AUSTRALIA'S
HONEYBEE NEWS
"The voice of the Beekeeper"

Volume 4 Number 3
MAY-JUNE 2011

New Minister for Primary Industries meets Beekeepers in Dubbo

AUSTRALIA'S HONEYBEE NEWS

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

Published Bi-Monthly **ISSN 1835 6621**

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COVER: Jodie Goldsworthy, Katrina Hodgkinson MP & Bill Weiss at the NSWAA Conference Photo: Mary-Ann Lindsay

Copy Deadline for Next Issue of *Australia's Honeybee News* - 1 August 2011

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3 Issues	$655.00	$990.00	$390.00	$550.00	$245.00	$300.00	$145.00	$185.00
1 Issue	$260.00	$400.00	$145.00	$220.00	$110.00	$150.00	$75.00	$100.00

Subscribers welcome $36.00 per annum - Classified Ads up to 5 lines - $30.00 (Free to Members)

Australia's Honeybee News goes free of charge to members of NSWAA. Non-member subscriptions are welcomed. Within Australia $36.00, Overseas (airmail) AUS$55.00 Forward payment to: PO Box 352 Leichhardt NSW 2040 Australia (Payable to NSWAA).

The opinions expressed in articles published in *Australia's Honeybee News* are those of the authors and do not imply the endorsement of the NSWAA for the promotion of any product, goods or services mentioned unless specifically stated.

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Phone: (02) 9550 4055 Fax: 02 9550 3403 Email: rob@farrellprinters.com.au

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PRESIDENT'S REPORT

Season
Winter is well and truly upon us with most hives in winter closed down. Some beekeepers who have gone into Queensland have bees doing well. Blue Top Ironbark has been good to bees and reports have it some areas of the Channel country in SW Queensland are doing well, while other areas suffer from lack of pollen. The South of the State has odd areas of Mugga Ironbark with some bud and some flowering, but no big flush of honey. We will have to wait till late July to see how spring may develop.

Prices
With some packers having enough honey for a few months, prices have remained stable. There is some apprehension as to spring production and August could well see many packers looking for honey.

***Apis Cerana* (Asian Bee)**
The industry has put forward the Volunteer Program to continue some form of Asian bee control as industry believes it cannot be sustainable with the increased pest load of Asian bees. This is reflected in the number of beekeepers who have offered to go to Cairns over the next few months to assist in this program. The program is named a Surveillance- Containment Program which is intended to gather data on Asian bees swarms, to provide evidence that they can be eradicated. Obviously swarms found will be destroyed.

The roster is being drawn up as I write with the first contingent of 12 persons expected to arrive in Cairns on Wednesday 22 June, work for 2 weeks and return home on 6 July. The second contingent of 15 persons would be scheduled to arrive in Cairns on Wednesday 6 July. We have selected mid week to travel to take advantage of cheaper flights.

If anyone wishes to assist in this program, you will be helping your own and the Industry's future and your help will be most appreciated. Please contact Bill Weiss on Phone: 02 6732 1263, Mobile: 0428 669 578 or Email: beeweiss@gmail.com.

As you can appreciate, this program will require a lot of support as the number of volunteers needed will run into perhaps 120-150 persons over 4-5 months.

Early negotiations with the management bureaucrats of the Asian Bee Eradication Program eluded that if Industry didn't contribute appropriately, then it sent a message that Industry did not consider the Asian bees a big threat. Nothing could be further from the truth.

Since then, Industry has offered $200,000 from FCAAA Contingency Fund, $200,000 from Animal Health Fund (AHBIC). Industry's volunteer value will be something in the order of $300,000 plus their proportion of travel and accommodation of approximately $50,000, plus FCAAA expected assistance of $60,000.

So the total Industry contribution could be somewhere in the vicinity of $810,000.

Sydney Show
Thank you to all our sponsors who donated product and gave assistance, all of which helps in making the Show an effective promotional vehicle for the Honeybee Industry, as well as making some profit (approximately $10,000) to assist with running your Association. We appreciate your generosity and ongoing support.

Once again the live bee demonstration created a lot of interest from the public and is an excellent forum to explain the value of honeybees to the food security of the nation.

Thank you to all the volunteers who helped to make the Sydney Show a success: Aidan Kelly, Bill Weiss, Brenda Linn, Brett Bingley, Brian Woolfe, Bruce Blunden, Bruce White, Carl Cooper, Casey Cooper, Cate Burton, Charlie Bingley, Chris Porter, Craig Klingner, Damian White, Daniel Rickard, David Bingley, Debbie Porter, Don Wood, Enid Whitby, Geoff Manning, Irwyn Doherty, James Lockhart, Jenna Barker, Jenny Farrell, John Benfield, John Patterson, John Staniforth, Joshua Lockhart, Julie Lockhart, Karl-Heinz Zinkel, Kevin Haswell, Laurie Kershaw, Lynn White, Malcolm Porter, Margaret Blunden, Margaret Marsh, Maria Cifuentes, Matt Kershaw, Matt Rickard, Neil Bingley, Neil Peadon, Nicola Lockhart, Noelene Benfield, Raelene Michie, Reg Marsh, Rene Riedelbauch, Rhonda Smith, Rob Michie, Roberto Cifuentes, Rosemary Doherty, Sam Bingley, Shannon Schmidt, Stephy Robertson, Tess Klingner, Therese Kershaw, Tom Argaet, Tom Bingley, Warwick Smith, Wayne Hammond.

Conference
A huge thank you to our Secretary Julie, for her tireless work organising the Show and Conference.

I am sure all who attended this year's Conference would agree it was a huge success. Having the new Minister for Primary Industries, Katrina Hodgkinson open Conference gave the Industry an opportunity to headline the major problems facing our Industry and also paved the way to discuss some solutions with the Minister in the near future.

Before the official opening took place the Minister was shown a video highlighting the "Bee Security means Food Security" campaign and the impact of the Asian Bee on the Industry. Thank you to Jodie Goldsworthy for putting it together.

There were some very good speakers who spoke on topical subjects which affect the Industry. Thank you to Doug Sommerville and the team from DPI who were well represented..

The Trade Show was well attended during the two days of Conference and many enjoyed the hospitality of Ecroyd Beekeeping Supplies who sponsored the Wine & Cheese night.

Thank you also to the members of the Western Plains Branch for their hospitality and for putting on a very enjoyable Field Day.

Many thanks to all our sponsors, exhibitors and volunteers who helped make the 2011 Conference a success.

Next year's Conference will be held on the North Coast.

State Executive
We welcome a new executive member, Harold Saxvik of Darlington Point.

A big thank you to retiring executive member John Benfield, for your input to Industry issues during your time on the executive.

The Executive members for this year are: Bill Weiss - President, Craig Klingner - Vice President, Laurie Kershaw, Malcolm Porter and Harold Saxvik.

Bill Weiss
State President

CONGRATULATIONS

Bruce White OAM was awarded the Medal of the Order of Australia in the 2011 Queen's Birthday Honour List. He was recognised for his life-long contribution to the beekeeping industry, which continued into retirement. Bruce retired from the Department of Primary Industries in 2008.

NSW CONFERENCE RESOLUTIONS

Set out below are the resolutions, apart from those of a routine nature, of the 2011 State Conference.

THURSDAY, 19 MAY 2011

Resolution 2011/10
Moved Gary Lucas, Seconded Mitchell Lucas
That there be no more than 120 x 10F hives be placed on any Forestry or National Park site in the State of NSW.

That 120 hives to include no more than 20 double demarees and if at any stage a Super is placed on a double demaree it is then deemed a production hive.

In regards to 8F hives – Permit 150 hives per sites and up to 30 double demarees and if a Super is placed on a double demaree it is then deemed a production hive.

Resolution 2011/11
Moved Laurie Kershaw, Seconded Rob Michie
That NSWAA negotiate with FCAAA requesting a research project from RIRDC. To develop bait stations to be trialed in the aid of containment of the Asian Bee in Australia.

FRIDAY, 20 MAY 2011

Resolution 2011/12
Moved Craig Klingner, Seconded Laurie Kershaw
That this Association supports the proposed establishment and operation of the Honeybee and Pollination Security CRC.

Resolution 2011/13
Moved Craig Klingner, Seconded David Mumford
Requests AHBIC to make a firm commitment to support the Honeybee and Pollination Security CRC, both in principle and financially, to the greatest degree its resources will allow.

Resolution 2011/14
Moved Craig Klingner, seconded Robert Michie
That AHBIC join or become affiliated with the National Farmers Federation.

Resolution 2011/15
Moved Trevor Monson, Seconded Warren Taylor
That this conference supports an independent inquiry into the Honeybee Industry, so it speaks with one voice.

Resolution 2011/16
Moved Craig Klingner, Seconded Elwyne Papworth
That the NSWAA supports the continuation of FCAAA.

NEW MEMBERS

A warm welcome to the following new members:

Anthony Andrist	North Ryde
Owen Cole	Wattle Flat
Craig & Sharon Dunbar	St Georges Basin
Jamie Crighton	Wetherill Park
Kevin Eastburn	Eulo QLD
Steven Fawns	Deniliquin
HG & OG Foley	Inverell
Robert Giles	Kingsford
John William Gould	Cambewarra
G M Harris	Young
Rick Kayess	Mt Riverview
Michael McCormick	Gladstone
Geoff Muntelwit	Lismore
Chris Porter	Yetholme
John Redman	Butterwick
Jenni Roberts	Numeralla
Cec Shevels	New Lambton Heights
Paul Tait	Hilltop
Warren Taylor	Blayney
Thomas Wilson	Coolamon

$2MILLION PROGRAM TO MANAGE ASIAN HONEYBEES

20 May 2011

The Gillard Government will provide $3.5 million to support national pilot programs aimed at creating an ongoing solution to the management of Asian honeybees and the plant disease, Myrtle rust.

"The funding will give greater certainty for efforts to manage these invasive pest species," Minister for Agriculture, Fisheries and Forestry, Senator Joe Ludwig said.

Earlier this year, two separate National Management Groups, comprising representatives from industry and federal and state governments concluded that eradication of Asian honeybees and Myrtle rust is no longer technically feasible.

"This funding means that important ongoing control activities against Myrtle rust and Asian honeybees can continue," Minister Ludwig said.

The funds, $2 million for Asian honeybees and $1.5 million for Myrtle rust, are being provided to support a pilot of the national transitional containment principles developed by the National Biosecurity Committee in 2010.

"Funds for the pilot programs are in addition to the Budget allocation of $15.4 million over two years for existing post-border plant and animal pest and disease eradication and control activities," he said.

"These programs compliment the government's $464 million Budget commitment to the ongoing reform of Australia's biosecurity system." Further information is available online at www.daff.gov.au.

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FOOD SECURITY NEEDS BEE SECURITY

Campaign Update – 23 May 2011

As a result of the Senate Inquiry into the Science underpinning the inability to eradicate the Asian bee the Asian bee containment group were asked to consider a new "containment" plan over a series of teleconferences even though the official position of the CCEPP has not changed at this point.

The Qld Government in consultation with industry have been asked to develop the plan for the other states to consider. An updated version of the plan was put forward on 19 May for stakeholders to consider.

A key factor in to getting to this point has been industries offer to co-ordinate volunteer beekeepers to assist with specific public engagement and reporting on the ground in Cairns.

There will be a lot of work involved in coordinating this effort and getting things organized quickly to allow this to happen. It has sent a strong message to the states that the wider industry behind the AHBIC team involved in the teleconferences on our behalf is very serious about the importance of eradication.

We were aware of two sticking points as put forward by some of the states with their support for the containment/eradication of Asian Honey Bee as: the level of industry contribution; effectiveness of containment/eradication efforts in Qld.

Taking the above into consideration on 29 April the Federal Council of Australian Apiarists Association (the peak body of all the State beekeeping Associations) moved to allocate $200,000 from its contingency fund toward the program going forward. This funding was conditional on the AHBIC recommending that $200,000 be allocated from the Animal Health Australia (statutory levy) fund.

On 2 May the AHBIC Executive agreed to recommend $200,000 be put forward from the Animal Health Australia Fund.

These initiatives mean that combined the industry has been able to put forward a new cash contribution of $400,000 combined with an in kind contribution of over $100,000 which involves beekeepers volunteering in Cairns with the effort required in the areas of surveillance and community engagement. In addition to these amounts the industry has previously committed $100,000 in the past.

On 5 May representatives of the Victorian Apiarists Association and the Victorian Farmers Federation met with the Victorian Minister for Agriculture and Food Security the Hon Peter Walsh and his Parliamentary Secretary Bill Sykes. It was heartening to learn of Victoria's intention to support the efforts of containment and eradication of the Asian bee. Victoria have been quite proactive in developing a policy for Apiculture as part of its wider agricultural policies which recognises Apiculture and the resultant pollination benefit from this sector as a cornerstone of Victoria's agricultural success.

In preparation for the beekeeper volunteer effort required in Cairns, from 7-10 May industry meetings were held between representatives from the Food Security needs Bee Security Campaign and the FCAAA President, Queensland Beekeepers Association President and Secretary and AHBIC Quarantine Chairman. Meetings took place outside Brisbane and in Cairns, and the groundwork was completed in preparation for the volunteer efforts that are being planned in Cairns as part of the program going forward. Meetings were held in Cairns between industry, Biosecurity Queensland, a representative councillor from the Cairns Shire Council, the local Cairns beekeepers association and the local branch of Agforce in Queensland.

On 12 May representatives from the NSWAA and NSW Farmers met with Bruce Christie, the decision maker for NSW from NSW DPI via a phone hook up. The discussion updated Bruce Christie on the Food Security needs Bee Security Campaign and discussed the stumbling blocks to be overcome to gain the support of NSW going forward. The meeting was advised that NSW were keen to see the Asian bee program work for the benefit of beekeepers and the entire agricultural industry. The meeting was a very positive step forward in the relations between industry and the level at which Bruce sits within the department and opens the way for an ongoing relationship between industry and NSW DPI on this issue.

In order to supplement and build the plan being developed by Biosecurity Queensland the National Management group meeting scheduled to meet on 13 May was postponed a week to 20 May.

On 20 May the Asian Bee coordination committee met again and from this meeting there was general support for the program. It was heartening to be informed of the $2 million allocation for the Asian bee program to be provided by the commonwealth to support a pilot of the national transitional containment principles developed by the National Biosecurity Committee in 2010. At this meeting industry also put forward a cash contribution of $400,000 to supplement the in kind support already offered which is expected to be in excess of $100,000. This is in addition to the $100,000 previously committed to date by industry and previous in kind support which has been ongoing over the last 4 years.

The issue has achieved tri partisan political support to get it to here which is rather unique in the political space. This highlights the degree to which this issue cuts across traditional party politics and how the desired outcome of a nation free of Asian bees is fairly and squarely in the national interest.

The industry stands ready to play a valuable role going forward in working through this plan with the aim of gathering enough scientific data to ask again, as soon as possible in the future the question "is the Asian bee eradicable?"

Industry can be justifiably proud of the coordinated lobbying efforts of grass roots beekeepers combined with traditional industry structures which have spanned all major honey producing states and lead to the door at least still being open in being able to control and possibly eradicate this devastating pest which will have so many serious impacts on the environment, biosecurity, food security, public health and amenity.

Jodie Goldsworthy

NSW DPI

-- CHANGE OF DETAILS --

Beekeeper registration change of details form

There is a new form available on the NSW DPI web site which can be used by beekeepers to notify a change of bee registration details. The form can be seen at the link below.

The full address is http://www.dpi.nsw.gov.au/about/legislation-acts/apiaries

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Website: www.industry.nsw.gov.au

SYDNEY ROYAL EASTER SHOW

The Sydney Royal Easter Show was abuzz with bees and all things honey this year including numerous producers awarded for their quality honey, demonstrations of live working hives and honey products tasted and tested by showgoers.

The Show, run by the Royal Agricultural Society of NSW (RAS) over 14 days in April, saw close to 900,000 people visit the largest display of agricultural excellence in the country.

The National Honey Show was once again an overwhelming success for Exhibitors.

In the non-commercial section, the Most Successful Exhibitor in Honey Classes (1 to 24) was awarded to Mr L N & Mrs B E Bingley and the Most Successful Exhibitor in Small Producers Classes (30-37) was awarded to Norman Adrian Webb & John Keith Godwin.

In the commercial section, Bartholomews Meadery were awarded four bronze medals for their liquid honey, colour light, whilst Malfroy's Gold also tasted success winning a bronze medal within the same section. These Exhibitors will now have the opportunity to display the prestigious Sydney Royal medal artwork on their products.

Bartholomews Meadery went on to take out the highest honour of the competition, winning The Phillip Carter Annual Trophy for Champion Commercial Exhibit. The Trophy commemorates the on-going service given to the National Honey Competition by Mr Carter, an honorary Member of Council at the RAS.

A new schools class was introduced into the competition this year. This initiative aims to give schools an opportunity to showcase the wonderful honey they are producing

and to compete against other schools. Congratulations to Melville High School for taking out first place If you know of any schools that are beekeeping please encourage them to enter in 2012.

Congratulations to all of the Exhibitors and to view the results from the Sydney Royal National Honey Show please visit www.sydneyroyal.com.au/honey

As well as the National Honey Show, the Honeyland stand returned to the Show. Honey tastings were as in demand again with 70,000 spoons of liquid gold slurped down by the crowds, up from 61,000 in 2010. Showgoers sampled over 180kg of honey during the 14 days, and bought an incredible 9,000kg.

Showgoers were also treated again to view the inside of a working hive with live bee demonstrations taking place at the popular Bee-Zeebo. Attracting large crowds, the daily demonstrations educated showgoers on how a beehive operates and the role the queen bee and her colony play, and gave an insight into the fascinating world of beekeeping.

The Sydney Royal Easter Show will take place from 5 - 18 April next year. If you are interested in entering or would like more information on the National Honey Show please contact Elaine Rogers on (02) 9704 1449 or email erogers@rasnsw.com.au

Elaine Rogers **- RAS**

Show visitors watched NSW volunteer beekeepers deliver four live bee demonstrations every day at the 2011 Sydney Royal Easter Show.

A crowd favourite, the Bee-Zeebo burst the many myths people associate with the behaviour of bees and gave an insight into the hive of activity that is beekeeping.

Show audiences were enthralled and educated about bees, beekeeping and the Australian Honey Industry.

Beekeeper David Bingley from Weerona Apiaries outside the Bee-Zeebo, as children check out the inner working of a beehive.

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NATIONAL BEEKEEPING FIELD DAY REPORT

The National Beekeeping Field Day held at the Dubbo Greyhound Track on the 21May 2011, was a successful and informative day.

Exhibitors were exposed to the public as well as amateurs, future up and coming beekeepers and successful commercial beekeepers.

Warren Jones provided a talk on bee diseases and field diagnosis, an important feature of the Field Day.

The Western Plains Branch had their first test run of the Bee-Zeebo live bee display which everyone enjoyed. Thank you to the Sydney Branch for the use of the Bee-Zeebo.

Thank you to the Dubbo Four Wheel Drive Club for their help on the gate in exchange for a donation to their nominated Charity, The Royal Flying Doctors Service.

A special thank you to Joe Horner for the two breeder queens he donated for the raffle, which were won by:

- Italian Queen - Ron Robinson, Redcliffs Victoria
- Caucasian Queen- Dave Mumford

Thank you also to:

- Terry Brown - Browns Bees for the ½ jacket
- Jones Honey Comb Australia for local honey
- Sunderland Apiaries for honey and Red Earth wines
- SA Beekeeping Supplies for a set of hive tools

All of which were donated for the lucky gate prize.

The food available on the day was delicious and the arts crafts and quilts on display were of exceptional quality.

Thank you to the Western Plains Branch and everyone who helped with the Field Day, both before and on the day.

The Field Day would not have been a success without the assistance of Alex, Natalie and Donna from Natalie Bramble Management.

Thank you to everyone who attended, and hope that everyone shares the information with their fellow beekeepers.

***Bryn Jones* - President, Western Plains Branch**

2011 CROP POLLINATION ASSOCIATION (CPA)

CONFERENCE - DUBBO 18 MAY

From left to right: Bryn Jones, newly appointed CPA President, Dubbo, NSW; Steven Targett, Narranderra, NSW; Ken Gell, Maryborough, Vic; The Hon. Robert Brown MLC, Member of the Shooters and Fishers Party, who officially opened the Conference; Elwyne Papworth, Strathallan, Vic; Dave Mumford, Narranderra, NSW; Harold Saxvik, Darlington Point, NSW and Frank Papworth, Hillston , NSW. *Photo: Les Jones, Dubbo*

FORESTS NSW SOUTHERN REGION
VACANT APIARY SITES

Due to the number of applications received for each site, a ballot was held. The ballot was drawn by Dr Doug Somerville, NSW DPI and witnessed by Julie Lockhart, NSWAA Secretary on Wednesday, 18 May 2011 in Dubbo.

VACANT SITE SUCCESSFUL APPLICANTS LISTED BELOW:

Site	Range ID	Map Sheet	Forest Name	Approximate Location	Successful Applicant
1	Scbby18.28	Currowan	Currowan	5km West of River Rd	**Jaye Hughes**
2	Scbby19.28	Currowan	Currowan	5km West of River Rd	**Grant W Kershaw**
3	Scbby19.29	Currowan	Shallow Crossing	5km West of River Rd	**Kevin M Forde**
4	Scbby21.36	Brooman	Yadboro	4km NWW of Clyde Ridge Rd	**John Casey**
5	Scbby22.35	Brooman	Clyde	1.5km NW of Clyde Ridge Rd	**Robert Shaw**
6	Scbby22.30	Currowan	Shallow Crossing	2.3km West of River Rd	**SL & EJ McGrath**
7	Scbby22.31	Currowan	Shallow Crossing	2.3km West of River Rd	**Brett Bingley**

DOUG'S COLUMN

Doug Somerville
Technical Specialist, Honeybees - NSW Department of Primary Industries - Goulburn
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NSW DPI returns

As a result of the change in government we have again changed our name, this time back to the NSW DPI (Department of Primary Industries). For those who didn't attend this year's conference at Dubbo, you missed out on a lot of good information. For those who did attend maybe you didn't get around to reading my 16 page report. So for this month I thought a summary of that report would be appropriate.

There are various sections or divisions within the DPI, Doug Somerville (Goulburn and Nick Annand (Bathurst) comprise the B team (B1 & B2), otherwise known as the Bee Industry Group. We are managed by Tim Burfitt (Orange, HO) who also manages poultry, pork and dairy. Dave Fuller (Richmond) a General Enquires Officer is part of the team and fields multiple enquires from the general public on bees. Unfortunately Dave has not been well and has been away from his desk since November last year but is making a steady recovery and looking forward to returning to work.

The report I provide each year at the annual beekeepers conference is a combined summary of research and advisory activities within the DPI. Mick Rankmore, who is the Regularitory Specialist Honey Bees (Gunnedah), provides his report as a separate presentation at conference. The DPI does not have any stand alone research scientist position specialising in honey bee research but it would be unusual for Michael Hornitzky, Senior Principal Research Scientist specialising in microbiology to not have at least one bee project. The last several years we have also had the pleasure of Garry Levot, Principal Research Scientist conducting studies on small hive beetles. Last but not least Bronwyn Hendry, (Orange HO) Policy Officer, Animal Biosecurity as part of her duties chairs our honey bee biosecurity committee. The following is a brief summary of some of our combined activities.

BEEKEEPING TRAINING FUND
Commercial beekeepers employing foreign labour were required to commit 2% of there payroll to an industry training fund to train Australian's in the art of beekeeping. The DPI was approached by a few beekeepers needing to meet their commitments by providing funds to a recognised training organisation. The funds gathered will be used to provide beekeeping training to students at Tocal Agricultural College who express an interest in honey bees. With the students permission their contact details will be provided to the commercial beekeepers who entrusted their funds with the DPI. If any further beekeeper wishes to use this facility to meet their Department of Immigration training commitments please discuss with Tim Burfitt or Doug Somerville. Darren Bayley the manager Continuing Education at Tocal Agricultural College will be managing the fund. Please talk to Darren, Tim or Doug about your beekeeping training requirements.

QUEEN COURSE
Nick and Doug conducted the annual queen course this year at Gretchen Wheen's property at Richmond from the 25-27 March. The course was fully subscribed with 18 students and a waiting list of 6. The feedback was 100% positive. This course will be offered again in March 2012, please book early with Kim Griffiths to ensure your place. Phone 1800 025 520 www.profarm.com.au

VIDEO ON DEMAND
Several videos have been produced on AFB and SHB. They will be available via the DPI web site. www.dpi.nsw.gov.au

The titles of each video are as follows:

1. Examining bee hives for disease - 8 minutes
2. Identifying American foulbrood (AFB) - 6½ minutes
3. Making an AFB disease slide - 5 minutes
4. Destroying bee colonies with soapy water - 5 minutes
5. Irradiating hives - 2½ minutes
6. Destroying bee hives with petrol & burning - 6½ minutes
7. Management strategies for AFB - 8½ minutes
8. Small hive beetle - 7 minutes
9. Small hive beetle control devices - 5 minutes

PEST and DISEASE COURSES
Twelve courses were conducted in NSW during 2010. This has been an extremely popular course. Two more courses are planned for 10/11 August and 11/12 October this year. I'll leave Nick to cover this subject.

SHB RESEARCH – NICK
Nick completed his research projects and submitted his final report. The study examined key aspects of SHB biology. Prior to 1998 SHB went largely unrecognised in its native homeland of sub-Saharan Africa. It was considered a minor pest to the African beekeepers. However its identification in the USA (1998), followed four years later in Australia (2002), raised its profile rapidly to a pest of major economic significance for beekeeping in both countries. The past twelve years have seen an extensive increase in research on SHB.

Environmental conditions of temperature and relative humidity were investigated to identify threshold values for SHB egg laying and emergence. It was found that temperatures of $\leq 15^{o}C$ and $\geq 45^{o}C$ prevented SHB from laying eggs. In addition eggs exposed to these temperatures did not hatch. Relative humidity of $\leq 34\%$ also prevented egg survival.

Healthy, strong hives attracted more SHB than hives in a weakened state. It was also shown that queen-less hives were no more attractive or susceptible to SHB when bee populations were high. However when hive populations decreased to very low numbers as a direct result of being queen-less, these hives became far more susceptible to SHB damage.

Over a 24 hour period the greatest number of SHB entering hives occurred in the two hours prior to nightfall. Most SHB movement occurred in the autumn months of April and May however a major spike was also observed in October (location-Richmond). The populations of SHB in the hives peaked in late autumn then declined through winter to bottom out in late spring producing a very cyclical pattern.

Almost half the SHB observed were outside the hive during the hottest month of the year however when seasonal conditions cooled the SHB retreated back into the hive. Washing 'slimed' (SHB larvae damaged) combs made no difference to the bee's ability to clean and resurrect slimed material. The trial did show that slimed combs can be resurrected by the bees when returned to the hives cautiously.

For a full copy of the final report view it at www.rirdc.gov.au under the honey bee program or contact Nick at Bathurst on nick.annand@dpi.nsw.gov.nsw.gov.au (ph: 02 6330 1210).

NOSEMA RESEARCH
Nosema is a major disease of adult bees and is responsible for the early death of adult bees and the poor performance of bee colonies. Michael has been conducting research on the impacts of nosema for several years. Recently for Australian beekeepers the discovery of a second species of nosema has caused some

concern that this second species of nosema maybe more virulent. The current project was completed in March this year.

The project involved a survey of apiaries in eastern Australia (New South Wales, Queensland & Victoria) to determine how widespread *Nosema ceranae* is, and determine the impact of the infection on honey bees and honey bee colonies. *N. ceranae* was found in every apiary and often as a high percentage of the test colonies indicating that it is well established in eastern Australia. The cyclic nature of *N. ceranae* as well as *Nosema apis* was clearly evident. The peak infection levels with *N. apis* usually occur in spring as does infection levels of *N. ceranae*.

Reports in the literature indicate that *N. ceranae* is replacing *N. apis*. This study demonstrated that this is not the case and that *N. apis* and *N. ceranae* can co-exist in honey bee colonies. 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*. Unlike *N. apis*, *N. ceranae* is sensitive to the cold and appears to thrive in warmer climates indicating that Queensland may be more severely affected by *N. ceranae* than NSW or Victoria. Young bees were fed *N. ceranae*, with and without pollen 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 *N. ceranae*. It was also demonstrated that feeding pollen to bees can reduce the infection level of bees fed Nosema spores.

RIRDC is in the process of publishing the final report. (www.rirdc.gov.au)

SHB RESEARCH –GARRY
A project to develop an effective means of killing SHB's in the hive without endangering the resident bees has been commercialised. The harbourage as it has become known became available to beekeepers early in 2011 under the trade name APITHOR™ available from Ensystex Pty Ltd. (https://apithor.com.au)

Presently beekeepers may use APITHOR™ in their hives according to the conditions of Australian Pesticides and Veterinary Medicines Authority (APVMA) Minor Use Permit PER12007. Work to support a full registration of APITHOR™ has been conducted including bee safety; honey residue and efficacy field trials in beetle infested hives. Results of the bee safety trial with APITHOR™ showed no significant differences in key indicators of hive health (frames of bees, area of brood and weight of honey produced) between 'control' and APITHOR™ treated hives. Moreover, results of the honey residue trial demonstrated that no fipronil (or toxic metabolites) was detected in the honey produced while APITHOR™ was in place. In the efficacy trial that compared 'control' (no insecticide) with APITHOR™ treated hives, the numbers of live beetles present in the hives were monitored over 36 days. At the final (day 36) count the number of live beetles in each of the APITHOR™ treated hives was reduced to zero (100% control) whereas beetle numbers increased in the control hives by an average of 22%. Data is currently being written up for inclusion in a product registration package for the APVMA.

INVESTIGATING SUSPECT EMERGENCY PESTS:
The department is receiving many calls about suspect bees, particularly Asian bees, and (approx 100 calls in the last 12 months). As the department has only a few field staff experienced in handling bees, we are looking for beekeepers that have completed the Pests and diseases of honey bee's course, who would be interested in being contactable to investigate suspect emergency bee pests and diseases, for payment, when requested.

For example, the duty veterinarian manning the emergency animal disease hotline may receive a call about a suspect emergency bee pest or disease. Sometimes the Department's honey bee specialists may not be available or in the vicinity. We could contact an accredited beekeeper (i.e. one who has completed the Pests and diseases of honey bees course) to investigate the nest or swarm and send samples to the laboratory, with a payment of $80.00 per hour proposed.

AUSTRALIA POST

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Australia Post is featuring four of Australia's largest native plant industries – eucalyptus oil, honey, macadamia nuts and tea tree oil in a new stamp issue.

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NICK'S NEWS
from DPI NSW

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

For all those beekeepers who missed out last year and heard how fantastically insightful and useful the **Pests and Diseases of Honey Bees** course is, don't despair. A further 2 opportunities to attended the course are now approaching. NSW DPI's Bee Industry Group, Dr. Douglas Somerville and myself, are planning on running another two courses in the second half of 2011. While attendance at these courses is well worth the price of admission of $480 their attractiveness is further enhanced through the financial support course participants receive through the Federal Government's FarmReady Grants program. Meaning that if you are a registered primary producer and wish to attend it will cost 35% of the $480 and the remaining 65% will be reimbursed (this changed from full reimbursement on 17/6/11

The FarmReady grants are one of the strategies the Australian Government have established to assist primary producers to adapt and respond to climate change. Up to $1,500 per applicant is available to cover course fees each financial year, with funding also available to cover excess travel, accommodation and childcare costs.

To be eligible for the FarmReady Reimbursement Grant, you must be:

- a primary producer;
- or an immediate family member of a primary producer (18+ yrs);
- or a member of the management team of a primary production enterprise; or
- an indigenous land manager.

For more details on FarmReady courses, and information on obtaining your grant within NSW, the contact number is: 1800 628 422 (freecall) or email simone.fuller@industry.nsw.gov.au

ABOUT THE COURSE

The **Pests and Diseases of Honey Bees** course is conducted over two days, with lunches provided. Doug Somerville (Technical Specialist Honey Bees) and myself (Livestock Officer Honeybees) are the course presenters. A maximum of only 15 people are permitted in each course.

The course looks at the basic science of pests and diseases, what is here already and what is threatening our shores and how bees can be managed to minimise their impact and cost. Subjects covered in class and practicals during the course include:

- General safety precautions involving bee stings, equipment, safety for you and others
- The seasonal cycle of honey bees, their regional locations, climate and food
- Why pests and diseases are important
- What is disease, what causes disease, definitions, the four main types of disease, causal agents, infectious and non-infectious diseases
- Different pathogens and transmission methods
- Four main brood diseases, AFB, EFB, chalkbrood and sacbrood
- Practical sessions that involve inspecting hives for brood diseases, bee collection and examination for nosema, examination and control methods for hive pests
- Adult bee diseases,: nosema and viruses
- Hive pests such as small hive beetle, wax moth and other minor pests
- Non-infectious disorders, neglected brood, plant poisoning, pesticides and queen bee problems
- Exotic pests and diseases such as varroa mite, tropilaelaps mite (Asian mite), tracheal mite, braula fly, Asian bees, Africanised honey bees and Cape bees
- Surveillance programs for exotics such as the National Sentinel Hive Program, NSW DPI sugar shake kits and awareness programs
- Exotic incursion response that involves AUSVETPLAN and the involvement of the beekeeping industry
- Management strategies for disease prevention
- Laws and legislation relevant to pests and diseases of honey bees

During the course you also have the option to be assessed for two nationally recognised competencies. They are:

- Implement sampling procedures - FDFOPTISP2A – Certificate II level competency
- Manage pests and disease within a honey bee colony - RTE3415A
  - Certificate III level competency

Some quotes from attendees on course deliver include:

- *The manner in which it was delivered was very clear and precise*
- *Well presented and easily understood*
- *Positive interactions with other participants and a training package is provided*
- *Ability to relate issues to local conditions.*
- *Well covered with practical experience*
- *2 professional instructors and good content*

Currently in Australia the **Pests and Diseases of Honey Bees** course is the only course specifically designed for the management of honey bees, eligible for the FarmReady grants. Money available for these grants ran out half way through the 2010/11 financial year but will be available again from the 1 July 2011.

Only two **Pests & diseases of honey bees'** courses are planned for 2011:

1. Euston NSW (Robinvale Victoria is across the river) 10-11 August 2011
2. Bathurst NSW 11-12 October 2011

This is a limited opportunity to attend a formal course specifically on pests and diseases of honey bees. Availability of this course and support by FarmReady grants in future years is not a certainty.

If you want to attend please contact either Doug, Nick and or Kim Griffiths, Short Course Secretary, Tocal College – Ph: 1800 025 520 or email: kim.griffiths@industry.nsw.gov.au

We will be able to put you on the list of attendees and provide you with the necessary information to claim your FarmReady grant.

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USA AGRICULTURE

Pricing for honey firms up as local bee colonies collapse - 22 May 2011

Mites, viruses and a mysterious malady that causes bee colonies to collapse have punished beekeepers in recent years - but there may be a silver lining.

The shortage of honey produced by the declining bee population has driven up the wholesale price of white-honey production in San Diego and Riverside counties to about $1.65 to $1.70 a pound, according to Jim Oakley, a director of Sue Bee Cooperative in Ramona.

"It's the highest ever," said Oakley, who oversees trucking 55 gallon barrels of honey from a dozen or so commercial honey producers locally to a Sue Bee processing plant in Anaheim, about 80 miles to the north.

Sioux City, Iowa-based Sue Bee is the biggest player in the honey market. It markets and processes honey from around the United States, and has plants in Iowa, Elizabethtown, NC, and Anaheim.

Explanations abound as to the reasons for the decline in honey-producing bees across the US. For sure, however, bee experts say that colony collapse disorder, or CCD, has hurt honey production. The phenomenon, which began to emerge about five years ago, could be attributed to the use of pesticides in agriculture, viruses and fungus growing in the bellies of bees, or parasites such as the Varroa mite that "blood-sucks" fluid out of a bee.

"Is CCD still here? Yes. Is it easier to explain? Probably not. If I could explain it, we could prevent it," said Eric Mussen, a well-respected honeybee expert with UC Davis, where he studies insects.

CCD, among other problems infecting bees, has wiped out more than half of the nation's bee colonies, leaving it with 2.2 million colonies, down from more than 4 million just a few years ago. The shortage, along with declining imports of honey from Vietnam, Thailand and India - which makes up about half of what the US consumes - also have played into the bullish honey-pricing scenario locally, according to Oakley.

The shortage also has driven up the rented price of hives that are transported to almond groves in the central valley, and used to pollinate the almond flowers in February and March. This is an annual money-making ritual for many local bee operators, who are paid to place colonies for about a month on thousands of acres of groves alongside freeway arteries that stretch north to south in central California's main agricultural region.

Roughly 600,000 acres of almonds are planted, and with two hives needed per acre, and an estimated 400,000 to 500,000 hives in California, the average hive rental rate stands at $135 to $165. This is roughly triple the price that bee brokers paid to rent hives a few years ago when CCD first showed up.

Bees pollinate about a third of the food crops in California, including avocados, apples, melons and other crops. Despite the shortage of honeybees (there are between 80,000 and 90,000 hives in San Diego County), operators in San Diego and Riverside counties say consumer demand, coupled with the decline in imports, may make this a comeback year of sorts.This is because California has seen record rainfall. There is enough moisture in the ground to cause brush and plants to flourish everywhere, including native plants, purple sage and perennials. With bees working overtime to pollinate this year, these favorable conditions should lead to a solid honey crop, according to Mussen.

Local bee operators are seeing early signs of healthy honey production versus those recorded in the past, when colony collapse disorder became an annual ordeal. "This year we may be able to produce up to 90 to 100 pounds per hive," or about double the yield in recent years, according to Oakley.

Alan Mikolich, who has tended up to 1,000 hives in San Diego and Riverside counties from Temecula, Rancho Santa Fe and other North County locations since the mid-1980s, lost 90 percent of his bees two years ago because of CCD, parasites, or whatever the culprit. By the end of 2009, he had 100 left.

By the time the height of honey-producing season rolled around in the spring and summer of 2010, Mikolich had built his hive count back up to 700 or so. The first half of the year is when most of the honey is harvested from the combs in the hives, which are kept in apiaries, fields with white boxes where the bees live in colonies.

"It was one of my best years in eight, nine or 10 years," Mikolich said. By last July, however, virus damage had begun to show up again in his bees. He was left with 240 hives this past winter, when CCD typically shows up. By this spring, he had replenished his bee population with a few hundred more hives to take advantage of rentals to almond growers. Even with the challenges, bee operators are seeing increases in honey production with fewer bees. Mikolich has recovered roughly 80 pounds of honey from his hives in recent weeks.

Brother Blaise Heuke, 75, a Benedictine monk at the 140-acre Prince of Peace Abbey in Oceanside, is seeing more honey this year than he's seen in the past decade. Heuke said he has collected about 15 pounds of honey to date.

Even though he has seen substantial bee deaths in recent years because of CCD, he said that the problem has become a non-issue since he moved his 100 hives away from a cluster of cellphone towers at the rear of the abbey's property, to a canyon hundreds of feet away that is protected from the electromagnetic pulses from the towers. "It's the cell towers," Heuke said. "It's not disease and pests. I tried everything to get the bugs (mites) cleared off."

Bee expert Mussen isn't so sure about Heuke's cellphone theory. "I have not seen well-planned and -conducted research on cellphone effects," he said. "You can move bees far enough and it changes their foraging habits. But the distance that he moved them tells me that is not the case here. Bees can go out four miles and collect food. This doesn't sound like they went into another foraging area," Mussen said. "Just because they got better when he moved them away from the cellphone towers doesn't mean you can say that is why they improved. Maybe all the rain is the reason they got better."

A recent study conducted by Daniel Favre of the Swiss Federal Institute of Technology, concludes that cellphone signals are seriously affecting, or even killing, bees. He says bees are sensitive to the pulsed electromagnetic fields generated by the phones. To conduct the study, Favre tested the reaction of honeybees to "nearby cellphones" set in different modes, including standby, off and making a call.

In a statement he provided via email, Favre said cellphones have "a dramatic impact on the behavior of bees" and wondered whether the rise of cell towers across the world also is contributing to declining bee populations. "I am calling (on) the international scientific community for more research in this field," he wrote.

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Apimondia 2011

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SICK BEES

by Randy Oliver - ScientificBeekeeping.com
First published in American Bee Journal September 2010

PART 2

A Model of Colony Collapse

Over the past year, I have watched the experimentally-induced collapse of an apiary. The experience has helped me to understand the progression of colony collapse due to multiple parasite infection.

The California Trial

Last year I was approached by Nitzan Paldi, Chief Technology Officer of the Miami-based company Beeologics (and a beekeeper himself), to run a trial of their new product Remebee™—an antiviral drug that targets Israeli Acute Paralysis Virus (IAPV), and to some extent the closely-related Kashmir Bee Virus and Acute Bee Paralysis Virus. Remebee works by activating the bees' natural antiviral immune response (via RNA interference; Maori 2009). The treatment had previously been demonstrated to help protect bees from IAPV in both cage and field trials (Maori 2009; Beeologics, unpublished), so the company funded two concurrent long-term controlled trials in Florida and California, following a strict FDA approved protocol.

I ran the California trial, assisted by local beekeepers and monitored by Dr Eric Mussen, in the Sierra foothills at 2600ft elevation, where we have a cold, wet, snowy winter (we intentionally wanted to cold stress the bees), followed by a hot, dry summer.

We started in late August by homogenizing, splitting, and then meticulously equalizing colonies at my *Nosema ceranae* test yard into 72 single deep hives. We requeened each hive with a fresh sister queen from a producer whose bees had not been exposed to varroa (in the expectation that they might lack resistance to viruses).

The trial site took place on an organic farm surrounded by wildlands, so that agricultural chemicals would not be a factor. I had not used synthetic miticides for 10 years, and most combs were of recent origin, so comb contamination was minimal. I purchased Apistan strips, and treated for two brood cycles prior to the start of the trial in order to eliminate most mites. For the next several weeks we equalized for strength and weight, fed syrup and pollen substitute, and replaced any poor queens with reserves from nucs in the yard, made from the same hives. Each colony received one dusting with Terramycin. The hives were color coded, and arranged into three circular groups of six sets of four hives, each group rotated 30 degrees, so that all treatments received equal sun/weather exposure.

The hives used had largely not been moved for two years (a few had gone to almond pollination), and had been largely untreated for nosema the past season except for a single feeding of fumagillin the previous fall. Average spore counts had run in the 2-10 million range (entrance bees) for about two years, but the colonies were thriving and had made a good crop of honey.

The trial began on September 30. We weighed each hive, and two inspectors graded every frame independently for bee coverage. All colonies were in good shape (one was removed due to queenlessness), with plenty of brood, stores, and fresh pollen. We then began a feeding program in which each colony received a half liter of 2:1 sugar syrup each week—one test group receiving Remebee each week, one every 4 weeks, and a control group fed only syrup. We fed for 20 treatments, with a break during the coldest weather when the colonies wouldn't take syrup (for those of you doing the math that means that we painstakingly mixed treatments for some 1400 feeder jars).

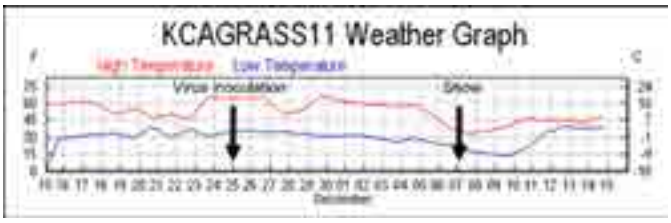
The California crew weighing and grading colonies for strength in the Remebee™ virus treatment trial, prior to inoculating the hives with the virus cocktail. The two beekeepers in the far back are waiting for foragers to return so that they can take samples to test for Nosema ceranae. Photo by Eric Mussen.

Concurrent with the field trial to this point, I ran cage trials in an incubator in which I inoculated bees with a virus extract (cultured in pupae that we had hand injected with squashed bee juices from lagging colonies in my operation). The virus extract did not cause noticeable bee mortality in the cages, so collaborator Dr. Wayne Hunter supplied a purified virus "cocktail" (mostly IAPV) originating from sick colonies from beekeeper Jeff Anderson's commercial operation, which had suffered CCD in California the previous year. This strain finally appeared to cause a sudden spike in mortality at about 9 days in some, but not all, cages (this incubation period was confirmed by Dr. Hunter in Florida). We now had a viable, virulent virus (say *that* three times real fast) inoculum on hand and were ready to roll!

So at this point we had 71 equalized, apparently healthy colonies at 6-frame minimum, still actively rearing brood in late November, with few of the common CCD suspects present:

- The bees were well fed, with natural pollen in the combs,
- Mite levels were low,
- *Nosema ceranae* was present, but the colonies had been building well.
- Each hive had a fresh young queen of good stock,
- There was no known exposure to insecticides or fungicides (notably no exposure to neonicotinoids),
- There was presumably no comb contamination from miticides, other than the small amount of fluvalinate from the Apistan strips,
- The hives had not been trucked, and the apiary was not crowded,
- Oh, I doubt that it is important, but all groups were equally exposed to any cell phone radiation.

Things were about to get interesting! On November 25(Day 0) we inoculated all the hives with the virus cocktail in the syrup feeder jars. The last part of November was unseasonably warm, and the bees had been flying, gathering pollen. There was fresh egglaying in the three colonies that we checked on inoculation day.



The weather turned cold two weeks later, and snow fell the night of Day 12, which prevented noticeable bee flight for two days. On Day 14, there were handfuls of dead bees in the snow on the landing boards of many colonies—the dead bees were full of nosema spores. ***Upon inspection, these colonies appeared to have lost much of their population in the12-day period between virus inoculation and the start of the snow***, since there were not enough dead bees present in the hives to account for the drop in population. This observation suggests that the bees had sickened quickly from the virus and abandoned the colony prior to the snowfall.

By Day 21, a number of colonies were in full collapse, and some were dead within a week. Since we didn't have any formal uninoculated controls, I checked the few extra nucs that I had taken from the yard to a nearby location—they were not suffering mortality. Neither were any of my other several hundred colonies within the county. It was clear to me that things had started to go badly only for these colonies that received a virus inoculation. (I did not ask until the trial ended, but things went similarly in the concurrent Florida trial).

We discontinued Remebee treatments on February 24, which left all the remaining colonies on their own to fight the viruses. It continued to generally be cool and rainy, with weekly snowfalls until the end of May, but there were continuous nectar and pollen flows from the last week of February on. Colonies that could maintain enough field strength put on honey most weeks until the end of the trial in July. ***Despite the generally favorable conditions, many colonies were either unable to build up, dwindled, or collapsed suddenly despite having good sized broodnests (Fig.1).***

The queens and nurse bees made heroic, but often futile efforts to expand the broodnests. It was heartbreaking to watch the dramatic losses occur in slow motion, despite conditions that afforded excellent forage, but it gave me valuable insights into the process of collapse.

Treatment with Remebee

This article is about colony collapse, not about the effect of Remebee, but as you are likely curious, I will give you a sneak preview. I was blinded until completion of the experiment (and have only recently received the final stats), but it wasn't hard to tell during the trial which group did not receive treatment! ***(This observation strongly supports the hypothesis that the critical factor that took the colonies down was indeed the virus).***

Although many of the colonies were unable to handle the combination of cold weather, *N. ceranae*, and the virus cocktail, ***those that received Remebee substantially outperformed those that didn't receive treatment. The treated colonies were stronger and produced more honey.***

Unfortunately, I can't yet tell you how well Remebee would have performed under "normal" circumstances, with stronger hives and a more realistic exposure to viruses, or had we treated for nosema. Had they started out as strong as I generally overwinter colonies in my climate, I suspect that more would have been able to shake the infection and rebound.

Figure 1. A hive showing evidence of recently having had five large frames of brood, but which suffered collapse in mid May (nearly five months after the virus inoculation). This colony reached the "starvation" stage due to its inability to muster a field force—there was little honey or pollen in the combs, despite plenty of forage available.

A Hypothetical Model

In order to make sense of a phenomenon, it often helps to attempt to create a model that explains your observations. I've attempted to do just that in the graphic below (Fig. 2). In the diagram I have tried to incorporate (as simply as possible) the major stages of colony collapse that I observed in this trial, in my previous experiences, and from reports of others. ***I also attempted to illustrate three major positive feedback loops that I feel are involved in the collapse process.***

In positive feedback loops, an initial push away from equilibrium leads to a self-amplifying chain reaction (as with, for example, explosives). ***In colony collapse, the normal colony-level immune response to a parasite infection can go haywire if it is not successful at purging the infection, and then snowball into the rapid depopulation of the hive.*** The collapse can take place in a matter of days, but generally progresses over several weeks or even months, largely dependent upon weather and temperature.

Please refer back to the diagram as I go through each of the stages of collapse. The model begins in the upper left hand corner with a healthy colony being subjected to the stress of one or more of the "Four Horsemen of Bee Apocalypse" (see my previous article), and then progresses through the cascade of events that can result in either recovery, stagnation, or full collapse. The path to collapse could initiate with any of the stresses, and its resulting feedback loop, but it generally takes some combination of Horsemen to bring down a colony, and a multiple parasite infection to thwart the normal recovery of the colony from stress. I will go into more detail in subsequent articles.

Figure 2. A tentative general hypothetical model of what occurs during colony collapse due to infection by a parasite or combination of parasites. Note how the positive feedback loops play into one another (asterisks), and can result in either rapid depopulation or slow dwindling. The three feedback loops are shown separately for clarity, but in actuality overlap. I've color coded each of the factors to help illustrate their interactions.

The "Healthy" Colony

Every hive (and perhaps every bee) deals with parasites, especially viruses. As I mentioned in the last installment, our bees have not yet come to terms with all the new parasites that have invaded hives in the past few decades, and even the equilibrium with well established parasites is constantly changing. ***In general, though, a colony can simply outbreed the parasites***—Lloyd Harris' (pers comm.) data indicates that a healthy colony's population can grow by 10,000 every 12 days during the spring growth phase!

With all those ready replacements, then the most important thing is for the bees to exhibit behaviors that minimize parasite transmission to the replacement bees. Hygienic bees actively remove sick larvae and pupae, and if they do so before the parasite generates infective spores or virions, they can often "shake off" the infection (unfortunately, varroa works against them by serving as an active vector of several parasites, notably viruses). It appears that if a nurse bee itself gets sick, then it quickly shifts to foraging duty, apparently so as not to infect the brood or queen with the parasite (Dr. Gro Amdam, pers comm).

How about older bees that get sick as adults (this includes those that became infected as larvae or pupae)? Just as bees fly outside to defecate in order to avoid fouling the hive, evolution has hard wired in a similar behavior called "altruistic suicide" in which sick or aged bees use their last bit of energy to fly (or crawl) out to die. I'm not sure that "suicide" is really the right word, since the bees appear to engage in foraging behavior up to the end, but with a vengeance—they'll forage even in poor weather that would keep healthy foragers indoors.

There is a substantial adaptive advantage to such a behavior—by removing its sick or aging self from the hive, a bee saves its sister undertakers considerable work, plus more importantly, removes its pathogen-ridden corpse from the hive environment. This process can be very effective at "purging" a colony of infected bees. The self sacrifice of those bees allows the rest of the colony to recover and survive. This phenomenon takes place, largely unnoticed by the beekeeper, on a regular basis as the colony deals with the constant onslaught of the ever present parasites (mites, foulbrood, chalkbrood, nosema and viruses).

There are (at least) two important factors involved in the phenomenon—vitellogenin levels, and ethyl oleate inhibition of "aging". The "aging" of bees has more to do with vitellogenin (Vg) levels and behavior than with chronological age. Bees that maintain high levels of Vg live for a long time, those with low levels die fairly quickly (see my Fat Bees articles). Such a shift occurs naturally as bees progress from wintering or nursing to foraging. But what is relevant to CCD is that bees that get sick accelerate the process, and immediately shift to "foraging" behavior (Tofilski 2009).

So far, so good. But what then happens when those sick foragers don't return? The regulation of the house bee to forager ratio is dependent upon the inhibitory feedback from foragers to the mid-aged bees via the pheromone ethyl oleate (see my Primer Pheromones series). So when sick foragers die, younger bees quickly take their places. This works fine as long as there aren't too many sick bees dying, and as long as there is plenty of emerging brood to take their places.

But if there is a parasite epidemic that knocks off the nurses and older bees faster than fresh bees can take their places (this is where the heavy black population arrow forks at the top of the diagram), then a vicious feedback loop can begin to take place, potentially leading to the depopulation of the hive! ***Any time that average bee longevity is decreased to the point that the colony can't replace the workforce as quickly as it dies, then the population will inevitably plummet.***

There is one additional point that I'd like to make. ***It is of benefit to both the parasite and to the colony, to have its sick workers drift to other colonies.*** For the parasite, such drift is essential for transmission to other hives; for the bees, it is a chance to knock out the competition (other colonies)! So we would expect to see drifting of sick bees to other hives. This effect has been documented for nosema-infected bees (Kralj and Fuchs 2009), ***which may help to explain the observation that CCD appears to slowly spread across an apiary from sick colonies to apparently healthy ones*** (this slow spread is very different from what we would expect if the transmission were due to robbing).

The Infection Loop

All colonies are infected with various viruses and other parasites, but the combination of the individual bee immune system and the colony-level immune response generally keeps the colony relatively healthy. However, a combination of pathogens, a novel pathogen, or an exceptionally virulent strain of an established pathogen can sometimes get a toehold in the hive, especially if others of the Four Horsemen are involved—generally a chill event or poor nutrition that stresses the bees.

In the California trial, the viruses in the cocktail, and likely *Nosema ceranae,* were players. I'm still processing samples, and will let you know more later. There are certain aspects of the bee antiviral response via RNA interference and nosema-induced metabolic stress that come into play. Each virus produces "suppressors" of the bee antiviral response, and multiple virus infection becomes complicated by viruses competing against one another. ***We are only beginning to understand the complex virus/virus & virus/nosema interactions within the poor bee!***

Cutting edge virologist Eyal Maori (2009) suggests that strains of ***bees previously infected with a virus may contain virus sequences in their genome that lie dormant like land mines, biding their time until they are triggered by infection by another pathogen***. Or viruses may exist in the "latent" form, similar to the way that the herpes virus is present in virtually all adult humans, just waiting to be triggered to reproduce by either stress, or another virus infection (again, I will detail more on this fascinating subject later).

For now, let's just say that it is common for collapsing colonies to be simultaneously infected with three or four viruses, varroa mites, *Nosema (ceranae* and especially *apis)*, and trypanosomes (Evans 2010), and that there are interactions between the pathogens and bee immune function.

The colony response to infection is to get the sick bees the hell out of the hive! The adult bees that are sick fly off, and the nurse bees remove (and perhaps cannibalize) the sick larvae and pupae (which may lead to further infection of both nurses and brood by viruses). The result, if all goes well, is to purge the hive of the infection. But if the colony is unsuccessful at fighting the infection, things can start to go downhill as the colony is overwhelmed by opportunistic pathogens that take advantage of the stressed bees.

In this particular case, the inoculation with the virus cocktail was apparently a "tip point" that initiated the parasite infection cascade, and from which, either directly or indirectly, most colonies eventually succumbed.

This is the dwindling phase of collapse, which can progress very quickly in some cases. The lack of foragers can be stunning! I really noticed it when I tried to vacuum returning foragers from the entrances for nosema sampling—there just wasn't any forager traffic. In collapsing colonies, there might be bees in the broodnest, but they are all busy trying to keep the brood alive—there just aren't any foragers to speak of!

The progression of colony collapse was recently described by Dr. Jerry Bromenshenk and colleagues (Debnam 2009):

"Regardless of whether the condition expresses itself in the spring or summer, organization within the hive shows slight changes. Brood nests are slow to expand. Instead the colony shows a tendency to maintain a brood nest centered in a single hive body. After the adult bees emerge the brood cells are abandoned and not reused. A midday inspection will reveal that many bees are out foraging and that the remaining bees are widely dispersed throughout the hive. This symptom may vary depending on time of day and the ambient temperature. Moreover, the population stops increasing during the growing season."

The above was typical in this trial of colonies attempting to purge the infection. I also saw the same in 2004 and 2005. This is a huge point—the mere presence of a colony in the hive does not mean that that hive is going to be a productive unit. We can't simply categorize colonies as either "live" or "dead"—there are also "zombie" colonies that lie somewhere in the limbo between the two classifications.

"The bees may appear to be restless. When viewed from the outside, flight activity may appear to be normal, giving the illusion of a strong colony. Smaller hives often abandon the upper brood chambers and the bee population is completely contained within a few frames in the lower hive body. This is often the easiest and quickest sign of CCD for beekeepers to notice."

That and the fact that the colony isn't building normally. These signs appear as the epidemic takes hold of the colony. Also look for lack of forager flight and spotty brood. An indication of sick hives during a flow is that the bees don't glue the lids down, and white wax is not present. The bees in collapsing colonies are often listless and nondefensive, and may cluster away from the brood (Fig. 3).

Figure 3. A colony at mid collapse, with listless, restless bees not properly covering the brood, which is suffering from neglect. Colonies can hang on in this sorry condition for many weeks.

"In the earliest stages the brood pattern may appear to be solid, but if the pupal caps are removed, it likely consists of brood of all ages, due to the replacement of dying brood. As this condition advances the lack of adult bees results in an inability to cover the brood. Capped brood cells may be abandoned and unattended. Removal of chilled brood is still obvious and abandonment and chilling can be seen on brood frames because of the 'holes' in the pattern. The removal of dead larvae and pupae results in a 'shot gun' pattern on brood frames. Healthy colonies can keep up with the removal of chilled brood, which makes the 'shot gun' pattern of CCD colonies a strong indicator."

This is when the chilling feedback loop starts to come into play.

The Chilling Loop

An observation by vanEnglesdorp (2009) is important:

"The premature loss of forager bees, the older cohort in a colony, results in younger bees prematurely becoming forager bees. If these replacement bees die at a rate that exceeds the colony's ability to replace them, the result would be rapid depopulation, a reduction in the bee-to-brood ratio, and eventually colony failure."

"Eventually" can be in a matter of days! But the term that I want to bring to your attention in the above quote was something that I first heard in a presentation by Dr. Frank Eischen—the "bee-to-brood ratio." This is something that I really noticed in the trial—that in collapsing colonies, there simply weren't the expected number of bees that should be there to cover the amount of brood present (Fig. 4).

Figure 4. A rapidly-collapsing colony with an obviously low bee-to-brood ratio. Note that the brood is still alive and white, but that there are no longer enough bees left in the hive to tend to it.

Although the altruistic suicide of the sick adult bees is of great benefit to the colony, the downside is that unless they can be quickly replaced, the bee-to-brood ratio will drop, and in cool weather, the bees may then simply not be able to keep the brood warm. We are all familiar with the phenomenon of "chilled brood," in which we see dead brood on the landing board the morning after a cold snap; the colony quickly recovers. The effects of chilling in collapsing colonies are more subtle, but much more devastating.

As I wrote in my "Old Bees, Cold Bees" series, bees are warm-blooded animals, and chilling causes them great stress. ***There is suggestive evidence that their antiviral immune response is temperature dependent, meaning that when they are chilled, they may not be able to fight off virus infections. Ditto for chalkbrood and nosema, both of which thrive in slightly chilled bees.***

Brood that is slightly chilled may appear normal the next day, but if the chilling allows the ever present viruses to explode in their bodies, the removal of their corpses may spread that virus into the young workers that chew them out—a positive feedback to the nascent epidemic (Figure 5).

Nosema infection also comes into play here. Two recent papers from Dr. Dhruba Naug's lab offer some intriguing suggestions. They found that bees infected with *N. ceranae* preferred warmer temperatures, and were not able to generate body heat as well, especially if not satiated with nectar (Campbell 2010). And Mayack (2010) found that ***even relatively low levels of* N. ceranae *infection put forager bees under energetic stress***, and kept them from maintaining their normal levels of the storage sugar trehalose in their haemolymph (blood).

Trehalose is the major "blood" sugar of bees, and critical for the effective use of their flight muscles for both flight and the heating of their bodies (and thereby thermoregulation of the hive).

Figure 5. Chilled brood in a collapsing colony. The bees will uncap and remove the chilled or virus-killed larvae and pupae, resulting in a spotty pattern of uneven-aged brood. Unfortunately, the process of removal is likely to further transmit the viruses.

Even more insidious is the effect upon the adults which later successfully emerge from brood that was slightly chilled. Researchers (Tautz 2003, 2008; Jones 2005) found that bees that were chilled even slightly as pupae emerge as adults lacking in short-term memory. And that ain't the half of it! They may not even live long enough to make it to foraging age! Medrzycki (2010) found that "Our results showed that lower rearing temperature had no significant effects on larval mortality and adult emergence, but adult bee mortality was strongly affected"

(Fig. 6). ***Again, we have a nasty positive feedback loop at play—loss of adult bees causes chilling of the brood, which then leads to shortened lives for emerging bees, and even quicker adult bee loss!***

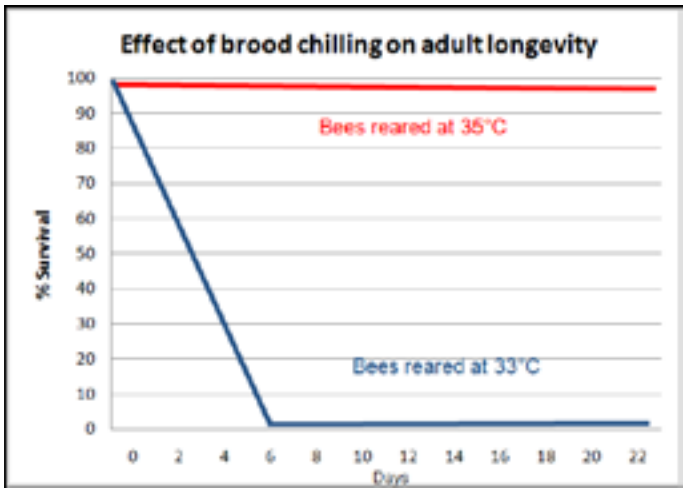


Figure 6. The effect of slight chilling of the brood upon adult bee survival. Compare the survival of normally-reared workers (which would live an average of about 56 days), to that of those that were slightly chilled as pupae (which in this particular experiment all died by day 6; in two other experiments, death came at day 10 or 14). ***Note how such an effect can cause worker depletion in a hive to snowball!*** *After Medrzycki (2010).*

But we're not done with chilling yet! Medryzcki also found that chilling increased the bees' susceptibility to pesticide poisoning! This should be of special interest to those whose combs are contaminated with miticides. I found an interesting piece of old data regarding the most commonly used miticide, fluvalinate. In general, pesticide and miticide testing on bees is done in an incubator held at about 32°C, which would simulate the temperature within a hive. But on a cool night, or during winter, the temperature of the bees may drop to as low as 10°C. ***Niijima (1985) found that fluvalinate was 4-1/2 times more toxic to bees at 20°C than at 32°C*** (Fig. 7)! Another potential case of unexpected positive feedback!

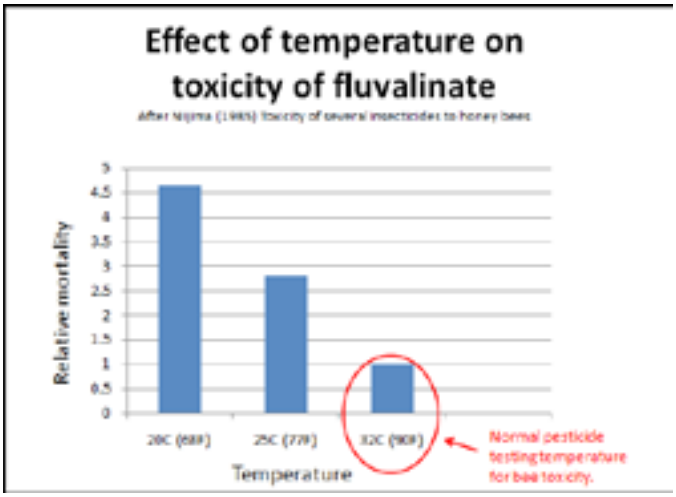


Figure 7. This is a little-addressed phenomenon when we speak of pesticide, or in this case, miticide toxicity to bees. The normal testing of pesticides at broodnest temperatures may not truly indicate their toxicity to the older bees at the outside of the cluster. Note that the common miticide fluvalinate is four and a half times more toxic to bees if they are chilled. It is possible that the chilling that occurs in collapsing colonies could enhance pesticide toxicities that would not normally be noticed.

Pesticide and miticide exposure were not factors in the collapses that I observed (nor in historical collapse events), so are certainly not necessary components. However, there are many operations today in which they could well be contributing factors.

The Starvation Loop

The most surprising observation that we made was how strongly the premature loss of foragers could affect the colony's nutritional intake! Dr. Mussen and I looked at two side-by-side colonies—one with a broodnest overflowing with fresh pollen and nectar, making white wax, and putting on honey, while the struggling colony right next to it was starving in the midst of abundance because it simply could not maintain a forager force (Figs. 8 and 9)!

Figure 8. An apparently healthy colony in mid May. Note the solid brood and plenty of pollen stores (there was freshly-stored honey in the super above—not shown). Note also the normal bee-to-brood ratio. Compare this photo to the one below.

Figure 9. A brood frame from a hive adjacent to the colony shown above. This colony is in the final stage of collapse. The still-living (white) brood is clear evidence that collapse came rapidly. Although the area of brood is similar to that in Figure 8, note the lack of pollen stores due to the depleted forager force that preceded the final collapse.

I watched a few colonies starve to death on nights when there was an overnight cold snap, *during a substantial honey flow!* I wouldn't have believed it if I hadn't seen it with my own eyes (Fig. 10). Even supplemental feeding of these sick colonies may not help.

Figure 10. This colony starved overnight, despite having honey stored on the periphery. Note the green grass, as this happened during spring weather under good foraging conditions with an ample nectar and pollen flow. There simply weren't enough foragers to restock the stores each day!

As I noted in my "Primer Pheromones" series, the presence of fresh pollen around the broodnest is of paramount importance to nurse bee function and regulation.

Young bees that go hungry start foraging prematurely (Toth 2005), and the absence of fresh incoming pollen appears to induce a rapid loss of the forager force (Mattila 2007).

Dr. Jürgen Tautz explains that the presence of cells of nectar in the middle of the broodnest is critical to thermoregulation of the broodnest temperature by "heater bees." So the lack of fresh nectar and pollen due to lack of foragers has severe consequences upon the health of the colony and the aging of the bees; again an example of positive feedback that can lead to rapid collapse.

And let's return again to the Naug group's recent studies of the effects of *Nosema ceranae* infection. They found that unless the infected forager bees that they studied were fed sugar solution to satiation that they could not maintain the necessary sugar levels in their "blood" necessary to produce heat and forage for extended periods.

So it would not be surprising if nosema infection contributes to the demise of collapsing colonies simply by thwarting their ability to generate heat.

In this final stage of collapse, when foragers are unable to keep the broodnest stocked with adequate fresh nectar and pollen, "starvation" starts to have an effect—even in the midst of plenty!

The lack of proper provisioning of the brood area has the effect of accelerating the "aging" of young bees into foragers, which, coupled with the shortening of the lives of bees due to chilling and disease, can finally topple the colony, despite heroic efforts of the queen and few remaining young workers.

Figure 11. The end result of a dwindling collapse. This was a common sight—a colony that had dwindled down to a healthy queen heroically laying eggs (see multiple eggs in some cells), a handful of young bees, and a patch of brood about the size of a silver dollar. In warm weather, colonies could hang on like this for weeks!

Practical Applications

It is clear that colony collapse can be initiated, and continue for months until it eventually decimates an apiary, simply by the introduction of one or more virulent strains of virus. The presence of nosema is likely contributory, but at least in this trial, the virus was key, as evidenced by the observation that those colonies treated against the virus were noticeably stronger. As I write this article, some eight months after inoculation, the difference between the treated and untreated colonies is unmistakable!

Beekeepers everywhere ask, what can we do to prevent or cure CCD? I've spoken to a number who have recovered, or have avoided it (so far) while others suffered. Their management suggestions are pretty much common sense:

1. Learn to recognize the early signs of colony collapse: lack of normal buildup, low bee-to-brood ratio, spotty brood, lack of stored nectar and white wax when expected. You may wish to move sick colonies to an isolated yard.
2. Make sure that your colonies are well nourished—plenty of honey reserves, and adequate pollen forage. If not, the feeding of several pounds of high quality pollen supplement during times when colonies are nutritionally stressed can make the difference between boomers and deadouts. (Although in this case, colonies succumbed despite good nutrition).
3. Keep mite levels low. Varroa acts as a vector for viruses, as well as causing major stress to bees. (Again, mite levels were low in this trial).
4. Treat for nosema if levels get high. Just how high is the question! The colonies in my yard did just fine with *N. ceranae* levels in the few millions for two years, until I added the virus inoculum.
5. Avoid the added "Horseman" of toxins by minimizing the exposure of your hives to pesticides, including beekeeper-applied miticides, which have been strongly implicated in several studies with colony losses. (Again, not a factor in this trial).
6. It's pretty clear that the one factor that is most difficult to specifically control for is viruses, to which your bees ***will*** be exposed either through transport to almonds, or even from visiting flowers (Shen 2005). Remebee™ is the only specific antiviral product that I know of, and it could prove to be a godsend to those with stressed bees; the company hopes to have it commercially available in a few months (followed by a multivirus product). There are also some indications that certain essential oils may also help to control viruses—Dave Wick is currently setting up trials to get some actual data.

7. Start yards of fresh colonies with broodless shook (or package) bees, treated to eliminate most mites. This practice serves to break both the varroa and virus epidemics in the hive. The resulting colonies are generally very healthy for the first year, and Dr. Jerry Bromenshenk has documented that virus levels generally remain very low.
8. Don't combine collapsing colonies with healthy colonies! Collapsed deadout equipment appears to become less infective after "aging" in a dry environment for a month or so, or after sterilization with bleach, formic acid, or radiation. I'm currently setting up a continuation of this trial in which I am going to restock the deadout equipment from the untreated control group.
9. Propagation of resistant stock. It's equally clear that bees (at either the colony or population level) are able to develop resistance to any virus that comes along (one, but only one, of the unmedicated control colonies in my test yard is thriving, despite having been inoculated). Breeding from survivors is our best long-term hope for dealing with colony collapse, no matter what the cause(es).

Closing Thoughts

All colonies of bees are forced to deal with the Four Horsemen (parasites, chill, toxins, and poor nutrition) on a regular basis, yet they generally don't collapse. In my California trial, collapse was clearly initiated by the introduction of virus(es). The other Horsemen may stress a colony severely, or even kill it outright (like a pesticide kill, or winter starvation), but unless a parasite epidemic is raging within the hive, any challenge would be unlikely to cause the type of progressive collapse observed in CCD.

Will CCD "go away" as have the other instances of "disappearing disease"? Most viral epidemics do eventually either disappear, or morph into opportunistic background infections. We are in the midst of the Deformed Wing Virus epidemic, which started shortly after varroa arrived, but shows no signs yet of abating. ***As pointed out earlier in this series, bees are currently coming to terms with an onslaught of novel parasites and their interactions, so we may be seeing sick bees for a while.***

Complete collapse is not inevitable. Some colonies may collapse quickly, seemingly overnight. Others may stay "stuck" at just a few frames of healthy-appearing bees and brood, for weeks or even months. And others may dwindle to a couple of frames of bees, and then, if they manage to purge the infection, spontaneously recover (especially if they are on a good pollen and nectar flow in warm weather).

A few things surprised me during the California trial, like our success at inoculating the colonies with virus by the feeding in sugar syrup. It is unlikely that each bee in the hive fed directly from the feeder jars (which each had only one small hole), so I must assume that the virus was passed throughout the hive via trophallaxis, and that it was infective via the gut. We tend to associate virus infections with varroa, but in this case, varroa levels were still quite low when we checked in May, so either the virus alone, or in combination with *N. ceranae*, was able to increase to lethal epidemic proportions.

I was also surprised by how quickly ostensibly healthy colonies collapsed after the virus inoculation, even before cold weather hit. It was not so surprising that the remainder struggled during the cold, wet winter. As beekeeper Zac Browning told me after he suffered major losses last winter, "Bees don't get better over the winter." However, they generally ***do*** get better once they are on a good spring nectar and pollen flow. But in this case, most didn't. ***This was the most unexpected observation of all - that many colonies were not able to rebound during the spring, and continued to collapse even during excellent foraging conditions in early summer!***

I would have expected the virus, or virus/nosema infections to go "away" after the initial kills, and for the surviving colonies to recover. Jeff Anderson (from whose bees we obtained the virus cocktail) tells me that many of his colonies dwindled to about two frames, and then spontaneously recovered. So my questions are, why were so many of my colonies unable to recover during spring, and what were the pathogen dynamics during this time? I currently have samples in for testing, and am slowly slogging through other samples to determine how much of a role nosema played.

To be continued…

Acknowledgements

I'd like to thank those beekeepers who assisted me in the hard work of the field trial--my sons Eric and Ian, my partner Stephanie Hughes, and local beekeepers Rob Slay, Steven Kauffman, Jerry van Heerington, Aaren Bryars, Larry Merrit, and Thom Staser. Phil Carville of Loma Rica Ranch generously provided us the location on the organic farm.

I'm also grateful for the scientific assistance of researchers Nitzan Paldi, Eyal Maori, Denis Anderson, Jay Evans, Wayne Hunter, and especially Jerry Bromenshenk and Scott Debnam, whose observations of a vast number of collapsing colonies were critical to the formation of this model.

I'd also like to tip my hat to the heroic efforts of Dennis vanEnglesdorp, Jeff Pettis, Diana Cox-Foster and Nancy Ostiguy and the rest of the Penn State group, and to all the others who are working so hard at finding the causes of Colony Collapse Disorder.

A special thanks to my friend and colleague in this experiment, California Extension Apiculturist Eric Mussen, with whom I bandied thoughts and observations in the field.

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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

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AUSTRALIAN HONEY BEE INDUSTRY COUNCIL

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2010 - 2011 ANNUAL REPORT

On behalf of the Australian Honey Bee Industry Council it gives me great pleasure to present the 2010/2011 Annual Report.

I would also put on record my thanks to my fellow AHBIC Board Members: Ed Planken, Ian Stephens, Trevor Morgan, Trevor Weatherhead and Ken Gell

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

- Providing a voluntary contribution to AHBIC
- Gave of their time by attending the Rally in Canberra and communicated Industry's concerns to the public
- Contributed their time to member bodies of AHBIC
- Assisted with the *Apis cerana* incursion in Queensland

APIS CERANA INCURSION – QLD

- **On the Friday 20 May a further meeting of Government and Industry has been called to discuss a proposed containment program**
- **From an Industry perspective the outcome of this meeting will be successful if there is an ongoing surveillance program and eradication with the use of Fipronil**
- **Up until this decision the Apiary Industry has contributed $100,000.00 and has committed funding eradication to 31 March 2011.**

Since the initial incursion additional swarms and nests have been found, totalling 384 detections.

The Apiary Industry has been the only industry prepared to commit funds to the Asian Bee program.

AHBIC has been involved in numerous meetings with Government and other industries to eradicate the Asian Bee. The Governments now feel that eradication is not possible but appear to support some form of containment program.

From an Industry perspective however any such containment program will need to include ongoing surveillance and eradication work so that after a two year period there may be potential to again support an eradication program.

AHBIC continues to work with Government to fund the incursion response and assist technically. I would particularly thank Trevor Weatherhead and the members of the Queensland Beekeepers Association. Industry has also indicated that part of the containment strategy we will look at the provision of additional funding and manpower to support a viable containment program.

ANIMAL HEALTH AUSTRALIA (AHA)

- **Industry's funding for disease and pest responses is paid by beekeepers through a compulsory levy of 0.07c/kg to AHA**
- **AHBIC does not control the Fund but makes recommendations, the Directors of the Fund have the final say**
- **In respect of Varroa the Fund has also paid to register Bayvarol, Apivar and Apistan as well as paying for a cost benefit analysis of the effects of Varroa**

Currently beekeepers pay a compulsory Honey levy of 2.3c/kg split as follows:

- R&D - 1.5c/kg
- NRS - 0.1c/kg
- EADR (the "Contingency Fund") – 0.7c/kg

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 if eradication had proceeded would be in the order of $25M. Even with cost sharing i.e. Industry paying 20% this is approximately $5M, hence the importance for the Apiary Industry to gain agreement from the Pollination dependent industries to contribute to any incursions.

We also need to increase our own resources going into the biosecurity/contingency fund and hence an additional $50.00 compulsory registration fee on all apiarists both commercial and non-commercial has been suggested.

VARROA PREPAREDNESS STRATEGY

- **A renewed commitment to the Sentinel Hive Programme, Australia's early warning system for *Varroa destructor***
- **The pre-registration of Bayvarol, Apivar and Apistan**
- **Review of Bee Pest Surveillance**
- **Establishment of a Varroa Treatment and Preparedness Committee**
- **Negotiations of appropriate cost-sharing arrangements with the pollination industries through Plant Health Australia**
- **Further Government support for education and training**

Despite the Asian Bee incursion in Queensland Industry during the year continued to work on our Varroa preparedness strategy.

This has included:

- A full review of bee surveillance
- The pre-registration of chemicals used for Varroa treatments
- Fresh negotiations through Plant Health to encourage pollination dependent industries to participate in cost sharing
- A Varroa Treatment and Preparedness Committee comprising of: Peter McDonald, Des Cannon, Rod Pavy, Ian Roberts, Trevor Weatherhead, Bill Weiss, Julian Wolfhagen, Gerald Martin and Dave Alden.

RESIDUE & CONTAMINATION ISSUES

- **Pyrrolizidine Alkaloids (PAs)**
  International bodies including Codex have now called for a risk assessment for PAs in food and animal feed
- **Copper Napthanate**
  AHBIC has sought to register the use of Copper Napthanate through the APVMA
- **Para dichlorobenzene (PDBs)**
  Industry established an Extraneous Residue Limit (ERL) for PDBs which will conclude in 2012

PAs

Industry is working with Food Standards Australia New Zealand (FSANZ). This follows the Codex Committee on Contaminants in Food (CCCF) undertaking a risk assessment of PAs in 2012. We are also aware the European Food Safety Authority has established its own working group to provide an assessment of the risks related to PAs in food. These are important developments that we continue to monitor and actively engage with regulatory authorities.

Copper Napthanate

We have recently sought from the Australian Pest & Veterinary Medicines Authority (APVMA) registration for the use of Copper Napthanate which is often used to paint bee boxes.

PDBs
As you are all aware the Industry had a temporary ERL to deal with PDB contamination and at the end of a five (5) year period (which began March 2008) tolerance of the PDB contamination was to come down to zero and would remain at zero. I would urge all beekeepers to maintain their vigilance to ensure that PDB is not used in the Australian Industry.

THANK YOU
I would like to thank the Residue Committee: Dr Ben McKee, Des Cannon, Dawn Smith, Laurie Dewar and Ed Planken for their ongoing work.

EASTERN CREEK QUARANTINE STATION
- **Risk assessment analysis is near completion hence the facility should shortly be available to import bees**
- **In 2015 Eastern Creek will close and Industry has been working with Government to ensure that a replacement facility will be available to beekeepers**
- **The federal budget contained funding to proceed to the next level in the development of an alternative facility**

I would just like to advise on two issues regarding Eastern Creek Quarantine Station:

The first being its re-opening for bees following its closure. I can advise that we have recently been assured by DAFF that risk assessment analysis is nearing completion and this is the final obstacle for re-opening Eastern Creek for bee imports.

Secondly in 2015 the facility at Eastern Creek is to close and Industry has been working with Government to ensure that a replacement facility will include the ability to import bees.

TRADE ISSUES
- **Japan has introduced *Nosema* into their Queen Bee and Packaged Bee Protocol**
- **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 a import quota**

Trade issues have been highlighted today to once again demonstrate to you some of the matters that are confronted by your Industry Association on an ongoing basis.

We are attempting to deal with these issues but progress is not always as fast as we would hope but they are issues that concern or should concern every beekeeper and every member of the Australian Honeybee Industry.

In the case of Korea we are working closely with the Australian Government to seek the right to import a certain amount of Australian honey into the Korean market without any tariffs or export quotas. Prime Minister Gillard's recent visit to Korea again highlighted this issue.

SUMMARY
- ***APIS CERANA* INCURSION**
- **VARROA MITE PREPAREDNESS**
- **RESIDUE CONTAMINATION ISSUE**
- **TRADE ISSUES**
- **THE FUTURE**

In summary, despite the *Apis cerana* incursion in Queensland that has consumed enormous time and resources, AHBIC has continued to work on other areas:

- Varroa Mite Preparedness
- Residue Contamination Issues – particularly alkaloids.
- Trade Issues

The future for our Industry is coping with a high A$, increased costs of production and a massive imbalance between supermarkets and producers.

As a small Industry we need to do everything we can to market true Australian Honey produced under ideal environmentally friendly conditions.

Strengthen our biosecurity arrangements.

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**

US SCIENTISTS DISCOVER FOUR NEW VIRUSES

Are they contributing to Colony Collapse?

A 10-month study of healthy honey bees by University of California, San Francisco scientists has identified four new viruses that infect bees, while revealing that each of the viruses or bacteria previously linked to colony collapse is present in healthy hives as well.

The study followed 20 colonies in a commercial beekeeping operation of more than 70,000 hives as they were transported across the country pollinating crops, to answer one basic question: what viruses and bacteria exist in a normal colony throughout the year?

The results depict a distinct pattern of infections through the seasons and provide a normal baseline for researchers studying a colony – the bee population within a hive – that has collapsed. Findings are reported in the June 7 issue of the Public Library of Science ONE (PLoS ONE) at www.PLoSone.org

The study tracked 27 unique viruses that afflict honey bees, including four that previously were unknown and others proposed as causes of the Colony Collapse Disorder that has been wiping out colonies for the past five years, according to senior author Joe DeRisi, PhD, a Howard Hughes Medical Institute investigator and professor of biochemistry and biophysics at UCSF.

"We brought a quantitative view of what real migrating populations look like in terms of disease," DeRisi said. "You can't begin to understand colony die-off without understanding what normal is."

Because the colonies in this study remained healthy despite these pathogens, the research supports the theory that colony collapse may be caused by factors working alone or in combination, said Michelle Flenniken, PhD, who jointly led the research.

"Clearly, there is more than just exposure involved," said Flenniken, a postdoctoral scholar in the laboratory of UCSF microbiologist Raul Andino, PhD. "We noticed that specific viruses dominated in some seasons, but also found that not all of the colonies tested positively for a virus at the same time, even after long-distance transport in close proximity."

Honey bees are critical to U.S. agriculture, which depends upon them to pollinate 130 different crops, representing more than $15 billion in crop value each year and roughly one-third of the human diet, according to the U.S. Department of Agriculture.

For the California almond crop to be successfully pollinated, DeRisi said, roughly half of the honeybees in the country – about 1.3 million honeybee colonies – must be in the Central Valley by the first week in February, when the trees begin to bloom. That need is echoed throughout the country, as different crops come due for pollination, resulting in semis traversing the nation for most of the year, each bearing hundreds of hives.

Since 2006, however, the bee industry has reported a mysterious phenomenon involving the sudden disappearance of most of a hive's worker bees, which leaves the queen and young bees without enough workers to support them. The disorder is one factor in the growing decline of U.S. honey bees – an estimated 30 percent of the population is lost each year and some beekeeping operations cite 90 percent losses, the USDA reports.

Researchers nationwide have identified various possible causes of that collapse, mainly based on pathogens found in the affected hives. While this study did not identify the cause of colony collapse, it did offer a measurement of the normal levels of pathogens.

In addition to viruses, the research revealed six species each of bacteria and fungi, four types of mites and a parasitic fly called a phorid, which had not been seen in honey bees outside California. One of the new viruses, a strain of the Lake Sinai virus, turned out to be the primary element of the honey bee biome, or community of bacteria and viruses.

"Here's a virus that's the single most abundant component of the bee biome and no one knew it was there," DeRisi said, noting that hundreds of millions of these viral cells were found in each bee in otherwise healthy colonies at certain times of the year.

Flenniken jointly led the work with doctoral student Charles Runckel, in DeRisi's lab. The team used a broad range of molecular detection tools for the study, including gene sequencing and a custom-designed microarray to detect insect pathogens. The microarray was designed using the same principles used for detecting human viruses, which DeRisi pioneered with UCSF professor Donald Ganem, MD. It was built in the Center for Advanced Technology on the UCSF Mission Bay campus.

The research was primarily funded by Project Apis m., which includes members of the American Honey Producers Association, the American Beekeeping Federation, the National Honey Board, California State Beekeepers Association and California almond farmers. DeRisi is supported by the Howard Hughes Medical Institute. Flenniken's research was supported by the Häagen Dazs post-doctoral fellowship in honey bee biology, through University of California, Davis. Other funding sources and data can be found in the full paper.

Co-authors include Andino, in the UCSF Department of Microbiology and Immunology; Juan C. Engel, in the UCSF Sandler Center for Drug Discovery and UCSF Department of Pathology; and J. Graham Ruby and Donald Ganem, in the Howard Hughes Medical Institute and UCSF departments of Biochemistry & Biophysics, and Microbiology.

UCSF is a leading university dedicated to promoting health worldwide through advanced biomedical research, graduate-level education in the life sciences and health professions, and excellence in patient care. For more information, visit www.ucsf.edu

Findings are reported in the June 7 issue of the Public Library of Science ONE (PLoS ONE) at: www.PLoSone.org

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To All Industry Members,

As most of you are probably now aware Chris Kath has moved on from Superbee after a very successful 7 years. To those of you whom I have had the pleasure to talk to, I would very much like to thank you for your support and understanding during this transition.

After now settling into the new role, I'm looking forward to introducing myself to those of you who I have not yet had the chance to meet. By all means, please feel free to pop in for a chat or give me a call anytime.

I would like to say a big thank you to our Operations Manager, Russell Pout, who I am looking forward to working closely with. Many of you may already know Russell and I am hoping that the two of us can get around to visiting some of you in the coming months.

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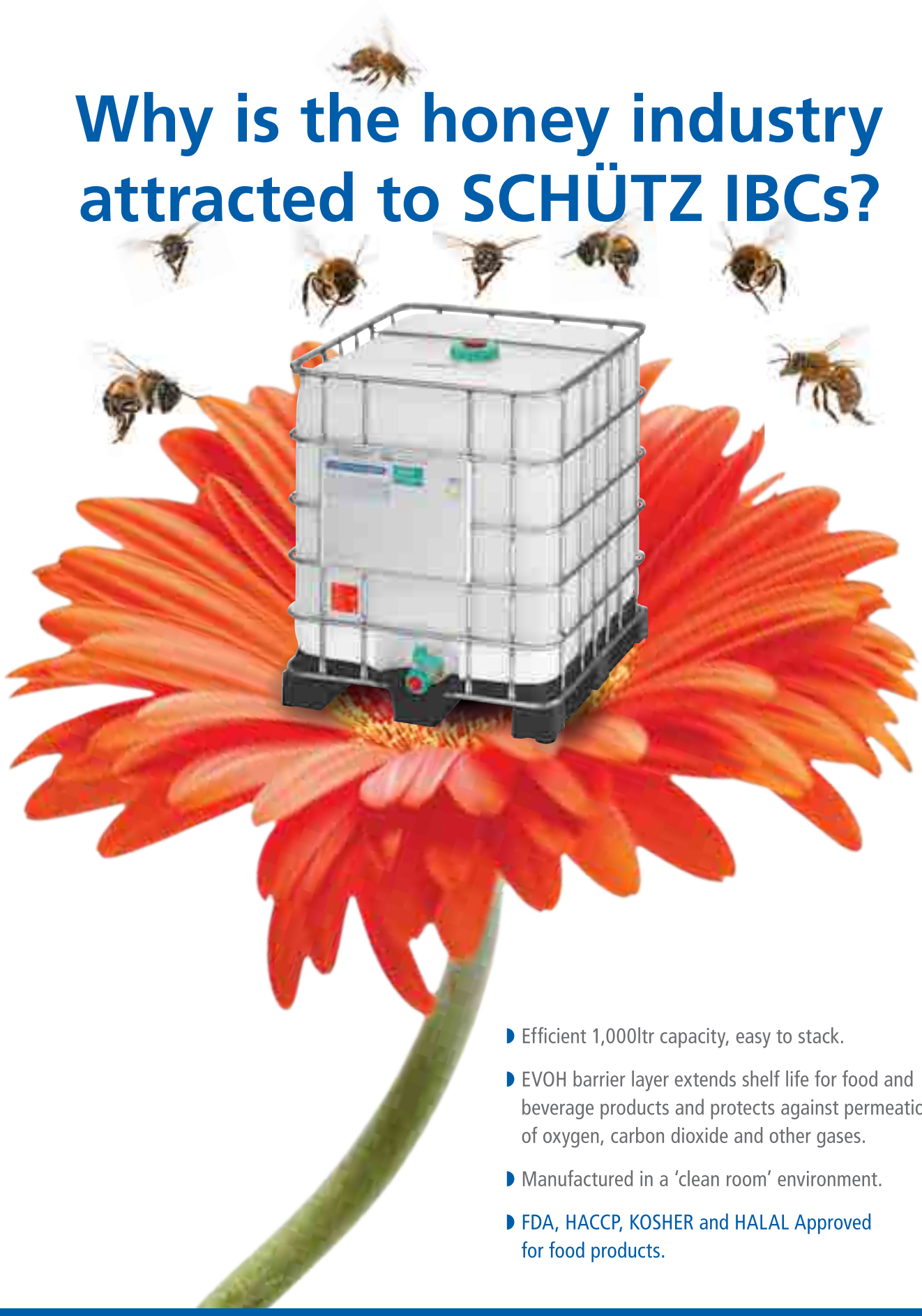

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