JULY 2015 | VOLUME 23 No. 6

The NEW ZEALAND BeeKeeper

Exotic disease surveillance
Tony Roper

C4 sugar analysis
Megan Grainger

Impact of nosema on NZ hives
Frank Lindsay

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Front cover: Nelson beekeeper Norbert Klose provided this photo of a "queen bee crowned with a varroa mite."

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PRESIDENT'S REPORT

AGM, APIMONDIA, AND **AUDITS**

Ricki Leahy, NBA President

It is always difficult to write the July report as I perceive an expectation that it should contain items of interest that evolved from conference. Not so … as in fact I am writing this a week prior to Conference to meet journal timelines.

[Editor's note: please see article on page 6 for an update on the industry unification vote at AGM.]

I hope the new-look journal meets with kind approval. Many have said it looks clean and fresh and even more professional, which is good. It's amazing what a bit of colour and design pizzazz can do.

Industry unity

Industry unity has been my big push for a long time now, and I suspect some of you may be sick to the back teeth with my harping on about it.

Even so, I just want to make the comment that no matter what the outcome may have been at conference, or most importantly at the AGM, I am very confident that all factions of our industry will continue to build bridges and strengthen relationships both amongst ourselves and those with whom we need to be effective.

Apimondia Congress

In September, the 44th Apimondia Congress is to be in Daejeon, South Korea. This isn't too far for any of us to travel, compared with some other places.

In 2015, the position of president for Apimondia's Regional Commission for Oceania will expire and elections will be held at Daejeon. Oceania, of course, includes Australia, New Zealand and the neighbouring Pacific nations. Our very own Maureen Conquer has represented us as the Oceania President for the past four years. Jodie Goldsworthy from Beechworth Honey in Australia has been the vice president for the past year.

Maureen has reached the extent of her term and would need to stand for re-election. Unfortunately, however, because of all her other activities, Maureen has chosen not to stand again as the Oceania President, but has quietly suggested she could be available to stand as a vice to help mentor her successor into the position.

Maureen has made an awesome contribution and commitment in representing us from this part of the world, and has been quite astute in helping people make connections throughout the beekeeping world. Indeed, she has been asked to help with the World Beekeeping Awards with 30 other judges, some of whom, I am told, have the most outstanding and important-sounding qualifications and titles. Good luck, Maureen, and have fun, as I suspect you will.

Maureen is also very well recognised for her work at conference each year facilitating our own honey competition.

[Editor's note: Maureen has written a progress report on the preparations for the Daejeon Congress: see page 19.]

> [The Chinese government] is in the process of developing import/export measures for honey …

Beehive thefts

It must be disappointing to us all that instances of beehive thefts appear to be increasing. It is becoming more of a concern and I must advise that any thefts should always be reported to the police in the first instance.

I know that the police often can do little to assist but we never know what other information they may have, and indeed whether police are aware of a pattern emerging.

Something we can think about doing is rigging up the odd hidden security camera. If enough of us do it, surely some culprits will be caught red-handed. Hive rustlers will also realise that there is now a good chance of getting caught. Probably with actual footage as proof, enabling successful prosecution, the police would be very much more interested. And please let them do the apprehending.

> Beehive thefts should always be reported to police …

Honey industry systems audit to occur

Another little heads-up for us all is that whispers are going around that China's General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) has informed MPI of its intention to conduct a systems audit of New Zealand's honey industry.

AQSIQ has advised that it is in the process of developing import/export measures for honey, which will include a requirement for the assessment of the exporting country's sanitary system and certification for all honey and honey products. Any audit is anticipated to take place in November/December 2015 to coincide with the honey flow season.

MPI has been advised that premises processing honey for export to China will be required to be registered with the Certification and Accreditation Administration. Any timeframes have yet to be advised. This isn't something exactly new to the country, as other primary sectors also have either established certification regimes or, like our industry, will be doing so.

It is likely that several operations (both beekeeping and packing) will be audited by MPI as part of a systems audit and to assist in the design of certification requirements. Obviously, to be eligible for certification, products will need to be produced in a premises operating under an MPI-approved Risk Management Programme (RMP).

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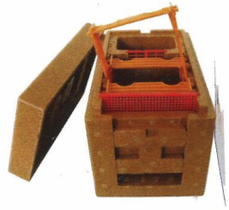

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Apart from ensuring that our paperwork is correct, we should all be taking notice that our honey processing facilities must be kept up to standard at all times. Good management processes must be adhered to so that at all times, food safety processes including product traceability, premise cleanliness and maintenance are up to the standards expected under our RMPs.

This might mean some of us will have to extend our culture to improve the appearance of our premises, from the cleanliness of our staffroom facilities through to an ordered tidy workspace, even when we are under pressure and at our busiest. In my experience, if you provide that tidy workplace, combined with other such things as clean overalls, good gear to do the job and so forth, you get a tidy and efficient job done in return.

Break time!

If you managed to winter down your hives satisfactorily, then July is a great time of the year to simply leave the bees to themselves. Take a break but if you must, keep yourself busy in a warm workshop. Really, it won't be long and suddenly we will all be cranked up chasing those bees again … something I always look forward to. Happy beekeeping.

UPDATE ON BEE DEPOPULATIONS

As many of you will have heard at Conference and/or seen in recent news reports, *Lotmaria passim* (a Trypanosome parasite formerly classified as *Crithidia mellificae*) has been detected in New Zealand hives for the first time. This detection has come about following newly developed molecular diagnostic methods used during the ongoing investigation into the bee mortality experienced in the Coromandel and elsewhere in New Zealand last spring. More details will be provided in the August journal.

BREAKING NEWS

NBA APPROVES **UNIFICATION**

The NBA AGM on Thursday 25 June has overwhelmingly agreed to pursue industry unification.

President Ricki Leahy said the vote was a very positive move for the NBA and for the wider industry.

"There is still a lot of work to do, but this is good news for our industry, which will benefit hugely from having a single and well-resourced representative body."

Mr Leahy said next steps in the process are:

- the appointment of an interim governance board
- the NBA will work closely with Federated Farmers Bee Industry Group (BIG) to further develop a vision for the united industry
- enhanced communications channels will be established across and within the various sector groups so they understand and appreciate the unification process and how they can contribute.

Ricki Leahy said NBA members and the wider industry will be kept fully informed at all stages of the process.

NEW **NBA EXECUTIVE COUNCIL**

The NBA Executive Council was elected at the Conference AGM, Taupo, 25 June 2015. Left to right: Peter Ferris (Southern North Island), Russell Berry (Lower South Island), President Ricki Leahy (Upper South Island), Stephen Black (Waikato), new EC member Barry Foster (East Coast), Vice President Dennis Crowley (Bay of Plenty), Roger Bray (Central South Island), Kim Singleton (Northern).

LOOK OUT FOR MORE **CONFERENCE COVERAGE** IN THE AUGUST EDITION OF THE JOURNAL.

The National Beekeepers Association of New Zealand

NZ APICULTURE CONFERENCE WAIKATO 2015

FEDERATED FARMERS INDUSTRY GROUP BEES

PEST AND DISEASE CONTROL

WASP BIOCONTROL UPDATE: WINTER 2015

Ronny Groenteman and Bob Brown, Landcare Research, PO Box 69040, Lincoln 7640
E-mail: GroentemanR@landcareresearch.co.nz

The first year of the wasp biocontrol programme is drawing to a close and it is time to reflect on the challenges and success to date.

At the very start of the year we struck success with answers to two important questions: yes, the mite is naturally found outside Canterbury—where it was discovered; and yes, the mite is found in wild nests of both wasp species—common and German. Refer to our first update (Groenteman & Brown, 2014) to read a bit more about these findings.

We then tackled the issues around the legal status of the mite as a new or non-new organism. If the mite was considered a new organism, this could have caused us problems down the line. But the case we made to the Environmental Protection Authority was convincing and the mite was declared a non-new organism. For more details refer to Update 2 (Groenteman & Brown, 2015). [*Editor's note: this update also was published in the March 2015 edition of The New Zealand BeeKeeper.*]

In the past few months the focus of the programme went into systematic surveys for mite prevalence and into learning how to manage and handle wasp and mites in captivity. Bob managed to dig 20 nests: 9 from Canterbury, 4 from around Nelson, 4 from Nelson Lakes National Park, and 3 from Tasman region. Nests were mainly of common wasps: 17 of them, with only 3 of German wasps. A huge thank you to those who located nests, directed Bob to them, and assisted in retrieving the nests. The stings you suffered are well appreciated!

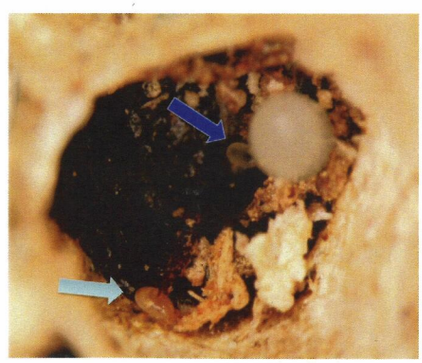
An interesting preliminary observation from the survey is a correlation between mite presence/absence, nest size (20–30% smaller when mites are present) and wasp aggressiveness (reduced when mites are present). Importantly, the survey confirmed that immature life-stages of the mite are present inside wasp nests, in cells containing wasp eggs or larvae, alongside adult mites.

Why is this important? Prior to this finding we could not demonstrably say that the mites were spending a significant part of their life history inside the nest. With the finding of immature stages inside brood cells, we have gained stronger evidence that the link between the mites and the wasps is strong and not merely coincidental. While we are still a long way away from determining that the mites have a detrimental effect on wasps, we are a heck of a lot closer!

Rearing mites and wasps in captivity has been a cause for much frustration so far. The good news is that Bob found a way to extract live mites from nests, so we may be able to get away without having to mass rear wasps in order to have a supply of mites. We may still need to rear these organisms for some of the programme, so we will keep trying new protocols.

Many of you will have heard about the wasp economics report that was released in April. If you haven't had a chance to download it, the link is given below (MacIntyre & Hellstrom, 2015). This report was commissioned by the Department of Conservation and the Ministry for Primary Industries, and was written by Sapere Research Group.

Finally, winter has well and truly set in, and at this time of year, when wasps are INACTIVE, we are **asking for your help!** Wasp queens are now hibernating in your woodpiles, behind your curtains, and in various other dry and sheltered accessible sites. We would LOVE it if you could collect wasp queens you come across, and send them our way, preferably still alive. We will examine them for presence of mites.



Immature mites (dark blue arrow) in the nests alongside adult mites (light blue arrow) in cells containing wasp eggs or larvae. Photo: Bob Brown.

INSTRUCTIONS FOR SENDING HIBERNATING QUEENS

1. Keep refrigerated (NOT frozen) until posting.
2. Place queen/s in a small container with some tissue paper.
3. Include information about the geographic location of where the specimens were collected (a GPS reference would be fantastic, but even an address or other location identifiers would be helpful).
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Sources

Groenteman, R., & Brown. B. (2014). Wasp biocontrol update. Published 14 October, 2014 at http://www.landcareresearch.co.nz/about/news/snippets/wasp-biocontrol-update/_recache

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PEST AND DISEASE CONTROL

BEEKEEPING INDUSTRY **BENEFITS FROM SURVEILLANCE PROGRAMME**

Tony Roper, Apicultural Officer, AsureQuality Limited, Tauranga

Each year a large number of hives throughout the country are inspected for a number of exotic bee diseases. High-risk areas are targeted where diseases are likely to be found, such as hives located near the main airports and seaports.

The current Honey Bee Exotic Disease and Pest Surveillance Programme benefits the beekeeping industry. This programme is funded by the Ministry for Primary Industries (MPI) and managed by AsureQuality Limited.

A big bonus to the beekeeping industry is that the inspectors are also likely to pick up any AFB when they are checking hives for exotic diseases and AFB-infected hives can be destroyed.

This annual honey bee exotic disease and pest surveillance programme has two primary goals:

1) to detect an exotic pest or disease early enough for an eradication attempt to be considered. As a general principle, the sooner an exotic disease can be detected, the greater the chance of eradicating it.

2) to enable New Zealand to make country freedom statements with respect to exotic pests and diseases, which help facilitate the negotiation of more favourable overseas market access conditions. This is one of the reasons New Zealand beekeepers receive such excellent prices for their products.

The sampling specifications for the programme require apiaries to be sampled for a range of pests and diseases of importance to the beekeeping industry. Every hive in each of the apiaries is required to be inspected and tested in order to maintain the sensitivity of the surveillance programme.

Exotic pests and diseases of interest include:

- small hive beetle (*Aethina tumida*)
- European foulbrood (*Mellisococcus plutonius*)
- Africanised honey bee (*Apis mellifera scutellata*)
- Cape honey bee (*Apis mellifera capensis*)
- other Apis species (*cerana, dorsata etc*)
- Asian mite (*Tropilaelaps clareae, Tropilaelaps koenigerum*)
- Tracheal mite (*Acarapis woodi*)
- the parasitic fly (*Braula coeca*).

Inspection programme outline

The programme is split into two components:

1) the inspection and sampling of a number of apiaries in high-risk areas (e.g., near airports and seaports), as shown in the maps below

2) the testing of bee samples provided from apiaries for which clearance is required to supply live bees for export.

High-risk areas

Three hundred and fifty apiaries from within 19 high-risk areas are inspected and sampled for the exotic pests and diseases mentioned above. High-risk areas are areas that have been identified as most likely points of introduction of an exotic bee disease or pest and include:

- seaports
- airports
- large population centres
- tourist areas
- transitional facilities
- areas where there are large hive movements, such as kiwifruit pollination.

The inspectors doing the surveillance work are experienced beekeepers and are warranted by the Ministry for Primary Industries (MPI) as Authorised Persons (Level 2) under the Biosecurity Act. This means that they have legal authority to enter the property for the purpose of inspecting and sampling hives under the direction of an AsureQuality Apicultural Officer. However, the inspector will endeavour to contact the owner prior to any hives being inspected to arrange a suitable inspection time and obtain information that will be helpful such as locating the hives, etc. Some beekeepers may have their hives selected for inspection each year because their hives are located within a high-risk area.

All hives in each of the selected apiaries are tested. Hives receive a 24-hour miticide and sticky board test to detect presence of exotic external mites and have adult bee samples taken to be tested for tracheal mites (*Acarapis woodi*).

continued...

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Graphics provided courtesy of AsureQuality Limited.

In addition to the routine sampling, hives will receive a visual inspection for signs of European foulbrood, small hive beetle, Africanised honey bee, Cape bee, other ***Apis*** species and *Braula*. In some cases, suspect samples will be taken while in others (particularly if there is a threat to human safety), the hive will be reassembled and marked for further investigation and/or sampling. The inspectors will also note any unusual symptoms associated with the apiary. All samples are sent to MPI's Investigation and Diagnostic Laboratories for identification.

If your apiary is selected to be inspected you will not be advised of the results of the tests unless they are positive. If a test does come back positive, an exotic disease or pest investigation will be launched. An article will be prepared later each year summarising the results for the programme.

Bee samples from export supply apiaries

At least 300 apiaries, supplying bees for export, will have an adult bee sample taken and tested for both internal and external mites. Each supplier is required to provide samples from up to 25 apiaries that they use to harvest bees for export. All samples are sent to MPI's Investigation and Diagnostic Laboratory for inspection.

In previous years, considerably more than 300 apiaries have been sampled and when this occurs, testing has been undertaken on more than the 300 apiaries required. This increases the sensitivity of the programme. As with the high-risk samples, beekeepers are not informed of negative test results.

Apiary database

The Honey Bee Exotic Disease Surveillance Programme relies heavily on the apiary database for the design of the surveillance programme and the selection of apiaries for inspection. Because of this, MPI provides 25% of the funds to collect and maintain the information on the database. MPI also funds from other budgets a further 25% of the costs towards the upkeep of the apiary database. MPI has also provided funding for ApiWeb, which beekeepers can use on the Internet to update their personal records in the apiary database.

What you can do

Keeping the information in the apiary database as accurate as possible will ensure that apiaries are selected for inspection from current information and will limit wasted time associated with incorrect apiary information. Beekeepers can access their information held in the apiary database via ApiWeb at http://apiweb.asurequality.com. This gives beekeepers greater flexibility to update information outside of business hours at times that suit their schedules.

While it is important for this surveillance programme to inspect and sample hives, beekeepers remaining vigilant honey bee exotic pests and diseases is even more likely to detect any pests and diseases early enough for eradication options to be considered. Please read the pamphlet on exotic bee pests and diseases of honey bees, together with always being on the lookout for any signs of an exotic pest or disease when you are inspecting your hives. If you suspect an exotic pest or disease, ring the **MPI Exotic Disease Hotline 0800 809 966**.

Finally, a special thanks to all those beekeepers that are taking part in this programme and are supporting the beekeeping industry. Both MPI and AsureQuality Limited greatly appreciate your support because without it, the success of this surveillance programme would not be possible.

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(NB: new address as of May 2015)

continued...

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Ph: (07) 850 2837
Email: derryb@asurequality.com

South Island – Margaret Roper, Registrar
Ph: (07) 574 2596
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AFB RECOGNITION COURSES

Rex Baynes (contact details on page 3)

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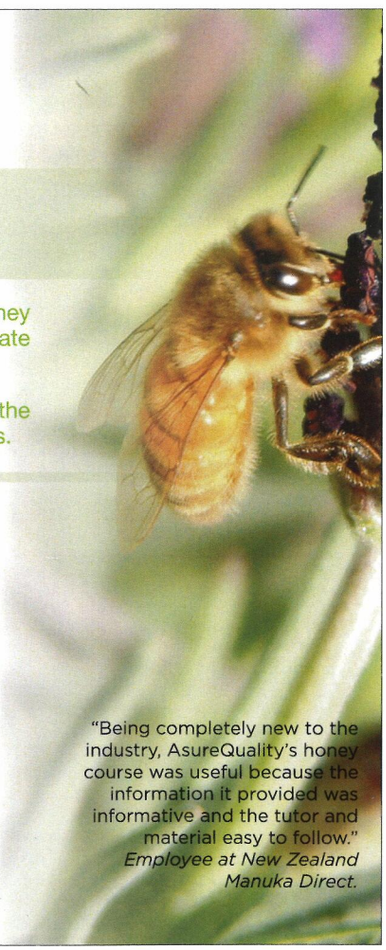

"Being completely new to the industry, AsureQuality's honey course was useful because the information it provided was informative and the tutor and material easy to follow."
Employee at New Zealand Manuka Direct.

RESEARCH

C4 SUGAR ANALYSIS

Megan Grainger, Technologist, Analytica Laboratories Ltd

Introduction

C4 sugar analysis of honey is an internationally recognised way of testing whether the honey has been adulterated with other sugars. Unfortunately, recent experience is that manuka honeys can fail the test without any sugar adulteration, and there is ongoing work taking place to understand why.

What is C4 sugar analysis and why should we test for it?

The CODEX standard for honey states that honey sold should not have anything added to or removed from it (Codex Alimentarius Commission, 2001). However, with honey being a valuable product, many countries are concerned that honey offered for sale may have been adulterated by the addition of low-cost sugar (cane sugar; high fructose corn syrup) to increase the amount of 'honey' available to sell. C4 sugar testing is used to identify if sugar has been added to honey, based on an internationally accepted standard method called AOAC 998.12 (AOAC International, 1999).

The C4 sugar test analyses the ratio of the two most common isotopes of carbon (^{12}C and ^{13}C) in both the whole honey and the protein which is precipitated out of the honey using isotope ratio mass spectroscopy (IRMS).

The ratio of $^{13}C/^{12}C$ is different in honey produced from nectar (which comes from C3 plants) compared to cane sugar or high fructose corn syrup (which come from C4 plants). The basic principle of the C4 sugar test is that if honey has not been adulterated with additional sugar, the ratio of $^{13}C/^{12}C$ in the whole honey and the protein precipitated from that honey will be very close. However, if sugar has been added, the ratio of $^{13}C/^{12}C$ will be different in the whole honey and the protein. Internationally it is accepted that the difference in the ratio of $^{13}C/^{12}C$ between whole honey and protein (also called $\delta^{13}C$) in unadulterated honey will be less than or equal to 7%.

Honey from hives that have been fed sugar for management reasons may fail a C4 sugar test, especially if harvested early in the season. It is best to test individual batches before blending to avoid contamination of a large blend of honey. Unfortunately, unlike tutin, compositing of samples in the laboratory can't be used to provide an indication of the likely C4 sugar test result of the individual batches.

Honey from hives that have been fed sugar for management reasons may fail a C4 sugar test, especially if harvested early in the season.

Complications for manuka honey

Between 2010 and 2012, over $6 million of New Zealand honey exports failed the C4 test (Rogers, 2014). Further investigation found that manuka honey which had not been adulterated was susceptible to failing the test. While honey usually fails the test because there is a positive shift in the $\delta^{13}C$ honey (due to addition of C4 sugar), manuka honey fails due to a negative shift in the $\delta^{13}C$ protein.

Figure 1 shows the results of 765 honey samples tested for C4 sugar at Analytica Laboratories in early 2015; 43.5% exceeded the threshold of 7% and failed the test. While these samples were from a range of floral origins, there will have been an emphasis on manuka honeys.

It is currently unknown what causes the negative shift in $\delta^{13}C$ protein of manuka honey, and it is an area of active research. Various hypotheses have been or are being investigated, such as the contribution of pollen (Rogers, Somerton, Rogers, & Cox, 2010) and the effect of dihydroxyacetone (DHA) and methylglyoxal (MG) in the honey. Research in 2014 (Rogers, Grainger, & Manley-Harris) showed an increase in the %C4 over time for manuka honeys, as well as clover honeys spiked with DHA, compared to no change in clover honeys stored under the same conditions. Figure 2 shows the change in C4% over time for a manuka honey stored at 37°C.

Between 2010 and 2012, over $6 million of New Zealand honey exports failed the C4 test.

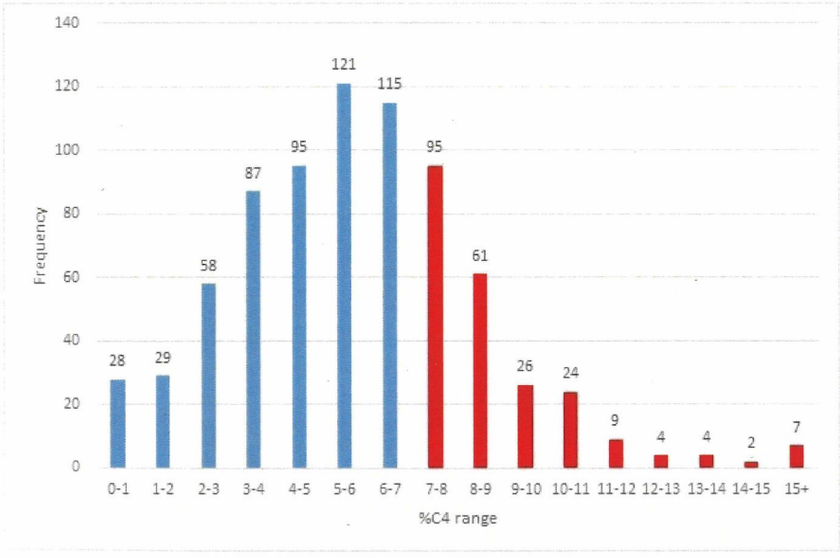

Figure 1. Distribution of %C4 for honey samples of various floral types analysed by Analytica Laboratories. Samples above 7% fail the C4 sugar test.

continued...

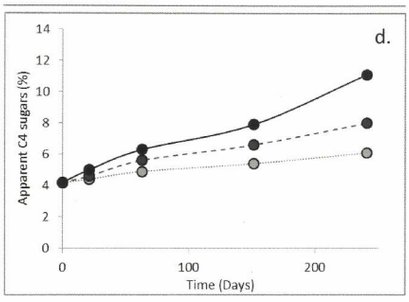

Figure 2. Apparent C4 sugar contents (%) of a manuka honey (Rogers, Grainger, & Manley-Harris, 2014).

Conclusion

C4 sugar testing is an understandable response to the global problem of adulteration of honey. While New Zealand exporters can have their honey tested to satisfy the requirements of overseas customers, there is ongoing work taking place to understand the reasons why manuka honey produces unexpected results in this test.

References

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What are C3 and C4 sugars?

There are three ways in nature that carbon can be incorporated into plants through photosynthesis; two of these pathways are the Calvin cycle (also known as the C3 cycle) and Hatch-Slack cycle (the C4 cycle). Nectar is produced by plants using the C3 photosynthetic cycle while sugars like cane sugar (from sugar cane) and high fructose corn syrup (from maize) are produced using the C4 cycle. Carbon naturally exists as two different stable isotopes, which behave in the same way but have slightly different molecular weights. Carbon-12 (^{12}C) is the most abundant in nature (98.89%); and Carbon-13 (^{13}C) is far less common (1.1%) and is heavier than ^{12}C. More ^{13}C is incorporated into sugar produced in the C4 cycle, and this can be analysed by isotope ratio mass spectroscopy (IRMS).

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ANALYTICA LABORATORIES

WEATHER

A MILD AUTUMN, BUT **EL NIÑO 'VERY LIKELY'**

NIWA National Climate Centre

Overview

An El Niño event is now under way in the tropical Pacific. In the second half of May, the Pacific trade winds weakened substantially and the Southern Oscillation Index (SOI) dropped below -1, indicating coupling had been achieved between the warmer sea surface temperatures and the overlying atmospheric circulation.

International guidance indicates that El Niño conditions are very likely (90% chance) to continue over the next three months period (June–August 2015). The likelihood of El Niño persisting or strengthening as we reach into spring is also very high (above 80%).

During June–August 2015, above normal pressure is forecast to the west of New Zealand, while below normal pressure is expected to the northeast of the country. This circulation pattern is likely to be accompanied with anomalous westerly to southwesterly wind flows.

The likelihood of El Niño persisting or strengthening as we reach into spring is also very high

Sea surface temperatures for the coming three months are expected to be near average around the coasts of New Zealand.

Outlook summary

June–August 2015 temperatures are about equally likely (35 to 45% chance) to be average or above average in all regions of New Zealand except in the north of the North Island, where temperatures for the next three months as a whole are most likely (45% chance) to be in the near normal range. Note that cold snaps and frosts are to be expected in some parts of the country as we progress into winter.

June–August 2015 rainfall totals are about equally likely (35–40% chance) to be in the near normal or below normal range for all regions of New Zealand except for the west of the South Island, where near normal rainfall is the most likely outcome (50% chance).

Soil moisture and river flows are most likely (50% chance) to be below normal in the east of the South Island and about equally likely (35–40% chance) to below normal or near normal in the north and east of the North Island.

In the west of the North Island and the north of the South Island, soil moisture levels are most likely (40% chance) to be in the near normal range, while river flows are about equally likely (35–40% chance) to be in the near normal or below normal range.

Soil moisture levels and river flows are about equally likely (35–40% chance) to be in the near normal or above normal range in the west of the South Island.

AUTUMN CLIMATE SUMMARY

NIWA recently released its seasonal climate summary for autumn 2015, which confirmed that most of New Zealand experienced a mild autumn. Highlights included:

Temperature	Autumn temperatures were above average (+0.51°C to +1.20°C) for many parts of the country. It was a particularly warm autumn in parts of eastern Canterbury, West Coast and Taranaki where temperatures were well above average (> +1.20°C). Temperatures were near average (-0.50°C to +0.50°C) in southeastern parts of Southland and Otago, inland mid-Canterbury and parts of the central North Island.
Rainfall	Rainfall was below normal (50–79%) or well below normal (< 50%) for some eastern areas of New Zealand including South Canterbury, North Canterbury, Wairarapa, northern Hawke's Bay and Gisborne. Rainfall was either above normal (120–149%) or well above normal (> 149%) for southwestern and western parts of both the South Island and North Island, and much of Waikato.
Soil moisture	As of 1 June 2015, soil moisture levels were below normal for this time of year for East Cape, coastal Wairarapa, southern Marlborough and eastern parts of Canterbury. It was especially dry about North Canterbury where soils were considerably drier than normal for this time of year.
Sunshine	Autumn sunshine was above normal (110–125%) for the eastern Bay of Plenty, East Cape, Gisborne, Hawke's Bay and eastern North Canterbury where autumn sunshine. Most remaining areas of New Zealand received near normal sunshine (90–109%). The exception was parts of Taranaki and the West Coast where autumn sunshine was below normal (75–89%).

Sources:

National Institute of Water and Atmospheric Research. (2015, May 29). Seasonal climate outlook, June–August 2015. Retrieved 5 June, 2015, from http://www.niwa.co.nz

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LETTER TO THE EDITOR

ADDRESSING THE PROBLEM OF HONEY ADULTERATION

Colin McLean stated in his letter in the June issue of The New Zealand Beekeeper *that he is not quite sure why the Ministry for Primary Industries is so intent on differentiating between manuka and kanuka.*

I would like to point out that the interim guidelines put out by the Ministry actually make legitimate the common practice of passing off kanuka honey as manuka honey. A kanuka honey containing less than 1% manuka honey will meet the requirements set for a honey to be called manuka honey. Also, by specifying a content of kanuka or manuka pollen as a percentage rather than as an absolute number of grains, the Ministry has legitimised the common practice of adulterating manuka/kanuka honey with rewarewa honey or honeydew honey which contain low numbers of pollen grains in them.

Anyone who has been following the numerous reports in the UK news media about the scandalous situation with the selling of manuka honey there will be aware that the real concern is about people passing off as the famous "active manuka honey" honeys in which the activity is due to hydrogen peroxide just as in any other type of honey, and not due to methylgyoxal which is unique to manuka honey. The Ministry not only failed to deal with this problem, but actually made the situation worse by banning sellers of the genuine famous active manuka honey from saying that it is.

The simple solution would be for there to be legislation requiring any honey described as manuka honey to have the level of its content of methylglyoxal clearly stated on the jar. Then it would not matter whether the predominant nectar source of the honey was manuka, kanuka, rewarewa, honeydew or anything else—consumers would be able to easily see what they are getting with respect to the special antibacterial activity that is unique to genuine manuka honey. It is, after all, for this antibacterial activity that consumers pay the high prices charged for manuka honey.

Concern has been expressed that a level of methylglyoxal in honey could be achieved by addition of synthetic methylglyoxal or dihydroxyacetone. Such adulteration would be criminal fraud and should be investigated and prosecuted like any other type of fraud—it is not something that should come into food standards. If such adulteration has been done, it can be easily detected by measuring the thixotropy of the honey. The Ministry's current interim guidelines would not preclude the selling of adulterated honey.

- Peter Molan

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EDUCATION

THE **BEES** AT **BERHAMPORE** SCHOOL

Tony Eagle, Wellington Beekeepers Association

Room 1 students at Berhampore School learning more about bees and bee products from Tony Eagle, and looking very cool in their suits. Photos provided with permission from Berhampore School.

It was a bright and calm autumn morning as I led the small group of students down the path to the Berhampore Apiary. The year 5 and 6 students all proudly wore their protective suits, hoods and gloves. These child-size suits were the property of the Wellington Beekeepers Association for the use of schools to enable students to have a close up experience with a beehive.

The Berhampore Apiary consists of four hives. They had been wintered down a few weeks previously with reduced entrances. Varroa treatment was with a single pad of Mite-Away Quick Strips™ for a quick seven-day hit, followed by Bayvarol® strips as maintenance into the beginning of winter. Three of the hives had two brood boxes with one super still on. They also had top feeders still in place. The fourth hive, a swarm I had captured during the summer, was in just two brood boxes.

The morning sun was on the hives so the bees were fairly active. We had to file along in front of the hives to get into the space behind them. The kids found the experience of bees landing on them and bees crawling across their face masks fascinating. I had stressed to them the importance of being calm and quiet when near the hives, and now they spoke in hushed tones as I blew a little smoke into the hive entrance. I took off the cover, top board and top feeder. I then smoked the top box and removed that as well to reveal the top brood box.

They had seen and handled frames of honey in the classroom so they were familiar with the cell structures stored with food, but this would be the first time they were to see the same structures filled with brood. After some adjustment and some more smoke, I pulled out a frame from the centre of the box. It was almost a perfect brood frame. Pollen and honey stored around the outside and the centre was a dense crowd of healthy, capped brood.

continued...

After checking that the queen was not present and shaking of the bees, I passed it over for them to have a close look. As I took it back, I noticed a small movement on the surface of one capping. A new bee was slowly emerging. As I pointed this out to them with the tip of my hive tool, one of them solemnly intoned, "the miracle of birth". I tried to explain it was actually the miracle of metamorphosis, but their phrase sounded more dramatic.

By this time the air was thick with annoyed bees, so I closed that hive and moved to the next one. From this I pulled a frame of uncapped brood. This enabled me to run through the bees' life cycle, which I know they had studied before but to actually see it is the best way to study anything.

We opened up the other two hives (I still had to put in the Bayvarol® strips), and then it was time to head back to the classroom. The happy, excited chatter as they removed and packed away the suits was proof of the success of our visit to the bees. Hopefully it was an experience that will stay with them.

Future plans are for the school to raise the money to buy their own suits, hopefully by way of a Community Trust grant. When the students have these suits, I can enlist them to do the spring feeding of the hives. With the top feeders they will not need smoke to do this.

The students also can be involved in creating some splits from the existing hives, and possibly some requeening. They can test their maths skills by doing varroa monitoring.

I would also like to invite neighbouring schools to send along groups of their students so they too can experience the fascination of the beehive.

It's great to see so many schools getting their students involved in beekeeping. As Frank Lindsay has said, "Get them while they're young" and grow the next generation of beekeepers.

Do you know of similar initiatives happening in your area? If so, we'd love to hear from you.

APIMONDIA

APIMONDIA CONGRESS STATUS REPORT

Maureen Conquer, President, Apimondia Oceania Commission

I have recently returned from an Apimondia Executive Council meeting in South Korea. One of the primary agenda items was to complete a final inspection of the site and facilities for the 44th International Congress to be held in Daejeon, South Korea from 15–29 September. We worked through the scientific programme and received a progress report from the local organising committee. We also received a progress report for Congress 2017, which will be held in Istanbul, Turkey.

I am very pleased to announce that South Korea looks to be a great venue for an Apimondia Congress. The facilities are modern and well organised and the programme is shaping up well. Pre- and post-technical and visitor tours are in place, combining rich tradition with high-tech efficiency, and our hosts are both genteel and gracious. The theme is 'Bees! Connecting the world!'

The NBA is a member of Apimondia, the International Bee Federation. One of the membership benefits is that we have the opportunity to network, learn and share ideas with beekeepers (amateurs and professionals), scholars and entrepreneurs.

The 44th International Congress is expected to bring together between 8,000–10,000 participants, an amazing opportunity for our industry. As such, I strongly encourage that you attend. And with only three hours' flight time between Seoul and Tokyo, maybe take in a few days in Japan on the way home. I am happy to supply some contacts.

My term as Oceania Representative is up for re-election this September. Reluctantly, I have decided to stand aside and give someone else the exciting opportunity to participate at this global level. For continuity I will continue in a vice role, but I acknowledge the importance of fresh, enthusiastic input to keep Boards vital and relevant.

I thank the industry for what has been an enlightening opportunity and wish the new president every success in the role.

I look forward to meeting many of you at the Apimondia Congress.

continued...

Before we commenced our executive meetings, we were hosted by the local organising committee and the Yasaeng bee equipment family to a very interesting cultural tour of Gwangju. As part of our day, we participated in the planting of a bee garden. Maureen Conquer is joined by Africa Commission President Mulufird Ashgrie Zewdu (left), and Americas Commission President José Gomercindo Corrêa da Cunha (centre).

The Apimondia Executive Council with our local hosts and Congress organising committee at the planting of the Gwangju Bee Garden. The plaque named the Apimondia members who participated in "Planting a green hope for honeybees and people".

The Apimondia Executive and others involved in the organisation of the Congress. Some of the hosts are dressed in their national clothing.

Gilles Ratia, Apimondia President, replying to the welcome by one of our Korean hosts, President of Local Korean Organising Committee Kyoonhwan Cho.

Maureen Conquer with the plaque. This named the Apimondia members who participated in "Planting a green hope for honeybees and people".

NBA MANAGEMENT TEAM

New products available

We have two new products available for sale on the NBA website.

The 'Love Our Kiwi Bees' tea towel makes a great gift, and it should be very popular at the conference and during Bee Aware Month.

The *Queen Bee* book has already been selling well, and is a helpful guide to the biology, rearing and breeding of queen bees.

Queen Bee: Biology, Rearing and Breeding

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This title offers everything you ever wanted to know about the biology, rearing and breeding of queen bees. Divided into three major chapters with many sub-sections, Queen Bee is a definitive guide to the biology and breeding of queen bees. It includes:

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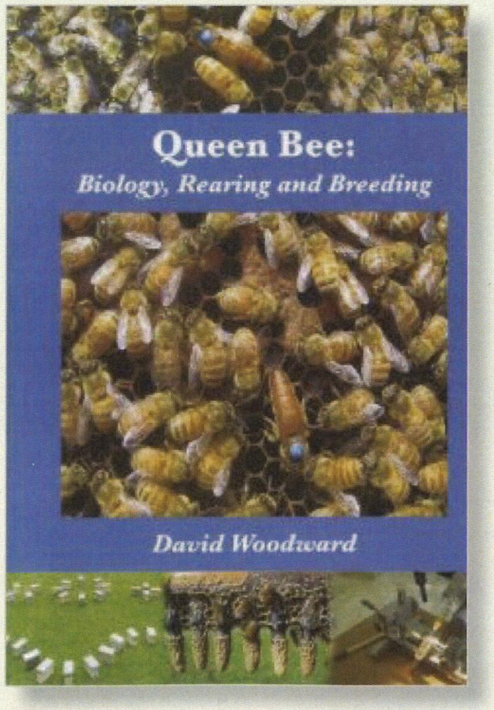

Chapter Three—Queen Bee Breeding, Genetics & Reproduction, Stock Selection & Improvement, Breeding Programmes, Instrumental Insemination, and Glossary.

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BRANCH REPORTS

FROM THE **COLONIES**

Auckland Branch

The Auckland Branch AGM was held on 21 May at Waitemata Honey Company's premises. The meeting was attended by approximately 20 people and the office bearers were re-elected unopposed.

Once the AGM was completed, the floor was given over to Kim Singleton, who led a lively discussion about the proposed industry unification plan.

Kim was at pains to point out that the proposed vote to be taken at the Conference at Wairakei is to decide whether an Interim Governance Board (IGB) will be convened to continue to investigate the finer points of the unification plan, and that another vote, probably at a special meeting, will be required to actually decide whether to put the plan into action. One of the important tasks of the will be to explore the ways in which the new body will be financed.

The meeting concluded at 10pm.

- Helen Sinnock

Waikato Branch

Up until recently the weather has been horrendous, rain, wind, sleet, and even snow on Pirongia mountain. Just no fun, and nothing to do about it but light the fire and read a book!

But as I write this, it is brilliant sunshine—the bees are out and happy as. Strips are out, and most are doing their winter tuck up. Conference will be over by the time you read this, so we're all looking forward to a bit of a rest.

- Barbara Cahalane

Bay of Plenty Branch

Outgoing Branch secretary Barbara Pimm advises that following their AGM, Sarah Sanford is the new Branch secretary. Sarah's contact details are on page 31.

And in future you'll be reading reports from the new Branch scribe, Bruce Lowe. Welcome, Bruce!

Many thanks to Barbara Pimm and outgoing scribe Greg Wagstaff for their contributions to the journal.

- Publications Committee

Hawke's Bay Branch

There has been some discussion about the difficulties of filling in annual disease returns (ADRs) online. One comment I heard was that a set of instructions would be useful and another was that every time you changed something, you had to go back to the beginning again.

The site has a reputation for being difficult to get on to, slow and user-unfriendly. I know that it wasn't designed to be this way but it sounds like it needs some serious work, or at least a very clear and simple set of instructions.

Winter is finally here and we have already had more frost than we had all of last winter but we are having some glorious winter days.

- John Berry, Branch President

Nelson Branch

Wet, wet, wet, is probably the best way to describe the recent week or more of weather. The positive aspect is that most beekeepers have wintered down hives and the need to visit or go to apiary sites is less urgent, if at all necessary. Even with mucky weather, there always seems to be plenty of other tasks such as sorting gear, repairs, and maintenance that can be conducted.

It is also good to have that extended smoko and consider how the industry is progressing. There seems to be a lot happening in this regard, much of which is positive. However, there is a growing tension I have seen more this season than others amongst many beekeepers. Whether this is due to new organisations moving in to an area, new beekeepers or others expanding, the tension is always over sites and beehive density.

While this is probably not new to many beekeepers in other regions, and definitely not as serious in the Nelson region as some reports from up north, it is still not pleasant. How such conflict is resolved I am unsure. Would it help if some form/code for conduct or understanding were established at a regional or national level to address such conflict?

All I know is that thinking such situations won't occur in the future is about as useful as a fashion model wishing for world peace.

I hope those going to the conference have a great time and there is good progress on several topics for the benefit of the industry.

- Jason Smith

Canterbury Branch

Winter has arrived with some hard frosts but not much snow to show for it. The beginning of June saw a much-needed rainfall. We're now having sunny days, but it's much chillier.

The bees are still bringing in a bit of pollen (mainly gorse). I haven't heard of much varroa damage, and wasp populations seemed to be moderate.

There have been incidents in the Ashburton area of stolen hives. Look after your neighbouring beekeepers, and let them know if you see or hear of anything suspicious.

The May branch meeting was our AGM. Vyvyan Treleaven was elected President [*contact details on page 31*], Linda Bray was re-elected as Secretary, and Roger Bray remains the Central South Island Ward representative.

It would be good to see more people at our meetings: second Tuesday of the month, 7.30 pm at Hornby Working Men's Club, Christchurch.

- Noel Trezise

Otago Branch

The new Branch executive after our AGM is:

President: Frans Laas
Vice President: Brian Pilley
Secretary: Tudor Caradoc-Davies
Treasurer. Bill McKnight
Committee: All of the above and Doug Scott, Allen McCaw, Neil Walker and David McMillan.

Branch field day

The Branch will hold a field day during the first weekend in October (either Saturday 3 October or Sunday 4 October). The event will again be held in Lawrence.

- Tudor Caradoc-Davies, Branch Secretary

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HISTORY

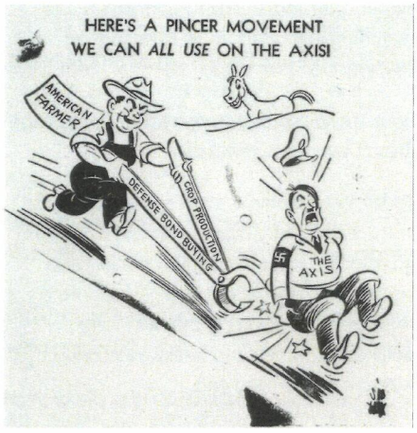
BEEKEEPING AND ITS IMPACT ON WORLD WAR II

Karen Nielsen Lorence, first published in the American Bee Journal, *August 2014*

Seventy years ago this past June 6, the world watched as Allied Forces invaded the beaches of Normandy, France to liberate the areas of Europe overrun by the Axis powers of Germany and Italy. The commemoration this year opened our eyes to the part that beekeepers and honey bees played in winning that war!

"Beekeepers?" you might ask. "What did bees and beekeepers have to do with the war?"

"Actually, quite a lot." is the answer.



World War II cartoon depicting the American farmer giving the Axis the "pincer movement".

Sugar in short supply

Since the Japanese occupied many of the countries where the United States had been purchasing some of their sugar, it was not available in abundance. Thus, honey was in great demand. Sugar was rationed and honey was a perfect substitute for a sweetener. It was also difficult to transport sugar to the United States across seas occupied by opposing forces.

The sugar rationing made it difficult for beekeepers who were often in need of additional sugar for supplemental feeding. According to the Illinois State Beekeepers' Association bulletin of March-April, 1943, the North Central States Entomologists resolved (at their conference in March of 1943) that an additional fifteen pounds of sugar be allowed to beekeepers for feeding in addition to the fifteen pounds already available per hive. Carl E. Killion, secretary-treasurer of the North Central States Apiarists, submitted this resolution to the War Production Board and to the Food Production and Distribution Administration. Why was supplemental feeding needed? The honey crop either nearly or completely failed in the summer of 1942 in the north central states. The need to save and build up colonies to serve as pollinators and as producers of honey and beeswax was paramount.

The Department of Agriculture in Washington D.C. also placed honey under the commodity loan program to increase production since the honey industry was deemed 'essential' in wartime. In 1942, the industry was requested to make a 20% increase in production since both honey and beeswax were urgently needed. It was stated, "The individual beekeeper, debating the high wages of industry or the duty of service in the armed forces against the project of expanding his apiaries, must give thought to the future of the industry, accepting the hazards of weather and consequent crop failure, the shortage of bee range, the incidence of bee disease, and the menace of bees to the use of poisonous insecticides."

Alsike clover must be pollinated in the seed stage by bees. It is a top forage crop for beef cattle and milk cows...both of which were needed to feed the military and the home front.

Need for more pollination

It was also necessary to increase all legume seeds for additional production of dairy and beef cattle forage. Thus, bees were needed to pollinate the alsike clover. In the early 1940s, yellow and white sweet clover were used to add nitrogen to the soil when corn was planted every couple of years. The legumes in the roots provided that nitrogen fixation and the flowers were wonderful forage for the bees. As a result, our armed forces were well fed. Today that same yellow and white sweet clover is deemed a 'nuisance.'

Beekeepers enlist or get drafted

Gene Killion was keeping 400 hives back in 1942 but enlisted in the Air Force. He was sent to Barrackpoor, India during the war where he flew the Aluminum Trail over the Hump into China from India. When asked if he had any experience with beekeeping in India, his reply was that he saw no *Apis dorsata*—the giant honey bee most common in India—in the two years he was there. Yet, he was able to provide much information about beekeeping back in the states during that time. His father, Carl E. Killion, was an advocate for the beekeeping industry during the war. He went to Washington D.C. with the Director of Agriculture to get that extra needed sugar for the beekeepers to feed their bees. He even wrote to D.C. to get two commercial beekeeper brothers from Illinois deferred. They were needed on the home front to produce the honey and pollinate the crops. They surely were not the only ones that were needed to keep agriculture functioning at home to feed both the armed services and the families 'back home.'

The dire need for wax

The War Production Board also listed over 350 uses for beeswax in wartime military operations and industries. Officials in Washington were concerned about whether there would be sufficient beeswax to supply the Army, Navy, and Air Force. The real 'stock pile' of beeswax was in the hands of the beekeepers in the United States and it was the government's intent to enlist the aid of the beekeepers in collecting and supplying the needed wax. The goal, however, was not to devastate the hive but to urge the beekeeper to scrape burr comb, cull poor combs, get rid of drone comb, and save

continued...

scrapings and cappings to be turned in to government procurement agencies. It was estimated that 800,000 to 1,000,000 pounds were needed annually.

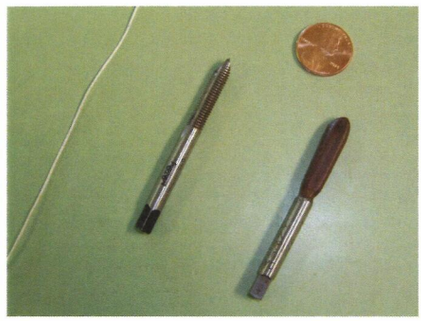
Wax was used to coat air planes, shells, and drills. The tips of tap and dye sets were covered with beeswax to protect them. Bits, also were coated in beeswax to prevent rust. Cables and pulleys, adhesive tape, varnishes, canvas tent and awnings needed to be waterproofed and the thread had to be strong. All were coated with beeswax for strength and waterproofing. Gene also mentioned that his father, Carl E. Killion, and he would take blocks of wax to the Tent and Awning company of Terre Haute, Indiana and there they would use the wax to coat the threads before they sewed the canvas together. The canvas was also waterproofed with beeswax.

Common string was coated with beeswax so it would not slip. Pharmaceuticals, medicines, ointments, and dental procedures depended upon beeswax. Practically all types of ammunition were coated with beeswax from rifle cartridges to 16 inch shells. Beeswax did not expand in desert heat nor crack in polar cold. It was said that the typical war machine contained ten pounds of beeswax. Beeswax was used to desensitize gun powder for naval guns, as a corrosion inhibitor for brass casings, and as a waterproofing for leather.

About a million pounds of beeswax was used annually in the United States during the war, mainly for waterproofing ammunition and airplanes, ignition systems, and in motors and electric coils. When watching the old video footage of the invasion of the coast of Normandy on D-Day, one can appreciate the necessity of coating all the metal with beeswax to prevent rust in the salt water. This included weapons, shells, and tools.

According to a British blogger, an unusual use for a beeswax-based polish occurred during World War II when hundreds of thousands of kilograms were used for polishing metal 'aeroplanes,' coating shells, waterproofing

This British Spitfire has been polished with beeswax to reduce drag, increase speed, and reduce fuel usage.



An unwaxed and a waxed drill bit are pictured, courtesy of Gene and Mark Killion. The Killions also provided blocks of wax to the Tent and Awning Company of Terre Haute, Indiana. The wax coated the thread before the canvas was sewn together. Waterproofing of the canvas was also done with beeswax.

ignition apparatus, and coating canvas tents. Today he, a hobbyist, is building a Hugo Armstrong Spitfire IX FY-F BS 435 and is using the same coating used originally by the original British war plane manufacturer. The recipe is as follows:

Shred beeswax into screw top jar. Add same quantity of turpentine and same of linseed oil. Leave in mild warmth until next day, then shake to an emulsion.

It was stated that this recipe enabled the plane to fly faster, thus saving valuable fuel. Also, the 'spit polish' on the airmen's boots and the shine on the tires most likely indicated the plane polish had more than just one use! Part of the reason beeswax has been so valued as a polish is because of its ability to seal out water.

The slogan contest for saving beeswax

Joe Graham from the *American Bee Journal* related that the magazine was a forerunner in supporting the war industry. For example, they actually sponsored a 'best saying' contest during the war years for beekeepers. Over 400 slogans were received from 167 entries. The slogan was meant to stimulate the consciousness of the many uses of beeswax

The slogan contest for saving beeswax was initiated by the American Bee Journal. "Let the Bees Wax the Way to Victory" was the winner.

in coating ammunition, airplanes, shoes, skis, pharmaceuticals, medicines, and for chemical warfare. The one that won was ***"LET THE BEES WAX THE WAY TO VICTORY."*** It was used during the war years on the ABJ cover and in their ads. The winner, by the way, received a $25 war bond. The magazine also had cartoons depicting bees chasing Hitler or Tojo.

Other interest-catching phrases submitted included the following:

"Let Your Beeswax Ride to the Battlefront" was submitted by Mrs David Pile from Corvallis, Montana. Pictured in that ad was a tank, reliant upon the precious beeswax, and manned by military men.

"Wax For the Gun Keeps the Axis on the Run" was an E. L. Gamble (from Adams, New York) original. This is pictured with a convoy of trucks and tanks, again reliant upon beeswax.

"Many a Burr Comb Makes a Pound" submitted by Magdalene Lenges from Huntington, Indiana pictured men's boots marching in formation. "Help Keep Their Shoes Dry." was her advice.

"Wax the Wings of Victory" was J. M. Hitching's (from Davenport, Iowa) idea.

Today, beekeeping is a hobby for many of us. In the early 1940s, however, it was deemed an essential industry to the war effort and beekeepers—large and small—supported that effort by supplying the necessary pollination, honey, and beeswax to bring that war to a peace-filled end.

Acknowledgement

Many thanks to Joe Graham and Susan Nichols of the *American Bee Journal* for granting permission to reprint this article and for supplying text and graphics. Some of the graphics in the original article do not appear here due to space considerations.

Source

Lorence, K. N. (2014, August). Beekeeping and its impact on World War II. *American Bee Journal*, 154(8), 907–910.

Editor's Note: *New Zealand beekeepers also played their part in the war effort, both at home and with the armed forces. NBA Executive Council member Roger Bray, writing under the pseudonym Apiarius Antiquary, wrote on this topic in his excellent series of historical articles marking the centenary of the NBA. See the April and May 2013 editions of* The New Zealand BeeKeeper *for further details.*

INTERNATIONAL BEEKEEPING NEWS

UPDATE: EVA CRANE TRUST

Richard Jones, Chairman, The Eva Crane Trust

The Trust was set up by the late Dr Eva Crane in 2002 and is a grant-giving charity. It also aims to be a portal to information of interest to beekeepers and bee scientists.

The web site www.evacranetrust.org has been in operation for some time, but since 12 May it has become easier to use. The site offers an amazing range of information that is being constantly expanded.

The three main portals are:

Eva Crane documents

This is being continually updated as we add more of Dr Crane's original documents onto the site. These papers range from talks and presentations to her typescripts for book chapters and journal articles. It is truly a fascinating and informative collection.

Apiculture abstracts

From 1949 to 2005, Dr Crane instigated a method of collecting and collating bee-related abstracts from an infinite variety of sources and from all over the world. The collection has well over 60,000 abstracts in total.

Now, working in collaboration with the National Library of Wales, the Trust is making freely available over 20,000 of these academic abstracts, and hopes to add more as the time-consuming task permits. These are an excellent first step for researchers and inquisitive beekeepers wishing to source scientific data. What is more it is often possible, working through the National Library of Wales, to source the full original papers form the Eva Crane Collection.

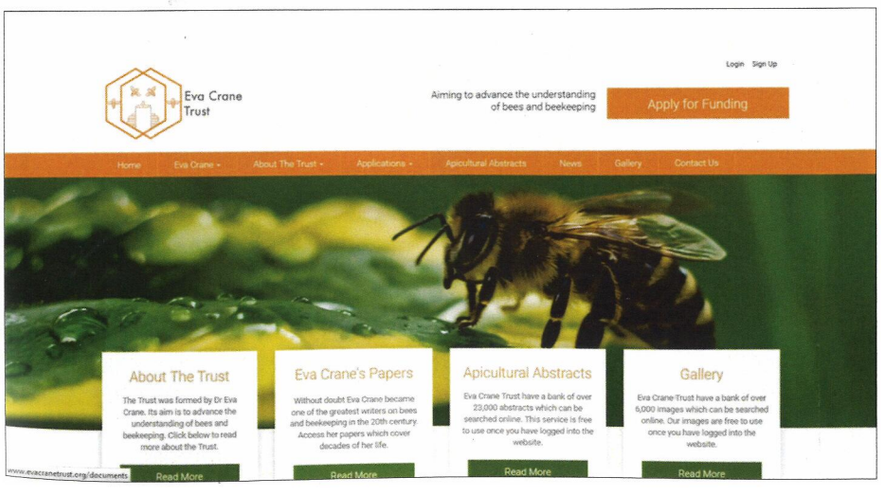
The gallery

This is a personal collection of photographs taken by Dr Crane. It is an eclectic mix of world travel and beekeeping forays! There are approximately 500 images currently freely available, but this part of the web site is also being continually updated, as there are a total of nearly 6,500 images that will eventually be made available.

> The Trust would like to make sure this work is available for the enjoyment and benefit of all

For almost half a century, Dr Crane was the driving force behind the provision of a sorting/clearing house and central reference point for bee information that was the equivalent of the Internet of her day. The Trust would like to make sure this work is available for the enjoyment and benefit of all. It is hoped it will inspire further research and developments that might, in turn, be reflected on the web site that carries her name.

All updates will be regularly Tweeted: @evacranetrust



BUSINESS

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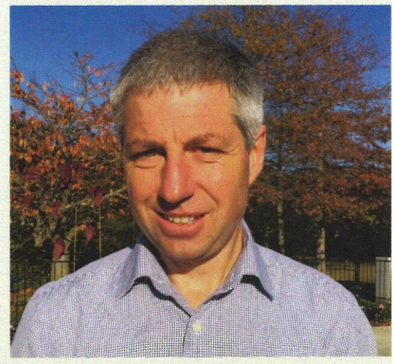
NEW AGMARDT BOARD MEMBER

Media release from AGMARDT, 9 June 2015



Rural businessman Richard Green of Canterbury has been appointed to the AGMARDT board.

AGMARDT is an independent not-for-profit trust with a vision to catalyse and enable compelling innovation and leadership within the agricultural, horticultural and forestry sectors of New Zealand.

Chairman Barry Brook said: "We are very fortunate to have Richard join the AGMARDT board of trustees."

"Richard brings a wide range of agribusiness experience to our board and I am sure he will make a valuable contribution to AGMARDT."

Green is involved in aged care, honey production, marketing and dairy farming businesses.

He sits on the boards of Lignotech Developments Ltd, the Foundation for Arable Research, Canterbury Westland Cancer Society, New Zealand Institute of Primary Industry Management and the Rural Leadership Consortium.

He had 11 years in the seed industry and was previously general manager international for PGG Wrightson Seeds, and sales and marketing director for AGRICOM. Before that he was an agricultural consultant, mainly in Otago.

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Contact: Colin - ph: 07 8666766 | email: macbeth@farmside.co.nz

WE WANT YOUR PHOTOS!

The Publications Committee welcomes photos for the journal. Pop a camera in the truck and snap away when you find something interesting. Please provide a caption and the name of the photographer so we can credit them.

If you're thinking big (such as a potential front cover photo, which we always need), these need to be as large as possible (3MB or larger if possible), in portrait format (vertical rather than horizontal), and ideally 300 dpi (dots per square inch). Regular digital photos are only 72 dpi, so are not suitable for the front cover.

Email them to editor@nba.org.nz

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ABOUT THE APIARY

IMPACT OF NOSEMA ON NZ HIVES

Frank Lindsay, NBA Life Member

Winter is now here with wet, windy conditions. Mud tyres and chains are required to prevent getting stuck in the out apiaries now that ground conditions are sticky. My bees are now restricted to a few hours flying on sunny, calm days. Most are bringing in only water, but some are still bringing in pollen.

After reading the book *The Bees* by Laline Paull, I'm a little sympathetic for those forager bees that land short of the hive. I have been picking up a few and putting them into the entrance of the hive. Older bees are dying and the bees are now in a cluster. Some still have brood and perhaps will for the whole winter, meaning that varroa could be expanding in those hives.

Nosema

At the Southern North Island Branch field day in April, I did a presentation on nosema. A number of beekeepers wanted my notes, so I have written this summary as it may be of interest to other beekeepers, and a lot of new beekeepers are learning as they go.

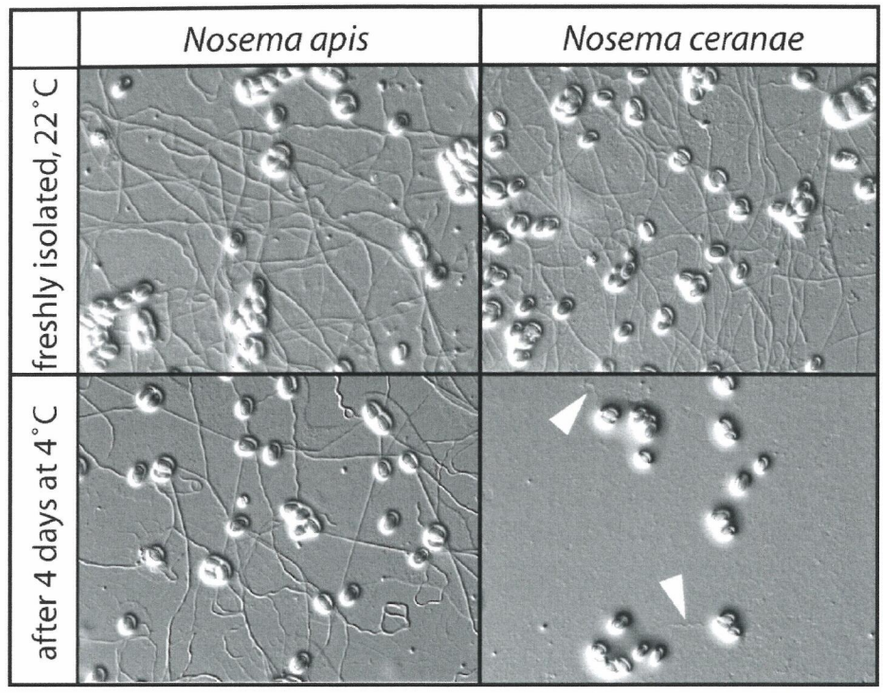
Bee health is essential to good honey production. If you don't know what's wrong with your bees, send samples to a lab for diagnosis.

Nosemosis is an insidious intra-cellular parasite that was previously classified as a protozoan, but has recently been reclassified as a fungus or fungi-related. It infects all types of bees and insects.

Until recently, New Zealand had only *Nosema apis* in our honey bees. However, at about the same time as Psa (*Pseudomonas syringae pv. actinidiae*) was discovered in kiwifruit, *Nosema ceranae* was also found in several areas of New Zealand.

Nosema exists in all hives. Beekeepers generally are unaware of it, as it can't be seen unless you dissect a number of bees, remove the midgut, grind them up and view their contents using a microscope. (Use nigrosin stain so the contents can be seen clearly on the slide.)

Nosema generally shows up when bees are under stress during cold, damp weather, poor housing and foraging conditions. Its symptoms are similar to—and therefore easily confused with—bee paralysis (crawling bees), starvation, pesticide poisoning and dysentery.



In vitro germination of N. apis and N. ceranae spores. Source: Sebastian Gisder et al. Appl. Environ. Microbiol. 2010;76:3032-3038. Copyright © American Society for Microbiology.

Nosema spores enter the midgut after bees drink contaminated water in which other bees have defecated, or by bees cleaning faeces within the hive. Foragers can transmit it to younger bees and brood when they exchange nectar and food.

When a spore detects the right glucose level within a bee's stomach, it fires a long filament into the bee's epithelium (the cellular layer of the stomach/midgut), hoping to hit the nucleus of an epithelial cell. The spore nucleus is transported along the filament and into the cell nucleus where its vegetative stage grows and divides asexually until all the protein is used, at which time they turn into the spore form. Each spore can produce up to 50 new spores.

This usually occurs within five to nine days, at which time the spores are released back into the midgut/stomach again when the cellular lining is shed. Some will re-infect the stomach lining, while others are passed out through the faeces. It doesn't take long before there are millions of spores in the bee's midgut.

With the stomach lining infected with nosema, all the nutrients provided in the epithelial cells have been used, which means the bees cannot convert pollen into food. The bee effectively starves, shortening its life. Infected young bees can't produce brood food, so skip this step in their development and become early foragers. Unfortunately they don't live very long and this can cause spring dwindling.

It was thought that nosema is an adult bee disease, but new research published on PLoS ONE has proved that larvae infected with nosema also can have a much shortened lifespan (Eiri, Suwannapong, Endler, & Nieh, 2015).

Nosema symptoms and historical treatment methods

When I first started beekeeping 40-odd years ago, nosema was quite common in the dark English/European bee (*Apis mellifera mellifera*) that predominated in some areas. Yellow Italian bees were less affected. It was easy to identify a hive with nosema as you generally saw a pile of 'young looking' bees dead on the ground immediately in front of the landing board, maybe 25–30 millimetres high.

Another visual sign of *Nosema apis* is dysentery spotting over the front of the hive. This is nothing like the spotting you see in

continued...

American photographs, perhaps because our bees get an opportunity to void on warm days during the winter.

The treatment in those days was to feed fumagillin in sugar syrup to all the hives in the apiary, spring and autumn. (Fumagillin is no longer registered for use in New Zealand.) A hive free of nosema would produce a full box of honey: 20 percent more than an infected hive. Over time I weeded these sick hives out of the system by killing the bees (by spraying with soapy water), melting out all brood frames and starting swarms on clean gear.

As fumagillin was fairly expensive, I purchased a microscope and a hemocytometer and started measuring nosema levels in all my 150 hives by sampling bees off the landing boards, and producing queens from those that had low levels of nosema spores in the spring.

During wet springs, most of the hives in the Wellington area would be infected with nosema. Another indicator was very early queen supersedure. Queens coming from one Northland queen breeder would, in some years, be superseded within six weeks of introduction. We blamed the queen breeder for the poor queens, rather than looking at what was happening within our own hives. Perhaps both factors contributed to the problems, as it happened only every three to five years.

In those days, the keys to controlling nosema were selecting good stock, paying attention to hive placement, controlling drifting, placing hives where water was flowing and sticking to good queen breeders. Nosema incidence reduced within a number of years, so I gave up feeding the drug and carrying out scientific monitoring. I just used the subjective measure of pulling out older bees' guts and checking the colour and size of the midgut to determine whether a bee had nosema or not.

Current status of nosema in NZ

All this has now changed with the detection of *Nosema ceranae* in New Zealand a couple of years ago. A hive in Thames infected with *Nosema ceranae* apparently died within eight months. *Nosema apis* never killed a hive: like all parasites, its main result was to seriously weaken hives in the spring.

Nosema ceranae is a little different in that it increases through the summer and has been attributed to hive losses in a number of countries. Spain had a problem with serious hive deaths that they attributed to *Nosema ceranae* a few years back.

Last spring, thousands of hives were lost in a couple of areas of the Wairarapa. Within three weeks, strong two-high and single hives just faded away to a handful of bees with the queen. Stronger hives had bees on two frames, but at least 50% of the affected hives died.

A week or so later, hives in the Coromandel suffered the same fate. After feeding both sugar syrup and pollen supplement, most recovered, but some hives never built beyond two frames of brood and bees.

Most of the problems were situated close to a large migratory beekeeper's hives, but it didn't help that there were large concentrations of hives in the area and that the weather prevented decent flying for a month. Poor nutrition and overcrowding allowed nosema to be transmitted between hives until it overwhelmed them.

In talking to a number of beekeepers, they had noticed faeces spotting on the front of hives in the autumn before, which is a sign of *Nosema apis*. Generally with *Nosema ceranae*, beekeepers don't observe any spotting. My assumption is that hives were weakened by *Nosema apis*, then *Nosema ceranae* took over in the spring. One beekeeper observed that his bees were slow to take up sugar syrup and a lot drowned in the syrup.

Bees with nosema cannot feed themselves or the brood. Within the hive the signal goes out (pheromone from the brood) for the foragers to collect pollen but being weakened by nosema, they never return. More are recruited and the situation spirals until only a handful of bees are left.

What can be done?

What can be done about this situation? Better biosecurity might have helped. Prevention is better than cure, but it's too late now. Be aware of your own apiary biosecurity, especially when boosting weak hives.

Increase the number of brood nest frames replaced each spring. Danish beekeepers remove and melt down all their brood frames after the honey is removed, put the bees on to new foundation and feed the bees sugar syrup so they build all new comb and winter on clean comb.

Provide better nutrition. Plant for good spring and autumn sources. Some pollen supplements have helped to reduce the effects of nosema. Proprietary products are available that are said to help reduce nosema, but beekeepers must check that they are registered for use in New Zealand before putting them in their hives.

Read the manual *Fat Bees Skinny Bees* by Doug Somerville, and other booklets from the Rural Industries Research & Development Corporation (RIRDC, administered by the Australian government).

Use the Internet to obtain information.

Adding thymol or acetic acid to the sugar syrup on a warm flying day may help to purge the bee's stomach lining, thus reducing nosema spores in the midgut. Don't do this if there is a line full of washing nearby, as it will get covered in spots of excrement.

Don't squash bees when working a hive. It may take slightly longer, but your bees have to clean up any squashed hive mates and this can spread nosema.

Start measuring spore levels and breed from hives with low spore counts. Randy Oliver's website Scientificbeekeeping.com has very good advice and an easy test which doesn't require an expensive microscope. Breed from bees that winter over well.

Hive losses could increase for the next few years until our bees become more tolerant to this new strain of nosema.

Nosema ceranae spores are killed by freezing combs, so perhaps it might not be as virulent in the bottom half of the South Island.

Things to do this month

Sort out old combs and render them down. Purchase new frames. Purchase plastic frames early so the plastic smell has time to reduce. Waterblast dark plastic frames and re-wax. Make up new gear (bases, roofs, split boards, etc.) ahead of spring.

Check your hives after storms. Make sure cattle haven't knocked any over. Heft each hive to check its weight. Order spring queens. If there's been robbing, check hives for varroa.

Winter is also a time to get a little education. Check the FarmSafe website for training opportunities.

Have a winter break with the family. Hot pools are nice at this time of the year but wear a hat, as snow on the head can be cold.

Reference

Eiri, D. M., Suwannapong, G., Endler, M., & Nieh, J. C. (2015). *Nosema ceranae* can infect honey bee larvae and reduces subsequent adult longevity. *PLoS ONE 10*(5): e0126330. doi:10.1371/journal.pone.0126330

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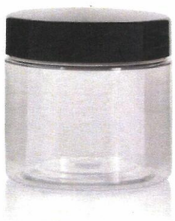
...please email editor@nba.org.nz and secretary@nba.org.nz so that we can update your details in the journal and on the NBA website www.nba.org.nz.

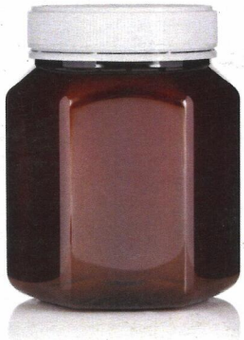


360ml Round Pot

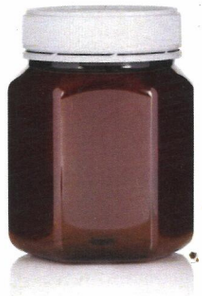
500gm Round Jar

340gm Round Jar
(coming soon)

250gm Round Jar



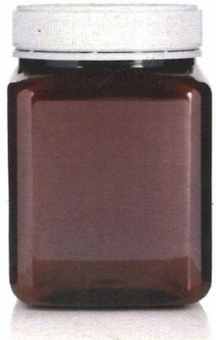
2kg Hex Jar



1kg Hex Jar

500gm Hex Jar

250gm Hex Jar



2kg Square Jar

1kg Square Jar

500gm Square Jar

250gm Square Jar

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