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Volume 5 Number 3

MAY - JUNE 2012

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AUSTRALIA'S HONEYBEE NEWS

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

Published Bi-Monthly ISSN 1835 6621

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COVER: Vice-President Harold Saxvik, Secretary Kate McGilvray & President Craig Klingner Photo: Mary-Ann Lindsay

Copy Deadline for Next Issue of *Australia's Honeybee News* - 1 August 2012

Editor & Production: Margaret Blunden PO Box 352 Leichhardt NSW 2040 - Phone: 02 9798 6240
Mobile: 0411 662 014 Fax: 02 9797 8061 Email: honeybee@accsoft.com.au

Printer: Farrell Printers PO Box 253 Croydon NSW 2132
Phone: (02) 9550 4055 Fax: 02 9550 3403 Email: rob@farrellprinters.com.au

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NSW Apiarists' Association Inc. Executive Council

Rob Michie, Harold Saxvik, Kate McGilvray, Craig Klingner, Neil Bingley, Casey Cooper

PRESIDENT: Craig Klingner PO Box 564 Glen Innes 2370 Ph: 02 6734 4125 Email: klingnershoneyco@bigpond.com
VICE-PRESIDENT: Harold Saxvik 5 Kings Street Darlington Point 2706 Ph: 02 6968 4217 Email: jsaxvik@gmail.com
COUNCILLOR: Neil Bingley 101 Woodfield Rd Sutton 2620 Ph: 02 6230 3578 Email: beez101@bigpond.net.au
COUNCILLOR: Casey Cooper Darby's Road Tingha 2369 Ph: 02 6723 3551 Email: To be advised
COUNCILLOR: Rob Michie 127 Stirling Road Moore Creek 2340 Ph: 02 6767 1066 Email: robraem@westnet.com.au
SECRETARY/TREASURER: Kate McGilvray PO Box 833 Mudgee 2850 Ph: 02 6373 1435 Fax: 02 6373 1436
Email: nswapiaristsassociation@gmail.com Website: www.beekeeping.asn.au

BRANCHES	PRESIDENTS		SECRETARIES	
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FEDERAL COUNCIL OF AUSTRALIAN APIARISTS' ASSOCIATIONS (FCAAA)

Federal President: Bill Weiss
206 Lambeth Street, Glen Innes NSW 2370
Phone: 02 6732 1263 Email: beeweiss@gmail.com.au

Interim Secretary: Marlene Weiss
PO Box 649, Glen Innes NSW 2370
Ph: 02 6732 1263 Email: beeweiss@gmail.com

AUSTRALIAN HONEY BEE INDUSTRY COUNCIL (AHBIC)

Chairman: Lindsay Bourke Mob: 0418 131 256
11/11 High Street Launceston TAS 7250
Email: queenvic@cradlemountain.com.au

Executive Director: Stephen Ware
PO Box R838, Royal Exchange NSW 1225 Ph: 02 9221 0911
Email: ahbic@honeybee.org.au Website: www.honeybee@org.au

HONEY BEE RESEARCH & DEVELOPMENT COMMITTEE (HBRDC)
Ms Helen Moffett, Program Coordinator, Honeybee Program, RIRDC PO Box 4776, Kingston ACT 2604 Ph: 02 6271 4132
Email: helen.moffett@rirdc.gov.au Website: www.rirdc.gov.au

AUSTRALIAN QUEEN BEE BREEDERS ASSOCIATION (AQBBA)
Secretary: Mrs Paula Dewar, 157 Lake Moogerah Road Kalbar QLD 4309 Ph: 07 5463 5633 Email: aqbba@bigpond.com

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Secretary: Kevin Webb, 184 Cavan Rd Dry Creek SA 5094 Ph: 08 8262 7555 Email: kevin.webb@springgullyfoods.com.au

PRESIDENT'S REPORT

THANKS
Firstly to the former President Bill Weiss - thank you on behalf of the honey bee industry for your time and dedication you have shown over the 14 plus years, NSWAA President (for ten years), FCAAA President, AHBIC Executive member is only the start of a long list. Thanks Billy and we all hope you can continue to contribute into the future.

Thanks to the four new Executive members Harold Saxvik, Neil Bingley, Casey Cooper & Rob Michie for putting your hands up and doing your bit for the industry we do have a lot of work ahead of us.

Thanks to the two retiring Executive members Laurie Kershaw and Mal Porter, your input was greatly appreciated and we look forward to your continued contribution to the industry in the future.

Thanks to both the North Coast Branch and Therese Kershaw for organising the Field Day and Trade Show both a huge success.

Lastly to our new Secretary Kate and Margaret the Editor of this magazine, your professionalism and dedication to the Association is greatly appreciated.

KEY ISSUES
The honey bee industry has one major difference to most if not all other agricultural industries - we do not have to own land to carry out our business. That said we do have to have access to bee sites, be they private property, National Park sites, travelling stock routes (LHPA's) or Forestry. It is for this reason access to all sites whatever the type must be maintained along with reasonable policies to work with.

NSW FORESTRY
Beekeepers in the south coast area are experiencing difficulties with dealing with their local forestry office. Executive members have been in touch with the Batemans Bay office, some of the issues raised are:

- transferring of sites between beekeepers, (charging transfer fees)
- setting site fees appropriate to the resource (eg: more $ for a spotted gum site than a bloodwood site)
- a more equitable way of allocating vacant or new sites, (ballot, tender)
- cleaning of access roads
- use of apiary warning signs (public safety)

Some of these issues are fairly straight forward and with some discussion can be dealt with, however there are three issues at the top which will certainly need some attention. Neil Bingley and Harold Saxvik have a meeting at the Batemans Bay office on the 18th of this month to discuss the issue further. I will be planning a meeting with the head of NSW Forestry to address the same issues and hopefully bring the problem to a close. As a side issue recently the Minister announced that NSW Forestry would be turned into a State owned corporation, we are looking into the effects of such a change and can only hope it is not the start of privatisation.

COAL SEAM GAS / MINING
This is an issue that has a lot of people concerned, largely because the true effect to our industry down the track is unknown. It is reported that the coal seam gas industry is worth around $10 billion a year to the three eastern States alone. Attempting to stop these activities in beekeeping areas I believe would be fruitless, what we need to do is begin dialogue with the industry so as we both can understand each other. Rob Michie and Casey Cooper are organising a meeting with Santos, one of the larger coal seam companies, to discuss our concerns (the two biggest being access in and around gas wells/mines where a bee site already exists and water quality) this will take place in the middle of August, at the same time we will be talking to Forestry also about the same concerns (Pilliga State Forest to start with). At the last Conference Queensland beekeepers warned that access was the biggest issue up there, they are probably five years ahead of us!

AFB CONTROL PROGRAM
Discussions are ongoing with NSW DPI regarding a joint DPI and Industry run disease control program. I have been in discussions with Bruce Christie since the AGM in Coffs Harbour and we are working towards the NSW Government amending the current Apiaries Act to enable the Industry to better use the existing levy for inspection services, the corner stone of an effective program.

CROWN LANDS INQUIRY
The Government has initiated a inquiry into the process and impacts of conversion of crown lands, state forests and private property to national parks. It will also scrutinise land management practises including fire, weed and pest management. The Association intends to put in a detailed submission; however we would like as many individuals to put together their own submissions and send them in.

WORK PLACE HEALTH AND SAFETY
The Executive is reviewing old OHS documents with the aim of updating them to fall into place with the new regulations.

CONFERENCE
The Conference was again a success, thanks to all of the sponsors and to all the volunteers that worked tirelessly to make it happen. Planning is underway for next year's Conference will be held at Merimbula on the south coast on 22, 23 & 24 May, we are already talking with a number of world class speakers and hope all will be able to attend.

Craig Klingner
State President

NEW MEMBERS

A warm welcome to the following new members:

Colin Bull	Crescent Head
Terry Hampson	Burleigh Waters QLD
Peter Leehy	Murrurundi
Joanne Love	Bridgewater VIC
Lamorna Osbourne	Gymea
Allyssa Staggs	Gilgai
Graeme Stevens	Logan Central QLD
Robert Westley	Minnamurra

FUTURE POST ENTRY QUARANTINE ARRANGEMENTS

In the 2012-13 Budget, the Australia Government has announced funding of $379.9 million over seven years for the construction and operation of a new post entry quarantine (PEQ) facility for high risk plant and animal imports.

This builds on the government's announcement in the 2011-12 Budget, when a commitment to fund further development of future post entry arrangements (including detailed design work and procurement activities related to land acquisition) was made, along with funds for the maintenance and refurbishment of existing DAFF PEQ facilities.

When the concept design work is complete, the proposal will be referred to the Parliamentary Public Works Committee, which must approve the project before any building work can begin.

The project will replace our current post entry quarantine facilities with a sustainable, reliable facility that adopts modern technology and operating practices. It will deliver a state-of-the-art facility that will consolidate existing animal and plant services into a single, integrated site in Victoria.

The additional detailed design work being undertaken in the next 12 months will help to settle the size, structure and layout of any new facilities. The consolidation of Australia's existing PEQs into one facility in Victoria means that the facility will be of a substantial size.

DAFF Biosecurity has undertaken an extensive stakeholder consultation program to ensure that staff, facility users and interested parties provided input on matters including operational, business and future facility needs, cost estimates and risks and impacts.

This input has supported the effective development and analysis of options for future post entry arrangements, especially on matters such as:

- suggestions for the layout and design of each element of the facility on the Victorian site
- information about recent changes in patterns and volumes of imports through PEQ sites, and views about likely future changes in imports
- views on the potential for improvements in the technical specifications of each building or key structure in the post entry facilities and
- information and data on the scale and complexity of post entry operations.

This process of consultation will continue through ongoing engagement with staff and registered stakeholders. You can register by emailing the project at: peqproject@daff.gov.au or by visiting our website: http://www.daff.gov.au/aqis/quaratine/future-post-entry-quarantine-arrangements or by calling our toll free number 1800 134 497.

CONFERENCE RESOLUTIONS

(2012 Conference resolutions other than those of a routine nature)

Resolution 2012/1 - CARRIED
MOVED: David Lord SECONDED: John Deacon
That the NSWAA president only serve a maximum term of five (5) consecutive years as president on the Executive Council.

Resolution 2012/2 - CARRIED
MOVED:Wayne Hammond SECONDED:Geoff Porter
The successful nominee who attends the Marcus Oldham College is strongly encouraged to stand on Branch Executives for the following year.

Resolution 2012/3 - CARRIED
MOVED: John Casey SECONDED: Niall Keane
That the incoming Executive establish meaningful dialogue with relevant agencies with the aim of securing uniform regulations across forest NSW districts.

Resolution 2012/5 - CARRIED
MOVED: Wayne Hammond SECONDED: Mal Porter
That the Executive investigate the cost and value of employing a lobbyist.

Resolution 2012/6 - CARRIED
MOVED: Bruce White SECONDED: Geoff Manning
That honey packers who have had honey tested for AFB provide the Association with the results, % positive, % negative and state of origin.

Resolution 2012/7 - CARRIED
MOVED: Craig Klingner SECONDED: Carl Cooper
NSWAA take on board Michael Clark's recommendations and begin an industry owned AFB control program by requesting the amendment of the Apiaries Act so the compensation levy can be used for inspection.

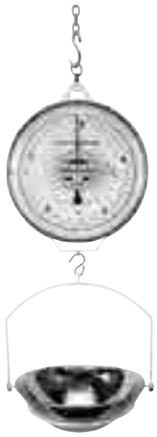
Resolution 2012/8 - CARRIED
MOVED: Kevin Haswell SECONDED: Bryn Jones
That no discounts be given to members of the public by individual volunteers on sales of bee and honey items sold at the NSWAA Honeyland exhibit held each year at the Sydney Royal Agricultural Show as this causes problems for sales by volunteers the next year as people will demand a discount and our volunteers are caught out.

Resolution 2012/10 - CARRIED
MOVED: Craig Klingner SECONDED: Harold Saxvik
That all monies presently held/managed by FCAAA be either held in trust for contingency use and be managed by 3 former FCAAA presidents or be disseminated pro rata between the states that contributed should the FCAAA be wound up.

Resolution 2012/11 - CARRIED
MOVED:Craig Klingner SECONDED:David Mumford
That the NSWAA instruct AHBIC to consider a national approach to the control and management of AFB.

Resolution 2012/12 - CARRIED
MOVED:Margaret Blunden SECONDED:Bruce White
That the NSWAA Executive send a thank you to Marlene Weiss for stepping in as interim secretary.

Scales and Labels



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NEW ZEALAND HONEY PRICES HIT RECORD HIGH

New Zealand Herald - 31 May 2012

Bad summer weather and growing global demand have combined to produce record high prices for New Zealand honey.

Supplies of Manuka honey, highly sought after for its health properties, and other native floral honeys have been particularly hard hit.

Neil Stuckey, owner of the Waitemata Honey Co and northern representative for the National Beekeepers Association of New Zealand, estimates the overall honey crop will be down 30 per cent this year, with Manuka down between 60 and 70 per cent.

According to a MAF apiculture report New Zealand produced 9,450 tonnes of honey in the year to June 2011, and honey exports earned $101.6 million.

Prices have risen sharply as a result of the latest disappointing season and Stuckey says beekeepers who got $10.00 a kilo for Manuka honey last year are now receiving $15.00.

"Bees like nice still days and warm weather and a lot of flowers don't yield nectar if the ground temperatures don't get up to a certain level.

In the top half of the North Island Manuka flowers early when it's pretty unsettled weather with a lot of wind and bees don't like wind; they won't fly if it's above 10 to 15 kilometres per hour because they get blown around, so they stay home."

"We produce pohutukawa honey on Rangitoto Island but we didn't take hives there (last summer) because the Pohutukawa just didn't flower."

Stuckey says bee deaths through colony collapse disorder have affected global honey production at a time when demand is increasing, in part because of the shift away from refined sugar and corn starch to more natural sweeteners.

That growing demand has helped push up prices here but Stuckey says international customers are still prepared to pay extra for New Zealand honey because it has such a good reputation.

"We've put up our prices considerably this year. Japan and China just say 'oh yeah, right' and go on and sell it."

Waitemata Honey recently sent an 18 tonne container load of honey to China where it sold so fast "they're talking about taking a container load a month."

While the price bonanza might be good for exporters, it's a headache for companies supplying the domestic market and using honey in food manufacturing.

Honey Meisters is a Canterbury-based business that packs honey aimed at the tourist and gift market, and makes honey-based products such as Beenut Butter. It has stores in Kapiti and Wellington and also sells online. Over the past three months owner Kris Jansen has faced a 40 per cent increase in the price of the Manuka honey she buys from beekeepers. "Prices are unprecedented."

Already paying up to $18 a kilo for Manuka honey, Jansen expects it to climb higher still and says even clover honey that used to cost under $5 a kilo is up to $6 or $7. Native honeys such as rata, rewarewa and kamahi are in very short supply. "One of my beekeepers only got 10 per cent of his normal crop."

Beekeepers Association president Barry Foster says higher honey prices are offset by the fact that apiarists have had to contend with increased costs for fuel, labour and sugar (used to feed bees in bad weather), and a growing number of apiarists are spending up to $160 per hive to have them helicoptered into Manuka growing areas.

Foster says there's concern the honey price rise will increase pressure on regulators to allow the importation of cheap honey, currently banned because of the risk of introducing new bee diseases to New Zealand.

"We have been fighting tooth and nail to keep these out. Importing honey is a bit like allowing the importing of kiwi fruit pollen and we know the consequences of that with Psa (disease) in the kiwifruit industry."

NEW METHODS FOR THE DETECTION OF RICE SYRUP IN HONEY*

In addition to the established methods for the detection of honey authenticity (13C-stable isotope analysis by EA-IRMS and LC-IRMS, beta-fructofuranosidase, beta-/gamma-amylase) *Intertek Food Services now offers further specific methods for the detection of rice syrup in honey:

SM-R (Specific Marker – Rice syrup)

TM-R (Trace Marker – Rice syrup)

The implementation of these new tests became necessary to reach an adequate detection sensitivity (approx. 10%) for certain highly purified rice syrups.

The SM-R method, originally developed and routinely applied by the Chinese CIQ laboratories, was implemented and verified in our laboratory in close collaboration with CIQ. Furthermore, Intertek Food Services developed an additional method (TM-R) in order to confirm positive SM-R results.

You can order the SM-R method separately or in combination with the TM-R method (authenticity package rice syrup).

We recommend both tests in case the honey is suspected to be adulterated with starch-based sugar syrups, particularly for honey of Asian origin. However, adulterations with rice syrup can occur globally.

www.intertek.com

PROTECTING BEES - A Guide for Farmers & Beekeepers

Farmers and beekeepers alike are being urged to get hold of a new guide aimed at helping them improve communication and work together to manage the risk to honeybees from farm pesticides.

A potential shortage of more than half a million beehives needed for the pollination of our food supply is looming, and potential harm to bee colonies from pesticide poisoning is a key barrier to beekeepers providing more services for the 65 per cent of agricultural production that is reliant on pollination by bees to produce fruit, vegetables and seeds.

The guide was developed with funding from the Pollination Program, a partnership between the Rural Industries Research and Development Corporation (RIRDC) and Horticulture Australia Limited (HAL). It was written by TQA Australia, with assistance from the Victorian Department of Primary Industries.

Chairman of the Pollination Program, Gerald Martin, said one of the aims of the guide was to enable beekeepers and farmers to identify pesticides that are known to be toxic to bees, and to provide all relevant information on their use in one location.

"Only around 200,000 of Australia's 500,000 managed beehives are currently used for honeybee dependent crop pollination services. It is hoped that by making all this information easily accessible, both farmers and beekeepers will be encouraged to communicate and work together to maintain healthy bee colonies for pollination as well as honey production," said Mr Martin. The guide also outlines good practices for farmers and beekeepers to adopt, and contains a number of useful forms, contact details and other relevant information," he said.

Australia is fortunate to have a massive population of wild European honeybees that provide free pollination services, but if a bee pest such as Varroa mite becomes established here, these bees will be all but wiped out.

"We know that if Varroa mite becomes established in this country 480,000 managed hives will be required to provide pollination services every winter and spring. This is likely to increase in peak seasons to 750,000 hives, far outstripping current supply. "It means we really need this valuable information to help beekeepers and farmers protect managed, working bees and our pollination services," said Mr Martin.

The guide – "Honeybee pesticide poisoning – a risk management tool for Australian farmers and beekeepers" is available for free download on the RIRDC website at www.rirdc.gov.au/pollination. Users and providers of pollination services are encouraged to share it widely and are free to provide links to the guide on their own websites.

Bruce White OAM and his wife Lynn at Government House on the occasion of his investiture - 11 May 2012

DOUG'S COLUMN

Doug Somerville
Technical Specialist, Honeybees - NSW Department of Primary Industries - Goulburn
doug.somerville@industry.nsw.gov.au

CONFERENCE 2012 DPI REPORT

The location for this years NSW Apiarists' Association annual conference was great. Coffs Harbour compared to Goulburn, no arguments from me! At each years conference the DPI present two reports, both are provided in written form in the proceedings and in a presentation on the morning of the first day. The following is a condensed version of the NSW DPI Advisory/Research report for anyone who didn't make it to this year's conference. Most of the advisory services to the NSW apiary industry are provided by me, (Doug Somerville) and Nick Annand. Projects are carefully considered and planned in advance, to provide maximum gain from what is a very small resource of two people.

We have a major focus on building up extension and education products having produced videos last year, and continue to provide educational courses, Primefacts and articles to Honey Bee News. With a limited staff resource it is essential that we build up a library of resources and products placed on our website for access at any time by anyone. Many beekeepers may say they don't access the web, the reality is that many information seekers do and this medium is better than no medium at all.

We are very ably backed up by a Department of committed staff in animal health, diagnostic, business analysis, general enquiries, bee research, legal perspectives and regulation enforcement.

Industry committees, while this doesn't sound very exciting it has become a vital function.

- Dr Doug Somerville sits on the **NSW Apiarists' Association** executive committee as the DPI representative attending all the executive meetings. He was part of the interview panel for the Associations' secretary position.
- Tim Burfitt and Doug Somerville are members of the Beekeeping Industry Consultative Committee chaired by the president of the NSW Apiarists' Association.
- Dr Doug Somerville is the Secretary/Treasurer of the Goodacre Award committee.
- Dr Michael Hornitzky has been appointed the Chairman of the Honey Bee program on the Rural Industries Research and Development Corporation.
- Dr Doug Somerville and Nick Annand are members of the National Honey Bee Industry Biosecurity Group, chaired by Plant Health Australia.
- Nick Annand coordinates the NSW component of the National Port Surveillance program managed by Plant Health Australia.
- Dr Doug Somerville is a member of the Asian Honey Bee Scientific Advisory Group managed by Plant Health Australia.
- Dr Doug Somerville is a member of the Varroa Continuity Strategy Management Committee managed by Plant Health Australia.

Queen Bee Breeding Course
This course has been designed to provide beekeepers with the skills and knowledge to produce their own quality queen bees. The queen bee in essence is the engine of the colony, without her the colony does not survive. A queen bee reared from superior genetic stock on good nutrition, in a disease free environment, will provide to a colony of bees the basics to maximise productivity.

The aim of the course is *for each participant to understand the theory of producing queen bees and demonstrate the skills necessary to produce quality queen bees.* This course is presented each year and will be offered in March 2013 on the 22-24th. This year it was conducted at Gretchen Wheen's property at Richmond. The feedback was overwhelmingly positive.

Each participant receives a course manual and grafting kit. This course is delivered using both indoor and outdoor instruction and has been mapped to the national unit of competency, AHCBEK407A - Rear queen bees.

This course suits beekeepers and people interested in either entering the queen bee industry or producing their own quality queen bees. The cost for the course in 2012 after the NSW Government subsidy was $665 GST-free. Learning outcomes include grafting queen cells with correct age larvae, raising quality queen bees and implementing a queen breeding program.

Book early if you are interested in attending the 2013 course with Kim Griffiths to ensure your place, Phone 1800 025 520. Details can also be found at www.profarm.com.au. For further information on courses on beekeeping conducted by the NSW DPI see: www.dpi.nsw.gov.au/agriculture/livestock/honey-bees. No need to pay until close to the course date.

Pest and Disease Course
This two day course provides beekeepers with the skills to identify, monitor and manage the impact of pests and disease on commercial honey bee colonies. It is also designed to promote awareness and surveillance for exotic pests and diseases threatening the Australian beekeeping industry. The course cost is $480 GST incl. which includes the course notes, instruction, morning and afternoon tea plus lunch on both days.

The course structure covers: seasonal cycle of honey bee colonies; why pest and diseases are important; what is disease; what causes disease; different pathogens and transmission methods; the four main brood diseases; practical - opening a hive and inspecting for brood disease; adult bee diseases; hive pests; non infectious disorders; exotic pests and disease; surveillance programs for exotics; exotic incursion responses; management strategies for disease prevention.

The report card since inception of the course:
- 225 participants
- 17 locations/courses (2 in Tassie and 1 in the ACT)

Approx 75% of the participants were commercial beekeepers.

Two courses are scheduled for the remainder of 2012, Euston 15th-16th August and Bathurst 30th-31st October. Other dates and locations are available on demand. Unfortunately the Farm Ready Climate Change subsidy from the federal government is no longer available.

If anyone wishes to attend a Pest and Disease course please talk to Doug, Nick and/or Kim (Kim Griffiths, Short Course Secretary, Tocal College – Ph: 1800 025 520, or email kim.griffiths@industry.nsw.gov.au)

The DPI web site www.dpi.nsw.gov.au/agriculture/livestock/honey-bees
This web site contains significant amounts of information on beekeeping. The information is listed under the following headings: Industry contacts; general public and bees; compliance; management; pests and diseases; pollination; useful links. Plus details of the bee courses we offer, honey money software and contact details for the labs to submit samples.

Surveillance activity
Nick is the main participant in managing the NSW DPI's involvement in surveillance activities. This surveillance activity has primarily focused on exotic pests. In the past year the responsibility for the management of the Commonwealth Government's National Sentinel Hive Program has changed from Animal Health Australia to Plant Health Australia. This change has seen an increase in the level of surveillance relative to the previous program. The three main high risk ports in each state/territory will be more closely monitored. For NSW these ports are Port Botany, Port Kembla and Newcastle where the sentinel hives will be increased from one to six. These hives will now be sampled every 2 months rather than every 3 months. The surveillance hives will be exposed to miticide strips for 48 hours. The other sentinel hives at the smaller ports of Richmond, Goodward Island, Kurnell and Darling Harbour will remain with a single hive.

During the past year some of the important volunteers in the surveillance program retired from the program. They were Tony Hill near Port Botany, Sue Hankel at Balmain and Jim Holdsworth at Kurnell. A very big thank you to all three for the voluntary service they have performed over many years for the apiary industry.

We have also had some new additions to the NSW program with Bill Stratton initiating discussions and eventually placing a sentinel hive, at Jervis Bay Naval base. Bill did all the negotiations with the Navy, and his persistence eventually paid off. John Crouchley has joined the team and will be doing the surveillance around Port Botany and Kurnell. This support from the network of volunteers is acknowledged and greatly appreciated.

Another initiative in our surveillance program is the sugar shake program. The distribution of sugar shake jars free to beekeepers continues with in excess of 600 in circulation. This program is about increasing awareness of the threat of the devastating external mites, varroa and tropilaelaps. The aim is for beekeepers to take on some responsibility and be proactive with bee biosecurity. Many beekeepers are under the false understanding that varroa mites are relatively easy to detect, probably because most of the information available pictures a mite sitting on the back of the thorax of an adult bee. This is an extreme vision and once you start seeing mites the population is usually extremely high. A high population of mites will largely go un-noticed by most beekeepers without some form of monitoring such as the sugar shake test. Hopefully now with the use of a range of surveillance techniques, any incursions of these mites will be detected quickly providing an opportunity for possible eradication.

Small hive beetle
The final report of Dr Garry Levot's research work on the Commercialisation of the Small Hive Beetle Harbourage Device was published in January 2012 by RIRDC. This report describes the commercialisation of the APITHOR™ small hive beetle harbourage and the results of bee safety, honey residue and field efficacy trials conducted to support full product registration of the device by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Previous RIRDC research, reported in *Insecticidal control of small hive beetle* (Levot 2007), developed and successfully field-trialled a small hive beetle harbourage that comprised a two piece, tamperproof plastic housing for a fipronil-treated corrugated cardboard insert. The device needed to be patented, commercialised, registered with the APVMA and available to Australian beekeepers at a reasonable price.

The project aimed to bring to market the small hive beetle harbourage device developed during the feasibility project, *Insecticidal control of small hive beetle* (Levot 2007) through establishment of a team that included a commercial manufacturer and an experienced regulatory affairs consultant.

The aim was to market the device under permit whilst collecting additional residue, safety and efficacy data to satisfy registration requirements as set out by the APVMA.

In APITHOR™, Australian beekeepers now have a legal, affordable, safe and effective product available to them to control small hive beetles in their hives. Patent protection of APITHOR™ small hive beetle harbourage in the United States of America potentially opens up additional markets for the device.

A study of *Nosema ceranae* in Australia
The project was conducted by Dr Michael Hornitzky, Senior Principal Research Scientist. The final report was published by RIRDC in June 2011. Some key findings are as follows:

A survey of honey bee colonies in apiaries provided a good indication as to the prevalence of *N. ceranae* and *N. apis* in the test apiaries, and most likely reflects the prevalence of these two pathogens in honey bee colonies in eastern Australia. The fact that *N. ceranae* was found in every apiary and often in a high percentage of the test colonies indicates that it is well established in eastern Australia. The cyclic nature of *N. apis*, *N. ceranae* and infection levels with *Nosema* spores was clearly evident in colonies sampled in NSW and Vic. The peak infection levels with *N. apis* usually occur in spring, as does infection levels of *N. ceranae*.

Mixed infections of *N. apis* and *N. ceranae* were common, as more than 80% of colonies in some test apiaries were infected with both *N. apis* and *N. ceranae*. It appears that the impact of *N. ceranae* on honey bee colonies in Australia is similar to that observed for *N. apis*. Unlike *N. apis*, *N. ceranae* is sensitive to the cold and does not persist at 4°C or when frozen. *N.ceranae* appears to thrive in warmer climates, indicating that Qld may be more severely affected by *N. ceranae* than NSW or Vic.

Bee feeding assays were carried out to determine the role of pollen in bee longevity. Pollen was demonstrated to be an important component in bee longevity by helping bees to survive longer than bees not fed pollen, even though they were infected with *Nosema* spp. It was also demonstrated that feeding pollen to bees can reduce the infection level of bees fed *Nosema* spores compared to bees not fed pollen.

This study has demonstrated that pollen availability is a key factor in bee longevity. Bees live longer, even if they are heavily infected with *N. ceranae* or *N. apis*. Beekeepers can mitigate the effects of nosemosis by ensuring bees have access to good pollen or by the provision of pollen supplements.

AFB

A review of the NSW DPI AFB program was initiated by the NSW DPI Honey Bee Industry Group early in 2011. Michael Clarke from AgEconPlus was employed to conduct the review. The DPI approached the NSW Apiarists' Association executive to co-fund the project. The project concluded in September 2011.

Five key points were identified as being essential to any effective AFB control program:

- Process to identify sources of infection.
- Effective inspection service and follow-up.
- Lab support (cost effective).
- Beekeepers' ability to identify AFB and to manage it.
- Legislation to enable industry to fund and regulate.

The outcome of the project is still a work in progress and an article was written for the last issue of the Honey Bee News titled 'AFB– Its day of reckoning has arrived'
The NSW beekeeping industry needs to carefully consider where they want to proceed with this very important subject as the size and capacity of the NSW DPI continues to reduce.

A glove box guide on AFB titled 'Managing AFB Guidelines for the identification and management of American foulbrood – a fatal disease of honey bee colonies' has been produced. This was two years in the production but is now complete. We are in the process of seeking sponsors to be able to print and distribute a copy to all registered beekeepers within NSW. Finding funds for such projects is a sign of the times.

This article is illustrative of only some of the key projects and activities carried out by the NSW DPI advisory and research staff over the past 12 months. Your feed back on our activities is most welcome. See you at The NSW Apiarists' Association conference in Merimbula in May 2013.

NPWS BALLOT RESULTS

BEESITE IDENTIFIER SF GRID	BEESITE IDENTIFIER GIVEN	STATE FORESTS BEE RANGE ID	PARK NAME	PARK NUMBER	AREA	REGION	SUCCESSFUL APPLICANTS
N07484-C0011	C0011		Ngambaa NP	N07484	Coffs Coast	North Coast	Ross Cooper
N0124-C0212	C0212		Kumbatine NP	N0124	Macleay	North Coast	Anthony Andrist
N0124-C0213	C0213		Kumbatine NP	N0124	Macleay	North Coast	Dougal Munro
IPA-773-1	1	773	Indigenous Protected Area	IPA	Lower Darling	Far West	Jeff Ashfield
IPA-773-4	4	773	Indigenous Protected Area	IPA	Lower Darling	Far West	Kevin Emmins
N1064-441	441		Pilliga CCA Zone 1 National Park	N1064	Baradine	Northern Plains	Steve Johnson
N1091-1102	1102		Pilliga CCAZ3 SCA	N1091	Baradine	Northern Plains	Jonathon Keane
N1095-266-537	537	266	Pilliga CCAZ3 SCA	N1095	Baradine	Northern Plains	Mark McClelland
N1090-1643	1643		Pilliga CCA Zone 3 State Conservation Area	N1095	Baradine	Northern Plains	John Casey
N1075-266-1237	1237	266	Pilliga East CCA Zone 2 Aboriginal Area	N1075	Baradine	Northern Plains	Johathon Keane
N1075-266-1282	1282	266	Pilliga East CCA Zone 2 Aboriginal Area	N1075	Baradine	Northern Plains	Johathon Keane
N1075-266-1304	1304	266	Pilliga East CCA Zone 2 Aboriginal Area	N1075	Baradine	Northern Plains	Niall Keane
N1090-266-1280	1280	266	Pilliga East CCAZ3 SCA	N1090	Baradine	Northern Plains	Rod Whitehead
N1090-266-1281	1281	266	Pilliga East CCAZ3 SCA	N1090	Baradine	Northern Plains	Rod Whitehead
N1090-266-1141	1141	266	Pilliga East CCAZ3 SCA	N1090	Baradine	Northern Plains	Jonathon Keane
N1090-266-1234	1234	266	Pilliga East CCAZ3 SCA	N1090	Baradine	Northern Plains	Dougal Munro
N1090-266-1235	1235	266	Pilliga East CCAZ3 SCA	N1090	Baradine	Northern Plains	Jonathon Keane
N1067-274-1526	1526	274	Timallallie CCA Zone 1 National Park	N1067	Baradine	Northern Plains	Niall Keane

APIMONDIA 2013 - KIEV

Beekeepers & Colleagues from Beekeepers Associations!
Scientists and Researchers!
Equipment Producers, Exporters and Importers!

Organizing Committee of the XXXXIII International Apimondia Congress announces the start of the registration of the full delegates for the XXXXIII International Apimondia Congress that will be held in Kiev, Ukraine from 29 September till 4 October 2013.

http://apimondia2013.com.ua/registration

We are using one more opportunity to provide our participants with the advantages of the super early Registration of the full delegate that could save up to 40% on their costs.

Full delegate fee for super-early registration is 150 euro.

Super-early registration for the full delegate will last till June 2012.

You can download super-early registration form here
http://apimondia2013.com.ua/files/Api2013_regform.pdf

Tetyana Vasylkivska
President
XXXXIII Apimondia International
Apicultural Congress
http://www.apimondia2013.com/
http://www.apimondia2013.org.ua/

Southern Tablelands Branch

Invites all Members & fellow beekeepers to a meeting on Friday 13 July at the Batemans Bay RSL Club Beach Road commencing at 2pm

GUEST SPEAKERS

Ian Cane

Gippsland Forest Management Plan
NSW Forests

Kevin Petty - Planning Manager for Southern Region

Fees for Bee Site Transfers
Re-assessment of Rental Fees
Site Safety Plans

Southern Tablelands Branch Executive:

President:	James Kershaw	0400 370 481
Secretary:	Sylvia Cornwell	0428 299 127
Treasurer:	Therese Kershaw	

EMERGENCY AND NOTIFIABLE ANIMAL (AND HONEYBEE) DISEASES AND PESTS

Emergency animal diseases
can have serious consequences for trade, production or human health. Contact a vet or call the Emergency Animal (includes honeybees) Disease Hotline on **1800 675 888** if you see symptoms or deaths in animals (or honeybees) that may be due to an emergency animal.

Notifiable animal diseases in NSW
A number of animal diseases, including all emergency animal (and honeybee) diseases, are notifiable under NSW legislation. This means there's a legal obligation to notify authorities if you know or suspect that an animal (or honeybees) has one of these diseases or pests.

You may notify a suspected or confirmed non emergency animal (and honeybee) disease or pest using the online form or fill in the notifiable animal disease form (PDF 44KB) and fax it to NSW DPI Biosecurity on 02 6361 9976.

The on-line form can be seen at: http://www.dpi.nsw.gov.au/agriculture/livestock/health/general/notifiable-animal-diseases-nsw/animal-disease-for

The notifiable animal disease form can be seen at: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0007/260809/Notifiable-animal-diseases-in-NSW-form.pdf

FOR MORE INFORMATION CONTACT:

Mick Rankmore
Regulatory Specialist,
Apiaries Agricultural Compliance
NSW Department of Primary Industries
PO Box 546 Gunnedah NSW 2380
Tel: 02 6741 8374 F: 02 6742 4018
Mob: 0402 078 963
Email: michael.rankmore@dpi.nsw.gov.au
Web: www.dpi.nsw.gov.au

STOCK DISEASES ACT 1923

ANIMAL DISEASES AND ANIMAL PESTS (EMERGENCY OUTBREAKS) ACT 1991

APIARIES ACT 1985

NSW Notifiable Animal Disease Form

This form may be used to notify the knowledge or suspicion of a notifiable animal disease under section 9 of the *Stock Diseases Act 1923*, or under section 7 of *the Animal Diseases and Animal Pests (Emergency Outbreaks) Act 1991*, or under section 22 of the *Apiaries Act 1985*.

Disease: ....

Species of animal/s affected: ...…...

Date of onset of signs: ..../......../......... Number of animals/hives affected: ....

Description of affected animals (breed, age, type, sex): ………………………………………………...

....

Identification of affected animals (NLIS number (if tagged), brand, tattoo, earmark, beekeeper reg. no.):

……………..

PIC (**NOTE**: important to provide this if property has PIC) ……………………………..

Address/location of affected animals ....

....

Property owner (name, address, phone, mobile): ....

....

Animal or hive owner (name, address, phone, mobile): ....

....

Laboratory tests: **s**pecimens were submitted to laboratory: YES ☐ NO ☐ (please tick)

If yes, laboratory details (name, address, phone): ....

....

Person making notification (name, address, phone, mobile): ……………………………………...............

……………………...

Signature .... Date: ..../......../...................

This form can be delivered, faxed or emailed to your local Livestock Health and Pest Authority (LHPA) office. Alternatively it can be faxed to the Department of Primary Industries (DPI) biosecurity branch on 02 6361 9976, or emailed to biosecurity@dpi.nsw.gov.au

Notifiable animal diseases in NSW, 3rd edition p 8

HONEY JUDGING TUTORIAL

The Royal Agricultural Society of NSW Agriculture Committee will be holding a one day honey judging tutorial at Sydney Olympic Park which will be led by Mr Bruce White OAM on Monday 13 August 2012.

The purpose of this tutorial is to teach anyone that is interested in judging honey or would like to become more competent in judging. Bruce who will be conducting the tutorial has spent his life providing services to the beekeeping industry as an employee of the NSW Department of Agriculture, a total of 43 years. In his retirement Bruce continues to be very generous with his time and knowledge, continuing with his dedication to passing on his extensive experience and enthusiasm for honey bees.

Bruce is the beekeeping teacher for the Open Training and Education Network of TAFE and also co-wrote educational packages for the Australian beekeeping industry. He has also judged at the Sydney Royal Apiculture Competition for 27 years which has now grown to become the Sydney Royal National Honey Show.

If you have any questions, please don't hesitate in contacting Elaine Rogers on 02 9704 1449 or erogers@rasnsw.com.au

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

Small hive beetle populations outside hives (Trial No.4)

This is the second last of these articles relating to my small hive beetle (SHB) research. The aim was to determine the proportion of beetles found in close proximity outside the hive and ascertain if this fluctuated throughout the year.

To capture beetles on the ground in the vicinity of the hives (under and around where a bee hive had been sitting), six rectangular trapping enclosures were made (Figure 1). The bottom edge of the steel enclosure was sharpened to allow easier penetration of its frame into the soil. These enclosures were hit into the ground preventing any beetles from escaping.

Figure 1. Shows the screened enclosure placed over were the hive was moved from. A lure is within the enclosure and a shovel is in the background. A hive lid is yet to be place on the screen over the lure.

A lure was placed within the enclosure to attract the trapped beetles. The lures comprised of opaque plastic fishing tackle boxes, with 7 mm holes drilled in each corner of its base. A piece of fresh comb containing capped and uncapped brood and pollen (Figure 2) was placed in the tackle box with a dampened piece of scrunched paper towel.

Developing the lure, preliminary investigations evaluated a range of different container types and attractants. Fresh comb was found to be the most successful at attracting the beetles. To test the efficacy of the lures, 100 beetles were released within the enclosures with the lures. Beetles were recaptured and counted the following day after release, then every second day over the proceeding week. This was done seven times with a mean recapture rate of 91.5%.

For the trial, six two-deck, ten-frame hives at Richmond were used. The colonies had been in the apiary for a number of months prior and were located in a mix of full sun to predominantly shade. The hives were tested on fourteen occasions between February 2008 and May 2009, usually monthly.

Figure 2. A lure – a piece of freshly removed comb containing brood and pollen placed within a tackle box containing 4 holes in the base. Still requires a piece of moist paper towel and the lid closed.

Before setting up the enclosures, each of the hives was tilted *in situ* to collect any beetles under the hive. All beetles were collected, counted and included in the outside-hive tally. The hives were then moved approx. 1 m forward in the direction the hive entrance was facing , keeping the same alignment to minimise confusion for returning bees. The lure was then placed, holes facing down, on the ground where the hive entrance had previously been and the enclosure immediately placed over the lure and where the hive had been (Figure 1). A sledge hammer was then used to sink the enclosure frame into the soil to prevent the beetles escaping. Once in position, a hive lid was placed onto the enclosure screen over the lure, for protection from sun and rain.

Once all six enclosures and lures were in place, the repositioned hives where opened and all beetles collected and counted for each hive. The lures within the enclosures were checked every 1-3 days over the following week and any beetles found were added to the beetles' outside-hive tally. Once the collection period was completed the enclosures were removed, the lures emptied and washed and the hives returned to their original positions in readiness for the next monitoring.

While examining under the hives prior to setting the enclosures, the majority of beetles were under the front cleat or deep in the grass/litter in close proximity to the hive entrance.

For the months November 2008 to February 2009, over 10% of the beetle population was outside. The largest number of beetles outside a single hive was 148, in February 2009. The highest proportion of beetles found outside a single hive was 70% (92/132) of the total population associated with that hive. On five occasions, individual hives had more beetles outside the hive than inside.

Late in the season (autumn), beetles outside hives occurred mainly in hives in sun, or with their entrances in sun. For example, on the observation of 8 April 2009 five of the six hives were predominantly shaded for the day but the other hive was in full sun with its entrance facing the sun (north). There were 20 beetles recorded outside this latter hive, compared with a total of only one beetle outside the other five shaded hives. Similar results were obtained on 4th May 2009, when four of the six hives were mainly shaded, with two in full sun but facing opposite directions; i.e. one north and the other south. Only one beetle was collected outside the shaded hives, and one outside the hive in full sun facing south, whereas 21 were collected from the hive in full sun and facing north.

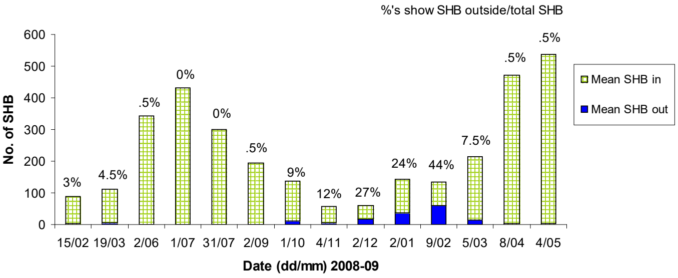

Figure 3. The total mean SHB for each observation between 15 February 2008 and 4 May 2009 with SHB counts for inside and outside hives. Percentages above columns give the proportion of SHB found outside relative to the total SHB.

The number and proportion of beetles outside hives was greatest during the summer months of the year. In late January/early February, when mean temperatures are at their yearly maximum, almost half (44%) of the beetles were outside the hive, with one hive as high as 70%. However, from April through to September, less than 1% of total beetles were found outside the hives. It is suspected that the warmth of the colony draws the beetles inside the hive. Beetles have been observed in the middle of wintering bee clusters.

Variation in seasonal conditions appears to greatly influence the relative proportions of beetle populations inside and outside hives. A much higher proportion of beetle numbers were recorded outside hives in February 2009 (44%) than in February 2008 (3%). This may have been because of the warmer weather in 2009 around the date of inspection or, possibly, the wet weather that occurred around inspection time. On the other hand, the comparative March levels during these two years were similar at 4.4% and 7.3%, respectively. This is consistent with the relatively similar temperatures experienced in these two years during the March monitoring.

With beetles capable of moving from inside and outside the hive so readily the daily and perhaps even hourly temperature changes may govern the proportion of beetles outside the hive. To examine this further, data for the maximum and minimum temperature for the day of setting the enclosure and the day before were related to the proportions of beetles outside. The percentage of beetles outside tended to be higher when the mean of those maximum and minimum temperatures was higher, further supporting the view that with higher ambient temperatures, more beetles inhabit the environment outside hives.

The microclimate at the hive entrance also appears to influence the number of SHBs outside hives. Hives with entrances with full sun exposure in cooler months (April-May 2009), had considerably more SHBs outside them than those in shade.

The presence of beetles within a honey bee colony provokes harassment by the resident bees which leads to beetles seeking refuge in small cracks within hives. This often results in their encapsulation within these refuges by the bees. However, when conditions are favourable (i.e. when external temperatures are similar to those in the hive) it suspected that many beetles relocate to the outside environment around the hive to avoid being harassed by the bees. This allows the beetles to avoid confinement and harassment while still being within easy reach of food and warmth to which they can return at any time. It therefore appears the beetles are content to live outside hives if the temperature is sufficiently warm.

Interestingly, the proportion of beetles found outside the hive peaked when the total beetle population was near its lowest levels for the year. With bee population numbers peaking through summer it is possible that the high bee to beetle ratio increases harassment levels inside the hive. Other factors possibly influencing the number of beetles outside the hive include the aggressiveness of the bees, hive health, bee genotype, the hive situation (on grass, concrete or on toad stands), and availability of harbourage locations within the hive.

The beetle population recorded within the enclosure may have been inflated by newly-emerging beetles from the surrounding soil. However, this situation is unlikely as there was no evidence of beetle larval activity in the experimental hives.

The pattern observed in the beetle population strongly reflects patterns in ambient temperature. However, if one overlays the seasonal ambient temperature pattern with the beetle population, there is a lag of about five months in the peaks and troughs in the beetle populations. At higher temperatures emergence is expected to be faster, with the life cycle from egg to emergence taking 49 day at 17-24ºC but only 32 days at 30ºC.. Therefore, at the higher temperatures recorded during the investigative period the rate of increase in beetle population numbers is increased.

The lag is likely to be a result of the time taken for the beetles to develop from an egg through to an adult Population numbers are notably increased in December and continue to increase at a more than linear rate until May. The data suggests that successful reproduction was initiated with eggs laid in October. Other factors which may have also influenced beetle reproduction include day length and hive strength.

Adult beetles have a life expectancy of up to six months, which allows the population to build up until conditions become too cool for development. This was demonstrated in the current study by the beetle populations increasing until late autumn. The build up of the beetle populations in hives can also make it harder for the bees to manage the beetle, improving the opportunity for beetles to reproduce further, increasing their number. Hence, the population expansion into late autumn continues until conditions become too cold for further reproduction and development.

The life expectancy of beetles also affects the beetle population pattern. In the same way, we see a rapid increase in beetle numbers between December and June, a similar decrease in population numbers occurs from July to November. As temperatures cool, breeding and development decline. With a six month maximum life expectancy we see a natural decline in numbers as they reach the end of their life with no opportunity to breed and replenish through the winter and into spring. Different seasonal patterns and local climatic conditions would cause variation to this pattern.

The number and proportion of beetles found outside the hive during the hotter months of the year definitely indicates there is opportunity to target beetles in this environment (under the hive near the entrance) at these times.

In conclusion, investigating beetle populations outside but in close proximity to hives, and populations within these hives over a 14 month period found that:

- A significant proportion of the beetle population occurred outside hives over a sufficiently long period of the year to warrant investigating development of control techniques targeting these beetles.
- The proportion of the total beetle population located outside a hive is strongly influenced by ambient temperature, with greater populations occurring during the warmer periods of the year.
- The microclimate around the entrance of hives can also impact the number of beetles found outside the hive.
- The total beetle populations fluctuated throughout the period of observation, peaking at the end of autumn/ early winter and lowest in late spring/early summer.
- In areas where warm conditions prevail longer than they did at the experimental site (e.g. Northern NSW, Queensland), opportunities for targeting external beetle populations are likely to be prolonged.

Knowing that adult small hive beetles spend a substantial amount of time outside the hive provides opportunities for new control strategies, including chemical controls, to be developed and implemented. This area of research warrants investigation.

The full report on all five experiments is available online on the RIRDC honeybees web page (address below) or a hard copy can be purchased from RIRDC.

https://rirdc.infoservices.com.au/items/11-044

Big THANK YOU - Sugar shake tests

Thank you to all those who did some sugar shake tests throughout last year and sent their results on to me. This practice way well provide the opportunity to have a feasible attempt at stopping an incursion of varroa or tropilaelaps.

Thank you for your efforts.


Ref: 0201

SICK BEES

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

PART 8

TIME FOR A PARADIGM SHIFT!

Bee health issues completely changed with the invasion of the varroa mite. Beekeeping success these days is largely dependent upon managing the mite level in your hives. However, it's not varroa that actually kills colonies; rather, it is the bee viruses, which is why I've been belaboring the subject. Mite management should be considered as only one facet in the overall context of virus management. I feel that it's time for a paradigm shift in the way that we look at bee health issues!

Understanding Viruses
Just as the successful beekeeper these days must understand varroa biology, it helps greatly to understand virus biology, which is why I've been going into such great detail on the subject. Let's return to the discussion…

Bee/Virus Coevolution
To understand the process of evolution, one must first disabuse himself of any misconception that evolution has any plan, goal, or rules of fairness. Look at it from a Zen perspective—it just happens, and no telling where it will go! Whatever beats the competition is favored; everything else is cast by the wayside without regret or empathy. Like Danny DeVito explained in the film "Other People's Money," no matter how exquisite and perfect the now outdated buggy whip, it will be abandoned if it can no longer compete in the "marketplace" of nature.

Honey bees are masters (or is that mistresses?) of adaptability. They exhibit the highest genetic recombination rate (of germ cells) of any know animal (Beye 2006), and queens go to great trouble to ensure that they mate with as wide a diversity of drones as possible. This great genetic diversity within the colony ensures that there are plenty of alleles (gene variations) present in a natural population to allow rapid adaptation (Pritchard 2010). The honey bee is always poised to adapt to whatever Nature throws at her!

Viral Quasispecies
And what Nature throws at bees are a mess of ever-shifting RNA viruses. All the bee RNA viruses are noted for their mutability and existence in multiple, constantly evolving forms. This rapid mutation and evolution is evident not only within the bee population as a whole, but even within a single hive, or within a single bee! Scientists use the term "virus swarm" to recognize the great variability within any bee virus species, and apply the descriptive term "quasispecies" when speaking of a particular virus (Lauring 2010).

Once an individual virion enters a bee cell and begins to replicate, a process takes place similar to the "Pass the Message" game played at parties, in which a message is whispered from one person to the next, often becoming bastardized in the process. RNA viruses use an intentionally sloppy replication process (they exhibit by far the highest mutation rate of any known life form), so that in any infected host they create a wide range of modified new forms of themselves. ***The result is that any single bee that cannot suppress the initial infection winds up being inhabited by a swarm of slightly different virus mutants, any of which might be more or less virulent, or better adapted to the immediate environmental conditions.*** Most new genetic combinations are not adaptive, but even so, from time to time the virus gets lucky!

There's a chance that in any hive an extremely virulent virus form might evolve, but luckily such a virus (generally) quickly kills the individual bee (or perhaps the colony) before it can transmit to other bees. Remember that the population of a colony of bees mostly consists of up to a few dozen distinct half sister cohorts, each fathered by drones form different mothers. This genetic diversity serves to prevent the sort of rapid spread of a virus that you'd see if all the bees were very closely related (Tarpy 2003). Along the same line, each colony of bees differs in its overall susceptibility to any specific virus strain, so it takes a generic sort of virus mutation to be virulent in the bee population overall.

Practical Application: Multiple mating ensures that the "team" of sister groups within the colony is more likely to include some members with better disease resistance, janitorial skills, or the ability to produce and propagate an antiviral RNAi response for the benefit of the entire colony.

Regional Bee Stocks
One controversial hypothesis is that bees could use viruses to their competitive advantage, in a process called "plague culling" (Hunter 2010). Say a virulent new virus strain evolves, but instead of being killed by it, the bees are able to ramp up their immune response to it, recover, and then keep the virus in check. From that point on, they could use that virus as a potent weapon to take out the competition (other colonies that lack immunity to that specific virus) by spreading it via the drift of infected drones or by intentionally contaminating the nectar of visited flowers! Soon the only colonies left would be those which were able to carry that virus as a harmless inapparent infection.

There is of course a problem of carrying such a ticking time bomb—it might go off at any time that the host bee is stressed or infected by another synergistic virus! Burden (2005) cites cases where covert viral infections in insects exploded years later into epidemics that devastated the population.

What you wind up with in nature are bee populations micro adapted for specific regions, which may be as small as a particular valley. Within that region, the bee population may have atypical symbiotic bacteria (Evans 2006) and resistance mechanisms to specific virus strains. Of course, we beekeepers completely mess up these regional adaptations by shipping a limited genetic pool of queens cross country and by trucking bees (and their viruses) all over the place (not to mention importing them from other continents)!

Brown and Fries (2008) explain the natural evolutionary situation well:

Given the likely distribution and density of wild colonies, vertical [mother-to-daughter] transmission [of viruses]…to offspring swarms should be the dominant mode of transmission. If this is true then there should be strong selection at the colony-level for low virulence in viral pathogens, as highly virulent pathogens will either kill off their host colony prior to [swarming] (and thus have no opportunity for transmission) or will reduce their growth to the point that they are unable to swarm (with similar impacts on transmission). Given that maintenance of the virus in the honey bee population ultimately depends upon inter-colony transmission, vertical transmission as the dominant route should result in viruses that have little or no effect at the colony level. In fact, unless there is some horizontal [colony to colony] transmission among colonies, theory suggests that viruses should ultimately be expected to evolve to be commensals [causing no harm]. Both acute paralysis virus and slow paralysis virus, *which prior to the advent of* Varroa *mites were never associated with disease, provide evidence for such a scenario.*

Practical application: It is normally only when something either depresses normal bee immunocompetency (such as lack of pollen (Fig. 1), chilling, environmental toxins, or parasites) or favors the transmission of unusually virulent virus mutants (by the crowding of too many hives into an area) that virus epidemics rage through the bee population.

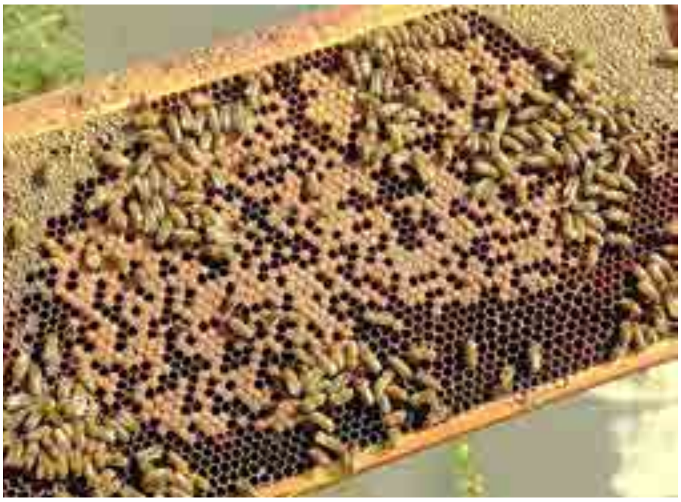

Figure 1. This colony is under nutritional stress. Note the lack of a band of pollen around the brood, and the spotty brood pattern. A colony under nutritional stress cannot defend itself well against viruses and other parasites.

The Natural Situation Prior to Varroa

Allow me to first dispel a common notion—that there is any normal "natural order" of things. The only thing that is assured in nature is that things will change. There is nothing essentially stable about ecosystems—they are in constant flux due to shifts in the environment, the introduction of new species, and the never ending evolutionary changes in the players, especially with regard to pathogens. Ecosystems and the species within exist in a state of "dynamic equilibrium," and can change substantially should a new factor enter the equation. It is only in terms of the short human lifespan that we can speak of "normal" or "stable."

The mechanism that maintains such apparently stable systems is a dominance of negative feedback loops. In my proposed model for colony collapse, I focused on the ***positive*** feedback loops that may lead to the rapid depopulation of a hive. On the other hand, the apparent stability in natural systems almost guarantees that there are strong ***negative*** or stabilizing feedbacks in operation.

In my neck of the woods, the Gray Squirrel population swings up and down between booms in response to food availability and then decimation due to epidemics of mites and other parasites. Similarly, the Gray Fox population builds up over several years, until the foxes become so abundant that the host density favors the transmission of canine distemper, at which point the fox population crashes. One could say that the squirrels and foxes are stable members of the foothill ecosystem, but their actual populations are anything but stable! However, the negative feedback loops that either increase or decrease parasite transmission in these species tend to keep the populations within a certain range—neither too abundant (for long) nor eradicated to the point of extinction.

The major negative feedback on virus epidemics is host density. The main constraint upon virulent bee viruses in natural situations is the distance that bees will fly to rob deadouts. An epidemic of a virulent strain of virus will spread until it reaches the point where there are no more ***susceptible*** hives within robbing distance to transmit to.

At that point, the surviving colonies that demonstrate ***resistance*** to that particular strain of virus will restock the population, with the deadout cavities being cleaned out by wax moth in the interim.

Unfortunately, managed bee populations generally remove the constraint of host density upon viruses—we tend to crowd as many hives into an area as possible, often to the point of stressing them nutritionally.

I previously wrote about the regular periodicity of colony collapse events due to Thai Sacbrood in Asia. Such periodic virus epidemics are common in human, animal, and plant populations (Fig. 2). The same goes for insect populations. Dr. Jennifer Cory (2005) gives an example in the case of the Western Tent Caterpillar, whose population collapses every 6-11 years due to a virus. She also notes that ***sublethal effects*** of the virus appear to regulate the caterpillar population—that is, ***the virus does not need to necessarily kill the host to affect it at the population level***. She also brings up a point of interest to beekeepers: "that the diversity of the virus population plays a role in infection severity, such that mixed genotype infections are more virulent than any individual clone." As we beekeepers bring large numbers of colonies together, we ensure that multiple genotypes of each virus strain have more chances to interact. I'll return to this point when I discuss how beekeepers help to create virus epidemics.

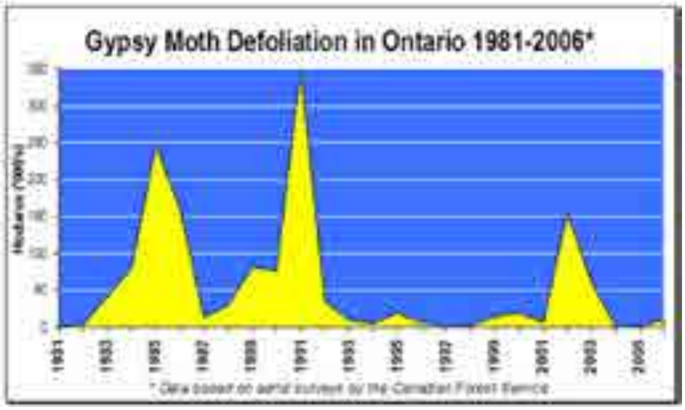

Figure 2. An example of recurrent outbreaks of a pest, in this case, the Gypsy Moth. Virus epidemics may be periodic (occurring cyclically) or sporatically triggered by environmental events. Source http://www.inspection.gc.ca

The 50-year adult human lifespan often does not allow us to recognize the changes in ecosystems over the years. With regard to bees, in the Big Picture, the European and African honey bee populations on all continents except Australia are in the process of adjusting to new parasites, notably the varroa mite. In the absence of human intervention, the natural bee population generally recovers to a new "equilibrium" within a decade, after establishing a workable host-parasite relationship.

In most managed populations of honey bees, our intervention to prevent the loss of apiary businesses finds us tenuously nursing along strains of bees that are unable to hold their own against the ubiquitous varroa mite and its associated viruses. The sooner we can replace those strains with parasite-adapted stock, the sooner beekeeping will again be easier.

What's Changed?

Most of our current viruses were present prior to varroa, yet we didn't see as many collapse events as we see these days—why's that? The answer is due to a simple fact that all beekeepers should keep in mind: ***it is rarely to a virus's advantage to actually kill a bee or the colony!*** In the mindless and mathematical process of natural selection, it is most adaptive for a virus to exist rather benignly in the bee population as an inapparent infection.

The reason for this is that as soon as a virus makes a bee feel sick, that bee stops sharing food with other bees (thus minimizing the transmission of that virulent strain of virus) and performs "altruistic self removal"—the process by which sick bees protect the mother colony by flying away to die. It is exactly this process (***which is normally a negative feedback***), that can cause the rapid depopulation of a hive when it ***snowballs into a positive feedback loop*** due to poor nutrition, multiple pathogens, chilling and/or environmental toxins.

It is generally to the virus's interest to keep its host bee alive and kicking as long as possible, in order to increase the chance that infected bee will transmit that particular virus strain to either another uninfected bee or to another colony (Brown 2005).

Of the roughly twenty known bee viruses, only one instance comes to mind in which it might be to the virus's advantage to kill an ***individual*** bee within a hive. That would be for Sacbrood to kill bee propupae, as the virions would then be spread when undertaker bees remove the dead larva. However, for most of the year Sacbrood exists mainly as a very common infection in adult bees, with no dead brood to be seen (but note that Sacbrood-infected workers exhibit shortened lifespans). This constraint does not apply, of course, to viruses which manage to kill entire colonies, and thereby get spread (along with their mite accomplices) to other hives via robbing.

In general, there is a sporadic and dynamic ebb and flow of the infection levels of the various bee viruses in the hive (this has been independently documented by both Dr. Joe DeRisi and Dave Wick). But most of the time, the viruses persist as inapparent infections without any visible symptoms.

The point to keep in mind that bee viruses don't "want" to kill bees. They are most successful when they vertically transmit from parent colony to swarm without killing off the host! But it is not as simple as that, since the bee colony goes through seasonal growth phases, in which different evolutionary pressures are put upon the viruses. ***It will help the beekeeper to recognize this dynamic, in order to better understand why colonies crash in fall and winter.***

The Seasonal Progression of Virus Infections
Let's look at the dynamics of virus epidemics within a hive:

Phase 1—Late Winter Population Turnover. The winter break in the brood cycle sets back both mite and virus reproduction. At this point of the time, varroa levels are at their lowest. Sometime in December, the colony initiates broodrearing in order to start building up in order to be able to take advantage of the first pollen and nectar flows. This is the last hurrah for the long-lived "winter bees," which will start dying en masse once they've raised a generation or two of brood (Harris 2009). There is a relatively rapid turnover of the hive population from the long-lived "winter bees" to a new generation of short-lived "summer bees" (Harris 2010). The colony at this time is very susceptible to both chill and nutritional stress, either of which can lead to virus problems.

Phase 2—Spring Buildup. The colony builds up rapidly in the spring and produces abundant brood and maintains a large proportion of nurse bees. ***During this period of rapid growth, it can simply "outrun" the mites and viruses due to the rapid turnover of the bee population***.

Phase 3—The Flow: During an intense honey flow, the nectar processors fill the brood cells with nectar, thus shutting down the queen. In order to capitalize on the available nectar flow, the nurse bees then quickly transition into short-lived foragers. As a result, the hive population structure shifts to being heavy on foragers rather than nurses. At this time, the mites have less brood to parasitize, and thus the infestation level of the brood greatly increases. In other words, ***this is the turning point when the mites catch up with the bees. The result is that the current generation of brood, which is critical for the next phase, will consist of bees that were heavily parasitized.***

Phase 4—Population Recovery. Once the flow is over, the colony must attempt to replace its population, which at that time will consist largely of worn-out foragers, yet there may be little sealed brood from which to draw recruits. ***This is the critical time when viruses can go rampant if mite levels are high.***

Phase 5—Late Summer Pollen Dearth. This is the worst time for Western beekeepers, since without adequate pollen, the colonies cut back on broodrearing, and the nutritionally-stressed hives simply can't hold their own against varroa and the viruses. ***This is when we typically start to see the initial signs of a brewing virus epidemic in the hive (sick pupae, adults with deformed wings).***

Phase 6—Fall Population Turnover Once the fall pollen flow is over (due to seasonality or weather), the remaining summer population of bees flies off to die, leaving a smaller population of broodless long-lived "winter bees" to hold the fort until spring (Matilla 2007***). It is critical for colony survival that these bees go into winter in healthy condition!***

Phase 7—The Winter Cluster. Once broodrearing ceases, all mites must subsist in the phoretic stage on adult bees. They move about freely from bee to bee, and abandon dying bees, moving to fresh hosts (Bowen-Walker 1998). During this period of time, due to the combination of cold temperatures, and the constant transmission of virus strains throughout the hive, it is easy for an epidemic of a virulent virus strains to infect the majority of the hive population, especially as infected mites are forced to concentrate upon fewer and fewer surviving bees!

At each stage of this cycle, the evolutionary pressures on the bee parasites change. For the Big Three—varroa, viruses, and nosema—their levels go from benign to epidemic and then back down, each on its own schedule. *Nosema ceranae* infection typically peaks in May; varroa infestation goes from a low point in early spring, and peaks around September 1st.

The surprising thing is the viruses. Colonies, and even individual bees are often infected with at least three viruses simultaneously, but that does not necessarily mean that they are all reproducing (USDA 2010, p. A-4)—they may just sit tight until the bee is stressed, which then upsets the virus/immunity equilibrium. Each virus has its own seasonal peaks for prevalence (reviewed by Ribière 2008):

VIRUS	TIME OF PEAK INFECTION
Chronic Bee Paralysis Virus (CBPV) Sacbrood Virus	Spring and summer
Kashmir Bee Virus (KBV)	Spring
Israeli Acute Paralysis Virus (IAPV)	Unknown, but is genetically similar to ABPV and KBV
Deformed Wing Virus (DWV) Acute Bee Paralysis Virus (ABPV)	Both track the varroa infestation level, so peaks are generally in late summer and fall
Black Queen Cell Virus (BQCV)	Tracks nosema infection level
Insect Iridovirus (IIV)	During cool, damp conditions

Note in the above table that in the absence of varroa, virus levels typically peaked in spring, when the bee population was growing most rapidly, and declined in fall, as the population dropped and older bees abandoned the hive. Why would this be? When the hive population is growing rapidly, and consists mostly of short-lived bees, then it is to the virus's advantage to be more virulent. On the other hand, when there is little brood, when the older bees are flying off to die in the fall, or when the population is composed of long-lived "winter bees," then less virulent virus strains are more successful. Prior to the mite, the seeds of virus epidemics sprouted during spring and summer, and then were naturally weeded out in fall and winter.

ENTER VARROA

Direct Effects of Varroa
The host upon which varroa mites reproduce are the bee pupae. Workers parasitized as pupae never recover from their loss of hemolymph proteins; they begin foraging at an earlier age, and have a significantly reduced life span. ***Those handicaps placed upon individual bees put a real drag on overall colony growth and peak population.***

A bee's exoskeleton is its first line of defense against viruses and other pathogens. For the first time in their evolution, European honey bees now routinely have that very cuticle perforated by varroa feeding wounds. The trauma of the wound alone may be enough to "wake up" an inapparent virus infection in the bee (Anderson 1988). Diana Cox-Foster's team (Shen 2005, Yang 2005) also brought to our attention that varroa mites actually inject an immune suppressor into the bee (likely in order to inhibit the normal rapid healing of the wound). This immune suppression may allow the latent viruses or nosema that are normally endemic in the bee to explode into full-blown infections resulting in actual disease.

Kanbar and Engels (2003) produced some stunning electron micrographs of the bacterial colonies that then become established in those wounds. What occurs to me is that if mite wounds are infected with bacteria, then the bees will need to maintain a metabolically-expensive immune response for the rest of their lives in order to keep the bacteria in check (Hain2008).

This bacterial infection has other consequences. Yang (2005) suggests that: "The increased replication of DWV in honey bees needs two components, varroa mite parasitization and exposure to a bacterial factor. This microbial challenge may naturally exist, because bacterial colonies are found on the varroa feeding sites in some bee pupae." The suppression of bacterial infection by antibiotics may help mite-infested colonies to survive. Note that "antibiotics" may include the essential oils and propolis, rather than manmade antibiotics, the overuse of which leads to antibiotic-resistant bacteria.

Imagine the arrival in your community of a crab-sized external bloodsucking parasite that infested, say, about one out of ten people, and left gaping half-inch wide, bacteria-infected, unhealing skin wounds, and that the parasites moved freely from person to person, spreading viruses and bacteria from one traumatized victim to the next. Sounds like a recipe for disastrous epidemics, huh? Well, that graphic scenario accurately describes a colony of bees suffering from a 10% varroa infestation (a level commonly seen in late summer).

Question: what would be the long-term effect on apiaries if parasitism by the foundress mite inevitably caused bee pupae to quickly die?

Hint: A mite typically creates a long-term feeding wound on the left underside of the abdomen of its favored host—a drone pupa; there's generally only one shared wound per pupa, no matter the number of mites in the cell (Kanbar and Engels 2004, 2005). The single wound is likely an adaptive trait, since multiple wounds might kill the pupa, resulting in the mite(s) being trapped in the capped cell. Interestingly, the mite does not yet appear to be well adapted to worker brood, and often creates wounds in the thorax. Think about the answer to the above question…it's in

References.

Remember that the bees' first line of defense against viruses is an intact integument. In the past few decades, bees in the U.S. have picked up three parasites that breach that barrier—varroa mites pierce the exoskeleton, tracheal mites the tracheal lining, and *Nosema ceranae* the basal cells of the gut. It's small wonder that bees are under duress from viruses!

Aaronstein (2011) reports that "Bees parasitized as pupae (with normal wings) by varroa are approximately twice as susceptible to IAPV infections as non-parasitized bees." Once a bee's been bit, it appears to be a sitting duck for the next pathogen to come along!

To make matters worse, recent research indicates that miticides and other pesticides may induce the death of bee gut cells, make bees more susceptible to virus infection, or increase the reproduction of nosema (Gregorc 2011; Diana Cox-Foster, pers comm; Judy Wu, pers comm). This breaching of the normal bee gut defense against parasites must be factored in when we discuss bee health.

It's not completely clear as to whether the bee viruses are merely vectored by varroa, or if they actually replicate in the mite as an alternate host. A number of researchers have found high virus titers in some mites. However, when Santillán-Galicia (2008) meticulously sectioned (sliced into thin pieces) mites, she only found negative DWV strands (negative strands are indicative of actual virus reproduction) in the mite guts, and nowhere else in the mites' bodies. This finding suggests that perhaps DWV does not actually replicate in the mite, or maybe it does replicate, but only as a relatively harmless infection of the gut lining, similar to the way in which influenza viruses benignly infect the guts of their natural host—waterfowl. This finding is very intriguing, especially since the closely-related Varroa Destructor Virus appears to specifically be adapted to reproduce in the mite (see my previous article for the implications of DWV/VDV hybrids).

DWV and Bee Behavior

A number of viruses and other parasites have been shown to affect host behavior to cause the infected host to better transmit the parasite (human cold viruses cause us to sneeze, rabies virus induces infected animals to bite, other viruses initiate behaviors that increase the chance that a host will be eaten by a predator). Well, bee viruses are likely no different! A study by Shah (2009) found that DWV preferentially replicates in bee brains: "Therefore, it is possible that the virus affects the bees' flight behavior, homing performance, and perception of odorants." In the case of colony collapse or reduced honey production by colonies with high mite levels, the loss of bees might be directly attributable to disorientation due the replication of DWV in the antennal and optic lobes of their brains!

Varroa and Queens

Excessive queen loss has been problematic in recent years, yet research by various researchers indicates that it is neither the queens nor the producers to blame, except perhaps for the fact that all queens are infected by DWV, many at surprisingly high levels, relative to other viruses (Delaney 2010). Delaney also suggests that: "There is also an intriguing possibility that DWV may affect sperm production by drones, the ability of queens to adequately store sperm, or both."

Dr. Frank Eischen recently presented intriguing data which suggests that queen losses are linked to varroa infestation levels. It appears that queens, all of which test positive for at least one virus, are prone to succumb when mite levels increase. This could be due to viruses being inadvertently passed via jelly from nurse bees to the queen, or perhaps by direct feeding of a mite upon the queen. I've searched the literature, and also asked several notable varroa researchers if there is data on whether varroa actually feed upon queen bees, but no one seems to have actually investigated!

Things are Different These Days

Our bees have always dealt with viruses. Even in varroa-free Australia, inapparent virus infection is common in pupae (Anderson 1988). In the absence of varroa, viruses generally infect hives with little obvious effect, except for the occasional flare up of a geographically-constrained event. There are historical records of such events from all continents of Sacbrood, Chronic Paralysis Virus, Kashmir Bee Virus, and Black Queen Cell Virus, but these epidemics were uncommon, and generally related to nutritional stress.

Before the arrival of varroa (Fig. 3), episodes of sudden colony collapse were not unusual (often called "Disappearing Disease" (Underwood 2007). Beekeeper Andy Nachbaur (1996) wrote about "Seasonal Affective Disorder" and "Bee Immune Deficiency" problems in commercial California operations. But when varroa arrived, things got a whole lot worse!

Figure 3. Prior to varroa, beekeeping was much easier! However, as far back as we have records, there have been episodes of collapse events that were likely caused by virus epidemics, generally initiated by nutritional stress and poor weather. Photo: Apiary at Cogswell's Sierra Madre Villa, Ca. 1886, Carleton E. Watkins. Courtesy of the California History Room, California State Library, Sacramento.

Healthy bees have a hulluva strong natural resistance to getting sick from viruses by the normal route of infection—from eating contaminated jelly, honey, or pollen. Oral inoculation typically requires the ingestion of millions or billions of virus particles to initiate observable disease. However, if a varroa mite inadvertently injects as few as 100 virus particles directly into a pupa or adult bee when feeding, that bee may quickly sicken and die! This why varroa is such a problem - it transmits viruses throughout the hive in a novel manner (Martin 2007).

Such vectoring of virus particles means that if a phoretic female mite feeds on an infected bee, that she will likely transfer that infection to the next pupae that she subsequently parasitizes, from which her offspring (and any other mites in the cell) then become infected (Di Prisco 2010). When those infected offspring then go into the phoretic stage, or switch from bee to bee in the winter cluster, they can rapidly serially transfer the ***most infective virus strains*** from bee to bee. ***This is a huge point! That the relatively quick "hopping" of mites from bee to bee, and their abandonment of dying bees, specifically selects for the most virulent strains of virus to be successfully transmitted.*** This is totally unlike the situation prior to varroa, when natural selection worked <u>against</u> highly infective viruses.

Practical consideration: Martin's computer modeling (2001) demonstrated that the rate of mite transfer from bee to bee greatly affects the overall proportion of bees in a hive infected by virus. This brings up an interesting thought—any disturbance (trucking? smoking? alarm pheromone) or substance introduced into a hive (pesticides, sublethal doses of essential oils) that increases bee-to-bee mite movement without actually killing the mites could hypothetically increase the rate of virus transmission!

Varroa and Viruses

Varroa has affected the historical host/parasite relationship between bees and viruses. I've detailed a number of the direct effects of varroa upon individual bees (Fig. 4). But how about the colony- and population-level effects of the mite on bees?

Figure 4. Mites chew a hole in the skin of a pupa, which initiates both bacterial and viral infections. Bees parasitized as pupae will never develop into fully competent adults. This photo is of mite-infested drone brood skewered on a cappings fork.

Parasitism by mites greatly increases the chance that pupae will become infected by more than one virus, and that those combinations of viruses will be subsequently transmitted throughout the hive via mites, as well as through the action of mid-aged "cleaner" bees as they chew away dying pupae. Again, such removal of virus-killed brood selects for the transmission of the most virulent strains of virus.This vectoring of viruses is an indirect effect of varroa, but perhaps the mite's major impact upon beekeeping. The tenuous bee/virus equilibrium was upset when this highly-effective vector entered the picture. Instead of natural selection weeding out the most virulent strains of viruses, varroa actually favored them!

When varroa initially arrived in the U.S., the viruses had not yet adapted to using it as a vector, and you could see apparently healthy hives with as many as 20-50,000 mites (the same was reported from England, South Africa, and New Zealand). A yearly treatment with a "silver bullet" miticide would bring the mite population down enough for the colony to recover (we often marveled at the sight of mites too numerous to count on the stickyboards). A varroa infestation appeared to be relatively harmless those first years, so long as you knocked the mites back each fall (unfortunately, many beekeepers still try to stick to this strategy). But this was back when viruses were less common in hives, and those viruses had not yet evolved to exploit the mite for their purposes.

Practical Application: Simply knocking the mites back in fall is no longer adequate for successful colony wintering. Mite management must begin by midsummer at the latest.

Shortly after the arrival of varroa we started to notice the symptoms of Deformed Wing Virus (DWV). Varroa and DWV is a match made in Hell! Either species alone is a relatively benign parasite, mostly transmitted ***vertically*** from parent colony to daughter. But the two parasites in combination spread quickly when their joint infestations caused colonies to collapse and get robbed out, thus ***horizontally*** transmitting both parasites to new host colonies. As long as there are plenty of new hosts, the most virulent strains of varroa and DWV spread hand-in-hand like wildfire through the bee population--both the mite and the virus assisting each other.

When I wrote an article in 2007 on mite threshold levels, there were U.S. researchers suggesting that colonies could winter with as many as 3500 mites in fall! But at the same time European researchers were saying that 1000 mites in fall was the kiss of death. The difference was apparently due to two factors in the European hives:

1. The constant presence of varroa since the mid 1980's meant that there was much greater overall presence of several viruses in hives, and
2. That due to the evolution of the mite-vectored viruses, there was an increase in the efficiency in transmission and in the virulence in those viruses.

In a few years, the U.S. situation caught up with that in Europe. The most observable change to beekeepers was the evolution of DWV, since we can visually see the symptom of deformed wings in those bees most severely infected as pupae. In the early years of varroa, we'd only see bees with deformed wings once mite infestation built up to high levels. But after several years, things began to change. We started seeing bees with deformed wings even when there weren't many mites. DWV has evolved away its formerly obscure pre-mite status, and is now a ubiquitous and potentially devastating inhabitant of virtually every bee in every hive, causing winter mortality even in the near absence of mites (Highfield 2010).

As I explained in my last article, the various strains of DWV can hybridize and interact, and can cross with its sister virus, Varroa Destructor Virus (VDV-1) to form highly infective and virulent hybrids. ***We beekeepers in the U.S. have this to look forward to as VDV-1 or other strains evolve and spread rapidly across the country, helpfully assisted by migratory beekeepers.***

Other viruses also seem to have evolved, especially the Kashmir Bee Virus (KBV) family, which includes Acute Bee Paralysis Virus and Israeli Acute Bee Paralysis Virus (ABPV and IAPV). Dr. Stephen Martin explained (2007) that rapid-acting ABPV can cause a colony to collapse very quickly (which we've also observed when we inoculate colonies with a good dose of IAPV). Di Prisco (2010) found that varroa actively transmits IAPV. DWV, however, tends to cause a colony to decline more slowly, generally collapsing during fall or winter when the normal decrease in broodrearing cuts back on the recruitment of fresh young workers to take the place of sick ones.

Generally it takes a minimum number of mites in a hive to kick start a virus epidemic. Stephen Martin's 2001 model indicated that a mite population of 2000 could initiate an unstoppable epidemic of either DWV or ABPV, leading to eventual colony death sometime between fall and spring. Note that 2000 mites in a colony with 10 frames of bees (about 40,000 bees) would represent a 5% infestation of the total hive population, including the bees in the sealed brood. A recent study by Katie Lee (2010) found that roughly half the mites would be in the brood during the summer, so that 2000-mite infestation level would show as a 2½ % infestation of the adult bees (less than 3 mites per 100 bees, or 8 mites in a ½ cup sample of bees).

Practical application: most successful beekeepers already have realized this, but if you allow mite levels to climb beyond the 5% level in September, you are in serious risk of later losing that colony to a virus epidemic, no matter if you later knock down the mites with a treatment! That's like closing the barn door after the horses are already loose—the virus epidemic has already taken on a life of its own, and the colony will have a hard time recovering. Coupled with poor late-summer nutrition, the sublethal effects of the miticide and some Ag pesticides, the colony may have little chance at making it through the winter!

Practical Tip: As a general rule, do not allow mite infestations to ever exceed 2 mites per 100 adult bees (6 mites in an alcohol wash of ½ cup of bees). This threshold should be even lower in winter and spring, but might go a bit higher around September 1st.

As the virus epidemic spreads (generally invisibly) through the hive population in late summer, the workers' lifespans are shortened, brood survivability drops, and the colony is not able to maintain the necessary recruitment rate of young workers to replace the aged, sick, and fallen. As Rosenkranz points out, ***colonies can handle mite and virus epidemics so long as the colony is in the rapid growth stage*** (note that few colonies die at this time of year). ***The problems start as the colony begins its natural population decline in late summer, when the mite and virus infection levels are increasing, just as the bee population is decreasing.***

Practical application: Be aware that mite/virus problems begin when colonies slow down on broodrearing, such as during an intense honey flow, in late summer, or during pollen dearths. Management to promote broodrearing in late summer can help compensate for the negative effects of the mite/virus buildup at that time. Moving hives to better pasture or feeding supplemental protein can greatly improve colony health.

Holding Yards

In large holding yards, drift and robbing quickly homogenize infected bees and vectoring mites throughout the operation. Some viruses which infect the brain, such as DWV, appear to affect the bees' ability to navigate, and may lead to increased drifting of infected bees into other hives (ditto for nosema, Kralj 2009). The process would then go into a positive-feedback loop that selects for the most virulent virus strains. If the rest of the colonies are stressed by poor nutrition, cold, and pesticides, they could also be drug down—even if mite counts are relatively low! Infected bees will quietly fly off to die, leaving emptied hives with little patches of young bees valiantly trying to save the queen! Sound familiar?

Practical application: Large holding yards are perfect breeding grounds for mite/virus/nosema epidemics.

Beekeeper-Applied Miticides

One of the major indirect effects of the varroa invasion is that, for the first time in history, beekeepers are intentionally dumping large quantities of synthetic pesticides into their hives. It now appears that the cure may have been as bad as the disease! Bees have had to deal with agricultural pesticides for many years, but the addition of high levels of miticides may have been the tipping point in suppressing overall colony immunocompetence not only against viruses, but also against nosema, and perhaps even varroa itself!

This is truly a case of the pot calling the kettle black! There is considerable irony in the fact that as beekeepers worldwide decry the putative harmful effects of agricultural pesticides to their bees, they in fact are typically the primary polluters of those very hives! As much as beekeepers wish to stick their heads in the sand, in every recent study of collapsing hives, from every country of the world with varroa, the presence of high levels of beekeeper-applied miticides is a primary suspect for causing poor colony health.

It is important to keep in mind that when a miticide or agricultural pesticide is tested for bee toxicity, it is generally tested on healthy, pesticide- and miticide-free bees. Unfortunately, in the real world, that pesticide will in actuality be one more addition to the toxic stew already existing in a hive, likely with synergistic negative effects upon bee immunocompetence and survival!

The reality is that any assessment of apiary health must take into account that the presence of these miticides in the combs likely negatively affects brood survival, queen longevity, and the ability of the colony to maintain an effective immune response to the ever present pathogens in the hive.

Practical application: there are effective, off-the-shelf "natural" miticides that leave insignificant residues in the combs (Fig. 5).

Figure 5. My sons applying Apiguard thymol gel in Nevada in late summer. I highly recommend placing it between the brood boxes in the middle of the cluster for best efficacy. We have no problem with keeping mites in check by using resistant stock and "natural" treatments.

Varroa changed everything

Dr. Keith Delaplane (Bee World 2010) recently summed up the feelings of most bee researchers (including myself):

I have come to believe that Varroa commands the prominent place in the list of bee problems, to the point –I propose – of constituting the kingpin, the overarching preconditioning liability, the snowball that starts the avalanche. This blood-feeding, non-natural ectoparasite attacks bees at both the larval and adult life stages, shortening life span, altering behaviours, vectoring or activating a host of bee viruses, and suppressing immune systems. Moreover, the synthetic miticides used to control Varroa are themselves hazardous to the bees they are intended to protect.

I echo the summation of Peter Rosenkranz and co-authors when they said in a recent special issue, "No other pathogen [beside Varroa] has had a comparable impact on both beekeeping and honey bee research during the long history of apiculture." In summary, it is simply non-controversial among the world's practicing bee scientists that Varroa destructor is problem #1. Thus, Varroa associated bee morbidity is an unholy mix of direct injury, mite-vectored or activated pathogens, suppressed immune systems, and non-target miticide effects.

Practical Wrap Up

I bring to the reader's attention Dr. Delaplane's use of the word "morbidity," a recent buzzword in the bee literature. Beekeepers have traditionally been more concerned with bee or colony "mortality"—the death rate in a population. But the damage due to the varroa/virus duo is more insidious.

Brown and Fries (2008) explain:

We use mortality for the sake of simplicity, but note that many parasites cause morbidity (that is, they lower host fitness without causing mortality), and thus the absence of mortality in any given honey bee/virus system should not be taken to mean the absence of an impact of the virus on honey bee colonies. While using mortality as a metric may seem to be straightforward, the presence of covert infections…puts a serious wrinkle into the picture.

The term "morbidity" relates to the incidence of unhealthiness or disease in a population. Even when there is no apparent overt bee or colony mortality, one might notice slower colony build up, poor brood patterns, a higher incidence of nosema or chalkbrood, smaller hive populations, decreased honey production, increased queen supersedure or failure, or poorer wintering. Any of the above would be considered as examples of colony morbidity due to viruses.

Many long-time beekeepers have noticed that colonies just seem more "fragile" these days, less productive, and harder to get through the winter. Note how these symptoms reflect the bee/virus coevolution since the arrival of varroa. Prior to varroa, the bees and the viruses had reached an uneasy sort of "détente" or generally peaceful coexistence. This didn't change immediately after the arrival of the mite, but went to hell as the viruses evolved and "caught up" with the altered transmission dynamics afforded with having the mite as a vector. It's now the bees' turn to catch up with this entirely new situation of having both varroa and the recently-evolved virus strains constantly present in the hive.

The resulting decreased health and fitness of managed hives means that they are often closer to a "tip point" from which they may succumb to a combination of additional stresses imposed by any of their traditional nemeses: poor nutrition, chill, parasites, or environmental toxins.

A Paradigm Shift

Granted, beekeepers who practice good varroa management are generally successful at keeping their colonies alive. But I feel that it is time for a paradigm shift in our understanding of the actual biological situation. What we are really dealing with is not varroa per se, but rather the impacts of the ***viruses***, exacerbated by varroa. ***So I feel that it would be of benefit to beekeepers to shift our perspective from mite management to that of virus management.***

Virus management depends upon maintaining colony ***immunocompetence***, plus holding the virus ***vector/activator*** (varroa) in check at the appropriate times of the year. The following would be the main items to address in a good integrated pest management program against viruses:

Basic Immunocompetence

1. Colony immunocompetence is largely a function of good protein nutrition. Provide good nutrition by either stocking fewer colonies in a yard, moving hives to good pasture, or by supplemental protein feeding.
2. Maintain genetic diversity, both within the hive, and within one's operation. The less diversity, the greater the chance that a virus mutant will tear through your entire operation.
3. It's been demonstrated that it's easy to breed for virus resistance, and that such selection is as important as breeding for mite resistance.

Medication and Treatment

1. We may find that certain natural antibiotics such as propolis or essential oils are helpful at controlling the bacteria that infect varroa wounds.
2. The new siRNA product Remebee™ may prove to be useful as an antiviral immunization.

Sublethal Toxins

1. Another major aspect of colony immunocompetence is to minimize pesticide residues within the hive. A number of insecticides, fungicides, and pesticide adjuvants are clearly harmful to bees and brood, and appear to suppress immune function. Multiple pollination contracts on heavily-sprayed crops can leave colonies in stressed condition.
2. That includes any persistent miticides! The major pesticide stress in hives is likely due to the very synthetic miticides applied by beekeepers. Switch to an Integrated Mite Management program which uses timely application of "natural treatments" (thymol, formic, oxalic, plant extracts) for varroa control.

Vector Management

1. *Use mite-resistant bee stock. This is the number one most effective part of virus management!*
2. Make sure that colonies start each season with very low mite levels. An ounce of prevention is worth a pound of cure!
3. Regularly monitor mite infestation levels, and take action if they start to approach the 2% threshold.
4. Minimize drift, keep smaller yards, avoid allowing hives to collapse and be robbed out.
5. Keep an eye on your neighbors! Don't allow a mite-ridden operation to load yours up when it crashes!

Timing

1. Recognize when a virus epidemic starts brewing (generally in mid summer) and spot check brood for signs of pupal death or bees with deformed wings.
2. **August 15th.** Put this critical treatment date on your calendar! Break the back of the incipient virus epidemic by removing the vector! You want to create a break in virus transmission prior to the colony raising the bees that will eventually form the winter cluster.
3. Recognize that the most critical time for virus epidemics to take hold is when the colonies naturally decrease their populations (immediately after the main flow, or generally around **September 1st**). Take action to prevent the mite to bee ratio from rapidly shifting upward at this critical junction.
4. Double check mite levels in late fall (Fig. 6). Realize that during winter, mites move from bee to bee within the cluster, and if there are virus issues, then they will spread. This can be a major problem, as there is little recruitment of fresh young bees during the winter to take the place of bees that fall ill.

Figure 6. Comparing the efficacy of my fall mite treatments after a snowfall in the Sierra Foothills. There is little broodrearing in November and December, so virtually all the mites will be moving about on the adult bees in the cluster, spreading viruses during this stressful time for a colony.

Recruitment of Replacement Bees

1. Colonies deal with diseases by out breeding them! Sick bees must be replaced with healthy young bees. Give your colonies a fighting chance by stimulating broodrearing in late summer.
2. ***Nosema ceranae* and Viruses**
3. I'm not yet clear whether nosema problems are a function of high virus levels, or vice versa. I'm getting mixed messages as to the economic benefit of treating for *Nosema ceranae.*

Keep your eyes open for virulent viruses! Remove sick colonies, steer clear of operations with sick bees, avoid large holding yards.

If you can get your head around this paradigm shift to virus management, rather than simple mite management, then you can better make the most appropriate decisions regarding mite treatments and timing, nutritional supplementation, and other actions. The above recommendations are all based upon common-sense animal husbandry. Look carefully at your operation, and identify the critical times for action, and the best and most cost-effective opportunities for managing against viruses during the season.

Acknowledgements
I dedicate this article to the memory of British beekeeper Dave Cushman, who generously helped beekeepers worldwide (including myself) via correspondence, and through his excellent website http://www.dave-cushman.net/.

As ever, I am greatly indebted to the research assistance provided by my friend Peter Loring Borst. I also wish to thank Colorado beekeeper Al Summers for his suggestion to start using the term "immunocompetence."

Suggested Reading and References
Answer to question: what would be the long-term effect on apiaries if parasitism by the foundress mite inevitably caused bee pupae to quickly die?

Varroa would shortly go extinct, since it could no longer reproduce! So there is a negative feedback that prevents the mite/virus combination from being too virulent to bee pupae!

The following suggested reading docs are all free downloads (thank you, authors):
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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."

AUSTRALIAN HONEY BEE INDUSTRY COUNCIL
Mailing Address: PO Box R838, Royal Exchange NSW 1225
Telephone: 02 9221 0911 Facsimile: 02 9221 0922
Email: ahbic@honeybee.org.au Website: www.honeybee.org.au
Executive Director: Mr Stephen Ware

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.

2011-2012 AHBIC ANNUAL REPORT

On behalf of the Australian Honey Bee Industry Council it gives me great pleasure to present the 2011/2012 Annual Report. I would also put on record my thanks to my fellow AHBIC Board Members. I acknowledge the presence of: Ed Planken, Ian Zadow, Trevor Morgan, Rod Pavy and Ken Gell.

I would like to particularly thank those beekeepers who contributed to the Industry by either:

- Providing a voluntary contribution to AHBIC
- Contributed their time to member bodies of AHBIC
- Assisted with the *Apis cerana* incursion in Queensland.

APIS CERANA TRANSITION TO MANAGEMENT

- Funding of the Transition to Management has been agreed on the basis of A$2 million from the Federal Government, $600,000 from the Queensland Government and $400,000 from Industry.
- The project is being managed by a Transition to Management group comprising the Federal and Queensland Governments and Industry and the Secretariat is provided by Plant Health Australia.
- Additionally, there is a scientific advisory group to provide input into the programme which again includes Industry, Government officers and individuals with specific expertise.

I am aware that Industry was fully supportive of eradication however, in simple terms, we were out-voted by various States and the Transition to Management outcome was the best position that could be achieved.

KEY ELEMENTS OF TRANSITION TO MANAGEMENT PLAN

- Development of methods to suppress Asian Honey Bee (AHB).
- Early detection of new incursions of AHB.
- The development of public awareness and the adoption of tools and strategies to control AHB.

Although agreement was reached not to eradicate the Asian Honey Bee, we are using the monies made available to invest in projects which we believe will ensure that we have systems in place to control Asian honey bees where they affect commercial honey bee industry. We are also trialling remote poisoning and the use of Fiprinol to control Asian bees. We are optimistic that some of the research work we are doing and projects being run, may in the longer term, allow us to revisit the possibility of eradication.

BIOSECURITY FUNDING ARRANGEMENTS

- Industry's funding for disease and pest responses is paid by beekeepers through a compulsory levy of 0.07c/kg to Animal Health Australia (AHA).
- We have now sought permission from Government to impose an additional $50.00 compulsory registration fee on all apiarists both commercial and non-commercial.
- This additional charge would raise approx. $500,000 per annum to add to Industry's ability to respond to incursions - the next obvious incursion being Varroa.
- We have also reopened negotiations of appropriate cost-sharing arrangements with the pollination industries through Plant Health Australia.

BIOSECURITY FUNDING ARRANGEMENTS

- What is of concern to industry is the sheer size of cost of incursions. Early figures from the Queensland Government indicated that the total cost of eradication if the Asian Honey Bee had proceeded, would have been A$25 million with Industry share being A$5 million.

EASTERN CREEK QUARANTINE STATION

- A Risk Assessment Analysis has now been completed and it will again be available for imported bees.
- In 2015, this facility will close and the Federal Government has allocated A$380million over seven years for the construction of the new facility in Victoria.

Industry has expressed concern at the location of the facility in Victoria but we have been informed by the Federal Government although they will support alternate quarantine facilities for the import of bees, they will not provide any other funding other than through the Victorian facility.

It is AHBIC's policy: 'That AHBIC support the continuation of a quarantine facility for the import of bees into Australia and seeks to avoid the potential loss of a quarantine facility by supporting a fully funded government quarantine facility.'

BEE SURVEILLANCE PROGRAMME

- Currently being managed by Plant Health Australia and funded by the residual A$150,000 provided to Animal Health.
- Basically the money will run out in 2013 and an alternative funding and implementation strategy will need to be found.
- Alternatives include a new programme based on 'Bee Alert' and additional funding coming from the pollination industries.
- On the 3rd and 4th July, Plant Health, RIRDC, industry and Horticulture Australia Ltd (HAL) will workshop these issues.

It is important that Industry have an effective surveillance system in place to give us warning of any new incursion if we are to have any chance of eradication.

RESIDUE CONTAMINATION

- Para dichlorobenzene (PDB's)
  Industry established an Extraneous Residue Limit (ERL) for PDB's which will conclude in 2012. Unfortunately in the last NRS Survey, small detections were recorded. Beekeepers are reminded PDB's are illegal in food products.
- Pyrolizidine Alkaloids (PA's)
  This issue continues to be monitored by the Food Safety Residue Committee of AHBIC and a number of experiments are currently being undertaken on the effects of PA's and the means by which they can be extracted from honey. This is an important issue which industry continues to discuss with Food Standards Australia New Zealand (FSANZ).

Residue contamination will continue to be an on-going issue to Industry. It is a Trade issue and it undermines consumer confidence in our product and the issue of PA's in food is one of increasing international concern.

TRADE ISSUES

- US beekeepers are using bee viruses to halt the live bee trade with Australia and the *Apis cerana* incursion is adding to this.
- New Zealand beekeepers took out a high court injunction against the import of Australian honey.
- The Australian Government is currently negotiating a free trade agreement with Korea which will have the potential for Australian honey to be imported into South Korea without an import quota.

These trade issues continue to be on the table and we have had a number of discussions now with the Federal Government to encourage their resolution. The results are slow but we are encouraged that some progress is being made.

SUMMARY

- The AHBIC General Meeting is to be held on 5th and 6th July in Launceston. Items for discussion include AHBIC's 2012-2017 Business Plan. Included in the Plan is the possible introduction of a Honey Week to promote our products.
- Additionally we have listed on the Agenda, discussion of a national AFB programme.
- Finally, I would like to thank you – the industry – for your support in what are definitely difficult times.

As a small industry we again have many issues to confront in the next 12 months. I would like to thank you for your support to date and ask again for your assistance in the coming year.

***Lindsay Bourke,* Chairman**

HONEY PACKERS & MARKETERS ASSOCIATION OF AUSTRALIA (HPMAA) REPORT – 2012

The Honey Packers and Marketers Association members serving the mainstream grocery industry have been under a lot of pressure this last 12 months. The two areas of impact have been prices and margins. The reluctance of the two major supermarkets to automatically increase retail prices when requested affects everyone. Naturally those increased values could flow back to beekeepers. The supermarkets deflation on retail prices (milk, bread, and other staple lines) by squeezing manufacturers and primary producers has been well reported in the media. While everyone loves a bargain, nobody loves it when it is their hip pocket being affected. Industry sources from wider food suppliers to supermarkets, note that strong-arm tactics or implied strong arm tactics for more margins and promotional discounts went unabated throughout the year. That means lower margins for packers as costs for all inputs have risen the same as it has for beekeepers.

Overall the association continued to support the best interests of the Australian apicultural industry and as President I was fortunate enough to be re-elected as Deputy Chair of AHBIC last year allowing direct contact other professional bodies and governments' thus serving industry and the honey packing community.

Overviewing the past year I can report that:

- The volume of honey sold via the three mainstream supermarkets of Coles, Woolworths and Metcash (IGA) increased 8.7% during 2011 *(Source: Retail World January 2012)* for a total of 10,184 tonnes. Aldi, Costco and others do not report into this system so volume variations with them are unknown.
- Of the honey sales, it shows by volume that 84.4% was for clear honey, 12.8% for varietals and 2.8% for creamed honey.
- House brands/private label accounted for 24.3% of the sales dropping from 28.8% last year. This is probably partly due to the effect of heavy promotions on branded product (like the major half price promotions undertaken by Capilano).
- The Coles and Woolworths price war had the others joining in to retain market share. The net result is more pressure on suppliers and lost overall margin per unit of sale. The pressure to have supermarket own brands move closer to 50% of the category sold continues as does the reduction of suppliers and products sold. Promoting brands therefore assists in keeping our brands before the public.
- Competition from Beekeeper sellers against main stream packers outside of the few major retailers continued during the year (often beekeepers undercutting each other in price to try to get the sale).
- In export markets trading has been tough due to the high Australian dollar. A high currency heavily impacts our sales ability and profit.
- There remains mixed situation of supply of honey on hand with packers. While adequate stock coverage exists in some states there is difficulty due to the weather outcomes in others.
- From a production perspective on crops looking forward it appears promising for the new spring season onwards. Maybe the long dry for WA comes to an end.
- From an import and export perspective the below table shows what occurred over the last year and the comparison to the previous one;

AUSTRALIAN IMPORTS AND EXPORTS ANALYSIS

Period	Combined Imports Tonnes	Combined Exports Tonnes		Packed Exports Tonnes	Bulk Exports Tonnes	Packed Exports Tonnes	Packed Exports %	Bulk Exports Tonnes	Bulk Exports %
Mar-12	975	-	Mar-12						
Dec-11	782	1,501	Dec-11	543	957				
Sep-11	831	961	Sep-11	422	539				
Jun-11	658	1,104	Jun-11	529	575				
Total	3,246	3,566				1,494	42%	2,071	58%
Mar-11	797	1,174	Mar-11	495	679				
Dec-10	653	1,200	Dec-10	374	827				
Sep-10	997	1,270	Sep-10	407	862				
Jun-10	983	1,308	Jun-10	427	881				
Total	3,430	4,952				1,703	34%	3,249	66%

The numbers above show imports reduced 5.4%. Export data was not available at the time of writing for the period ending March 12, but it suggests a lower volume would be the outcome (result of the higher currency).

World bulk honey export prices have held reasonably steady over the last year staying in a narrow price band. For Australian honey packers - we cannot be commercially competitive to move any reasonable volume due to currency at this time. Only minor specialty bulk product is being exported or it is due to long held contracts. Last year I reported that International packers needed cheap product as they in turn are being squeezed by their supermarket customers (like we are in Australia) and this remains the case.

On an AHBIC level over the last year we have contributed on industry's behalf in the following areas:

- AHBIC funding support;
- Quality and honey export issues;
- Residues;
- International trade access;
- GM in honey and the EU situation;
- And a range of other issues.

Our association remains strong and unified even though we compete in the market place as we face many similar problems and issues. Honey Packers members support having a peak industry body such as AHBIC that can interface with the government in

a range of issues and areas that packers or individual beekeepers could not as they like to deal with peak representative bodies. It is pleasing to see in the AHBIC newsletter that more and more beekeepers and smaller packers are starting to financially support our peak body. Previously most funding came from just a few major packer members.
Eduard Planken OAM, ***President of the HPMAA***

FOOD SAFETY & PREVENTION OF RESIDUE COMMITTEE REPORT
The Committee continues to work with FSANZ and AQIS to remain updated and to provide advice to government on the on-going research and discussion of the issue of PAs in foods. We provided a written response to FSANZ on the Discussion Paper produced by the Netherlands CODEX Committee with respect to best practice codes of conduct for reducing/eliminating PAs in food stuffs. It appears that best practice codes are likely to be developed only for weed management and not honey production, which we consider appropriate. There is presently a review beginning of the chemical toxicity of PAs that is being conducted by part of the World Health Organisation (JECFA) on request of CODEX. This review will deliver more robust scientific advice on tolerable daily intakes for PAs that will help us consider appropriate actions, if any, for industry to consider. Recently we have conducted our own research into the filtration of honey to remove PAs, and have very encouraging preliminary results. Further work is being done in this area to replicate findings.

Some years ago the Committee approached FSANZ to upgrade the detail of our existing Australian Honey Standard to make it more comparable with further developed international standards; unfortunately we were not able to progress this very far. We have progressed with a pre-application meeting with FSANZ following a letter of request from AHBIC to again review the Standard. This meeting has gone well and we need to meet and agree on next steps, either a) we make a request to change the Standard to prevent misleading and deceptive conduct, or b) we review the implementation of a Code of Practice for Good Manufacturing Practice to be registered with Standards Australia for the production of honey in Australia. The primary aim of this work is to ensure imported and locally produced honey for sale meets an agreed quality specification.

The Committee continues to follow updates on the European Court action with respect to GMOs and will make further representation to DFAT and DAFF should world trade obligations be breached or significant changes to trading implications with the EU arise. DAFF has been contacted to follow up with Australian Consular Officers in Brussels as to the impact of any potential regulatory changes.

It was recognised by the Committee that there is at times a lack of understanding by consumers of the antibacterial activity of Manuka honeys, and it has been agreed to prepare a short informative report to better educate consumers and to establish best practice testing and certification expectations for packers. This is still being prepared.

There has been a range of on-going concerns and changes to the certification and endorsement of EX188B AQIS export certificates. Representation has been made to the Minister and Biosecurity Australia with regard to the significant changes in cost and audits. A meeting was also attended with the Minister's Office to further the cause and we will be following up with further information. We will continue to follow up the issue in an environment of considerable change in the Department.

There was representation made to the Committee that the MRL for oxytetracycline be re-assessed with consideration being made to reduce the level. At this stage, the recommendation from the Committee has been to continually review residue data with no change proposed to the existing MRL that is in-line with other international MRLs for oxytetracycline in honey.

The recent test results for honey by the National Residue Survey (AQIS) resulted in the again detection of paradichlorobenzene (PDB) residues, albeit it at very very low levels. The limit remains in place to protect such detections, however we do need to reinforce to beekeepers that PDB is no longer used and that combs from old treatments should be replaced.

Another meeting is being considered shortly for the Committee following meetings with respect to the Australian Honey Standard. I wish to thank the members of the Committee for their on-going support and work to support AHBIC's operations.
Ben McKee, **Committee Chairman**

VARROA TREATMENT & PREPAREDNESS COMMITTEE REPORT
The Australian Honey Bee Industry Council (AHBIC) formed the Varroa Treatment & Preparedness Committee (VT&PC) which had its first meeting in July 2011. The committee was formed with beekeepers from every state and research group representatives to drive the implementation of a report developed by the federal Department of Agriculture, Fisheries and Forestry (DAFF) with input from across the honeybee and pollination industries. The report, "*A honey bee industry and pollination continuity strategy should Varroa become established in Australia*" (http://www.daff.gov.au/__data/assets/pdf_file/0004/1910029/honeybee-report.pdf) spelled out the actions that needed to be undertaken for the honeybee industry to be ready if the Varroa mite ever became established in Australia.

The committee has essentially been in abeyance since Sept 2011. The reason for this was that Plant Health Australia (PHA) was given funding from DAFF to setup a committee to manage the implementation of the honeybee continuity strategy, which is exactly what AHBIC had formed the VT&PC for. So it was decided to wait and see what eventuated from the PHA committee before time was wasted duplicating the same efforts.

At a subsequent AHBIC Executive meeting it was decided that the AHBIC VT&PC committee should continue for the foreseeable future, even if the committee operated as a communication conduit only to the wider beekeeping community.

The PHA Committee, Varroa Continuity Strategy Management Committee (VCSMC), has since met twice so far in 2011-12. Its first meeting reiterated that this PHA committee was replicating the aims of the AHBIC committee, with the added benefit of money allocated towards its operation and a wider beekeeping, pollinating, government and research membership.

The future for the AHBIC VT&P Committee will remain as a communication conduit until a decision is made otherwise.
Peter McDonald, **Chairman**

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