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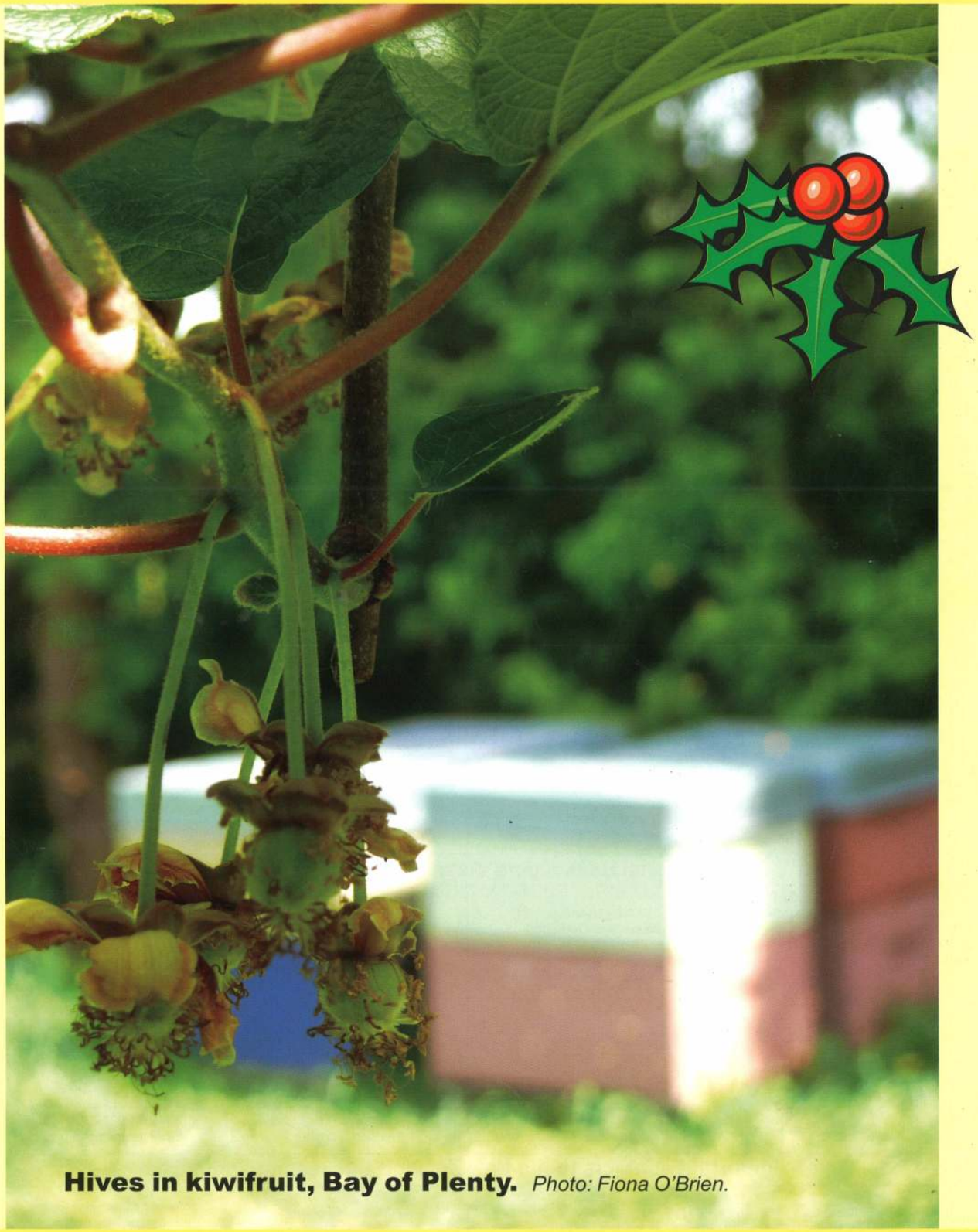

Hives in kiwifruit, Bay of Plenty. *Photo: Fiona O'Brien.*

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Table of Contents

Deadline for articles and advertising

(NB: No issue in January)

February issue: 11 January

March issue: 5 February

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)

Monitor your hives before Christmas!

The NBA strongly recommends every beekeeper alternates all varroa treatments and uses an effective method to monitor their hives before Christmas.

If your hives have resistant mites, checking before Christmas will give you time to reassess your treatments and save your bees.

DO NOT ASSUME YOUR TREATMENTS ARE WORKING.

For monitoring treatment methods please refer to the revised edition of *Control of Varroa — a guide for New Zealand beekeepers* by Mark Goodwin and Michelle Taylor. Copies of this book can be purchased from the NBA by contacting Jess on secretary@nba.org.nz or 04 4716254.

- If you do not monitor your hives you will not know if your treatments have been effective.
- If you do not alternate treatments you will promote resistance.

Use all treatments of any kind sensibly. Do not rely solely on treatments that you know may not be as effective as others. Rather, use all treatments within your 'armoury' with care.

Since our last update to members at the end of October reported a hive near Auckland had showed signs of resistance to synthetic pyrethroid treatments, we have received anecdotal reports of more resistance to synthetic treatments in the North Island.

Let me stress, these reports have not been confirmed.

More tests are planned but Dr Goodwin has not yet been able to source any additional resistant mites to test. Once resistant mites have been sourced testing will begin.

Until we have confirmed results everyone should err on the side of caution and assume the anecdotal reports have an element of truth.

In addition, the NBA asks members to restrict the movement of live bees or queens from the North to South Island. All efforts must be made to slow the spread southwards of varroa that might be resistant to treatment, should resistance be confirmed.

If you have any concerns or questions regarding the above, please do not hesitate to contact me.

We will update you when new information comes to hand.

- Gemma Collier,
joint Chief Executive Officer

NBA office hours for summer

The NBA office will be closed from 23 December until 18 January.

All publication orders, subscriptions and administration enquiries will be processed on the secretary's return.

All email/mail enquiries to Daniel Paul or Gemma Collier will be answered on their return.

If you have an urgent issue please contact Daniel on 021 400 993 or Gemma on 021 953 787.

Daniel, Gemma and Jess wish you all a happy festive season.

Beekeeper badly stung by heist

A Matamata beekeeper is on the hunt for more than a million of his winged workers after being stung by the theft of 28 of his hives. Thieves cleaned out a quarter of John Tyler's business in a bizarre bee heist, leaving him struggling with the impact at one of the busiest times of the year as demand for pollination from fruit growers hits its peak. "(I'm) stunned, I suppose," he said. "I'm pretty upset."

The theft of hives worth about $7500 and containing 50,000 bees each is nothing against the loss of income. "Each beehive would have fetched about $150 for pollination," he said. "Then there was the honey crop. A drum of manuka could reach anything from $5000 to $10,000."

Mr Tyler is now grappling with how 1.125 million of his bees were rustled about November 7 or 8 from the Te Poi farm paddock where their hives, each weighing 25kg, were sitting. "It would have taken at least two guys and a small truck to move them."

Last week his beehives were set to go to kiwifruit orchards in Te Puke for green pollination, before being moved on to the East Cape to collect manuka. He used the Te Poi farm as a convenient drop-off point. Mr Tyler said he would definitely recognise his stolen hives, which were uninsured. The lids, which he designed himself, feature a unique sugar feeding hole made with a galvanised washer.

Source: http://www.stuff.co.nz/national/farming/3092715/Beekeeper-badly-stung-by-heist/

From the Publications Committee

On behalf of the Publications Committee (Kushla Haenen and Trevor Cullen) and journal editor Nancy Fithian, I would like to convey our best wishes for a happy Christmas and New Year, and a productive honey season.

We hope you will be able to take some time to be with your families during the festive season before continuing with the honey harvest.

Thanks very much to our advertisers, without whom the journal would not be published—please support them! We are also grateful to everyone who has contributed articles and photos over the past year.

Finally, thanks are due to the members of the Executive Council, who work tirelessly on behalf of all NBA members, and to South City Print for a job well done again this year.

We will have an expanded committee for 2010—watch this space.

- Frank Lindsay
Chair, Publications Committee

How not to deal with a swarm

The following exchange of emails occurred recently between a farmer and a Waikato beekeeper:

Farmer (about 5 pm): Hello. A wild swarm of bees are determined to nest in our plum tree right where the highest traffic area in our garden is. Could you advise me on effective methods to remove them or direct me to a website that can help, please. Thanks a lot.

Beekeeper (about 7.30 pm): Hello. Where are you located? I can then try and put you in touch with a beekeeper in your area to help you.

Farmer (just after 9 pm): Hi. I ended up shooting the nest from a distance with my shotgun. Several times as it kept reforming. Sorry if I deprived some local apiarist of an opportunity, but I have young kids and am trying to get my maize planted, so had to do something in a tight time frame. Thanks for replying, though.

HAPPY CHRISTMAS

Best wishes to all for a happy Christmas, healthy bees and a good honey crop. We will be closed from 22 December to 11 January. For emergency supplies of Apivar over this period please email or phone and leave a message.

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Transport of bee products: information from NZFSA

By now all RMP premises should have been notified either by email (or by letter where we don't have an email address) about the need to cover transport in their RMPs or use transporters with RMPs or transporters who are operating under the Animal Products Transport Regulated Control Scheme (RCS). If you haven't been notified I suggest you check with Charlotte Treffers charlotte.treffers@nzfsa.govt.nz in our approvals group that we have the correct email address for you and/or that your postal address is correct. These letters are generic in nature so I have summarised what this means for the transport of bee products from 1 November 2009 for you.

Transport by domestic-only premises/ beekeepers

There are no specific transport requirements for domestic-only bee products produced under the Food Act regime. There is a general obligation on the beekeeper not to contaminate honey or other bee products or grossly contaminate the packaging during transportation or processing where honey or other bee products are subsequently sold. Bee products must not breach Food Act requirements that require food for sale to be sound, fit for human consumption, not likely to cause injury and be free from contamination. Food for domestic sale must be processed and packed in a premises registered under the Food Hygiene Regulations 1974 or under an approved Food Safety Programme or under a Risk Management Programme (RMP) under the Animal Products Act. Where a domestic-only RMP premises transports products to another premises with an RMP, that transport needs to be undertaken in compliance with Part 15 of the Animal Products (Specifications for Products Intended for Human Consumption) Notice 2004: http://www.nzfsa.govt.nz/animalproducts/legislation/notices/animal-material-product/human-consumption/admin-consolidation-of-hc-spec.pdf

Transport of full supers etc to RMP premises by beekeepers

Beekeepers that harvest honey and transport supers to an extraction facility with an RMP are already exempt from the need for an RMP so transport to the extraction facility does not fall under the RCS either. The beekeeping part of the operation has a few general requirements around avoiding contamination including during transport. These requirements are found in clause 108 of the Animal Products (Specifications for Products Intended for Human Consumption) Notice 2004: http://www.nzfsa.govt.nz/animalproducts/legislation/notices/animal-material-product/human-consumption/admin-consolidation-of-hc-spec.pdf

Transport of product between RMP premises and on to export

Under the Animal Products Act transport of animal products and animal materials intended for export with official assurances must occur under an RMP unless a Regulated Control Scheme (RCS) is in place. The reason for the need to get the RCS issued before 1 November is because without the RCS the various animal product industries (including bee products) would have found themselves in a very difficult compliance position. Businesses transporting products would have had to register an RMP by 2 November or cease transporting export animal products with official assurances. The RCS gave us the ability to bring in a system that is easier for businesses to sign up to and which can be implemented in stages. An RMP can't be implemented in stages; you either meet all the RMP requirements or you don't have an RMP. However we can deem certain RMPs to be compliant with the RCS for a specified period of time.

Transport of bee products between RMP premises and then on to export shipment must be undertaken in one of the following ways:

(1) By the RMP premises itself with transport included as part of the premises' RMP

Businesses with an existing RMP that transport their own products are deemed compliant until 31 March 2010 by when they must have amended their RMP to include transport. NZFSA is developing a template for operators to use for this purpose and operators will need to notify NZFSA that they have added the transport clip-on once they have done this. The template should be available from our web site within the next few weeks. Using the template to include transport is a minor amendment to the RMP and will need to be notified to NZFSA using the AP50 form http://www.nzfsa.govt.nz/animalproducts/publications/forms/ap-50-rmp-3yr-review/index.htm to allow us to update our records. There will be a small service charge for this minor amendment as detailed on the AP50 form.

There is an option to add transport not using the template but this may not be a minor amendment. Any amendment not using the template needs to ensure product transportation complies with Part 15 of the Animal Products (Specifications for Products Intended for Human Consumption) Notice 2004: http://www.nzfsa.govt.nz/animalproducts/legislation/notices/animal-material-product/human-consumption/admin-consolidation-of-hc-spec.pdf

(2) By a sub-contractor to the business covered by the RMP business's RMP

The subcontractor could be a transport firm or a beekeeper shifting drums from a contract extractor to a store. Either way there needs to be a written arrangement between the RMP premises and the sub-contractor to make it clear what the arrangement is. Businesses with an existing RMP that do this are deemed compliant until 31 March 2010 by when they must have amended their RMP to include transport per (1) above. The NZFSA template for operators is expected to include an option and documentation for use with sub-contractors. Note that by covering a sub-contractor with your RMP you are taking responsibility for compliance of the sub-contractor's vehicle, documentation and handling of product. This will all need to be documented and sub-contractors' vehicles may need to be available for checking when the RMP is verified.

(3) By a registered transporter operating under the transport RCS or with an RMP

Check out the transport RCS notice at http://www.nzfsa.govt.nz/animalproducts/legislation/notices/regulated-control-schemes/animal-products-regulated-control-scheme-animal-products-transportation-for-export-with-official-assurances-notice-2009.pdf and its Amendment http://www.nzfsa.govt.nz/animalproducts/legislation/notices/regulated-control-schemes/transport-of-animal-products-and-animal-material-for-export-with-an-official-assurance-amendment-notice-2009.pdf

All transporters listed under OMARs 00/94 and 02/107 have been automatically registered under the RCS other than those who opted to extend the scope of their dairy transport RMP to cover other product transport. Either way all those OMAR listed transporters are legally able to carry bee products. The web register for the transport RCS will be on line from December. Until that time you can continue to refer to the existing transporter list on this web page: http://www.nzfsa.govt.nz/animalproducts/registers-lists/transport-operators/index.htm and use the transporter IDs in that list for your EDs and transfer documents.

These are the only options for transporting product once secondary processing is undertaken for the product to retain eligibility for official assurances. Beekeepers who shift product themselves between RMP premises, but don't currently have an RMP themselves, need to either register under the RCS as soon as possible and ensure they meet all its requirements by 31 March, be sub-contracted under an existing premise's RMP, or register their own transport RMP as soon as possible.

Source: Provided by Jim Sim, Senior Programme Manager Animal Products, New Zealand Standards Group, New Zealand Food Safety Authority. Jim emailed this information to beekeepers on 6 November 2009.

Colony Collapse Disorder: an update

Murray Reid
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Hive losses still occurring

Colony Collapse Disorder (CCD) is a phenomenon that was reported in North America in late 2006. The name was well chosen as colony populations suddenly disappear with few, if any associated dead bees in front of, or inside the hive. The hives may be left with no bees at all or just the queen and a handful of bees. Brood of all ages is present and in many cases there is plenty of food.

The Apiary Inspectors of America (AIA) and USDA-ARS Beltsville Bee Research Laboratory conducted a survey between September 2008 and early April 2009 to estimate colony losses across the country. Over 20% of North America's estimated 2.3 million colonies were surveyed. A total loss of 28.6% of managed honey bee colonies was recorded, which compares to losses of 35.8% and 31.8% for the winters of 2007/2008 and 2006/2007 respectively (vanEngelsdorp, et al., 2009).

Canada reported similar results from surveys over the winter of 2008–2009. Normal long-term overwintering mortality pre-varroa was 15%, but this year commercial beekeepers reported wintering and spring dwindling losses of 34%, or 2.3 times the normal rate. This loss is similar to 2007–2008 (35%) and exceeds the 2006–2007 rate of 29.0%. Putting some numbers on these surveys, Canada lost over 200,000 hives last winter [Canadian Association of Professional Apiculturalists (CAPA), 2009].

Similar observations have been made in several countries throughout Europe and losses have also been reported in the UK, Taiwan, India and Brazil. The data in Table 1 was extracted from the proceedings of the 4th COLOSS (Prevention of honeybee COlony LOSSes) Conference in Croatia in March 2009, but only losses over 20% are noted here.

Causes

The cause of CCD is not yet fully understood but researchers in the United States believe that CCD is most likely to be a combination of several factors. Anything that compromises the immune system of bees, such as pesticides, management, poor protein nutrition, high-fructose corn syrup (HFCS) and pathogens like varroa, *Nosema sp.* or tracheal mites, leaves the bees vulnerable to other more lethal pathogens.

Israeli Acute Paralysis Virus (IAPV) appears to be the most likely pathogen at this stage, although some researchers make a good case for Deformed Wing Virus (DWV) and *Nosema ceranae* (CCD Steering Committee, 2009).

Symptoms of CCD

The characteristics of CCD were established by the USA CCD Steering Committee (2007) and can be broadly split into two groups: (1) those that are present leading up to the point of collapse and (2) those that are evident after collapse.

Characteristics prior to collapse are:

- the rapid loss of the adult bee population
- in actively collapsing colonies, there are not enough worker bees to maintain the brood
- remaining worker bees are mostly young adult bees
- at the end stages of collapse, a queen is attended only by a few newly emerged adult bees
- capped brood appears healthy with low levels of parasitic mites, indicating that colonies were relatively strong shortly before the loss of the adult bees. The losses cannot be attributed to levels of varroa and nosema known to cause economic injury or population decline (vanEngelsdorp et al., 2009)
- colonies in collapse are reluctant to consume sugar syrup and protein supplement
- remaining bees show a general lack of cohesion and are scattered all over the brood frames.

Table 1: *Overview of colony losses based on data presented in the submitted abstracts in the Proceedings of the 4th COLOSS Conference.*

Country	No. Bkprs	Colonies	Year	% Losses	No. hives checked	Type questionnaire	*N.ceranae*	[1]IAPV
Denmark	4100		07/08	32	17,000	questionnaire	yes	no
France	69,000	1,300,000	07/08	29.3	62,400	questionnaire	yes	yes
Hungary	15,000	800,000	07/08	10-30	170	Diagnostic programme	yes	no
Ireland	2000	20,000	07/08	15-20		Unofficial estimates	yes	
Italy	75,000	1,157,133	07/08	37.4	5973	questionnaire	Yes	no
Netherlands	8000		07/08	23	7434	NCB Dutch monitor	Yes	no
Portugal	40,000	1,000,000	06	30.3		National survey	?	?
Turkey	33,770	3,300,000	06/07	30	35,000	survey	yes	?
UK	41,000	290,000	07/08	33	10,897	questionnaire	yes	no
USA		2,400,000	07/08	36		questionnaire	yes	yes

[1] IAPV: Israeli Acute Paralysis Virus

Characteristics after collapse are:

- no dead adult bees are found inside or in close proximity to the colony
- collapsed colonies often have considerable capped brood and food reserves (Cox-Foster et al., 2007)
- a reluctance to rob the dead colony by bees from other colonies or invasion by wax moths or small hive beetle, suggesting the presence of a chemical deterrent or toxin in the hive
- the queen, if present, appears normal. However, sometimes she is found outside the hive, which is most unusual.

Figure 1: Brood frames from a CCD colony. Source: USDA.

A similar condition is seen in the UK where it is called the 'Mary Celeste Syndrome'. The main difference from CCD is that there is usually no brood present. However, some researchers believe that this may just be a characteristic of CCD in colder areas and the presence of capped brood is not necessarily a definitive symptom of CCD.

Possible contributors to the development of CCD

A lot of research is being undertaken to try and find the causes of CCD and solutions to colony collapse, especially in the USA. Much of this has been identified in reports from a CCD Steering Committee in 2007 and a progress report from the committee in 2009. Some of the key contributors that have been identified are:

- pesticides
- malnutrition and high-fructose corn syrup (HFCS)
- colony management
- pathogens.

Pesticides

Recent studies in the USA, Britain and the Netherlands have shown a decline in pollinator species as well as a decline in the plants that depend on them (Frazier, 2008). Some researchers now question whether CCD is a part of a broader pollinator decline driven primarily by environmental factors.

The toxic effect of pesticides on honey bees is well studied but the sub-lethal effect of some pesticides and some fungicides is less well known. The recently sequenced honey bee genome has helped to establish that bees are weak in detoxifying enzymes and have a weak immune system. This makes honey bees particularly vulnerable to pesticide poisoning (CCD Steering Committee, 2007).

Neonicotinoids are a class of pesticides released in 1985 by Bayer. They are related to nicotine and operate on the nervous system (Marron, 2007). Imidacloprid is a neonicotinoid used on seeds but can be taken up by the plant. It protects seeds from sucking and biting insects. Studies looking at the level of residues in nectar and pollen typically find levels well below that which would be toxic to honey bees. However, other studies show that sub-lethal doses of imidacloprid do change the behaviour of honey bees. Some researchers suggest that the changes may interfere with the navigation or memory systems of the bees (Ramirez-Romero et. al., 2005 and Mussen, 2007). More work is being carried on the lethal and sub-lethal effects of neonicotinoids and other pesticides (CCD Steering Committee, 2009).

Fluvalinate may also be having an effect on bee health. Formulation changes over the years have seen the LD50 move from 65.85 micrograms per bee, a level considered relatively non-toxic, to 0.2 micrograms per bee in 1995. This is considered by the US Environmental Protection Agency to be highly toxic to bees (Frazier et al., 2008).

Researchers at Pennsylvania State University in the USA are also looking at the potential effect of synergies between two or more chemicals. Pollen, wax, adult bees and brood have been analysed and found to contain many chemicals, including those used on agricultural crops and in the hive. Of 108 pollen samples analysed, 46 different pesticides were identified. The average number of chemicals found in one sample was five. However, one pollen sample from one colony yielded 17 different pesticides. Adult bee samples from a single hive have also contained up to 24 different chemicals.

There is evidence to suggest that fungicides can increase the effects of neonicotinoids by 1000-fold (CCD Steering Committee, 2007). In addition to synergies between chemicals, interactions between chemicals and poor nutrition may also significantly affect the immunity of honey bees.

As if this weren't bad enough, fungicides have now been associated with bee deaths. California beekeepers have long been reporting brood problems around 17 days after colonies in almond orchards were exposed to fungicides such as captan, Rovral® and now Pristine®. Larvae and pupae can die at various stages and even adults can die during their last moult or emerge with damaged wings. Such adults can be seen on the landing board or on the ground in front of the hives (Mussen, 2008 and 2009).

Malnutrition and high-fructose corn syrup (HFCS)

As would be expected, bees that have access to a wide range of pollens are typically more resistant to infection and live longer than those bees that are malnourished. Studies have shown that bees enduring a shortage of essential nutrients in the autumn were more likely to suffer from CCD in the winter (CCD Steering Committee, 2007).

HFCS is widely used in some countries and especially the USA for feeding to bees. However, hydroxymethylfurfural (HMF) is formed in the manufacture and storage of HFCS and this compound is known to be toxic to honey bees. Caged bee trials using corn syrup with 150 ppm of HMF killed half the bees after 16 days. Cages fed normal white sugar syrup only lost 10% of the bees after 16 days (LeBlanc et al., 2009). HFCS is not usually fed to honey bees in New Zealand. Heat-damaged honeys can also contain high levels of HMF and this is another reason not to feed this sort of honey back to bees.

Colony management

Moving huge numbers of hives into monoculture crops such as almonds is likely to compound any disease or nutritional problems that may be present (vanEngelsdorp et al., 2008).

Another researcher reviewed the possible causes of CCD and added a new hypothesis that CCD might simply be inadequate incubation of the brood (Oldroyd, 2007). Any factor-infections, chronic exposure to insecticides, poor nutrition, loss of adult population, and inadequate regulation of brood nest temperature might cause CCD-like symptoms.

Pathogens

In early 2007 a group of USA researchers screened adult bees, brood, wax pollen and bee bread from 91 colonies from 13 apiaries belonging to 11 different beekeepers in Florida and California to see what sort of 'bugs' were present (vanEngelsdorp et al., 2009). The researchers tested samples for bacteria, mites, *Nosema* sp., numerous viruses, nutrition status and 171 chemicals. They showed that CCD is consistent with a contagious condition or a result of common risk factors within apiaries. Of the 61 variables quantified (including adult bee physiology, pathogen loads, and pesticide levels), no single factor showed enough consistency to cause CCD.

However, bees in CCD colonies had higher pathogen loads and were co-infected with more pathogens than control populations. This suggests either greater pathogen exposure or reduced defences in CCD bees. Overall, 55% of CCD colonies were infected with three or more viruses, compared to 28% of non-CCD colonies. The researchers also found detectable levels of residues from 50 different pesticides in all of the sampled colonies. There was no association between increased pesticide levels and CCD.

However, the study could not show whether the higher pathogen load was involved in the cause of CCD or was a result of CCD. The researchers concluded that higher pathogen loads are likely to have caused CCD symptoms, but what causes the bees to become infected with so many pathogens requires further research.

It has also been demonstrated that packages installed on equipment originating from collapsed colonies (presumably dying from CCD) do better if the equipment has been sterilised with gamma radiation or treated with acetic acid rather than repopulated without treatment (CCD Steering Committee, 2009). After nine months, colony survival was approximately 70% on irradiated comb compared to 30% on non-irradiated comb. This has strengthened the belief that an infectious agent is responsible for CCD.

Varroa

Mites are known to be effective vectors of viruses. Both Kashmir bee virus (KBV) and Sacbrood virus have been detected in mites and KBV has been detected in the saliva of the mite (Shen et al., 2005). In addition it has been found that once varroa mites take hold in a hive, they suppress bee immunity (Beattie-Moss, 2008). This allows viruses and bacteria that generally would be of little concern to have a greater effect on the colony.

However, hives that succumb to CCD do not necessarily have varroa levels in the brood typical of a mite-induced collapse. The same applies to levels of nosema (vanEngelsdorp et al., 2009). Hive collapse in New Zealand is typically only associated with high mite loading.

Viruses

There are 20 viruses currently known to infect honey bees, each with different symptoms, and it has been shown that bees which have succumbed to CCD have very high virus loads (CCD Steering Committee, 2009). Bees infected with either varroa or *Nosema* generally have higher rates of viral infection than bees that are not infected.

Israeli Acute Paralysis Virus (IAPV) is a previously little known virus discovered in Israel in 2004. Infected bees presented with shivering wings, progressed to paralysis and then died just outside the hive (Cox-Foster et al., 2007). The shivering phenotype is not reported in CCD; however, there

are at least four different strains of IAPV circulating in the USA and differences could be attributed to strain variation. Alternatively, differences may be due to co-infection or the presence of other stressors such as pesticides or poor nutrition.

A recent study found that 96% of hives that had succumbed to CCD were infected with IAPV. Researchers have since introduced IAPV into healthy colonies in an attempt to induce colony collapse (Cox-Foster et al., 2007). The preliminary findings are encouraging but not conclusive. Colonies infected with IAPV experience significant colony mortality a short time after inoculation. Bees are found twitching on the ground outside the hive and guard bees are seen removing paralytic bees. Ultimately, the colonies decline to small clusters with or without a queen. It is clear that IAPV is highly pathogenic but researchers suspect that additional triggers are needed to cause colony collapse.

One of these triggers may have been found in research work announced recently. Johnson et al. (2009) are the first to identify a single molecular marker for CCD using the honey bee genome (only recently completed in 2006) and a genome-based tool called the microarray. The researchers looked for differences in gene expression in the stomachs of healthy honey bees and in those from hives afflicted by CCD and found large quantities of fragmented ribosomal RNA (rRNA) in the bees affected by CCD. Ribosomes are the factories which make proteins. When the team looked at the pathogens of healthy bees and bees from hives affected by CCD, they found that CCD bees had many more viruses that attack the ribosome. These picorna-like viruses take over the cellular machinery to manufacture only viral proteins, not those needed for the bee to survive or thrive. The list of picorna-like viruses includes IAPV. So, it looks like viruses can take over the ribosomes to make more viruses and prevent the bees making proteins, which they need to repair body tissues, maintain their immune systems and deal with pesticides.

Even more recent research found localised Deformed Wing Virus (DWV) in the brains of honey bees. DWV is a positive-strand RNA virus and can be present in bees with or without symptoms. In environmentally stressful conditions DWV can contribute to the demise of a honey bee colony (Shah et al., 2009).

The researchers found that the virus was actively replicating in critical regions of the bee's brain including the neuropils, which are responsible for vision and olfaction. Therefore DWV infection of the brain could adversely affect critical sensory functions and alter normal bee behaviour. This may cause bees to become disorientated and lost, so leading to colony collapse.

Nosema ceranae

Nosema disease is one of the most prevalent adult honey bee diseases and is caused by two described species of microsporidia, *Nosema apis and Nosema ceranae* (CAPA). *Nosema ceranae* has only recently been found in *Apis mellifera*, having been traditionally associated with *Apis cerana,* the Eastern or Asian Honey Bee. *Nosema ceranae* has not been found in New Zealand as yet, although no surveys have been done.

Nosema ceranae, like *Nosema apis* is a microsporidian parasite related to fungi and was said to be responsible for large bee die offs in Spain. It is thought that *Nosema ceranae* is considerably more pathogenic than *Nosema apis* and colonies inoculated with *N. ceranae* were dead within 8 days (Higes et al., 2007).

vanEngelsdorp et al. (2009) found both *Nosema* species were equally prevalent in CCD and control colonies. However, 34% of CCD colonies were co-infected with both *Nosema* species compared to 13% of the controls.

The genome for *Nosema ceranae* has recently been sequenced, which should assist research into how the species became dominant and develop diagnostic tests and treatments (Cornman, et al., 2009).

Control

One of the key strategies to mitigate the risk of CCD is to reduce the incidence and spread of viruses in colonies as well as other conditions likely to cause 'stress'. Frazier et al. (2008) gave the following steps beekeepers can take to minimise pesticide related stress on honey bee colonies:

- monitor and control varroa mite populations using "soft" chemicals. These include formic acid and thymol based products. (Many of these are registered for use in New Zealand.)
- reduce pathogen and pesticide build up in combs by regularly culling and/or irradiating old combs. Don't recycle combs from dead-out colonies
- Fluvalinate should only be used as a treatment of last resort
- Coumaphos should be avoided if possible. (Note that this chemical is not currently registered in New Zealand.)
- communicate with growers where bees are used for pollination to reduce exposure to pesticides, regardless of label recommendations
- monitor and control *Nosema* levels. This is done using fumagillin in the USA, but this product is not registered for use in honey-producing hives in New Zealand.

Keeping other pathogens, particularly varroa, under control will also reduce stress. Although CCD-infected colonies typically have very low levels of varroa, some researchers think there may be a 'varroa legacy' effect. This occurs where viruses spread by varroa are compromising the bees' immune system or brain function, even if there are not a lot of adult varroa present.

It is also recommended that collapsing colonies not be united with strong colonies and that hiveware from collapsed colonies is stored where it cannot be accessed by bees.

Continued on page 13

Continued from page 11

The good news is that researchers in the USA have found that bee strains that are resistant to other bee pathogens are also able to clear IAPV from their colonies. Other scientists are trying to identify genes that influence honey bee resistance to viruses, *Nosema*, and varroa and incorporating those resistant traits into bees.

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From the colonies

Northland Branch

The rains have eased around Whangarei and the paddocks have at last all dried. Northland is a long distance from one end to the other and we hear that around Kaikohe it's so wet that the fertiliser trucks can't get onto some farms.

The spring has been particularly cold with southwesterly winds making avocado pollination difficult on some orchards. We see such a variation in orchard microclimates around here. Some orchards have wonderful shelter and this creates an ideal microclimate. Even if the night time temperatures are low, as they have been, the high temperatures (early 20s) in the afternoon have resulted in plenty of nectar being secreted, plenty of bee pollination and quick germination. In other orchards that are exposed to the southwesterly and/or with poor shelter, it's a totally different story. The hives are strong and doing their job but the low temperatures make it very difficult. I find that some avocado orchardists are fairly ignorant of the pollination and germination process. I often give them a copy of the excellent publication 'Avocado Pollination Best Practice Guidelines 2006', available at www.nzavocado.co.nz/Best practice/Best Practice pollination avocado.pdf

As I write, the first split introductions have begun on Green kiwifruit. The cans of "V" are ready and the long nights are about to begin! We had an unusually cold winter for Northland and Green growers are hoping this will result in a higher number of trays to offset the bleak returns they will otherwise receive.

Over the last few weeks we have, thankfully, found plenty of well-mated queens in our nucs. It's nice to have a good supply at last so we can start replacing the older queens, replacing swarm queens and maybe even making some splits.

The Whangarei Bee Club (with membership of around 200) is opening its own purpose-built extraction plant in December. This is a huge achievement and a testimony to the organisational skills of the committee and the enthusiasm of members. The Portacom building and all the equipment has been designed to get all the RMP ticks, and is perfect for the many club members who need to extract and package smaller quantities of honey. Maureen Maxwell from the NBA and the deputy mayor will be at the official opening.

Swarming has continued through October and into November, despite the hives being hungry and needing an unprecedented amount of sugar to keep them going.

Christmas greetings to everyone. Hope you can get a good break over Christmas after the exhaustion of night shifting on to and off the orchards, taking off the manuka and extracting it and the boxing up for the summer honey flow.

- Simon Peacey, Branch Secretary

Bay of Plenty Branch

What a different spring it has been! The persistent rain has disappeared but the cold temperatures have not. It is still one day warm, two days cold and consequently the spring honey flow is very erratic.

Some of our sites are not too bad for supplies; however, we are still feeding syrup to many hives. The worst are those that stayed too long in Gold kiwifruit pollination and ended up very hungry. It seemed to be the norm this year to hang on to hives for extended periods of time due to the spread-out flowering period. Alas, the poor bees suffered, especially in the bigger orchards where there was little else for them and nutrition sadly failed. A month of kiwifruit pollen and syrup only is not a good diet. Hopefully the industry works out why this year's flowering—especially the male flowers—was so spread out and do something about it for the future. Many beekeepers throughout the BOP have had the same experience as we have with hives in orchards for four weeks: too long for hive health unless you are going to feed more supplements.

The other issue the kiwifruit industry has to come to terms with in conjunction with the bee industry is the new varieties and spray timings. Oil is still in favour although the new spray is gaining ground. Daytime spraying is very effective; however, with money being tight orchardists are reluctant to prune Gold male plants and to mow orchards, so that there is no reason for bees to be present. With several new varieties now being planted with flower timing between Gold and Green, the challenge of good spray management becomes even greater. Finding a solution will take effort on both sides.

Green kiwifruit pollination is now well under way and flowering seems to be consistent, but not early as previously predicted. It's not late either so we should be well sorted by mid-December and tidied up by Christmas.

All the plants are flowering well, so hopefully some warmth will arrive soon so the nectar can flow. Meanwhile, take care when driving, get some sleep and look forward to the fishing.

The BOP Branch would like to wish everyone a safe and happy festive season and a good honey flow. Catch you all next year.

- Barbara Pimm, Branch Secretary

Poverty Bay Branch

Where has the year gone?

The latest findings on varroa resistance in the Auckland area comes as no surprise or a small surprise. Hopefully we will know or have a bit more details on what/how/where, etc. As usual I am bleating on about alternating treatments, not just chemical to chemical but a THYMOL product, as overseas evidence shows no resistance to thymol products. Such is the nature of organics versus chemicals, as organics are sustainable. No one seems to be mentioning this, even though

it is a serious issue just like the carbon tax, which will sting us worse than opening a hive up in the rain...

Oh, that's right: bees. It has been a strange season with many beekeepers reporting a high percentage of supersedures and swarming around the district, including hives swarming when bees have plenty of room in the hive.

The weather has been random: hopefully a better crop than last year by the looks of things. Merry Christmas and happy New Year: hoping for a good harvest for everybody.

- Don Simm, Branch President

Hawke's Bay Branch

It has been very cold and things have slowed down considerably. Clover has been very slow appearing and we have gone from an early season into what looks like the late season. Some hives are full and swarming, some are hungry and swarming and some are doing nicely—it certainly has been a mixed bag.

During a recent stint at foulbrood inspection I was very disappointed to once again see hives treated improperly for varroa. Strips left in, strips in the wrong place and hives with no strips at all dying of varroa. They say that you reap what you sow, but unfortunately so will the rest of us. So make your New Year's resolution to treat varroa on time, alternating treatments and removing them on time.

While I'm on the subject, how about some more financial support for the breeding of varroa-tolerant bees?

- John Berry, Branch President

Canterbury Branch

Show day has come and gone so it should be only another few days and the bees will be self-sufficient. Most beekeepers in Canterbury this year will be looking forward to that after a long cold spring and what seems like one continuous feeding round. I haven't talked to many beekeepers but my spring matings have been poorer than average.

On the bright side, the pasture sward is full of clover and there has been an incredible amount of silage cut to date. A little rain and these paddocks will be great producers of nectar.

Varroa is a fact of life now and is continuously marching south. There is a good grapevine operating with most people being open and honest about where they are treating, so keep in touch with your neighbours.

This spring has been incredibly busy for me this year with my first spring with varroa and I am attempting to get through with my organic certification intact. Once upon a time I used to have lunch under a tree but not this year. As I was pouring my coffee from my flask to a sipper cup so I could drink and drive to the next yard, it occurred to me that this was the perfect example of the chicken-and-egg scenario. If I hadn't bought the sipper cup (and been the perfect consumer), maybe I wouldn't need to work so much and I would not be in such a hurry to get to the next yard. With Christmas just around the corner, it's a good time to think about what is really important.

Anyway, wishing everyone a bumper season, a Merry Christmas and a great New Year.

- Brian Lancaster, Branch President

From Telford Rural Polytechnic

Telford Rural Polytechnic's graduation was held on Friday 27 November at 1.30pm. I am writing this report before graduation but it is anticipated two students will graduate: Liam Wright from Nelson and Harley Kupa-Pickering from Balclutha. The students participated in an AFB disease recognition course (DECA) on 28 August and both passed the test.

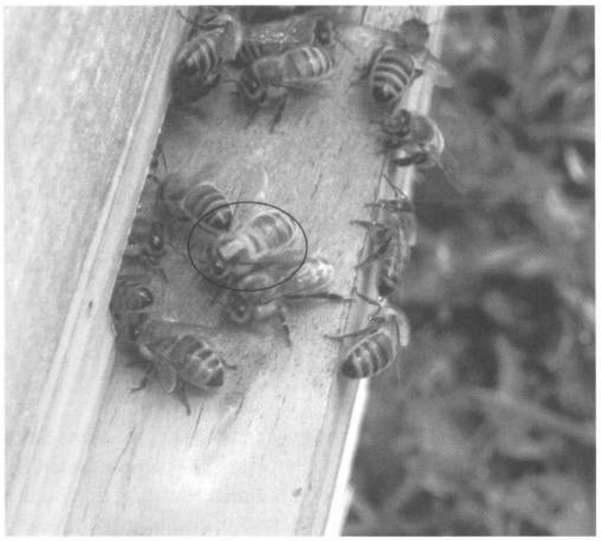
The students undertook three weeks' work experience in September with commercial beekeepers from Te Anau to Tauranga, and this proved a worthwhile experience to reinforce the learning. Students have been engaged in welding, mechanics, making a plant collection, spring hive management and topics covering botany, pollination, marketing and business administration.

- Dr David Woodward
Head of Department, Apiculture

About the Apiary

It's been one of those springs. Inconsistent, changeable weather has really mucked the bees around. The plant indicator in our garden, a succulent that normally starts to flower on 7 October, held off until early November waiting for the weather to warm up. Normally the bees are all over this succulent when it's flowering, but we have only had a couple of really nice days for them to forage on it up to now.

We had ample pollen from gorse early on and now broom is proving most attractive to the bees. You can see bees coming into the hives with pollen baskets full and that telltale stripe of yellow pollen on the bee's thorax, left when the bee crawls into the flower.



Broom pollen

Each area has its own microclimates. For instance, in some areas bees have been able to gather early nectar, while just a kilometre away I have found hives starving. This demonstrates the importance of selecting an apiary site. Even moving an apiary site a hundred metres to a warm spot can make a huge difference to the condition of the bees. As a general rule in farming, we try to select a site where the cattle and sheep have bedded down overnight (as indicated by the amount of dung left behind) and where there is easy vehicle access.

Strong hives that I split early have performed as expected. The bees have drawn out the three foundation frames I had spaced in the brood nest, then started to store nectar in the honey super provided without a hint of queen cell production. Those hives that weren't far ahead (that I considered had plenty of room for expansion) had swarmed on my return. It can happen so quickly, which is a bit disappointing but it's usually only one or two hives in each apiary.

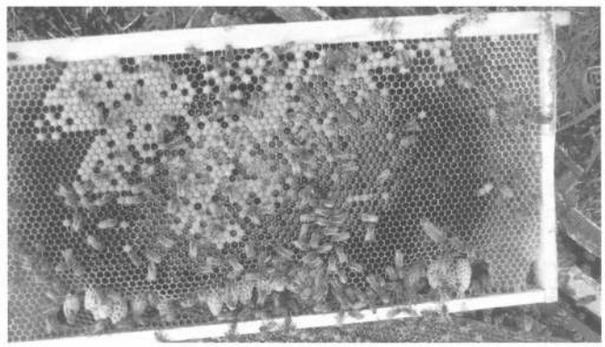
One of the nice things about this changeable weather is that in most cases the swarms haven't gone very far: you spot them on bushes close to the apiary. Shake them into a super, add a frame of brood and another of honey from another hive and wait until the next visit to sort them out. At this time the queen is laying so is easy to find and dispatch (or put into a nuc), and the bees can be united back onto the hive they came from without too much trouble. This will strengthen the hive again just as our first major flow (kamahi) is starting.

Supering

When things have gone right, it's a real pleasure to go into an apiary. Bees can be seen flying strongly from all hives and it's just a matter of doing a quick check for queen cells, flicking out the varroa treatment strips and supering the hives, ready for the flow.

When supering the hives, I tend to lift the top super up and put a new honey super on top of the brood nest (undersuper). First I take a frame of honey and place it in the centre of the super to draw the bees up into the new super. The honey super I put on top is not baited in any way but I do interspace drawn frames with foundation frames. When the super below is starting to fill, the bees will move up and begin storing nectar and drawing out the frames. If the bees are kept working they will not swarm once the flow has started.

Then there are those apiaries that are a whole lot of work where things haven't worked out as planned. Sometimes a quick check (looking along the bottom bars) doesn't pick up early queen cell development. Here's a photograph of a frame full of queen cells about to emerge.



There were only another three queen cells on the hive, all on the face of outside combs, so I missed this one. The solution: work part frames out of the system. Then there are the hives I split where the splits swarmed anyway and left the remaining bees to draw emergency cells.

Uniting hives

Now it's time to put the splits back together so they become production units again. Look over both units and see if both have laying queens. If so, find one and put her with a frame of brood into a nuc box as a spare. Combining bees when there is a flow on is no problem: just spray a bit of air freshener over the supers and put the hive back together.

If there isn't a flow on, then it's best to unite the bees slowly by using a sheet of newsprint between the splits. The same goes for hives that haven't built to the same extent as others. If it's because they have a new queen, assist her by adding a couple of frames of emerging brood from a very strong hive, or add a queenless split on top to increase the bee numbers.

A few of my hives have swarmed and then cast virgin swarms. It's very disappointing to just touch a small swarm to encourage it into a super, only to have the bees immediately take wing and fly away. When approaching a small swarm, consider trying to cage the queen if you see her, or put a frame of brood from a hive against the swarm to encourage it to move on to it, or carry a small spray bottle and wet down the bees before trying to work with them. Always put a frame of mixed brood into the super when hiving a swarm to encourage it to stay. Gary Jeffery, upon finding a hive that has swarmed (he's had seven swarm so far), finds the emerged virgin and dispatches her along with any remaining queen cells, and adds a nuc with a laying queen to the hive. The hive quickly builds to a production unit again. This works well if the hive contains not more that a super and a half of bees. Any larger and the hive will swarm again.

It's always best to prevent swarming but some of my splits have swarmed even with five-day-old queen cells. The smallest swarm I have caught contained led that a cup of bees. Seems to be one of those years.

For those who use queen excluders above a single brood super, you can use a form of Damaree system to relieve congestion and change the brood nest frames. Take a new super with all foundation frames and place it on the bottom board, and remove three foundation frames. Go through the hive and find the queen and put her and the frame she is on into the middle of the new super. Place a frame of pollen on the outside edges of the super, leaving the foundation frames in the middle. Put on the queen excluder and then sort all the brood frames so that the majority are in the super immediately above the queen excluder. Then put the three remaining foundation frames in the super above, between frames of either brood or honey. Put on a couple of honey supers.

Give the bees an upper entrance to allow drones to escape and for the bees to use as a quick way into the hive. You can do this by moving the third super back a little so the super is slightly askew, exposing the tip of the frames a little in the corner so that bees can get just into and out of the corner of the super. The bees quickly learn to use this top entrance, which reduces congestion in the brood supers.

In five days' time, check the brood frames in the second and third super for queen cells, and rub them off if you find them. The bees will have started drawing out the bottom foundation frames, which will have caused a break in brood production. The bees emerging in the supers above are not required to look after brood so become field bees.

The Demaree system is good in areas that have short, sharp flows or for average-sized colonies that you wouldn't expect to produce too much honey. The late Trevor Row (Taranaki), when finding what he called a dud hive just as the flow was starting (i.e., a single super hive), would kill the queen and put a honey super on top. Again, this created a longer brood break and the bees would fill the honey super while producing an emergency queen.

Extracting

Bees are stimulated into bringing in more nectar when there is space for them to store it. Part-time beekeepers generally undersuper their hives by gradually moving the honey upwards. By extracting honey from frames that are completely capped and returning them to the hives in the evening, the bees are kept working.

I recommend that you return wet (extracted) honey frames after dark as the bees become stimulated with all that wet nectar that remains in the frames. If you return the frames during the day, the bees will fly out in huge numbers looking for the source of this honey close by, which will upset your neighbours no end. But if you put the frames back on again in the evening, the bees will have got over their excitement and by morning they will have cleaned up the frames, ready to use again.

Once all the supers are full, the bees will stop working and it's hard to get them going again so add more than one super at a time, especially if they are three-quarter-depth honey supers.

If you don't want to extract early, remove the fully capped frames and store them in a super placed in a thick plastic bag to stop the honey attracting moisture from the air (honey is hygroscopic). If left exposed for a time in a damp environment, the honey in the frames will start to ferment. If you produce honey in a pohutukawa area, you will have to extract it quickly once it's off the hives as it can start to granulate in the frames within four days.

For those in the cities that have prolonged honey flows, the management is a bit different. The bees will try and fill the second super with honey and cram the queen down, as is the

natural order of their existence. This reduces the population of the hive considerably once the field bees—those bringing in the nectar—die off. City beekeepers have an opportunity to collect more honey because of the extended flowering of trees and shrubs. In this case, it's important to keep the queen laying by lifting honey frames from the second super and giving the bees either foundation frames or partly drawn frames for the queen to lay in. Beekeepers who use a queen excluder over the first super can lift up frames of capped brood into the second super, replacing them with freshly extracted or fully drawn frames.

Don't forget that honey is a food and must be extracted in a clean spotless plant. Wash everything down, then use a sanitiser and wash down again.

For commercial beekeepers with export extracting plants, it's time to review last year's operation, tweak things to overcome the little problems and complete the paperwork, ready to start extracting.

For North Island and top of the South Island beekeepers, start monitoring passion vine hopper populations on tutu. *Record everything.* We still don't know enough about the conditions that cause the bees to switch to collecting toxic tutu honey dew. Last season some beekeepers reported seeing lots of honey dew on tutu, but when the honey was tested there wasn't a trace of tutin found. Others who hadn't seen tutu bushes got a small surprise from the tests when minute traces were found in the honey, indicating the bees had found tutu bushes elsewhere in the area.

Things to do this month

Check feed, check for failing queens, introduce nuclei, super up hives. Prepare honey house equipment, begin the first extraction (in some areas), continue swarm control until the main flow starts. Keep weeds around the hives under control.

Always check several frames of emerging brood for AFB before interchanging frames, uniting hives or removing honey for extraction.

For those who can still produce comb honey, fit foundation to comb honey frames.

Take a couple of days off during the Christmas–New Year break to enjoy your family. The bees can be left for a while and will do everything, provided you have set them up properly and given them honey supers in which to store all that nectar. Here's hoping that the temperature increases considerably for the summer and that the bees have a better season than the last.

- Frank Lindsay, NBA Life Member

When washing your bee suit veil, weigh it down with a towel or something inside it. If it rides up during the spin cycle, the top edge of the washing machine's bowl will cut through the fabric and stiffening.

Index: *New Zealand BeeKeeper*, Volume 17, 2009

Title	Author	Issue	Month	Page
Club Contacts & Beekeeping Specialty Groups	Publications Committee	9	Oct	55
Colony Collapse Disorder: an update	Murray Reid, AsureQuality Limited	11	Dec	8
Comment: the changing nature of beekeeping	Publications Committee	3	Apr	27
Conference 2009: many good reasons to be there	Barbara Pimm	3	Apr	8
Conference address: The future of bees	Hon. David Carter, Minister of Agriculture	6	Jul	8
Conference comments	Ron Morison	7	Aug	12
Conference invitation	Conference Organising Committee, Bay of Plenty Branch	3	Apr	Insert
Conference organisers' report	Bay of Plenty Organising Committee	6	Jul	12
Congratulations to Dr Mark Goodwin	NBA Executive	10	Nov	6
Control of varroa using organic treatments—part 7	Michelle Taylor, et al., Plant and Food Research	7	Aug	17
Covering honey supers	Frank Lindsay	2	Mar	4
Croatian research on controlling nosema with a herbal preparation	Ivana Tlak Gajger, et al. Excerpted from *The Beekeepers Quarterly*,No. 95, Mar 2009 Comment by Dr Louise Malone	10	Nov	6
DECA course held in Christchurch	Marco Gonzalez, AsureQuality Liimited	2	Mar	9
Decline of manuka on the West Coast	Frank Lindsay	8	Sep	26
Did you know?	Rex Baynes, AFB NPMS Manager	3	Apr	36
Do's and don'ts of AFB control	Dr Mark Goodwin	9	Oct	51
Entertaining and educational	Kushla Haenen	10	Nov	21
Extraction Plant Open Day	Jeremy and Fiona O'Brien	3	Apr	7
Finding how MGO gets to be in manuka honey	Professor Peter Molan, Honey Research Unit	4	May	16
First aid for workplaces—a good practice guide	Department of Labour	10	Nov	7
Food hygiene for hobbyists	Barry Foster, NBA Vice President	9	Oct	51
Food Safety and RMP Awareness in the Honey Industry course report (Food Safety Programmes/Risk Management Programme)	Trevor Corbett	8	Sep	19
Franklin Beekeepers Club AFB Recognition and Competency Course and test	Bob Russell	10	Nov	13
From the archives	Linda Bray, NBA Librarian	8	Sep	17
From the archives (June 1928)	Roger and Linda Bray, NBA Librarians	9	Oct	41
From the archives (June 1929)	Roger and Linda Bray, NBA Librarians	10	Nov	15
From the archives: Disease control: are you prepared to do your bit?	John Heineman and Allen McCaw (originally published Winter 1991)	3	Apr	48
From the Publications Committee	Publications Committee	11	Dec	4
Get in quick for your copy of Starting with Bees	NBA Executive	10	Nov	6
Getting to know the industry	Daniel Paul and Gemma Collier, joint CEOs	9	Oct	6
Good news for future NBA conferences	Pam Edwards, NBA Executive Secretary	1	Feb	11
Helping our precious Honey Bee: National Bee Week 4th–8th May 2009	Arataki Honey (media statement 21st April 2009)	4	May	6
Honey Industry Trust Trustees' Report to the NBA AGM 9 June 2009	Presented by Dave Sawers	8	Sep	11
Honey producers, consumers winners in new testing method	University of Waikato media release, April 24, 2009	4	May	15
Honey Valley: now it's the bee's knees	Tina Law, reprinted from *The Press*, Chch, 3 Aug 2009	10	Nov	10
How not to deal with a swarm	Provided to Publications Committee	11	Dec	4
How not to start a hive	Ron Morison		May	9
Hungarian beekeepers and their experiences with Feedbee	Piffkó László (reprinted from Meheszet, 15 July 2008)	2	Mar	17
Indian honey import investigation	Jim Edwards, NBA CEO	4	May	4
Let's keep it simple—what's a COI?	Fiona O'Brien	9	Oct	26
Let's keep it simple—what's a DECA?	Fiona O'Brien	3	Apr	37
MAF investigates presence of P. alvei in New Zealand	Gemma Collier and Daniel Paul, joint CEOs	10	Nov	4
Management Agency places ADR defaulters in hands of MAF Prosecutions	Rex Baynes, AFB NPMS Manager	9	Oct	44
Management Agency prepares for spring surveillance programme	Rex Baynes, AFB NPMS Manager	9	Oct	17
Manawatu hobbyists field day	Frank Lindsay	2	Mar	10
Manuka honey saves horse	Tamara Toon	4	May	23
Massive crackdown on the use of scores of toxic pesticides	Geoffrey Lean (reprinted from *The Independent*/UK, Dec 23, 2008)	1	Feb	23
Meet your Executive Council	Photo by Jessica Williams	10	Nov	11
Meeting to resolve manuka issues	Dr Jim Edwards, BPSC and NBA CEO	6	Jul	13
Mervyn Joseph Farrington obituary	Frank Lindsay	5	Jun	6

Title	Author	Issue	Month	Page
Trees and Shrubs of New Zealand: Kunzea ericoides/Kanuka	Tony Lorimer	5	Jun	18
Trees and Shrubs of New Zealand: Beilschmiedia tawa/Tawa	Tony Lorimer	9	Oct	53
Trees and Shrubs of New Zealand: Gaultheria antipoda (Snowberry) and Corokia cotoneaster (Corokia)	Tony Lorimer	10	Nov	22
Trees and Shrubs of New Zealand: Kamahi	Tony Lorimer	1	Feb	11
Trees and Shrubs of New Zealand: Ongaonga/Tree nettle	Tony Lorimer	2	Mar	13
Trees and Shrubs of New Zealand: Westland Quintinia and Tawheowheo	Tony Lorimer	8	Sep	23
Tutin research project	Jim Edwards, NBA CEO	1	Feb	4
Understanding hive quality	Tim Woodward (Zespri) and Neale Cameron (beehive auditor)	6	Jul	19
Update on review of American foulbrood national pest management strategy	Paul Bolger, MAF	9	Oct	44
Upgrade of Apiary Database on track	Rex Baynes, AFB NPMS Manager	3	Apr	18
Waikato researchers find source of MGO in active manuka honey	University of Waikato media release, April 16, 2009	4	May	10
Why a standard is needed for 'Active Manuka Honey': some personal opinions	Professor Peter Molan	8	Sep	9

Joys of pollination, Bay of Plenty

Photos: Fiona O'Brien and Kushla Haenen.