AUSTRALIA'S

HONEYBEE NEWS

"The voice of the Beekeeper"

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AUSTRALIA'S HONEYBEE NEWS

The Journal of the NSW Apiarists' Association Inc. (NSWAA)

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COVER: Neil Bingley checking a South Coast apiary for Nosema Photo: Dr Doug Somerville

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PRESIDENT'S REPORT

At the time of writing this report most beekeepers will be gearing up for spring. Almond bees will be in the orchards and bees will be moving onto canola or other breeding conditions. The seasonal outlook from my perspective is average at best, all the short term budders will need to bud, flower and produce for the north of the State to achieve an average honey crop.

It is very concerning to hear of a major honey packer cutting beekeepers quotas; one has to wonder would this be happening if there was not the volume of honey being imported into Australia??? Unfortunately the mighty dollar rules over the interests of Australian farmers. I truly hope we are not in a slow spiral downwards like other agricultural industries where the cost of imported goods is below the cost of production here in Australia, leaving us unable to compete.

CROWN LANDS INQUIRY
The inquiry is well under way, the deadline for submissions has been extended to the 31 August and I encourage everyone to have their say. The Australian Honey Bee Industry Council (AHBIC), Victorian Apiarists' Association (VAA) as well as NSWAA are putting in submissions. The key points to the NSWAA submission is the retention of the current NPWS beekeeping policy and the opening up of sustainable bee sites in currently unused areas.

WORKPLACE HEALTH AND SAFETY
The updates to the work place health and safety manual will be soon available, anyone interested in the new version please contact our secretary Kate and they will be sent out as soon as ready. A brief of the manual is in this edition.

AHBIC and FCAAA
Recently AHBIC and the Federal Council of Australian Apiarists' Associations (FCAAA) held their Annual General Meetings in Launceston Tasmania. Both meetings were extremely positive.

Amongst many other issues discussed at the FCAAA meeting, a proposal was put up by Plant Health Australia (PHA) for FCAAA to fund t he printing and mail out of a *Honey Bee Biosecurity Manual*. This proposal was unanimously supported and a copy of this manual will be distributed to every registered beekeeper in Australia in the next couple of months. It is great to see FCAAA supporting such a worthy education tool for our entire industry. The manual was compiled by Sam Malfroy (son of Frank Malfroy) who has been with PHA now for 2 years, thanks for showing some initiative Sam.

At the AHBIC meeting a NSW motion to push ahead for a national approach for the control of AFB was unanimously supported by all sectors. This issue I believe has been discussed at AHBIC level before however at those times did not have full support. A small committee was formed being Jo Love (VIC), Ian Zadow (SA) and myself as chair. Plant Health Australia will be helping liaise with State DPIs on some of the proposed structure. Attempting to pull this together will be difficult; however with all State DPIs slowly walking away from our Industry I believe we have no choice but to give it a shot. This type of program will not work without the cooperation of both Industry, State and Federal Governments.

DAFF'S BIOSECURITY OVERHAUL
DAFF is currently reviewing the National Biosecurity legislation, this piece of legislation is over a hundred years old and a review is well overdue. I believe it will mostly be streamlined. AHBIC is looking into the impact on our Industry and will no doubt have input into the new legislation.

NSW STATE FORESTS
Discussions are ongoing with NSW Forestry, we have agreed with them to work together on a State based beekeeping policy. This will give clear guidelines to both sides of the equation. Negotiations are continuing and will take some time, effort and bending on both sides. For the time being Forestry have put on hold charging of transfer fees and any tendering/balloting of bee sites until the policy can be put together.

SYDNEY ROYAL SHOW
Plans are well under way for the 2013 Show. Bruce White will again be the Show Coordinator, thank you Bruce. To enable NSWAA to continue to operate *Honeyland* and make a profit we need regular volunteers during the show and donations of quality honeys. So please if you are able to look and plan ahead, put aside a day or two to help at *Honeyland*, or if you have a drum of quality honey and would like to donate it will be gratefully accepted. The Show dates are 21 March - 3 April 2013.

CONSTITUTIONAL CHANGES
Coming up in the Australia's Honeybee News will be some proposed /suggested constitutional changes. Already on the table for the next AGM is a motion dealing with the length of a President's term. I believe some small changes are needed to give the Association and the Executive some flexibility and continuity of Executive members.

The next Executive meeting is on the 13/14 August at Narrabri. Amongst the usual discussions we will be meeting with Santos to discuss issues affecting beekeepers around coal seam gas wells and mines in general, a report will be published in the next edition.

At the our last AGM a motion was passed to look into a part time lobbyist for the Association. We are currently looking into the idea. I can see in the future this is going to be a must, as we face ever decreasing services from all Government levels and increasing pressure on our Industry. Having professional help to get our message across will be essential.

Lastly to the McIlvride and Shearer families our thoughts are with you in these challenging times.

Craig Klingner
State President

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WORK HEALTH & SAFETY MANUAL

The NSW Apiarists' Association Work Health & Safety Manual is a practical tool to help your apiary business implement a WHS Management System.

This manual will assist apiarists to meet their obligations under the Work Health and Safety Act 2011 (WHS Act) and Regulation 2012, the primary purpose being concerned with safeguarding against workplace accidents for employees and visitors to the workplace. At the same time, allowing the keeping of bees in a manner compatible with the area/s in which they are located, ie State Forests, National Parks, Rural Lands, Reserves, farms, etc and in such a way that they are acceptable and safe to apiarists, landholders, employees and the general public.

The legislation provides the framework for proactive management of safety risks in the workplace and requires the establishment of a safety system which will help you to:

- Take a positive attitude to safety
- Know your responsibilities under WHS, injury management and workers' compensation laws
- Identify potential hazards and determine appropriate control measures
- Develop WHS policies and programs
- Assist employees to follow proper procedures for their job through appropriate training and education
- Promote WHS through consultation and involvement of employees in the process

This is done primarily through consultation with staff/ landholders and undertaking risk management practices to identify all foreseeable hazards, assess the risks arising from them and then eliminate or control them.

This is not merely an exercise in paper compliance – rather, it is to actively demonstrate an employer's obligation to have a workable, effective WHS management system.

This WHS Management System Manual is intended to help you establish systems to do this.

**** ANOTHER MEMBERSHIP BENEFIT ****

NEW MEMBERS

A warm welcome to the following new member:

Neil Fynn Ulladulla

VICTORIAN APIARISTS' ASSOCIATION INC. BENDIGO BRANCH

32ND ANNUAL BEEKEEPING FIELD DAY

Will be held on Sunday 14 October 2012 at the Marong Recreation Reserve from 9.30am to approximately 3pm

VICroads Directory Map 44 reference D5/6

Displays of Trucks and loading equipment etc.

Bee goods for sale

Stall sites are available at a cost of $10

Open hive display

Our beekeeping fraternity is always keen to see and have the opportunity to discuss/buy items of use and value in their beekeeping pursuits.

For more information contact:

Bill Shay, Secretary - 0419 337 276
shaybill@hotmail.com

DATES FOR 2013 ANNUAL STATE CONFERENCES

New South Wales Apiarists' Association	22/23/24 May 2013
Tasmanian Beekeepers' Association	31 May/1 June 2013
Victorian Apiarists' Association	5/6 June 2013
Queensland Beekeepers' Association	TBA
South Australian Apiarists' Association	19/20 June 2013
WA Farmers Federation – Beekeeping Section	4 July 2013
AHBIC Annual General Meeting	5 July 2013

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INTERNATIONAL NEWS

Learning Impairment in Honey Bees Caused by Agricultural Spray Adjuvants

Published in PLoS ONE
Timothy J. Ciarlo[*]*, Christopher A. Mullin, James L. Frazier,Daniel R. Schmehl* - Department of Entomology, The Pennsylvania State University, University Park, Pennsylvania, United States of America

Background
Spray adjuvants are often applied to crops in conjunction with agricultural pesticides in order to boost the efficacy of the active ingredient(s). The adjuvants themselves are largely assumed to be biologically inert and are therefore subject to minimal scrutiny and toxicological testing by regulatory agencies. Honey bees are exposed to a wide array of pesticides as they conduct normal foraging operations, meaning that they are likely exposed to spray adjuvants as well. It was previously unknown whether these agrochemicals have any deleterious effects on honey bee behaviour.

Methodology/Principal Findings
An improved, automated version of the proboscis extension reflex (PER) assay with a high degree of trial-to-trial reproducibility was used to measure the olfactory learning ability of honey bees treated orally with sublethal doses of the most widely used spray adjuvants on almonds in the Central Valley of California. Three different adjuvant classes (nonionic surfactants, crop oil concentrates, and organosilicone s urfactants) were investigated in this study. Learning was impaired after ingestion of 20 µg organosilicone surfactant, indicating harmful effects on honey bees caused by agrochemicals previously believed to be innocuous. Organosilicones were more active than the nonionic adjuvants, while the crop oil concentrates were inactive. Ingestion was required for the tested adjuvant to have an effect on learning, as exposure via antennal contact only induced no level of impairment.

Conclusions/Significance
A decrease in percent conditioned response after ingestion of organosilicone surfactants has been demonstrated here for the first time. Olfactory learning is important for foraging honey bees because it allows them to exploit the most productive floral resources in an area at any given time. Impairment of this learning ability may have serious implications for foraging efficiency at the colony level, as well as potentially many social interactions. Organosilicone spray adjuvants may therefore contribute to the ongoing global decline in honey bee health.

Read the entire paper at: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0040848

Water Supplement For Bees Is Claimed To Prevent Colony Collapse Disorder

Source: BeesFree 29 July 2012

Around the world, honey bees have been vanishing at an alarming rate. Since bees not only provide honey, but are also vital for pollinating crops, this is not only distressing, it also puts agriculture at risk. The reasons for this decline are still unknown, but a Florida-based company claims to have found a solution in the form of a concentrated organic feed supplement. BeesVita is purported to not only protect bee colonies in danger of collapsing, but actually causes them to grow and thrive.

CCD costs billions of dollars worldwide because of its impact on honey harvesting and on the role of the domestic bee in pollinating crops and wild plants. The cause remains unknown, though there are many theories about why CCD occurs. Possible causes include things like mites and other parasites, viruses, fungi, immune deficiencies, climate change, malnutrition, pesticides, migratory beekeeping and even speculation that the culprit is mobile phones or genetically modified (GM) crops.

BeesFree's BeesVita is a honey bee feeding formulation that claims to arrest CCD. According to the company's press release, "BeesVita Plus is a concentrated solution that is introduced to the honeybees' water supplies," says David Todhunter, BeesFree's chief executive officer. "Studies show when honeybees drink BeesVita Plus they become healthier, stronger and more resistant to various illnesses and CCD."

Del Vecchio is described as "an internationally-recognized biochemist specializing in DNA sequencing techniques used in genetic therapy and molecular biology." with a PhD from Cambridge. She says that tests of the product in Tuscany, Italy saw treated colonies enjoy a 50 percent increase in population while control colonies lost 40 percent.

Details of exactly what is in BeesVita or how exactly it works are unclear. It appears to be an "animal food product" that contains "known components." BeesFree says that it is going to commission university studies of BeesVita in the United States, though it says they do not require USFDA approval because the ingredients are recognized as safe.

BeesFree's chief scientist and BeesVita Plus inventor Dr. Francesca del Vecchio claims, "BeesVita Plus is composed of scientifically-engineered, natural components proven to contrast (sic) neonicotinoids' side effects on honeybees," says "The solution also contains antimicrobial agents and compounds to fight viruses and its interaction with Nosema parasite. Plus, it has powerful nutrients and antioxidants."

With a retail price of US$70 per liter, BeesVita will be marketed in the US autumn of 2012 and the company is also pursuing sales in Argentina, Italy, Slovakia and South Africa. BeesFree also sells an electrically-powered dispenser for the concentrate.

The claims made by BeesFree are sweeping and the company says that it not only has the research to back them up, it pledges to replace any bees lost to CCD if the product is used properly. However, since the cause and much else about CCD remains unknown, this may be an instance where wait and see is the best policy.

Thousands Of Bees Ground US Plane

Bemused commuters took pictures on their mobile phones of the bees which had taken up residence on the wings of a Delta aircraft.

THERE'S snakes on a plane - and then there's a huge swarm of bees sitting on the wings of an aircraft stopping it from taking off.

Commuters were left stunned when their plane, which was getting ready for take-off, was hijacked by a swarm of bees which decided to hitch a ride on the aircraft's left wing.

The Delta flight, from Pittsburgh to JFK, was delayed for at least 20 minutes last week while a beekeeper arrived to scrap thousands of the insects off the wing.

Pittsburgh International Airport spokeswoman Joanne Jenny told the Daily News, the passengers took the delay in their stride, with many taking pictures on their mobile phones.

She said it was the fourth time this year when bees had invaded the airport.

Beekeeper Stephen Repasky, who removed the insects, said the honey bees were harmless and were resting, adding that there was probably a colony somewhere on the airport site.

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NEW ZEALAND BEEKEEPING CONFERENCE 2012

Scary! Not the NZ beekeepers, but some of the subjects covered by the, conference (and I'm not referring to the talks I gave). The NZ Beekeepers' Association invited me to their annual conference which was held in the North Island of NZ. I gave three talks including honey bee nutrition, small hive beetles and Asian bees. I didn't think I was that scary in my presentations, but maybe the natives thought differently.

I've had the privilege of being invited to a few NZ beekeeping conferences and I have been very impressed with the structure and content of these events. The peak beekeeping body in NZ is the National Beekeepers Association of New Zealand (NBA). They hold one conference a year and alternate between the South and North Islands. Approximately two-thirds of the industry is based on the North Island and one-third on the South Island.

The conference is a lengthy affair when compared to anything in Australia. The proceedings started on the Sunday with a "hobby and small beekeepers' forum". Over one hundred beekeepers took part in this all day event with nine topics listed, which included two practical sessions. This event was designed and tailored to the smaller/hobby beekeepers and purposely held on a weekend to facilitate their attendance.

Running concurrently with this forum was a National Pest Management Authorised Person Course. This course essentially is to train industry inspectors who are warranted under the National Biosecurity Act. The focus of the training is on legislation and responsibility in entering private property. These industry inspectors are used in the National AFB program as inspectors and in the exotic disease surveillance program. This was conducted by Byron Taylor from NZ AgriQuality. Later on Sunday one of the specific interest groups "Betta bees" held their meeting, members only. In total three separate events on the first day.

On Monday the specialist group meetings and seminars were held. These were mainly one to one and a half hour sessions, following along from each other, all of which were open to anyone who wished to observe the proceedings. Voting was of course restricted to the members of each of the associations or groups. The speciality groups included: Comb Honey Association AGM, Queen Breeders' Open Forum; Pollination Association Open Forum; the NZ Honey Packers and Exporters' Association and the National Beekeepers' Association GIA Scenario. Between 40 and 80 persons were present at the sessions I attended.

An AFB recognition course and test was also offered on the Monday from 8.00 am to 1.00 pm with a cost of $60 per participant.

Tuesday and Wednesday were the conference seminars with guest and invited speakers. Nineteen subjects were listed for the two days, with an official opening from the obligatory politician. These sessions were the most popular with well over 200 present. At one stage I estimated the number of attendees to approach 300.

The sponsor's night was held on Tuesday evening in the trade exhibit area, which was also in full swing from Monday to Wednesday with about 15 exhibitors. The dozen plus sponsors of the conference paid $3,000 each for their logo to appear on the overhead screen during the conference between presentations and on the back cover of the proceedings. Sponsors night was designed to entice prospective customers into the trade area with "free" alcohol!

On the Wednesday evening the official dinner/dance was held at a local historic winery with over 200 participants. Very few presentations or speeches, an auction of a tie for Guide Dogs Association raised over $10,000.

The Thursday session was the annual general meeting of the NBA with approximately 60 present. The conference was organised with the drier business at the end of the proceedings. Motions had already been circulated to all the eight branches and each branch delegate may or may not have a direction from their branch members. The usual banter of debate and showmanship followed the proceedings of the day.

The 'lucky' elected representatives of the NBA management committee returned on the Friday for a post mortem of the week and to begin the task of carrying out the business of the association and act on the motions delivered the previous day. For some players this is very obviously a mammoth week with a lot happening.

Why scary? This was my opening comment and so far I haven't really covered this statement. Before I do, I think it is worth considering what I have written about the NZ conference so far. I thought the structure and balance was excellent and obviously this has been an evolving process over many conferences. One of the underlying murmurs at the event was that the NBA doesn't represent commercial beekeeping interests to the extent they should.

I hear this argument in Australia across various states associated with different state beekeeping organisations. At the NSW Apiarists' Association conference it is my guess that many of the attendees are hobby beekeepers. This is not surprising given the commercial beekeeping industry is made up of a relatively small number of players and the hobby segment is very large in comparison.

In the NZ situation, those beekeepers that did break away from the NBA are now in discussions with the NBA mainly because of the realisation that talking as one voice to government is far more powerful, effective and efficient with the limited resources of the small beekeeping industry. Often it comes down to personalities and the structures in place.

The annual report of the NBA was extremely professional. Disputes over financial aspects of the association had prompted the employment of an accountant to compile the financial report.

In the last twelve months the executive of the NBA had undergone corporate governance training in a workshop format at a cost of $4,000. There was currently underway a

review of the associations internal policies and procedures to ensure they are robust and professional. A review of the rules was also being conducted.

A Chief Executive Officer (shared position) and Secretary are both paid for their services. The secretariat was contracted to work for the NBA for 141 hours per month, but stated in the report that they regularly worked over 200 hours per month, on anything from 16 to 20 different projects being managed at any given time.

The NBA is also responsible for the production of the national beekeeper magazine of which 11 issues are produced per annum. The April and October issues are sent to all registered beekeepers as part of the American Foulbrood National Pest Management Strategy. This is a compulsory national program in which all beekeepers must participate and, as a means of communicating the business of the strategy, funds are spent by the program on the circulation of the national magazine twice a year. The April and October issues were large publications with April 2011 being a 64 page issue and October 72 pages.

I (still) haven't told you about the scary bit! No, I might hold onto that until the next issue of Honey Bee News. If you haven't found this article interesting, you should. Unless the Australian and NSW beekeeping industry has a strong association structure with equally strong support from all members and branches, it will struggle to put its case with governments at all levels and persuasions. Unfortunately I know too many beekeepers that are not a member of any beekeeping organisation because they have the selfish attitude that these organisations don't do anything for them. Whose fault is that I wonder?

Sorry about the scary bit …. you will have to wait for the next issue of HBN!

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NSW DEPARTMENT OF PRIMARY INDUSTRIES BIOSECURITY COMPLIANCE APIARY OPERATIONAL REPORT

Presented at the NSWAA Annual Conference - 24 May 2012

Biosecurity compliance structure within NSW Department of Primary Industries for apiaries
The Biosecurity Compliance services to beekeepers are provided through the Biosecurity Compliance Branch with Andrew Sanger as its Director. Andrew is responsible for the management of the Biosecurity Compliance Officers.

My position is Regulatory Specialist, Apiaries. I am responsible for coordinating services delivered to beekeepers via the Senior Inspectors who supervise the Biosecurity Compliance Officers.

There are four Senior Inspectors and they are located at Goulburn, Richmond, Yanco and Coffs Harbour. They have responsibilities for management of their staff and activities within their own zones.

Biosecurity compliance officers
There are two units in the Biosecurity Compliance Branch – the Animal and Plant Regulatory Operations unit and the Cattle Tick unit. Animal and Plant Regulatory Officers are multi-skilled inspectors and have a variety of regulatory duties to perform, including animal health investigations, plant health investigations and market access services, bee duties (including bee health investigations, nuisance bee investigations, export certification) and emergency management activities.

NSW Primary Industries – Biosecurity NSW currently has 25 Compliance Officers within the Animal and Pant Regulatory Operations unit, of which 15 are gazetted apiary inspectors who regularly work with bees. Several other inspectors are gazetted but have been removed from active bee work due to having experienced allergic reactions to bee venom.

Services provided by the regulatory program:

- **export certification**

We conduct inspections of live bees on behalf of the Australian Quarantine and Inspection Service (AQIS). Export destinations this season included Lebanon, Philippines, Beirut Canada and Japan. From April 2011 to April 2012, 6 inspections have been conducted which involved 15 hours of inspection time. This is a decrease from the previous year.

The Exporter is charged for this inspection service including any laboratory tests and freight charges for the submission of samples to the labs.

- **nuisance bee investigations**

We investigate written complaints about bees creating a public nuisance, a threat to public health or safety and bees interfering with the drying of fruit.

Some reports submitted referred to feral colonies or bees in wall cavities. These complaints do not constitute a nuisance bee complaint under the Apiaries Act. In relation to the Act, bees have to be hived and under some form of management.

A local beekeeper and/or a registered pest controller should be contacted if swarms and/or feral colonies are a problem.

Since April 2011 to April 2012 there have been a total of 28 written reports submitted. Most of these reports originated from the Sydney metropolitan area. Three Prohibition Orders and two Reduction Orders were issued.

Investigating nuisance bee complaints can be difficult due to language barriers and the emotional aspect both from the complainant and the beekeeper's sides.

The investigating inspector attempts to contact the beekeeper in all nuisance bee investigations as well as to speak with the neighbours. Sometimes no-one is prepared to talk to the inspectors and accept responsibility for the beehives, or no contact details can be found for the hives under investigation. Sometimes the beekeepers are absent – e.g. overseas - for extended periods.

Where , after investigation of the complaint, we are satisfied that there is a danger to public health or safety, the Director General may issue prohibition orders even though the beekeeper hasn't been able to be contacted. However, this is the exception rather than the rule.

If a beekeeper has problems with the process as it applied in a particular case, the beekeeper can apply for an independent internal review, and then go to the Administrative Decisions Tribunal. The agency that may be able to mediate for both parties (complainant and the beekeeper) is the Community Justice Centre, phone 1800 990 777. Web site is www.cjc.nsw.gov.au. Both parties can contact them to discuss the mediation process.

- **issuing health certificates for interstate movement of apiary products and bees**

Since April 2011 to April 2012, 252 Health Certificates were issued. For the same period 41 Health Certificates have been received.

Before an inspector issues a certificate the inspector must make due inquiry that they have no reason to doubt the accuracy of the beekeeper's declaration on the certificate. If it is necessary to confirm any information, the source apiary maybe inspected at the beekeeper's request and expense. Otherwise, certificates are normally issued free of charge. Inspectors will not sign blank certificates. Please do not wait until the last minute to request a certificate, as the inspector may not be available at short notice.

- **inspection of abandoned neglected or inadequately managed hives**

If you know of or become aware of any neglected, abandoned and/or diseased apiaries please contact me. Before an investigation is undertaken, a written 'Advice of Abandoned or Neglected Beehives' form is to be submitted. The form is available on the web site http://www.dpi.nsw.gov.au/agriculture/livestock/honey-bees or I can supply you with a form upon request.

Investigation of reported neglected apiaries is a more efficient way of using our limited resources and I encourage all beekeepers to report such sites to me for investigation.

From April 2011 to April 2012, nine written advice reports had been received. Two of these sites involved AFB. All reports have been resolved.

AFB notification
From March 2011 to March 108 reports of AFB have been recorded. 90 lab reports, 15 beekeepers notifications and 3 detections by Apiary Inspectors.

Contact with beekeepers with positive AFB lab reports
Some beekeepers who are competent in inspecting their own hives, in detecting AFB, who are willing to destroy or irradiate the infected hives and who do not seek compensation may not want an inspector to visit them.

However it is still important to obtain the location of the infected hives and the number of infected hives at those locations. In the event of a disease outbreak, beekeepers known to be at high risk are notified. Intelligence on the possible sources of the disease

will be collected and collated for possible action to identify the source and to limit the potential for spread.

Letters and Factsheets have been posted to beekeepers that have never had a recorded history of AFB and other beekeepers that have not had a recorded history of AFB for an extended period of time. This is to provide an acknowledgement of the lab report notification and to provide information on what to do with regards to the eradication of the AFB from their apiaries. A Tracing form and an 'Advice of Abandoned or Neglected Beehives' form is also included.

AFB inspections
From May 2011 to March 2012 a total of 84 apiaries were visited representing a total of 2,416 hives. AFB was confirmed at 28 of these apiaries and 1,047 hives were inspected. 788 of the hives inspected were confirmed with AFB.

AFB tracing
Beekeepers are asked about the source of the infection and in some cases this has led to detections of AFB apiaries. In other cases there is no obvious source. Below are some examples of tracing.

1. Possible source was from a hive the beekeeper purchased in and subsequently spread the disease, unbeknown to him during extraction of supers.
2. Internal source, on going inspections by the beekeeper.
3. Source not determined (a number of these received).
4. Likely source from another commercial beekeeper.
5. Beekeeper indicated two suspected apiaries. This matter was forwarded onto the Senior Inspector for further investigation.
6. Letter and tracing form posted to registered beekeepers at various locations.
7. Beekeeper indicated that the possible source was a wild swarm.
8. Beekeeper thought second hand boxes he obtained free were the source of the AFB.
9. Beekeeper stated most likely transferred infection from hives one apiary to another
10. Beekeeper suspects reinfecting hives due to making up nucleus colonies from parent hives which appeared to be AFB free.
11. Possible source was from second hand lid with an unknown disease history
12. Possible source from old combs of an unknown disease status

AFB figures
The percentage of beekeepers recorded with AFB for the period April 2011 to March 2012 was 1.5% of registered beekeepers (56 beekeepers from 3,740 registered beekeepers).

The percentage of infected hives recorded for the period April 2011 to March 2012 was 0.3% of registered hives (788 infected hives from 250,527 registered hives).

Beekeepers and registration
It is a legal requirement to be registered as a beekeeper with NSW Department of Primary Industries if you keep bees in NSW, unless you are exempt, see exemptions below. The registration fee must be factored into your operation.

As at 24 April 2012, there were 3,740 beekeepers registered, an increase from the previous year.

Notification of change of bee registration details
Please notify the clerical officers at Gloucester if you have changed any of your bee registration details, especially a change of mailing address. Contact details: NSW Department of Primary Industries, PO Box 108, Gloucester NSW 2422, Phone (02) 6558 1707.

Or you can use the Beekeeper registration change of details form. This form can be downloaded from the NSW Department of Primary Industries Honeybee web site.

Notification of sale or disposal of beehives –section 10(3)
Beekeepers are required to notify NSW Department of Primary Industries when they sell or dispose of their hives. This is usually achieved by the beekeeper submitting a Notice of sale or disposal of hives form. This form can be downloaded from the NSW Department of Primary Industries Honeybee web site.

When these notifications are received the Clerical Officer at Gloucester notes the information on the Government Licensing System (GLS). If the notification indicates that the hives were disposed of to a person, the registration status of that person who received the hives is checked. If that person is not registered an Application to Register as a Beekeeper is posted to that person.

From April 2011 to April 2012, 108 notifications were received. There's likely to be a significant level of under reporting.

Responses to exotic disease or pest incursions
Such cases are investigated urgently, with the subsequent response directed by the Chief Veterinary Officer. Compliance officers are available to assist in the detection, control and eradication of exotic diseases and pests such as Varroa mite.

Suspected exotic pests or diseases can be reported by ringing the **Exotic Disease Hotline which is 1800 675 888.**

Biosecurity, surveillance, incident response and tracing. (BioSIRT)
The aim of the BioSIRT program is to enable national consistency in the management of information and resources in response to routine and emergency incidents of animal (includes bees) or plant diseases, pests or incursions.

Breaches of the Apiaries Act
Written cautions
From March 2011 to April 2012 twenty five (25) official written cautions (warning letters) were sent to beekeepers. Breaches included failing to notify disease, keeping bees while unregistered, failing to identify brood boxes, failing to comply with written directions, introduce beehives into NSW without a health certificate and expose honey to robber bees**.**

Penalty infringement notices
From March 2011 to April 2012 two (2) Penalty Notices were issued. The breaches were failing to comply with Prohibition Orders.

Prosecutions
No prosecutions have been undertaken under the Apiaries Act 1985 since the last conference.

Written Directions
From April 2011 to March 2012 thirty one (31) written directions were issued by apiary inspectors to beekeepers. The reasons why these were issued include the destruction or irradiation of AFB infected hive material, to display brood boxes with the beekeeper's registered number, to 'put in order' neglected apiary sites and to keep access to hives clear to allow apiary inspectors to inspect brood combs.

Disclosure of information from the registration system
The *Privacy and Personal Protection Act 1998* restricts the circumstance under which the information can be provided. All requests for release of information from the bee registration system go through me. The information may be released depending upon the circumstances. Please contact me if you require further information.

From June 2011 to March 2012, five written requests for information were received and involved the illegal placement of hives on Council land, on State Forest sites and also on private land.

Stolen and or vandalized hives
Several Police Officers in the Rural Crime Units have received specific training in basic beekeeping and they are more receptive to beekeepers reporting stolen hives and/or equipment. If you do not report stolen or vandalised apiary material then the police can not do anything to help you. It is a good practice to inform the police of the dollar value of the stolen material. If you have any hive material stolen you should report it to the police. Ensure the police record your registered brand.

Since the last conference I was notified of the following:

1. Two hives reported to NSW Police and NSW DPI as being stolen in the Leeton area. These hives were located and identified by the owner. Hives and associated material seized and relocated by apiary inspectors under supervision of NSW Police Detectives. Owner retrieved his material.
2. Verbal notification of 15 hives stolen from the Grafton area.

Report all stolen and/or vandalised hives to the NSW Police.

Honey Bee Biosecurity Management Group
This is a Management level, cross-divisional committee that ensures that the Department's work on bees is coordinated and meeting departmental priorities, particularly for biosecurity. It includes representatives from Biosecurity, Research, Extension and Industry Development and Compliance.

Bee Industry Consultative Committee (BICC)
This committee meets twice a year and involves various Industry Groups as well as Livestock Health & Pest Authorities, NSW Police Rural Crime Unit, Forests NSW and Environment and Conversation.

I present a Compliance Apiary Operational Report to this committee. Policy matters are dealt with by the Animal Biosecurity Branch.

Publications
Various existing apiary compliance related publication on the public web site are being revised and will be publish later this year.

One new Factsheet was published entitled Why do beekeepers need to be registered

Publications in Industry magazines: NSW Honeybee News and the Australasian Beekeeper (ABK).
NSW DPI – Compliance Operations – Apiaries
- Fact sheet - Why do beekeepers need to be registered
- Beekeeper registration change of details form

Operational plans
Operational Plans are operations where several NSW Department of Primary Industries Regulatory Officers (apiary inspectors) conduct high profile compliance operations in an area.

The objectives of these operations are twofold:
1. To provide advisory material to beekeepers on registration requirements and disease notification/eradication by holding an information meeting with interested beekeepers and
2. To investigate compliance with, and obtain evidence of breaches, of the provisions under section 6(1) – unregistered beekeepers, section 15 – unidentified brood boxes and section 22(1) – fail to notify AFB and take appropriate regulatory action where offences are detected

The major objective is to heighten future compliance

APIARY OPERATIONS

Grafton: 12-15 September 2011
Anne Webster, Kathy Goulding, Doug Somerville and Mick Rankmore conducted an operation in the Grafton area.

Ten apiary sites were visited representing nine beekeepers. Several samples taken form an apiary of 30 deadout hives were confirmed to be infected with AFB. The owner was directed to burn all the hive material. The owner was issued a written caution for failing to notify AFB and also for keeping bees while unregistered (failed to renew his registration).

One beekeeper admitted to having AFB in the past and had not reported it. He was issued with a written caution and provided with Factsheets on AFB.
While in the area we also investigated a nuisance bee complaint. The owner moved the hives to another location and the matter was resolved**.**

GRIFFITH / LEETON DISTRICT - November 2011
Daryl Cooper and Mick Rankmore conducted an operation in the Griffith and Leeton areas 8-10 November 2011.

Eight sites were inspected, representing 8 beekeepers and 37 hives. 31 of the 37 hives were inspected.

Six unregistered beekeepers were detected. Two beekeepers did not have correct identification on the brood boxes.

One neglected site with up to 200 dead out hives and 3 or 4 live colonies (swarms that established themselves in the dead hive material) were inspected. Samples from the dead hive were tested for AFB spores, which returned positive for AFB. All hive material at this site was considered an AFB risk due to the owner's previous AFB history, the state of the hive material and the ongoing AFB infection in other commercial beekeepers operation in the area. The beekeeper was unregistered.

With the assistance of three commercial beekeepers all the hive material was moved to a nearby quarry and burnt under supervision of an apiary inspector and the Rural Fire Service.

Leeton
Following up on a report of neglected hives revealed that 2 of the hives were reported stolen. The owner of the hives confirmed ownership. Under supervision of two local NSW Police Detectives the hives were seized and relocated to a secure site. The owner subsequently retrieved his two stolen hives. The matter is under investigation.

Orange area
An operation was planned for the week staring 27 Feb - 2 March 2012 in the Orange, Ophir and Mullion Creek areas. Due to the forecast of heavy rain the operation was cut short and only one day of inspections occurred.

A meeting was held for beekeepers registered in the Orange Post Code area on the Monday evening at the Park View Hotel, Orange. Eight beekeepers attended the meeting. Doug Somerville presented a segment on American Foul Brood and Small Hive Beetle.

On the Tuesday nine apiary sites were inspected, representing five beekeepers, a total of 328 hives, of which 45 hives were inspected. American Foulbrood was not detected.

Eight sites had deadout hives. Written directions were issue to the beekeepers to remove the dead out hives. A written caution was issued to one beekeeper for failing to correctly indentify all brood boxes.

The participants were Paul Anderson, Wayne Haigh, Jim Boyce, Brett Dalliston, Johanne Taylor and Mick Rankmore. My thanks to the participants and Doug.

Two main reasons for the operation to take place in the Orange and surrounding districts were:

- neglected and AFB diseased hives owned by 2 beekeepers were detected by regulatory officers during November/ December 2011 in the Orange area and follow up inspections

were required to check compliance

- other apiaries in the district may have been exposed to diseased hive material and inspections were required to check diseases status

The failure to notify and undertake an eradication program by the beekeeper will contribute to the spread of AFB, not only to the beekeepers own operation but to other bee colonies within flight range of the infected apiaries

Correct identification of brood boxes allows departmental Regulatory Officers (Apiary Inspectors):

- To locate owners of beehive material and to trace disease outbreaks.
- In cases of emergencies such as fire or when aerial spraying may occur, correct identification of beehive material will help the authorities to contact the owner without delay.
- It will also assist the Police with the tracing of suspected stolen hive material to the correct owner.
- The requirement to be registered and to correctly identify beehives provides a traceability system consistent with the National Livestock Identification System.

Visit www.dpi.nsw.gov.au/agriculture/livestock/honey-bees for a form to report hives, for detailed information on honey bee compliance and PROfarm courses in beekeeping.

THE TAKE HOME MESSAGES FROM THESE OPERATIONS ARE:

BEEKEEPERS MUST TAKE RESPONSIBILITY FOR THEIR OWN DISEASE MANAGEMENT

IF BEEKEEPERS ARE SICK OR INJURED AND OR ARE GETTING ON IN AGE OR FOR ANY OTHER REASON THEY CANNOT MANAGE THEIR APIARIES, THEY SHOULD SEEK ASSISTANCE BEFORE A MAJOR DISEASE PROBLEM OCCURS.

Further information about beekeepers' legal responsibilities can be obtained from NSW Department of Primary Industries website at:
http://www.dpi.nsw.gov.au/agriculture/livestock/honey-bees

Please contact Mick Rankmore on (02)6741 8374 during business hours or mobile 0402 078 963 or by email:michael.rankmore@dpi.nsw.gov.au if you have any questions.

NICK'S NEWS
from DPI NSW

Nick Annand
Livestock Officer (Bees), NSW Department of Primary Industries, Bathurst
Ph: 02 6330 1210 Email: nicholas.annand@dpi.nsw.gov.au

HONEY BEE POISONING ON THE NSW SOUTH COAST

Dead bees at entrance to hive

For this article we will leave the SHB research and visit a topic which has been hot gossip amongst beekeepers since the end of June. As most of you are aware there was a significant poisoning of beehives down on the south coast of NSW. It was first noticed by a beekeeper on the weekend of the 16-17 June 2012. The poisoning appears to have been deliberate and targeted with 8 beekeepers having a total of around 2400 hives affected between them. For this particular case it warranted the police to investigate what appears to be a deliberate intent to maliciously damage people's property, ie. their bee colonies. NSW DPI inspectors visited the sites and assisted both the police and EPA by collecting samples of affected bees. The Environmental Protection Authority (EPA) have assisted the police in the investigation with the collection and testing of samples from the affected hives. A few different types of samples were collected and underwent pesticide screening tests to determine the killing agent. The results came back positive for the synthetic pyrethroid, permethrin, for the swabs taken at the hive entrances and dead bee samples. Uncapped honey samples came back clear suggesting the poison was unlikely to have been fed to the bees in a sugar based medium.

The investigation is ongoing so the police were understandably reluctant to give any details but said they have a few leads they are following. They still do want to hear from anybody with any information or evidence that may be relevant to the case. They also requested if anyone has video surveillance of their apiary sites on the NSW south coast between the 15 to 18 June 2012 to please contact them. The relevant police to contact include any of the following:

Archie French - Cooma (02) 6947 7104
Phil McCloskey - Queanbeyan (02) 6298 0555
Stephen Heffernan - Batemans Bay (02) 4472 0099
all Rural Crime Investigators or
Simon Davies - Batemans Bay (02) 4472 0099

Please be aware that speculation and rumour does not help the investigation and can cause unnecessary disharmony within the apiary industry that could escalate to more serious problems.

Actions for deliberate poisoning
Under such circumstances where the beekeeper suspects deliberate intent to damage their colonies/hives the beekeepers should immediately report it to the Police. The Rural Crime Investigators, a group of detectives within the Police force who are spread throughout the state, will usually be responsible for the investigations. Calling the local police station and asking for the regional Rural Crime Investigator is you best approach. With your apiary site being a possible crime scene beekeepers should avoid moving or changing anything at the site until the police have given the all clear to do so. Otherwise vital evidence for the investigation may be lost. As with the above situation the EPA also needs to be informed immediately so samples can be collected as soon as possible to minimise chemical breakdown. This will improve the possible detection of any chemical residues. The police would be requiring these samples as part of the gathering of evidence. The EPA will either come and collect samples or advise you on how to collect and store the required samples and were to send them. Discuss this with the police to ensure that they are aware of the EPA activity.

Actions for accidental poisoning
The other scenario is the more common accidental poisoning of hives by the use of a pesticide in the local environment. Many beekeepers at some stage have experienced hive losses this way. This will probably tend to increase as the apiary industry heads to more reliance on agricultural crops and pollination work with diminishing access to forest resources. On the counter point farmers and pesticide applicators are becoming more aware of their responsibilities regarding the application of pesticides to others around them and to the environment.

If you suspect that your hives have been accidentally poisoned you first need to consider your individual situation on whether legal action is appropriate or not. This will require some quick investigating to determine the possible source of the hive contamination, expected losses etc. You then need to decide whether to seek assistance from the EPA. For example, where a farmer who provides you with many valuable bee sites sprays a crop that affects your bees, it may be a wiser to talk to the farmer directly. In this way a method for preventing chemical damage in the future can be developed, whilst still remaining on good terms with the farmer.

For any cases where your hives have been affected as a result of possible pesticide misuse the EPA can be called in to investigate the circumstances. The EPA have a 24 hour, 7 day a week, phone service:

Environment Line - 131 555
This is the first response. Do this as soon as possible. The EPA will be able to advise you on whether they will come out to collect samples or direct you how to collect, store and where to forward samples for analysis. Any background knowledge regarding possible chemical used, date and time of use, user of chemical, crops in the area etc the beekeeper can gather can be helpful information if it can be found out easily. The EPA can do pesticide screening tests on the samples to determine the active chemical group responsible. The EPA will then investigate fully to determine the reason for the hive damage. If this leads to the conclusion of pesticide misuse the EPA have a range of actions available to it from warning letters, on the spot fines through

to prosecutions. The severity of the damage caused generally correlates to the punishment distributed.

It does not matter where your hives are, be it on government land, state or federal, leased or private land. Similarly it does matter who is possibly responsible for poisoning the hives in relation to action by the EPA, be it the land owner of where the hives are located, a neighbouring landowner, a contract sprayer or a government agency. They will investigate all scenarios if warranted and take appropriate action where responsibility for pesticide misuse can be proven.

Regarding compensation for hive and production losses from the party responsible for the poisoning of your hives legal advice should be sort. Some insurance policies will cover hive poisoning etc but be sure you know what you are getting if and when insuring your hives.

Minimise Pesticide poisoning

The other thing I strongly recommend when ever you place you bees at an apiary site that you make sure your contact details are clearly available to anybody. If you are using private land, ever time you use that land, ensure the owner has you contact details in numerous forms including mobile number, home number, work number, email and postal address. Even a letter box drop telling neighbouring properties of the presence of your hives with contact details can reduce losses through accidental pesticide poisoning. For apiary sites on public land make your contact details readily available by either putting your phone number clearly on your hives or on a warning post/sign nearby your hives. This way people can track you down easily if they need to spray crops. This can save a lot of hassle and reduce possible hive losses. I have also heard of it leading to pollination jobs. It pays to advertise.

A very useful publication to help minimise the accidental poisoning of beehives was released earlier this year. Rural Industries Research and Development Corporation (RIRDC), in conjunction with Horticulture Australia Limited and the Victorian Department of Primary Industries developed the booklet for farmers and beekeepers. Its called **'Honeybee pesticide poisoning: a risk management tool for Australian farmers and beekeepers'**. The booklet includes a list of pesticides that are known to be toxic to bees in Australia, as well as other information that can assist farmers and beekeepers with managing the risk of honeybee pesticide poisoning. It also has some handy appendices including a 'Pesticide poisoning report' and a 'Notification of beehives in your area' letter ready for use.

The booklet can be downloaded for free from the RIRDC website PDF Version: https://rirdc.infoservices.com.au/downloads/12-043

OAT, BUTTERMILK AND HONEY PANCAKES

Ingredients

1 1/2 cups buttermilk
1 1/2 cups rolled oats
2 tablespoons honey
1 egg
1 egg yolk
1/4 cup extra virgin olive oil
1/2 cup self-raising flour
2cm stick of cinnamon, finely ground (or ground cinnamon), to taste
Sea salt
Unsalted butter, for cooking

Method

Pour buttermilk over oats and leave for 10 minutes then add honey, egg, egg yolk and olive oil and stir.

Sift self-raising flour into another bowl, then add ground cinnamon and a pinch of salt.

Add oat mixture to flour mixture and combine well then leave for at least one hour in the refrigerator before cooking, but overnight is best.

Place a small piece of butter in a frying pan over medium heat and melt until it sizzles.

Pour a ladleful of mixture into the pan and cook until golden brown underneath, then flip over and cook until golden.

Repeat with remaining mixture, adding more butter to the pan if necessary.

Leave to cool a little, then serve with swirls of honey.

Serves 4

NSW DEPARTMENT OF PRIMARY INDUSTRIES

Regulatory Officers appointed as Apiary inspectors as at 23-4-2012 who can conduct live bee work

District	Officer	Telephone	Facsimile	Email
Wollongbar 1243 Bruxner Hwy	Ian Gerrard	(02) 6626 1200 0411 128 451	(02) 6628 1744	ian.gerrard@industry.nsw.gov.au
Berry Po box 63 2535	Elizabeth Yeatman	(02) 4464 6006 0411 139 585	(02) 4464 2113	elizabeth.yeatman@industry.nsw.gov.au
Coffs harbour Po box 530 2450	Anne Webster, Senior Inspector, Regulatory	(02) 6650 3111 0427 102 253	(02) 6651 2780	anne.webster@industry.nsw.gov.au
Goulburn Po box 389 2580	Wayne Haigh, Regulatory Specialist, Animals	(02) 4828 6620 0429 839 699	(02) 4822 3261	wayne.haigh@industry.nsw.gov.au
Gunnedah Po box 546 2380	Mick Rankmore Regulatory Specialist, Apiaries	(02) 6741 8374 0402 078 963	(02) 6742 4018	michael.rankmore@industry.nsw.gov.au
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Kempsey west Po box w141 2440	Michael Cagnacci	(02) 6563 6800 0427 102 706	(02) 6562 5614	michael.cagnacci@industry.nsw.gov.au
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SICK BEES

by Randy Oliver - ScientificBeekeeping.com
First published in American Bee Journal April 2011

PART 9

PATHOGENS AND PLAGUES

Our latest "bee plague," Colony Collapse Disorder, may finally be losing steam—there were just about enough hives this year for California almond pollination. But it is only a matter of time before beekeepers get hit by the next plague. In this article I'd like to look at old, emerging, and future plagues of infectious bee diseases.

Plagues

The human population, as does the bee population, suffers from bouts of epidemic infectious diseases. Take the Bubonic Plague, caused by a bacterium vectored by fleas from rodents to humans. There have been three great waves of human Bubonic Plague in historical times, at times killing up to half the human population in struck areas. These waves came centuries apart, with the second wave continuing to strike every 10 years or so for nearly 300 years! The Plague would appear to go into hiding between bouts. Plague has hardly disappeared—there were epidemics in three continents in the 1980's.

What strikes me are the many similarities between human plagues and bee plagues:

1. **They are generally fairly recently evolved or introduced:** The Plague bacterium evolved from another species only a few thousand years ago, and was then introduced from China to the other continents. Varroa, and a number of our other bee pathogens are recently introduced or, in the case of viruses, new strains.
2. **They often evolve into a number of different strains:** Similar to the bee viruses, each strain of Plague has slightly different characteristics (Achtman 2007), which may relate to its infectivity and virulence in its rodent and human hosts.
3. **They have an asymptomatic reservoir**: Between outbreaks, the plague bacterium circulates within populations of certain species of rodents without causing excessive mortality. Such groups of infected animals serve as silent, long-term reservoirs of infection. Similarly, bee viruses normally exist as inapparent infections in bees and other insects.
4. **They can infect multiple hosts**: The plague infects various species of rodents, and also cats, dogs, and some other mammals, and causes periodic epizootics, perhaps due to a slight mutation. Honey bee viruses also infect various other bees and wasps.
5. **They are transmitted by a vector**: The Plague by fleas; bee viruses by both varroa and by drifting and robbing bees.
6. **They can cause periodic outbreaks:** Note that epidemics may recur periodically for many years, and then disappear for a while.
7. **The outbreaks can be devastating:** When an epidemic takes off, it can kill from half to all of the host population.

Emerging Infectious Bee Diseases

There is nothing unique about plagues in honey bees. They follow the model of epidemics in humans (and epizootics in wildlife). What we appear to be currently experiencing are the effects of several concurrent "emerging" (or "emergent") infectious diseases in the bee population. Dobson (2001) defines "emerging (or re-emerging) infectious diseases [as those] whose geographical range, host range or prevalence have been increasing in recent years." *Nosema ceranae* is an example of an emerging pathogen of the European honey bee (Higes 2010) since it jumped hosts from the Asian Bee to the European honey bee and is displacing its cousin, *N. apis.*

Other emergent bee pathogens are the mutable forms of the Kashmir Bee Virus family, and Deformed Wing Virus (Genersch 2010). Unlike *N. ceranae,* the viruses were already present (but largely unnoticed) in the bee population, but became emerging epidemic diseases when varroa mite changed their transmission and reproduction dynamics.

In the US, chalkbrood fungus, the tracheal mite, and the varroa mite have all been emerging pathogens within the last 45 years, as each arrived and then invaded the entire bee population, but all would now be considered to be established parasites, although only chalkbrood and the tracheal mite have reached a mature host/parasite relationship with the bees.

Models for Emerging Pathogens in Wildlife

We can learn what to expect with emerging pathogenic diseases in honey bees by studying epidemics in wildlife. I have lifted quite a bit of information for this article from two excellent sources—Dobson (2001) and Ostfeld (2008). Dobson studied 31 cases of emerging wildlife epidemics, and concluded that they could be placed into three categories:

1. Recently invading parasites. "Because of high host susceptibility the introduction of novel pathogens is often followed by explosive spread through the host population in what is termed a 'virgin ground epidemic.' These pathogens most frequently originate from another host species (e.g., chalkbrood and the mites), but can also result from a mutation in a virus (as an example Dobson cites canine parvovirus, which spread throughout the world's populations of dogs, coyotes, and wolves in only 15 years).

2. "A second type of emerging pathogen is those native to a specific host and geographical region that are currently spreading within the host population as a result of new external factors." The viruses would largely fall into this category, with varroa being the main new factor. But Dobson also raises an interesting point: "Alternatively, some environmental factors, like pollution, can stress hosts and reduce their ability to respond to existing parasite infections." This may well be the case with regard to the problems that beekeepers have had when heavy miticide or pesticide contamination of combs allows opportunistic pathogens to decimate their colonies.

3. "A final category of pathogens emerges as a result of a combination of the previously mentioned circumstances. Here we would include pathogens that have recently invaded an immunologically naïve host population that is in addition stressed or immunocompromised because of existing environmental conditions." I introduced the importance of immunocompetence in my last article. Parasite epidemics typically explode when colonies are suffering from nutritional stress due to drought, rain, or placement on a monoculture. With the load of novel parasites that bees are carrying these days, they are even more susceptible to parasites when their immunocompetence is compromised by nutritional or chemical stresses.

Dobson then goes on to describe typical scenarios:

"Pathogens responsible for wildlife epidemics are frequently characterized by particular life-history traits that facilitate emergence. We found that the majority of these pathogens are microparasites that lack intermediate stages and have a direct life cycle [none of the bee pathogens have intermediate stages, as do tapeworms, etc.]…In addition, many emerging pathogens have catholic preferences regarding host suitability and can reproduce within a variety of related host species [as with bee viruses]. Emerging pathogens appear to have high transmission rates and are spread directly, either through contact between infected and uninfected hosts or indirectly through vectors [such as varroa]. Finally, some pathogens have the capacity to remain infective for long periods of time" [as is the case with the ubiquitous inapparent infections by the bee viruses].

"The majority of causative pathogens were of exotic or likely exotic origin…This suggests that it is more likely that an exotic pathogen will produce a severe wildlife epidemic than a pathogen locally co-evolved with its host [most of our serious bee parasites are of exotic origin]. Nevertheless, we did identify several examples of exclusively viral pathogens that apparently produce regular epidemics in wildlife populations" [as the bees viruses have historically done].

Interestingly, Dobson also found that humans were in some way involved in the majority of the outbreaks of epidemics in wildlife. Note that Dobson was studying wildlife, not domestic animals. Honey bees fall somewhere between wild and domestic, but humans are generally involved in bee epidemics, either by the transportation of bees and their parasites, or by creating additional stresses upon the bees: "Transported animals are often crowded and stressed and are therefore particularly susceptible to infection even if only a few individuals are infected." This brings to mind the overpopulated winter holding yards for hives in California.

The take home message is that the episodic epidemics in honey bees are quite similar to those in other wildlife. In some cases, such as with Thai Sacbrood, the epidemics occur in regular waves. In other cases, as with nosema, Disappearing Disease, or Sacbrood, the episodes occur sporadically, and are generally associated with environmental factors, such as poor nutrition or chill events. There are also occasional outbreaks from what are apparently novel virulent mutations of some of the normally benign bee viruses, such as by Chronic Paralysis Virus or Kashmir Bee Virus—these generally burn out quickly, as do human epidemics of highly virulent viruses such as Ebola or Hantavirus.

Introduced Pathogens

As Dobson pointed out, most animal epizootics are due to exotic pathogens, meaning that they have either jumped hosts, or were introduced by humans carrying them across geographical barriers, such as mountain ranges or oceans.

So where would an emerging new pathogen of the European honey bee come from? The most obvious source is from our bees' cousins, the other honey bee species, or from other bees or wasps. The Asian bee, *Apis cerana* (Fig. 1), was clearly the source of varroa, and likely also the source of some of the bee viruses, the tracheal mite, and *Nosema ceranae*. It's possible that some Asian viruses required the presence of the mites in order to gain a foothold in the European honey bee.

Figure 1.
The Asian Bee (Apis cerana) is the original host of varroa, and likely several other parasites that have jumped to the European honey bee, often with devastating consequences.

Photo credit: Wikipedia.

So how did the parasites of Asian bees get across the Pacific Ocean to the US? Well, two likely sources were the large scale importation of non sterilized pollen from China that was commonly used as bee feed, and from the ill-advised use of Chinese royal jelly for the priming of queen cells. Both practices appear to have been curtailed, but perhaps a bit too late.

Practical Applications: Well, duh!

Asian bee parasites can also make the jump into the European honey bee when it is introduced (for its superior honey production) into the native territory of the Asian bee. This unnatural contact between the species sets up a scenario in which parasites (including viruses) of the Asian bee can easily transfer to the European bee, as did varroa. Then it is simply a matter of someone illegally smuggling a favored queen, or of a swarm hitching a ride on a ship, from the Orient to any other country.

The honey bees species of Asia host to several viruses: Black Queen Cell , Thai Sacbrood, Deformed Wing, Kashmir, and Apis Iridescent Virus. As yet, it is not clear whether these viruses originated in Asia, or were also native to the European bee. But Jerry Bromenshenk has

suggested that perhaps we have simply now imported nearly the entire suite of Asian Bee pathogens to the European bee! (The *Tropilaelaps* mite of *Apis dorsata*, and other species of *Varroa* besides *destructor* have yet to reach this continent).

Ostfeld notes that "Increasing global trade, which is the root cause of most accidental introductions of alien species, including parasites and pathogens, causes increased connectivity between populations on different continents and in different regions." As we have seen by the recent rapid worldwide spread of both varroa and *N. ceranae*, we humans are remarkably efficient at transmitting bee parasites across natural barriers! This sort of connectivity is totally unnatural for honey bees and their pathogens, and just makes it so much harder for the bees and beekeepers.

We are also finding that honey bee parasites are often not too picky about the species that they parasitize, and that honey bee parasites may unwittingly be carried by other species. Elke Genersch (2010), in her excellent review of emerging bee viruses, notes that: "New Zealand native bumblebees are now hosts to a parasitic nematode and three mite species, all of which are thought to have come from the UK with the original introduction of bees.

Conversely, in some parts of the world where the European honey bee is an introduced livestock, a still unknown or a benign pathogen of a native species may switch the host and invade the honey bee population with unforeseeable consequences" (like the unforseeable emergence of Deformed Wing Virus as a major bee pathogen).

Each time we inadvertently introduce a new pathogen to the US bee population, the bees must then establish a new equilibrium with their existing suite of pathogens (since 1960 we've introduced chalkbrood, tracheal mite, varroa mite, deformed wing virus, small hive beetle, and apparently *Nosema ceranae*, and likely other viruses).

It's not surprising then, due to the increased parasite load that our bees are carrying, that they are less robust and productive than they used to be, and are perhaps more susceptible to pesticides.

Practical Application: It's probably a good idea to restrict imports of bees from overseas, and we should encourage Canada and Mexico to do so too. Australia's rigorous port surveillance and quarantine system should be a model for us.

When studying other host populations to which a novel parasite has been introduced, once the initial phases of epidemic have been resolved, the eventual host population generally reaches an equilibrium ***at a lower host density than prior to the introduction of the parasite.***

In the US, we may well have enjoyed the glory days of easy beekeeping back when the honey bee would still have been considered to be a relatively new introduced (and invasive) species, before it was burdened with the recent slew of additional pathogens, especially the infection in nearly every single bees these days with Deformed Wing Virus!

Practical Application: We may not notice that a colony is fighting infections, but the metabolic cost of ramping up the immune response and the insidious toll on forager lifespan may take a big hit out of colony buildup and honey production (Fig. 2).

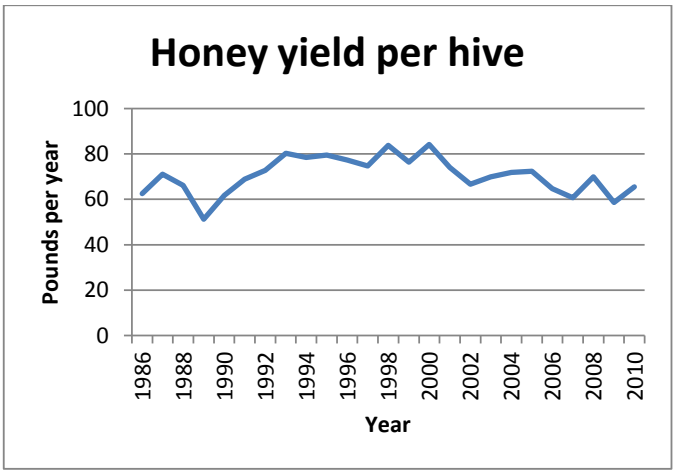

Figure 2. Unlike the great increases in productivity for virtually any other form of livestock or crop, the annual US honey yield per hive has been essentially flat for the past quarter century! How much is this due to the subtle deleterious effects of the new parasites?

Data source: http://www.ers.usda.gov/Briefing/Sugar/Data.htm

About the only good news for the long term is that both host resistance and parasite virulence are respectively evolutionarily costly to both host *and* parasite, so in the long term, we can likely expect this novel parasite load to eventually become less burdensome to the poor bees.

The Next One

The show is not over! I can guarantee that new strains of bee viruses will either evolve or be introduced into the US Even today there are distinct clusters of Israeli Acute Paralysis Virus circulating about the country (Palacios 2008), some quite virulent. And we may not even recognize that we've been hit--*Nosema ceranae* slipped under the radar; Dr. Joe DeRisi recently reported that our bees are infected with the larvae of a parasitic fly that no one had even noticed! And we should all be scared of the *Tropilaelaps* mite, the introduction of which would be calamitous to beekeeping in all but the coldest areas of the US

Practical Application: Expect more colony collapse events in your lifetime

So what will the next plague be, and what will happen when it appears? I found Richard Ostfeld's 2008 book *Infectious Disease Ecology* to be quite informative. He notes that nearly half of all the currently emerging disease outbreaks in plants, wildlife, and humans are due to viruses. This is likely due to the ability of viruses to evolve so quickly, and from their ability to jump from host to host. My guess is that most historical outbreaks of bee collapse events were due to the evolution of novel virus strains, coupled with environmental stresses.

Any time that a new pest or pathogen enters a host population, the first wave of infestation or infection may be relatively benign, due to the inefficiency of the pathogen at infecting the novel host. But after a generation or two, the more successful pathogen strains may then explode into a devastating epidemic (remember when tracheal mite first became established the US and killed off about 70% of the colonies?). But then the host fights back, with the survivors displaying a greater degree of resistance to the pathogen, and eventually a more stable host-parasite relationship.

Again, this result is evident in the case of tracheal mite, which is now rarely an economic problem in either US or European bee populations (but keep in mind that the only stable host/parasite relationships that we are able to study are those that "worked it out"—we can't study the ones that went extinct in the process!).

But a steady state is not necessarily the end result. Ostfeld explains that "It is no doubt realistic to acknowledge that many populations spend much of their time far from any equilibrium, recovering from the latest disaster or coming back down to earth after the latest bonanza, and that many [natural] populations are in fact metapopulations, comprising patches that may or may not be occupied at any given time." This was likely the case with honey bees prior to the widespread domestic management of hives.

Ostfeld also notes that there may be a see-saw balance between immunity to different diseases. For example, in human populations, epidemics of two unrelated diseases, measles (caused by a virus) and whooping cough (bacterial) alternate in a two- to three-year cycle. Even with a single virus, various strains can cause alternating epidemics, as in the case of the mosquito-borne dengue virus, which consists of four related serotypes. Epidemics of each serotype fluctuate out of phase with each other. I wouldn't be surprised if we find that some bee pathogens follow a similar course.

The bottom line is that we should just get used to the fact that we are going to experience periodic epidemics in our bees, and that by the time anyone figures out what happened, the epidemic may have already run its course, or even possibly set us up for the next one!

Practical Application: Whatever your pathogen problem was last year, it may not be the same next year!

Viruses are Everywhere!

When we see someone coughing and sneezing from a rhinovirus (a cold), or covered with measles rash or chickenpox blisters, we make an effort to avoid being exposed to those contagious viruses. The question then is whether we can avoid exposing our bees to harmful viruses? The answer is: Not likely!

Singh (2010) *analyzed 65 honey bee pollen foragers in 2007, and found that all were infected with at least one virus, with most having multiple infections.* Honey bees act as their own pathogen vectors, through contact on flowers, through worker and especially drone drift (Brenna Travers found that more than half of all drones may drift to other hives), by the multiple matings of queens with potentially infected drones, and especially through the robbing out of sick and dying hives (surprisingly, the math of evolution apparently finds that the benefit of the stolen honey to be greater than the cost of acquisition of pathogens).

Practical Application: Keep an eye on your yards for failing colonies. Don't let them get robbed out. If I find a hive that is really sick from something that I don't recognize, I simply kill the bees and burn the frames. I consider that cheap insurance to keep whatever the heck it was from spreading to the rest of my operation.

Diana Cox-Foster's team (Shen 2005) detailed the "intricate transmission routes" of bee viruses within the hive via the transfer of jelly from nurse bees, through the eggs of infected queens, and also by being vectored by varroa mites. The nest year, ARS researchers (Chen 2006) confirmed that BQCV, DWV, CBPV, KBV, and SBV could all be passed from queens to their offspring.

Then in 2008, another ARS scientist, Wayne Hunter, found that viruses and bacteria become "aerosolized" when large numbers of bees are defecating in the air. Such infective particles would then be electrostatically attracted to flying bees, likely groomed into their pollen pellets, and then carried back to the hive. One need only imagine the opportunities for such transfer of pathogens in a crowded holding yard!

As if that weren't enough, when Djikeng (2009) analyzed the waters of a freshwater lake in Maryland, they found four common bee viruses, Cricket Paralysis Virus, ***and evidence of a previously undescribed novel insect paralysis virus related to the above!***

The take home message here is that there is no way that bees can avoid being exposed to viruses! The end result is that every colony is going to "catch" the viruses, but may not exhibit noticeable symptoms. Once the colony manages to mount an effective immune response to keep each specific virus in check, it then becomes an "asymptomatic reservoir" of that virus, sort of like a "Typhoid Mary," likely contributing to the spread of those viruses to other hives.

Alternative Hosts

The picture is even more complicated than there simply being a reservoir of bee viruses. The reservoir is actually more like a smorgasbord! Remember earlier in this article when I mentioned that a common characteristic of plague-causing pathogens was that they could infect more than one species of host? Well, the "bee" viruses, nosema, chalkbrood, and likely their pathogenic bacteria do just that! And now we're getting to the real meat of the issue.

A parasite that infects more than one host species must then deal with different resistance mechanisms and life histories (like how quickly the host life cycle is completed). So multi-host parasites may not evolve into the sort of fine-tuned specialists that do little harm to the host, as their mechanisms for gently suppressing the immune system in one host may be devastating to another. Rutrecht (2009) found that some bumblebee species were far more resistant to *Nosema bombi* than others. Some species simply shrugged off an infection, whereas others were hit hard. Such differences may be involved in the competition between species, with those species that are common and carrying a diverse parasite load having a competitive edge over less common species that are unable to handle the parasites (Durrer 1995). We are currently witnessing the extinction of some species of bumblebees, likely due the "spillover" of introduced parasites from commercial bumblebees, while other species in the same areas continue to thrive (Colla 2008). This would be an example of the creation of a fatal plague in one species simply due to another species acting as a pathogen reservoir.

We think of "honey bee viruses" as being host specific, but in actuality they are rather generic, being also able to infect related bees, wasps, and ants, in some cases varroa mites, and perhaps even flowering plants! A recent eye-opening study by Dr. Diana Cox-Foster's Penn State team (Singh 2010) detected "bee viruses" in eleven other non-Apis hymenopteran species, ranging from solitary bees to bumble bees and wasps! ***This finding has profound implications!***

In nature, pollinator species compete for the same pollen and nectar resources. If any species starts to dominate the landscape, it is then more likely to suffer from epidemics of viruses or other parasites. This is especially true if the parasites can jump from one host to the other. So this brings up an interesting question: *if some of our native bee and wasp species are relatively immune to one of the bee viruses, then they could use that virus as a competitive weapon against competing honey bees by intentionally depositing the virus onto flowers?* Cox-Foster's findings suggest that such bee-to-flower-to-bee virus transmission may be commonplace (Fig. 3):

"For the first time, we report the molecular detection of [bee] viruses ... in pollen pellets collected directly from forager bees. Pollen pellets from several uninfected forager bees were detected with virus, indicating that pollen itself may harbor viruses. The viruses in the pollen and honey stored in the hive were demonstrated to be infective, with the queen becoming infected and laying infected eggs after these virus-contaminated foods were given to virus-free colonies."

They continue:

"Phylogenetic analyses support that these viruses are disseminating freely among the pollinators via the flower pollen itself...Notably, in cases where honey bee apiaries affected by CCD harbored honey bees with Israeli Acute Paralysis virus (IAPV), nearby non-Apis hymenopteran pollinators also had IAPV, while those near apiaries without IAPV did not. In containment greenhouse experiments, IAPV moved from infected honey bees to bumble bees and from infected bumble bees to honey bees within a week, demonstrating that the viruses could be transmitted from one species to another. This study adds to our present understanding of virus epidemiology and may help explain bee disease patterns and pollinator population decline in general."

Figure 3. Honey bees and other pollinators may swap pathogens on shared flowers. The dynamics of virus interchange among bee and wasp species are complex, and may be involved in the genesis of bee plagues. Photo by Sarah Greenleaf.

The authors have suggestive evidence that the viruses may actually be inside the pollen, implying that the viruses might replicate in the plants themselves! This is not unheard of, as there is evidence of related viruses transmitting similarly between plants and aphids.

Practical Application: More than 200 tons of honeybee-collected pollen is used annually for bumble bee rearing worldwide. This pollen, unless irradiated, is a likely vector for insect and plant viruses worldwide. It is unwise to feed non-irradiated pollen!

They also found that DWV could be transmitted from beebread to the queen (presumably via infected jelly produced by nurse bees), and that the newly-infected queen would begin laying infected eggs. ***The beebread was infective even after six month's storage!*** Surprisingly, it also appeared that the queen could selectively clear infection by Sacbrood while continuing to be infected by DWV!

Practical Application: Cox-Foster's findings confirm that viruses can remain infective in the beebread in deadouts. This may help to explain why the irradiation of deadout equipment appears to allow restocked packages to build up better. Unfortunately, short of radiation, there are no antiviral treatments that I know of that will penetrate the beebread.

The implications of Cox-Foster's findings are enormous in helping to understand why bees suffer sporadic plague epidemics (I've been leading up to this for some time). Remember the concept of viral quasispecies—that a virus exists as a "cloud" of slightly different mutated forms? Schneider (2001) explains:

"The theoretical advantage of maintaining a diverse quasispecies is that, when the virus is shifted to a new environmental niche or selective regimen, a variant may already be present in the population which will be more fit in the new environment."

But what happens when a virus jumps from one host to another, which will likely strongly favor one variant over the rest?

"However, excessive diversity can create problems if the virus is subjected to repeated bottlenecks. Since most mutations are deleterious, frequent bottlenecks can result in the rapid loss of fitness known as Muller's ratchet. In order to survive, a virus must be diverse enough to adapt rapidly to changing environments without losing fitness during passage from host to host."

Schneider performed an elegant experiment in which he tracked the genetic diversity of the viral cloud during serial passages of two plant viruses in single host species, and then tracked what happened when he introduced a single clone (one specific variant) of each virus into new host species. Amazingly, the virus clones rapidly replicated (doubling about once and hour), ***and generated enough mutations to recreate a cloud of variants roughly equal to that of the original host cloud!*** But the new cloud was different from the original—it was now adapted to the new host.

But different hosts put different pressures on the viruses and surprisingly, on their mutation rates:

"This suggests the possibility that different hosts may accelerate or decelerate the rate of viral evolution by permitting or denying high levels of diversity in viral populations. Diversity in viral quasispecies has been described previously as a mechanism to avoid host resistance responses or a reservoir to maintain variants with selective advantages in other environments and has been correlated with the ability to infect numerous hosts."

And the key issue here is:

"Perhaps, the very resistance mechanisms that [the alternative hosts] use to combat viruses are in fact generating high-diversity quasispecies that act as a source of new pathogenic variants."

This point is hammered home by Agudelo-Romero (2008):

"Sometimes, a virus may spill over from its usual host species into a novel one, where it usually will fail to successfully infect and further transmit to the new host. However, in some cases, the virus transmits and persists after fixing beneficial mutations that allow for a better exploitation of the new host. **This situation would represent a case for a new emerging virus"** [emphasis mine].

And there we have it folks! As bee pathogens jump from one host to another, the evolutionary pressure of adapting to different host resistance mechanisms is likely to create new forms of viruses that may be more virulent when they hop back to the original host. In nature, everything is connected to everything else!

Areas rich in pollinator species may be evolutionary "hot spots" for parasite evolution. Dupas (2003) explains: "Variations observed in parasite virulence and host resistance may be the outcome of coevolutionary processes. Recent theoretical developments have led to a 'geographic mosaic theory' of coevolution according to which there are some localities where reciprocal selection occurs (hot spots) and others where it is strongly reduced (cold spots)."

This theory suggests that in areas in which bees interact with numerous species of other pollinators, there would be more chance of novel virulent forms of pathogens to develop. Luckily, research by the same author (Dupas 1999) suggests that there is an adaptive cost to a virus in order to maintain genes for strong immunosuppression of the host, and that in areas where the virus infects multiple hosts, that that cost constrains the development of highly virulent forms.

How Do the Bees Keep Up?

So how do bees deal with this constantly-changing weaponry of their parasites? Largely by sex! Sexual reproduction is nature's way of creating genetic diversity in order to keep ahead of parasites (Lively 1996).

The most conducive set up for an epidemic is when all the potential hosts are closely related. We've seen this again and again in agricultural monocultures, such as with the devastating epidemics that decimated clones of potatoes in Ireland, bananas in Central America, and coconuts in the Caribbean—all those plants were propagated as identical clones, and when a virulent pathogen came along to which that clone was susceptible, it roared through those artificial populations like wildfire!

In order to prevent such epidemics in field crops, farmers routinely plant mixes of varieties seed—with a proportion of them being resistant to different pests (Zhu 2000). The genetic mixture slows the propagation of the parasite enough to prevent a plague from getting underway. Exactly the same effect occurs when bee colonies consist of a genetic mixture of workers due to the multiple mating of the queen, and when the overall population is genetically diverse (Whitehorn 2011).

Practical Application: Mix it up in large operations. Avoid having all colonies in a yard coming from the same mother. If you raise your own queens, make sure that they get to mate with a diversity of drones.

The Four Horsemen

I suggested in a previous article that beekeepers should always be alert for "The Four Horsemen of Bee Apocalypse": Famine (the lack of adequate pollen or winter stores), cold (especially spring or fall snap chills), pestilence (parasite buildup), and toxins (either natural or manmade). Any combination of two or more of the above can initiate a chain of events that can lead to the rapid depopulation of colonies (see Sick Bees 2). Bee plagues are generally associated with one or more of the Four Horsemen.

Practical Application: Most incidences of epidemic collapses in apiaries can be traced back to the presence of one or more of the Horsemen. The beekeeper, by intervening, may be able to prevent the situation from spiraling into a collapse event.

Bees as (Semi-) Domestic Animals

In reference to commercial beekeeping Dr. Gordon Wardell explains that ***"We are trying to shoehorn a wild animal into an intense agricultural management system."*** I'm typing this article shortly after almond pollination. Talk about exposing the bees to the Four Horsemen! Prior to, and just after bloom, the poor bees suffer from famine (since there is virtually nothing to eat on the orchard floor), from unexpected cold snaps, are exposed to strains of parasites from all corners of the country, and must detoxify both the natural amygdalin in the almond pollen, as well as the fungicides and insect growth regulators from the incessant spraying of the bloom (Fig. 4)!

If the almond bloom weren't so nutritious and stimulatory to broodrearing, many colonies would not be able to recover from the pre bloom stress. And some in fact don't. And if they are not moved out of the orchards soon enough after the petals fall, strong colonies can quickly get sick due to lack of pollen income.

Practical Application: The midwinter period just prior to almond bloom, when beekeepers are trying to stimulate hives sitting in forage-poor holding yards, is stressful to the bees, and the situation is ripe for a pathogen epidemic to take off.

Figure 4. This forager is packing on almond pollen. She is unaware that a spray rig passed by minutes before, blasting that pollen with a tank mix of a fungicide and an insect growth regulator. Almond pollen, though highly nutritious to bees, is often heavily contaminated with fungicides. Photo by the author.

In nature, plagues are largely self- limiting. As a virulent parasite kills off the host, eventually a point is reached where there are no longer enough uninfected nearby hosts for the epidemic to propagate, and it simply burns itself out. Any survivors then find that there is no longer competition from the deceased and therefore more food is available, which then helps the population to recover, founded by the genetics of the survivors.

In commercial agriculture, this sort of self limitation on plagues does not take place. ***When one makes their living with bees, the financial constraints of the economy of scale butt head-on into the biological reality of infectious disease epidemiology.***

In natural populations, virulent virus strains often simply go extinct, as they are unable to maintain an infective reservoir in the normal scattered and genetically diverse host population. Unfortunately, large-scale beekeeping (which would include even high colony densities due to hobby beekeepers) tends to create monocultures of closely-related bees, which are continually replenished should they perish to a parasite, thus providing enough new fodder to perpetuate a plague that would have burnt itself out under more natural conditions.

Brown and Fries (2008) explain the situation in large operations:

"In natural populations, where opportunities for horizontal transmission are likely to be low, such an epidemic [of a virulent virus strain] might rage through a colony, resulting in colony death, but would be unlikely to spread through the honey bee population (that is, it would be an intra- rather than inter-colony epidemic). However, in the managed system where opportunities for horizontal transmission are high, such an epidemic might well run through the larger honey bee population, causing mass colony mortality before dying down. Thus, at the population-level, viral impact may simply be a phenomenon of honey bee management."

Practical Application: Manage each yard of bees as its own population, and be careful about mixing sick yards with healthy ones.

Epidemics used to also be limited by geographical barriers, such as mountains and deserts. Nowadays, however, we tend to homogenize all the pathogens in the country every year. Roughly half of all managed hives are moved to California's almond orchards each winter. And then, nearly half of all honey-producing hives in the country are taken to only three states--California and the Dakotas.

Practical Application: Look for isolated locations and watch out for who you set down next to!

Colony resistance to pathogens is largely a function of good nutrition, which is often not to be had when bees have only agricultural monocultures to forage upon. That, coupled with the inordinate amount of pesticides used on crops often leaves colonies standing on weak immunological legs. Some commercial beekeepers are finding that it is simply not worth that extra pollination contract during the summer, and that their hives look better going into winter if they get a break from the toxin-laden agricultural lands.

Practical Application: A number of beekeepers have found that it is worthwhile to reduce the numbers of colonies per yard. The overall return per yard may actually be greater with fewer colonies.

In fall and spring holding yards, many bee operations resemble CAFO's (Concentrated Animal Feedlot Operations). Again, as with other domestic livestock, when one unnaturally crowds animals like this, one creates perfect breeding grounds for the next epidemic. Poultry CAFO's are sealed against outside birds, which might bring in a pathogen; unfortunately, there's no way to isolate a bee operation from other managed or native bees. Other animal operations routinely treat their stock with antibiotics and pesticides to prevent epidemics of bacteria, lice, or mites. Large-scale beekeepers do the same. We should be aware, though, that we know little about how such treatments affect the critical beneficial microflora in the bee guts and beebread, or the bees' immune response to viruses. It surprises me that some beekeepers throw every treatment in the book into their hives each year—something that they would never consider doing to their own children!

Practical Application: In large-scale operations, one should be judicious about the cost/benefit analysis of prophylactic treatments. Such treatments not only cost money, but confer metabolic costs on the bees, and may disrupt the balance of beneficial endosymbionts that normally suppress viruses, AFB, nosema, and chalkbrood. It would be wise to practice Integrated Pest Management, and only apply treatments if pest monitoring indicates that there is actually a problem brewing.

Brown and Fries go on to say:

"Given the potential for rapid mutation and mutant swarms in RNA viruses, it seems likely that these viruses have already evolved away from their pre-mite state. Because beekeepers remove the selective disadvantage of being virulent at colony level, by removing the vector through mite control measures, the current problems with virus induced colony mortality are likely to continue, or even increase, unless mite tolerant stock and/or virus resistant stock is developed. ***As demonstrated in natural systems, although mite infested colonies are likely to succumb to virus infections if left untreated, the species A. mellifera is unlikely to perish without the involvement of apiculturists"*** [emphasis mine].

Practical Application: Allow me to quote cartoonist Walt Kelly: *"We are confronted with insurmountable opportunities."*

It's up to us, as beekeepers, to work with nature to resolve the problem that we accidentally created by introducing the varroa mite to the European honey bee. The solution is to breed for resistant bee stocks so that we can wean our bees back off of chemical support. It's not going to happen overnight, but great progress has been made in the past decade (my hat is off to Drs. Hoopingarner, Harbo, Danka, Harris, Villa, and especially Rinderer for their foresight and hard work). In my own operation, I find that by breeding for naturally-resistant stock, that my bees look better, I have no need for synthetic miticides, rarely use any antibiotic, and most importantly, make more money!

Coming to Terms with Colony Collapse

I'm going to let Keith Delaplane (quoted by Reese 2011), summarizing the accomplishments of the Coordinated Action Project for CCD, summarize the situation regarding our latest plague--CCD:

"One of our biggest frustrations has been defusing the expectation for 'a cure' for CCD. The answer, when

it comes, will be a knowledge-based enterprise, not a product-based enterprise. The answer will be messy.

"The answer will include management decisions like lower-density apiaries, integrated pest management adoption, selective breeding programs, as well as new technologies like RNAi and marker-assisted breeding.

"Nothing about this is easy. Bee decline is a systemic problem on a continental scale. But you know what; we've shortened the list, made important discoveries in toxicology and disease and are coming up with practical answers in disease remediation and genetic resistance."

Meanwhile, many beekeepers are simply practicing good commonsense animal husbandry with their bees, and being very successful at it!

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"These articles were originally published in the American Bee Journal. All of Randy's bee articles may be found at:
www.Scientificbeekeeping.com

If you find these articles of use, Randy appreciates donations to fund his efforts."

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The following is an update of recent activities of AHBIC. If you should seek further clarification please do not hesitate to contact the AHBIC office.

JULY UPDATE

1. The Annual General Meeting was successfully held in Launceston. AHBIC again puts on record its thanks to Maxine Ewington and the Tasmanian Association for their hospitality and efforts in running an exceptional conference.
2. The Federal Government has new Legislation for Biosecurity this reform is far reaching with some good and bad elements. We are still reviewing its implications for industry and intend to respond in due course.
3. The Federal Government has also announced its response to the productivity commission review of research organisations. A copy of the results is included in this edition.
4. On the subject of Federal Government action, Minister Ludwig has released a food plan for the Agricultural Industry, details of which are contained in this edition of the newsletter. AHBIC will also be providing a response to this document given its importance to future planning and importance to the honeybee industry.
5. The Food Safety and Prevention of Residue Committee has set its meeting dates for the next six months: Monday 13 August 2012, Monday 10 September 2012 and Tuesday 27 November 2012.
6. Likewise the AHBIC Executive Committee has set its physical dates for the next twelve months: Monday 17 September 2012, Monday 26 November 2012 and Monday 13 May 2013. In the intervening period between meetings, the Board will be in communication via email and telephone hook-up when required.
7. Members should note that we have published dates for the various Industry Conferences. If there are any changes please advise the AHBIC office so that members are made aware.

AHBIC 2012 CONFERENCE RESOLUTIONS

1. "That the Chairman's Report and AHBIC Reports for year ending 30 April 2012 be adopted."
2. "That the minutes of the 14th Annual General Meeting held at Rydges Southpark, 1 South Terrace Adelaide, South Australia on Friday 8 July 2011 as circularised be confirmed as true and correct record."
3. "That the meeting confirmed the changes to the Constitution as circularised and tabled."
4. "That the membership of the AHBIC Council by the Australian Queen Bee Breeders Association be cancelled and that their vote not be issued to any entity."
5. "That the Committee Reports be accepted."
6. "That the Audited Financial Statements for the year ended 30 April 2012 be adopted."
7. "That the Member reports be formally accepted."
8. "That the Subsidiary Company Reports be taken as read."
9. "That the AHBIC Council recommend to the Directors of the Honey Bee Contingency Fund the expenditure of $75,000 per annum for 2014 and 2015 financial years to help fund the Honeybee Surveillance Program in conjunction with Horticultural Industries, to be administered by Plant Health Australia be made."
10. "That the AHBIC Council support the introduction of a Biosecurity levy on all beekeepers."
11. That AHBIC convene a meeting of major honey packers to discuss initiatives to market Australian Honey."
12. That the 2012-2017 AHBIC Business Plan be adopted
13. That AHBIC consider a national approach to the control and management of AFB.
14. That AHBIC separately account for and administer the FCAAA Contingency Fund on the same basis and guidelines as previously agreed by member bodies of FCAAA.
15. "That AHBIC asks RIRDC to implement a trial to look at any possible effects of neonicotinoids on honey bees foraging on plants that have been seed coated prior to planting"
16. That AHBIC recommends to RIRDC/HBRDC that RIRDC/HBRDC fund development of an external lure for small hive beetles."
17. "That AHBIC requests, that other industries (e.g. Horticulture and Agriculture) and the Wheen Foundation be asked to assist with funding for an external Small Hive Beetle lure."
18. "With the increasing spread of GM crops in Australia, AHBIC liaise with the Government Departments, who are approving the growing of GM crops, to alert them to the problems of Marketing GM honey not only overseas but also on the domestic level in Australia.

1. Also AHBIC is to bring this issue to the attention of the appropriate State and Federal Ministers

19. "That AHBIC investigate the use of QA programs as a basis of managing the National AFB control program."
20. "That the folllowing Executive Committee be confirmed."

    Mr Lindsay Bourke Chairman
    Mr Eduard Planken Deputy Chairman
    Mr Ian Zadow
    Mr Rod Pavy
    Mr Trevor Morgan
    Mr Trevor Weatherhead

APIS CERANA (ASIAN HONEYBEE) UPDATE

There was a finding of a swarm of Asian bees at Port Douglas on 2 July 2012. This is just north of the RA area and north of the previous find at Wangetti Beach. There are beekeeper volunteers in Cairns this week and it will be their role to do surveillance in the Port Douglas area to try to find the nest and determine if there are other Asian bees in the area.

As part of the Transition to Management (T2M) there are several research projects being funded by our industry through RIRDC. These were reported on at the various beekeeping conferences these past few months and details can be found at http://asianhoneybee.net.au/wordpress/wp-content/uploads/2012/07/Meeting-6-AHB-TMG.pdf attachment A. Cairns is being visited by some of these researchers to start their projects.

Community Engagement is being conducted at the various shows in the area. The local beekeeping group is helping out and I imagine the volunteers will also get a chance to go to the show and help out.

The first stage of the remote poisoning trails, now called remote nest treatments, have been completed. The Scientific Advisory Group (SAG) has considered the preliminary results and will be making some recommendations.

When the Government withdraws from swarm and nest destruction, there is a question mark as to how beekeepers will be involved. If beekeepers were to give advice, they would leave themselves open to public liability claims if anything when wrong. As I see it, all beekeepers could do is collect samples, if called out to a swarm or nest, and send them in for identification and give the website address for people to glean information from. As of 6 July 2012 they are up to IP664.

Trevor Weatherhead
17 July 2012

MAKING THE MOST OF OUR WORLD CLASS RURAL R&D - *23 July 2012*

The Gillard Government today announced significant improvements to rural research, development and extension which will see greater collaboration on research, efforts to increase investment, and a drive to improve the adoption of innovation across the sector.

Minister for Agriculture, Fisheries and Forestry, Senator Joe Ludwig, who released the rural R&D policy statement at an AgForce breakfast in Brisbane, said the Government remained committed to partnering with industry to drive innovation and productivity.

"The current rural R&D model has proven results, with rural productivity in Australia increasing at more than twice the rate of other industries' in this country in recent decades," Minister Ludwig said.

"Successive Labor governments have a strong history of collaborating with our rural sector on research and development, contributing more than $700 million annually through the Research and Development Corporations (RDC's), Cooperative Research Centres, CSIRO and universities.

"This is a government committed to rural R&D, and committed to the RDC model as the fundamental way that we fund and deliver it.

"This policy statement builds on the strengths of the RDC model, including the strong partnership we have with industry in funding and setting priorities."

The policy statement includes the government's final response to the Productivity Commission's inquiry report on Rural RDCs and the National Strategic Rural R&D Investment Plan. The improvements will:

- increase transparency and accountability in the RDC model
- improve coordination and priority setting across the whole rural R&D system
- increase the pursuit of productivity growth; and
- increase operational efficiencies and value for money on investment.
- Key changes include:
- measuring performance across the broader rural R&D system
- greater collaboration of RDCs on cross-sectoral research such as soils and climate change
- enabling RDCs to undertake marketing if requested by industry and funded by a dedicated levy
- matching government funding for private voluntary contributions where research findings are public; and
- moves to attract more private domestic and international investment.

"This statement goes hand in hand with work we're already doing as part of the National Food Plan green paper which asks whether the best way to increase innovation and productivity over the medium to long term is to increase investment in rural R&D," Minister Ludwig said.

"Research and development underpins future productivity and innovation within our rural industries. It drives growth, maintains our competitiveness internationally, and means rural Australia can make the most of opportunities and respond to challenges.

"Australian producers are some of the most innovative and productive in the world, and ongoing government and industry commitment to R&D will help keep us on the front foot."

The statement and more information is available at:
www.daff.gov.au

AHBIC AWARD OF EXCELLENCE

A delighted audience at this year's Australian Honey Bee Industry Council (AHBIC) Annual Dinner applauded the Council's decision to make a dual presentation of the AHBIC Award of Excellence to John Bowland (JB Manufacturing) and Peter Cash (Bee Engineering) for their contributions as manufacturers of high quality honey extracting equipment.

The awards recognised the efforts of both recipients in encouraging the Australian honey industry to reach out and meet the challenge of HACCP based food production.

The recipients **Peter Cash** from Bee Engineering, Western Australia and **John Bowland**, JB Manufacturing, Maiden Valley, Bendigo Victoria, were both in attendance and proudly accepted their awards from Mr Lindsay Bourke, AHBIC Chairman.

In 1997 Capilano Honey embarked on its drive to introduce HACCP standards to suppliers, highlighted by the release of its landmark "Reference Manual – Honey Extracting Facilities & Food Safety Program" in 1999.

A lot of the success with the Manual and later the successful introduction of the B-QUAL Program (and others) was due to the efforts of both of these men.

Why? With the introduction of Stainless Steel Horizontal Radial Extracting systems across the landscape of Australian beekeeping, came the need to upgrade "sheds". In essence QA followed advances in extractor design.

A little of the history of both recipients

John Bowland
A common link exists between JB Manufacturing and Beequip, a link forged by personal respect and friendship between Peter and John and the use by the latter of Beequip uncapping machines on his extracting systems.

To a larger extent John concentrated his extracting systems on the smaller sized machines, it would no doubt have come as a pleasant surprise to find his extractors located in state of the art mobile and central extracting plants handling hundreds of drums of honey a year. JB extractors ranged in size from one 36 fr to 42fr and 54fr Horizontal Radials.

These mighty extracting units now grace small to large operations and in nearly every place they have found a home, they have moved into pristine facilities.

Now for a little history, John started manufacturing his 3 bank 43 fr HR extractors in early 2000, Ken Smith, from Newstead got the first one, Glen Watson No.2, Ray Hall No.3; John Stanley No.4 and yes he does have a list of all who have purchased his machines.

John recalls attending the **Tamworth NSWAA Field Day in 2000** and being laughed at and told to go back and build a bigger one. He has a photo of one those beekeepers with 3 of his extracting systems on his truck heading off to the Northern Tablelands of NSW.

AHBIC Chairman Lindsay Bourke showed he is not one to play favourites; he now has one Beequip extracting system and a JB Manufacturing system.

John has manufactured 150 extracting systems and the audience was informed of a comment John had made prior to accepting the award "...that on a warm sunny summers day when the flows are in full swing, my "little" units would be humming away each turning out 10 drums a day and thinks, "that's 1500 drums a day! Or almost $1.4 million a day!" There is satisfaction in those thoughts.

John's association with the industry began when a friend introduced him to Roger Callaway from Bendigo. John was working in the Quarry and mining industry as a Sheet Metal worker/welder. He assisted Roger as he built his packing business. Like Peter Cash he started helping repair various pieces of equipment for beekeepers and began a business making metal lids for beehives, Bill Shay purchased that business from him. This was in the late 70's. He has also manufactured over 100 hand grip machines that can cut rebates for boxes and nearly 300 reducers.

He recalls older extracting sheds that were constructed with sheets of tin, had bare copper pipes and were far from food grade. He wondered if it was safe to eat honey! Then Ken Smith (Newstead Vic.) asked him to make an extractor because QA was coming to the beekeeping industry. Ken showed him the Capilano Manual and he recalls saying at the time that this was **"the best thing that had happened in his time with beekeepers."** After 3 months urging he finally made Ken his extractor. The rest is history.

Asked what his philosophy was, John replied **"to retire at 50!"** He is now 60. He thought a little longer and commented that his goal was to build an extracting system that would be virtually trouble free. A 4 bank extractor was too high and that was the reason for settling on a 3 bank machine.

Through much of his time developing and producing his extracting equipment, John endured a major health crisis and has drawn a huge amount of comfort from the goodwill shown by the beekeepers with whom he has had dealings over the past years. John suggested that over 80% of those using his extracting system are now personal friends.

John has taken a year away from manufacturing and may sell his business in the near future.

Peter Cash: Bee Engineering or Beequip was registered on the 30 December 1980, in its early stages Peter spent most of his time repairing existing beekeeping equipment while he developed a de-boxer.

Perhaps not so well known is the fact that Peter, as a high school student assembled and wired frames for Ken Healey (a commercial apiarist) after school. He left high school at the end of third year and went to work for Ken. When Ken established Old Cottage Honey in 1971 Peter worked in the honey packing room. All up he spent 15 years working with Ken.

Peter recalled a Karri flow that began in January and ran through to June, they had 8 or 9 loads of bees and they worked long hours extracting 9 drums a day using a hand knife, cappings reducer and a Pender Galvanised 9 frame semi radial extractor. All powered by a 3hp Villiers motor. That flow produced 500 drums. He had 35 hives of his own that he worked on weekends.

Nice to have a hobby!

His mechanical and sheet metal skills were picked up along the way. Developments in design often came from beekeepers, in 1998/99 Phil McHugh (Tamworth); Brad & Joel Johnston (Gunnedah) flew to WA and from the visit the high output twin extracting system fed by one uncapper was developed with the uncapper fitted to a rotating ring.

His son designed the 4 vaned stainless steel cappings pump that sold over 70 units. The design was unique in that it allowed for the outer housings to be removed and the direction of fitting could be adjusted to suit plant design without any engineering changes. With the exception of the inner portion of the pumps that are symmetrical.

Peter built his first Uncapping Machine on the 20 September 1982, a slide model based on the Cowen "Silver Queen", by the 1990's chain feed uncapper sales outnumbered the slide feed machines. In total 1357 uncapping machines have been manufactured.

Recently a WA beekeeper approached Peter and asked if his machine was still under warranty as he needed new blades for the knives and chains. Peter checked his records and found that the machine was 29 years old and this was its first major service!

Approximately 150 complete extracting systems have been sold. All of Peter's machines have been stamped with serial numbers. Beequip has also manufactured 94 capping's reducers. Plus many de-boxers.

He well recalls the comment made by commercial beekeeper from Tamworth over a decade ago that he had **"revolutionised the beekeeping industry".** That revolution was also exported overseas.

It has been 5 years since Beequip ceased making honey extractors but the manufacture of uncappers and de-boxers continues.

Today his uncappers feature SS sprockets, pressure bars, nuts bolts and main frame. They are a work of art and have a following in Australia and overseas.

Peter was open to change and requests for QA improvements to his machines, such as SS square tubing for the frame, covers under drive belts to keep honey free of belt rubber; BSM fittings in place of clamps, were willingly carried out.

When asked for his philosophy towards his equipment and design, Peter's response was he didn't have one, he simply **strived for excellence**, and there you have his philosophy.

His greatest challenge was to educate beekeepers in how to care for their new equipment, they did learn and the equipment is still pumping out honey throughout Australia and Europe.

Peter would like to see R&D put into developing better technology but recognises that we are part of a small industry and often growth is made through the endeavours of a few individuals.

Conclusion:
Both men when asked if they would accept the award in person in Launceston, without hesitation agreed to make the trip. They were truly amazed that AHBIC would recognise their endeavours and honour them in this manner at the AHBIC Annual Dinner.

Men of vision honoured together on the evening was very special, their contributions to the improvement of honey extracting standards in Australia has now been recognised at the highest level by an appreciative industry.

Bill Winner

AHBIC Award of Excellence winners John Bowland and Peter Cash with AHBIC Chairman Lindsay Bourke & Bill Winner

Twin Beequip 72 frame HR extractors fed by a Beequip chain feed uncapping machine, B-QUAL accredited premises

JB Manufacturing 42 frame extracting system in a B-QUAL Accredited facility

CONGRATULATIONS

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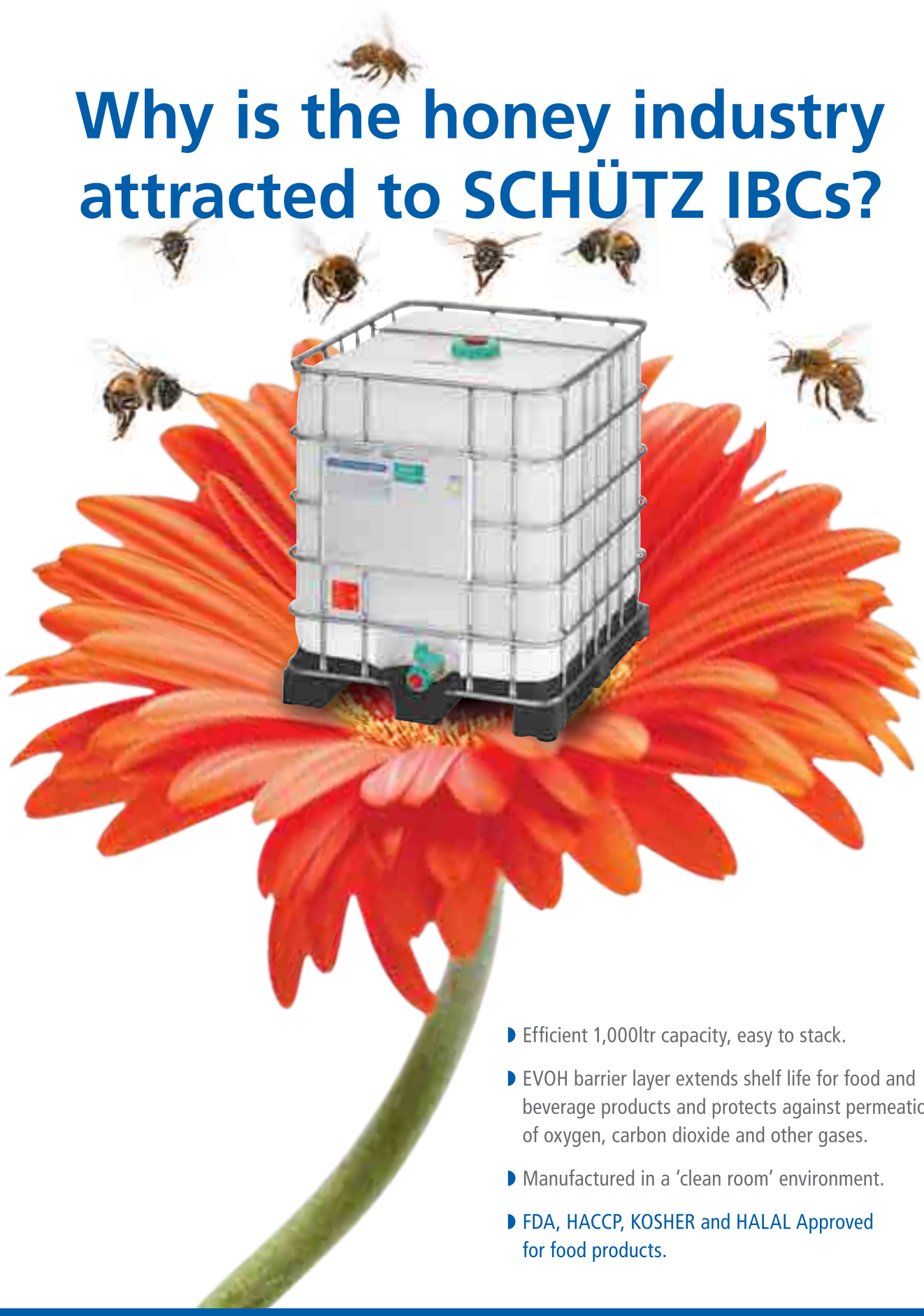

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