!



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BK356

Cat and mouse



Is your mouse giving you trouble? Maybe a little hard to control, doesn't seem to left and right click like it used to?

Recently I traded in my old mouse for a new one: I had to, you see! Upon inspection

of the old—you could call it a yearly audit or better still, a review of its functions—I found little teeth marks, courtesy of Theodora Chipmunk. It's okay, NZFSA, the computer isn't in the honey shed so she hasn't broken any rules, other than practising her mousing.

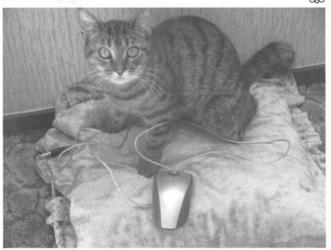
So along with the other computer problems that needed attention, it was off to the computer shop. Along with a new antivirus program, I now have a new mouse. What a beauty. The new Microsoft Wireless Laser Mouse 5000, while being a little heavier than the last one, has a nifty feature. If you are having a little trouble with your eyesight, on the right-hand side, about level with your knuckles, is a magnifier button. One click and you can hover and move over the computer screen using enlarged print.

While the Christmas sales were on I also took the chance to get new speakers. Sometimes I listen to music as I work away on the computer and I guess they will also come in handy when I figure out that podcast stuff.

The challenge in these uncertain economic times is knowing when something is completely broken; i.e., whether you need a new computer or if just a few of the components need to be fixed or updated to keep you going that bit longer.

- Fiona O'Brien

PS: As that is the limit of my computer knowledge, the Publications Committee would love to hear from someone out there who would be willing to share some skills and write a few pointers for *The New Zealand BeeKeeper*. See the bottom of page two for the editor's contact details.



Manuka honey saves horse

addy is a seven-year-old thoroughbred mare that got her leg caught in a wire fence. She managed to skin the leg from her knee down to the hoof on her rear right leg. This was a very serious wound and I was advised by the vet to put her down; if not, it would be a couple of years before I would know if I could ride or use her again. I couldn't do this, as she is my baby.

So the vet stitched a flap of skin back on that was hanging down; he advised that this skin would die off. The rest of the leg that was affected had no flesh or skin left: it was bare bone. The vet bandaged the leg and advised me to keep the bandage on for about six weeks, to try and create a fake scab and hope that some flesh would rejuvenate.

After a couple of days the bandage started to slip down. After doing some homework and picking everyone's brain I decided the best treatment would be manuka honey. Barry Foster from Tawari Apiaries in Gisborne kindly donated some manuka honey. I took this and applied it to the part of the leg that was exposed, and also managed to drip some honey down the bandage the vet had put on. We did this carefully every three or four days, rebandaging the leg after applying the honey.

Three weeks after the accident I removed the bandage the vet had put on, holding my breath and hoping that I wasn't going to have to put my horse down. To my delight the flesh on the top of her leg had rejuvenated. The flap of skin that had been stitched back on had re-taken and was growing again, and there was no sign of infection. I put this down to the manuka honey.

We piled manuka honey on the whole leg and re-bandaged it. I continued to do this for six weeks. The results are amazing. Nine weeks after her accident, Maddy has no bandage on her leg. There is still a sizeable wound on which I am putting manuka honey everyday but she is on the mend. There is no proud flesh and the hair is growing back again.

When a horse injures itself this severely there is always a big gamble in the way you treat it—whether it's worth saving the animal, and whether you are going to be able to ever ride or use them again. Fortunately I am going to be able to ride Maddy again and after all the trauma from this accident she will turn into a lovely horse, as the bond we now have is extremely strong.

- Tamara Toon

[Editor's note: Barry Foster reports that he provided Tamara Toon with samples of manuka honey from the previous season. This honey was supplied from a pot without making it into a dressing. This honey was considered to be medical grade after testing by Comvita; i.e., it passed the tests for UMF and had low CFU spore-forming coliform bacteria unit counts. The photos on the back page show Maddy's steady recovery.]

Maddy makes a comeback: see story page 23



Horse before manuka honey treatment.

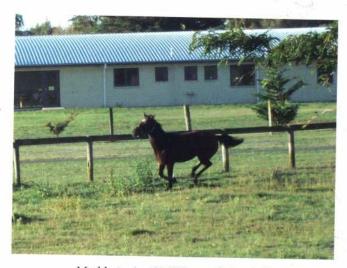


Three weeks after the accident.





Two views, six weeks after the accident.



Maddy in April 2009, nearly healed.

Photos: Tamara Toon.

