AUSTRALIA'S

HONEYBEE NEWS

"The Voice of the Beekeeper"

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AUSTRALIA'S HONEYBEE NEWS

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Editor: **Margaret Blunden PO Box 352 Leichhardt NSW 2040**
Advertising Enquiries: **Mobile: 0411 662 014 Email: honeybeenews@bigpond.com**

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VICE PRESIDENT: Casey Cooper Darby's Road Tingha 2369 Mob: 0428 233 551 Email: cooperbees@bigpond.com.au
COUNCILLORS:
Mark Page 424 Minimbah Road Minimbah NSW 2312 Mob: 0459 309 737 Email: mark.buzz.page@gmail.com
Dr Shona Blair 13 Lambert St Erskineville 2043 Mob: 0422 977 510 Email: shonaeblair@gmail.com
Stephen Targett PO Box 325 Narrandera NSW 2700 Mob: 0428 649 321 Email: wally.56@hotmail.com
SECRETARY/TREASURER: Roslynn (Ros) Riggs PO Box 5022 South Tamworth 2340
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Mailing Address: 11/11 High St, Launceston TAS
Email: queenvic@cradlemountain.com.au

Executive Director: Trevor Weatherhead Ph: 07 5467 2265
Mailing address: PO Box 4253, Raceview QLD 4305
Email: ahbic@honeybee.org.au Website: www.honeybee.org.au

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Ms Margie Heath, Project Manager, RIRDC PO Box 4776, Kingston ACT 2604 Ph: 02 6271 4145
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PRESIDENT'S REPORT

SEASON
Spring has been extremely challenging to say the least; well above winter through spring rainfall, made access an issue for most. This was then exacerbated by cold damp days especially in the south of the State and towards the later part of spring, with rainfall curtailing production from ground flora that dwindled to next to nothing.

The earlier rainfall has promoted good growth on many eucalypts but now masses of both Christmas and Scarab beetles are emerging to decimate the gums. Other than potentially a few autumn prospects beekeepers will find it a rather difficult season.

Please be extremely careful during this summer as fuel loads in most areas will be conducive to rapid fire spread. Always carry fire suppression equipment with you when working your hives during summer.

HONEY PRICES
I wish to express my disappointment at the recent honey price reductions at a time when most have not had a great season. The remainder of the season does not look like producing anywhere near an average crop so to drop wholesale honey prices just before Christmas is a real kick in the guts to beekeepers.

CITRUS GALL WASP
An outbreak of Citrus Gall Wasp occurred during the flowering of citrus last spring. A neonicotinoid spray was applied to control the pest and word has it that a least 300 hives were affected and 100 killed. This is a situation all beekeepers need to monitor in the future if you intend to work citrus.

Make sure you report any pesticide instances that affect your hives to the EPA Ph 131555. If there is no report then it is taken that it did not happen.

EXPANSION OF COTTON AREAS
The continued expansion of cotton along our southern river systems and with that the associated spray regimes, it will be almost impossible in future years to safely work our traditional honey flows on River Red Gum and Black Box.

This is not acceptable and Cotton Australia will need to ensure their growers and agronomists adhere to strict protocols that allow apiary operations to co-exist with cotton.

NEW SECRETARY
On behalf of the NSWAA Executive I wish to welcome our new secretary Ros Riggs.

Ros is one of the team at 2 Rivers Pty Ltd based at Ashford on the Northern Tablelands. The profile of this company is included in this edition. Ros can be contacted via email info@nswaa.com.au

Thanks must go to Shona Blair for taking the lead role in managing the job applications for the secretarial position, coordination of the committee and interview process. The interview committee was myself, Margaret Blunden, Doug Somerville and Shona Blair.

PUBLIC LANDS
Apologies to Steve Targett for not mentioning his inclusion in the Field trip to the south coast with the Government agency representatives and DPI staff last September.

Emma Marshall (A/Senior Policy Officer) from DPI attended our Executive meeting held 2 December at Tocal to inform us of where we were at in relation to the Public Lands policy framework.

The current draft is more favourable than previous versions but we still have much work to do before final agreement can be reached. A copy of the policy framework is included in this edition.

BIOSECURITY
Emma Cottage (Senior Project Officer Preparedness & Programs) DPI attended our Executive meeting and comprehensively covered the proposed Biosecurity Regulation. Discussions took place around our concerns and NSWAA will be sending in a submission addressing our concerns. Submissions close 29 Jan 2017.

Anyone wishing to review the draft regulations follow the link: www.dpi.nsw.gov.au/biosecurityact

BEE BIOSECURITY OFFICER
NSWAA has been advised that following amendments to the criteria for the BBO Position. Advertisements should be placed sometime in January 2017.

EDUCATION and TRAINING
Participation in training courses has increased significantly over recent months. Tocal College (Education Officer Honey Bees) Elizabeth Frost is doing an excellent job in bringing our industry to the fore. Thanks Elizabeth

CONFERENCE
The venue for our 2017 conference in Ballina has been booked. Ballina RSL Club will host us on May 18 & 19. We have identified a range of interesting speakers so hope to see you there.

The Trade Show is progressing thanks to Therese Kershaw. tradeshow@nswaa.com.au

The North Coast Branch will be holding a Field day on Saturday May 20 at the Alstonville Showground.

FARMER OF THE YEAR
Congratulations must go to Vice President Casey Cooper on being one of four finalists for NSW Farmer of the year. The winner will be announced 8 December.

We wish you well Casey.

HONEYLAND
Anyone with a straight line honey and willing to assist by supplying the NSWAA for sale at the Royal Sydney Show please contact our show coordinator Bruce White at brucesown@outlook.com

SEASON GREETINGS
Best wishes for Christmas and a healthy and prosperous 2017.

NEXT MEETING
The next executive meeting will be held at Dubbo on 20 February 2017.

Neil Bingley
State President

NSWAA WELCOMES NEW SECRETARY/ TREASURER

NSWAA welcome Ros Riggs from 2 Rivers Pty Ltd as our new Secretary/Treasurer. Ros comes to the position with over 30 years business administration experience, 25 of those years were spent at the former Rural Lands Protection Board. Her experience in working with member based organisations will prove an asset to the NSWAA.

In a time of change, NSWAA have engaged the services 2 Rivers Pty Ltd to deliver this position. 2 Rivers is a boutique community development company that offers Project and Event Management as well as Secretariat services and support to organisations. 2 Rivers are a boutique service that are flexible and the services they offer include administration and financial management, branding (including website and social media), project management, submission writing, business and strategic planning, community consultation and engagement, event management and governance support.

The 2 Rivers team all live in regional NSW and are committed to agriculture with an interest in sustainable land and natural resource management. They all currently or have previously lived on the land, which provides an additional level of depth and connection to our team.

NSWAA Executive Committee are confident that this change in direction will ensure that NSWAA are well serviced during this time of growth and significant legislation change.

NEW MEMBERS

A warm welcome to the following new member:

Anthony Andrist	North Ryde
Scott Endersby	Aberglasslyn
Andrew Fillery	Murrumbateman

Best wishes for a Merry Christmas and a Happy New Year to all our members, advertisers and subscribers

2 RIVERS PTY LTD

2 Rivers Pty Ltd is a boutique community development company that offers Project and Event Management as well as Secretariat services and support to organisations. Our office is based at Ashford in the New England NSW; the business was born in 2014 out of a need to create employment in a town with very little enterprise.

2 Rivers are a boutique service to ensure that the time, attention and detail are given to each project to encourage its full success, our services are flexible to meet the needs of our clients, and can include administration and financial management, branding (including website and social media), project management, submission writing, business and strategic planning, community consultation and engagement, event management and governance support.

The team all live in regional NSW and are committed to agriculture with an interest in sustainable land and natural resource management. We all currently or have previously lived on the land, which provides an additional level of depth and connection to our team.

Ros Riggs – NSWAA Secretary/Treasurer - has been with the team since 2 Rivers started. Her role has varied and matured as 2 Rivers has grown as a business.

She is an experienced submission writer who has seen vast success that has allowed delivery of carving workshops, weaving workshops, environmental projects and crime prevention programs.

Ros came to 2 Rivers with over 30 years business administration experience, 25 of those years were spent at the former Rural Lands Protection Board. Ros has experience in managing member based organisations having spent more than 30 years in executive roles for a number of sporting organisations including pony club and horseball.

Ros is a mother of 3, grandmother of 4 and works from home in Tamworth.

Lorrayne Riggs – 2 Rivers Managing Director - started 2 Rivers in 2014 and is a hands on Managing Director working at every level in the company. Lorrayne has built a strong and skilled team allowing community greater access to this niche service.

Lorrayne has a strong history of working in communities establishing their needs and wants then being able to convert this into successful outcomes. Lorrayne has more than 10 years community development experience and an excellent name for producing strong project outcomes which lead demand that encouraged her to open 2 Rivers.

Lorrayne is a licensed Real Estate Agent who has qualifications in business, real estate, WHS and project management. Lorrayne is an experienced administrator, writer and project manager who takes great pleasure from delivering projects on time and under budget.

Along with her partner Wade, they own and operate a mixed farming operation on their property which is located on the outskirts of Ashford.

Lorrayne Riggs
Managing Director

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AUSTRALIAN EXPORT AWARD WINNER

At the 54th Australian Export Awards category winners, Lindsay and Yeonsoon Bourke from Australian Honey Products in Launceston won the Agribusiness Award.

The citation said:

Lindsay Bourke started his apiary business with 200 hives while working as a firefighter. Today, Australian Honey Products (AHP) exports 65 per cent of its award-winning products to Asia, Europe and North America.

AHP's honey is cultivated from leatherwood trees in Tasmania's pristine Tarkine Rainforest. In addition to its active and organic honey, AHP offers ales, meads, honey nectar concentrates and a honey mead whisky.

The company also provides a pollination service for the Tasmanian agricultural sector and exports live bees to Canada.

In 2015, AHP's leatherwood honey was judged the World's Best Honey at the World Beekeeping Awards in Seoul. Its honey meads and ales also received medals.

Australian Honey Products - Taverners Honey Ale

AHP's biggest export markets include China, Hong Kong, Canada, Oman, Korea, Japan and Taiwan. In 2015-16, it increased exports by 18 per cent, achieved through direct sales and selling to Australian honey exporters.

To keep up with demand for its products, AHP opened a new state-of-the-art production facility in Launceston in 2016. The facility will allow the company to expand its production capacity, as well as develop health food products in the future.

A strong advocate for the honey industry, AHP launched a Certificate III beekeeping training program in 2014. The first three beekeepers graduated from the program in 2016.

Lindsay Bourke was also named the Biosecurity Farmer of the Year at the 2015 Farmer of the Year awards for his efforts to safeguard beehives against the varroa mite.

Judges praised Australian Honey Products for its inspiring development of international markets fora unique product that is utilising its environmental credential and personal approach very effectively.

Congratulations to Lindsay & Yeonson Bourke

NSWAA FIELD DAY

In conjunction with the upcoming

NEW SOUTH WALES APIARISTS' ASSOCIATION ANNUAL CONFERENCE

The North Coast Branch will be holding a **FIELD DAY** at the delightful Alstonville Showground

SATURDAY 20 MAY 2017

The Showground is only a few kilometers from Ballina and has plenty of indoor and outdoor space

A good roll up is expected from commercial and part time beekeepers

For further information or site bookings

Contact: Geoff Manning Ph: 02 6663 5211
Email:podargus@ycw.com.au

OR

Col Maloney Ph:02 6663 7051
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doug.somerville@dpi.nsw.gov.au

SOUTH AFRICA BEE CONFERENCE 2016

I had the honour of attending the 2016 South African Beekeeping Conference in early July at Surval, Oudtshoorn in the southern region of South Africa. I gave what I regarded as a standard presentation on honey bee nutrition and rearing queen bees. These presentations were well received and I obtained excellent feedback on the content. The reasons why were primarily because there is next to no queen rearing conducted in South Africa, and floral resources and honey bee nutrition are huge problems for the management of bees.

I had one brilliant opportunity to stir up my South African audience. A sample of South African honey was sent to the USA to a Florida beekeeping convention where a 'world' honey competition was being conducted. The honey originating from South Africa won grand champion honey. The South African audience were very proud of this achievement. But along comes Doug! The honey was obtained from a eucalypt species growing in South Africa. Thus, I made an announcement at the beginning of one of my presentations that I felt the 'grand champion' honey of the world, in actual fact, belonged to Australia due to the fact that it had been produced from 'Australian eucalypts'. Let's say I got a reaction! They eventually settled down and I proceeded with my presentation. As a footnote, I still got fed later in the day, so clearly they didn't take me too seriously!

The following are notes I took or gleaned from conversations at the conference. Before repeating them as definitive of South African beekeeping, I would cross check with other sources to decide how representative they are.

The conference was a two-day affair with another day prior to the event dedicated to training and practical workshops. There were a number of what I call political report card type talks providing statistics for the bee industry and pollination reliant industries.
Bee organisation politics: South African Bee Industry Organisation (SABIO) is the national beekeeping organisation of South Africa, made up of representatives from the various regional organisations. SABIO hold an annual conference over 2 days, plus speakers and workshops etc. The SABIO conference is hosted by one of the regional beekeeping organisations.

My estimate was that there were about 140 present at the 2016 conference. The actual AGM or business component of SABIO is held in the last few hours of the second day of the conference – members only. This is followed in the evening by a conference dinner. During the conference, lunch and frequent coffee breaks are held in the trade display area. There were about six tables in this room, including beekeeping equipment and bee supplements.

Some of the issues:

- Honey badgers sound like a real pain. They are responsible for smashing up and consuming the contents of hives. For this reason, many hives are put up on stands.
- Theft and vandalism, by all accounts, are a huge problem. Hive security is paramount and most apiary sites are located on private property behind locked gates. To overcome the human and animal damage to beehives, concrete hives were developed. They take two people to remove the lid and are a major job to move anywhere. There was some talk that bees don't do well in them because they are too cold. They weigh in the vicinity of 220 kg each hive. Between 20%–30% of the costs of beekeeping in South Africa was spent on theft and vandalism protection.
- Pollination is a growing area of the beekeeping business. Of the 180 million Rand estimated to be derived from beekeeping activity, 50 million Rand is said to have been derived from pollination service fees. The importance of pollination and the plant industries to South African beekeeping was evident from the number of plant industries sponsoring the conference. These included; Bayer, JW Seeds, Sabpa SA berry, Syngenta, Agricol, Dutoit, Eura Fruit, Fruitways and Klein Karoo.
- Social issues and South Africa. Poverty and unemployment were stated as major challenges. The white population are only about 15% of the population, but were the dominant group at the conference. There was a strong group of black beekeepers, but on the whole they were all small-time beekeeping farmers.
- I like this saying, one speaker (I think it was Mike Alsop) said "I'm only responsible for what I say, NOT what you understand".
- Agriculture in South Africa is not doing well. Approximately 12% of South Africa is used for crops and only 22% of this area is regarded as high value. Since 1950s there has been a decline in the number of farms and farmers, with a trend for farms to get bigger. Over 50% of the farms are still considered small, with only 12% of all the farms regarded as doing well. Technology and innovation is driving farming profitability.
- The farming industries only employ 4% of the labour population. There is massive labour unrest, political hostility, lack of leadership, corruption, crime, weak economic conditions and increasing difference in social levels. Agriculture was officially in recession, combined with the lowest rainfall recorded in 2015. Another speaker painted more sad news with:
    - Policy uncertainty
    - Farm murders and violence
    - Climate change
    - Water scarcity and loss of soil

- Rising input costs
- Lack of subsidies and extension service decline

- The subspecies of *Apis mellifera* that naturally occur in South Africa are *capensis* and *scutellata*. *Apis mellifera scutellata* is, of course, the bee that was released in South America and has now hybridised with the European sub-species right into the middle of the USA. The subspecies *capensis* was a darker coloured bee, whereas the subspecies *scutellata* was yellow. Both bee species were smaller in size compared to the European bees farmed in Australia.

  Apia mellifera scutellata and *capensis* can be aggressive in their home range and those working beehives will 'always' wear veils, jackets, gloves etc. The bee is not always aggressive every time that it is worked, but many beekeepers stated the unpredictability of its temperament. The *scutellata* subspecies is the dominant bee of South Africa. *Apis mellifera capensis* has a natural range across the south coast region of South Africa. There is a natural barrier between the two subspecies in the form of a large mountain range.

  Capensis worker bees have the capacity to copy queen pheromone and lay fertile eggs. Drifting *capensis* workers into *scutellata* colonies are common wherever the two bees are moved by beekeepers into the same areas. The *capensis* eventually displaces the *scutellata* queens and the *scutellata* colonies eventually fade away.

  While geography is stated as a means to keep these two bees away from each other, this is possibly not the only means that these bees don't intermingle naturally. Major problems arise when beekeepers managing one of the subspecies move their hives into another region in which the opposing subspecies naturally occurs. *Capensis* is seen as a problem bee in most of South Africa, except in the region in which it naturally occurs.

- Beekeeping in urban areas is nearly a non-event. Almost all municipalities have banned the keeping of bees. Approximately 20 people are killed by bees per annum.

- State of the beekeeping industry: thought to be 2,000 beekeepers in South Africa, but not clear. Many beekeepers are suspicious of authority and refuse to register their existence.

- Officially there are 1,246 beekeepers owning 79,901 hives. Many beekeepers do not belong to any of the beekeeping organisations, and as such communication is often limited within the industry.

- Honey consumption is on the increase, between 1,000–1,500 tonnes per annum produced, with 3,000 tonnes imported. Twenty-five years ago there were zero imports. The average honey crop is 50kg/hive, with various estimates of 50%–70% of the honey harvested derived from eucalypts. Domestic honey prices are seriously influenced by the cost of the imported honey. There has been a general failure on the domestic market to differentiate South African produced honey from imports.

- The capacity of the South African beekeeping industry to grow was discussed. The major limiting factor was said to be the lack of floral resources to support a growth in the industry. Others at the conference privately stated that this was not entirely true, and there were many areas of unutilised floral resources. Much of this resource was either in areas where security was a problem for the beehives, or many public land managers simply did not allow beekeeping.

- Eucalypts are a major floral resource for the South Africans, but they are introduced. In many minds this is a bad thing and generally eucalypts are not being encouraged except in plantation forestry, where eucalypts are the dominate species. There is a concerted effort to remove river red gums along water courses. This is a similar story to willows in Australia.

Some other random points during the conference:

- ❖ Bayer speaker; 14 of the 15 most popular insecticides used around the world are highly toxic to bees.
- ❖ Beekeeping development programs for the most part don't work. 90% fail.
- ❖ AFB is a recent problem (2009) for South Africa. Some say it's a big issue, others say it is not an issue.
- ❖ Baboons and other animals delight in vandalising beehives.

Notes from Peter Greeff, retired lecturer and consultant;

- ❖ Up to 15% increase in yield from the presence of bees on canola crops, contrary to popular belief by plant industry people.
- ❖ Too much moisture and the plant shuts down (no nectar production), interrupting pollination. Plants need 15%–21% oxygen in the soil.
- ❖ Cut back on application of nitrogen at flowering.
- ❖ Blueberry pollination 8–12 hives per ha, blueberry production growing.

A wasp species in some areas can knock off field bees coming back to the hive. This can induce the colony to go into a type of paralysis, with bees ceasing to fly. Apparently, placing the hive in shade will reduce the predation by the wasps.

As stated, one of my presentations was on queen rearing and breeding. This is virtually a non-event in South Africa and there was no one at the conference selling or advertising queen bees. Colony expansion and replacement is carried out by catching wild swarms. Empty beehives are placed strategically in various areas to entice wild swarms to enter and establish. This is a seasonal event, but can happen a few times during the year, depending on the region. As such, there is no splitting of colonies or requeening. As a consequence, there is significant variability between the productivity of hives.

This is but a brief look at beekeeping in another country. There are a lot of similarities with the Australian landscape. Their beekeeping is unique compared to ours. If you want to know how lucky you are living and beekeeping in Australia, jump on a plane and visit South Africa. I certainly enjoyed the experience.

(Thanks to Vicki Saville for typing my notes and Annette Somerville for proof reading the final article)

HONEY WARS: CRIME AND KILLINGS IN NEW ZEALAND'S BOOMING MANUKA INDUSTRY

An extraordinary rise in the popularity of Manuka honey has led to mass poisonings of bees, thefts, vandalism and beatings. It was the day the bees died – tens of thousands of them in 300 hives, mysteriously killed. "The massacre", as it is being called, happened in the otherwise idyllic landscape of Doubtless Bay in New Zealand's far north and for David Yanke and Rachel Kearney, co-owners of Daykel Apiaries, the cause of death was obvious: malicious poisoning.

"It is a nightmare, I don't feel safe anymore," says Kearney as she sits at her kitchen table on her family's farm, 40km east of the Northland hub of Kaitaia. "I feel violated. It has almost turned into a PTSD [post-traumatic stress disorder] for me." So far there has been no official ruling on what led to the Daykel bees' demise, although a biosecurity incident has been ruled out by the government. But Daykel and many other apiarists are in no doubt that the mass bee death is just the latest act of violence in the increasingly crime-ridden Manuka honey industry.

The global craze for Manuka, highly valued for its medicinal properties, has created a gold rush in rural New Zealand that some believe is rapidly spiralling out of control. Last year produced a record haul of nearly 20,000 tonnes of honey, a 15% increase on the year before. In 2010 the top price fetched for bulk Manuka honey was NZ$37.50/kg (£22/kg) – today it can command more than NZ$100/kg.

The export to the UK, China and other countries is expected to reach NZ$400m in the next few years. On the back of the boom, hive thefts, vandalism and poisonings have become standard fare, with every beekeeper interviewed for this article the victim of one or more serious crimes. Verbal threats and physical beatings have also been reported and there are unconfirmed reports that beekeepers now travel in packs for protection to work remote hives.

Positioning honey hives close to the plants means beekeepers can market their honey as "Manuka" and sell it for triple the price of standard clover honey, even if the active Manuka content is so low as to be negligible.

In the past five years the New Zealand apiculture industry has responded to rampant international demand for its unique product by doubling production, making David Yanke's former bee haven in Taipa increasingly claustrophobic. For decades, Yanke was the only registered beekeeper within a 5km radius – now there are 56 and he says his bees' health has suffered as competition for food sources intensifies.

Only months after they had buried the corpses of their bees, the midnight raids began. Farm gates were cut open with cordless tools, hives dumped into plastic rubbish bags and tossed carelessly into the back of open Utes (trucks). The couple has memorized every detail of the thefts, because they were captured on CCTV cameras, which were installed after the bee massacre. The raids also always occurred on the fifth of the month – another clear indication that intimidation tactics were being used against the beekeepers.

Bruce Robertson understands the pressures now bearing down on an industry that is being overwhelmed. As the managing director of Haines Apiaries in Kaitaia he has watched the boom happen in front of his eyes. "I got into the industry when Manuka was selling for NZ$10/kg and we thought that was an incredible price," recalls Robertson, a no-nonsense, old-school beekeeper. "Now it is commanding up to NZ$200 at the high-end – it has gone really stupid."

Robertson has become somewhat hardened to the scale and frequency of attacks on his 3,000 hives. Over the past five years, he's had hives stolen, vandalized and poisoned, and estimates three to four are pinched every week, at a cost of NZ$3,000-4,000.

Haines has set up CCTV cameras at the most frequently targeted sites but thieves smash or steal those. So now Robertson installs two cameras – one to film the thieves attacking his hives and the other to record the thieves stealing his CCTV camera. "The rule used to be that you put one hive per hectare and you didn't have another beekeeper working anywhere near you for one kilometre," Robertson says. "Those days are well and truly gone. We have amateurs setting up hives 200m away from our Manuka crop."

Beekeepers have started painting their hives in distinctive colors and printing unique numbers on them, but these efforts are cosmetic and have proven close to useless. "GPS tracking doesn't stop guys coming in with fly spray in the middle of the night and wiping out our hives," Robertson says. "There's no integrity any more – it's really sad."

In the 12 months to June, New Zealand police received nearly 200 reports of hive or honey thefts, largely in the Manuka-dense regions of Northland and central Otago. In a statement Senior Sergeant Alasdair Macmillan said New Zealand police were working closely with industry bodies to tackle the rise of Manuka crime, as well as establishing a national database for information gathering.

"Police are concerned that under-reporting of the issue is preventing a full understanding of the scale of the problem and gathering intelligence on it," Macmillan said. "Reducing beehive thefts requires help from those within the industry and members of the public."

But many frustrated beekeepers have taken retribution into their own hands, fed up with what they say is the police's poor record of solving and prosecuting Manuka honey crimes. At Daykel, seeking revenge was never an option. Yanke and Kearney's response to their trouble has become one of grief, rather than anger. They informed the ministry for primary industries of their "mass bee death", which had cost them an estimated NZ$200,000-300,000.

In a statement, the ministry said it tested the bodies of the dead Daykel bees for a biosecurity incident and "100 common poisons". MPI said it didn't test for "an exhaustive list of every possible bee toxin or poison" but that intentional poisoning was the most likely explanation for the deaths. Yanke has narrowed his suspicions down to two possible poisons he thinks are responsible for the slaughter but can't afford the NZ$8,000 for additional testing by a university lab. Both poisons are cheap and easily bought in New Zealand.

The local Kaitaia police investigated the incident but dropped the case when no leads were forthcoming. A complaint by Kearney about the lack of vigour surrounding the police's investigation has made all further interaction between Daykel and local police "very cool", she says. A hundred kilometres away on his Panguru farm, part-time beekeeper Lindsay Guest heard about the Daykel poisoning. The incident unnerved him, as it seemed to mark a tipping point from small, frequent acts of sabotage to something more sinister.

Guest learnt beekeeping from his father, Bill, 93, who constructed his first hive at the age of 14 with wood felled from a native Kauri tree. The Manuka crime wave is anathema to his father, who came of age when beekeeping was seen as a noble profession and Sir Edmund Hillary the archetypal beekeeper. These days, Bill prefers to potter in his vegetable garden and largely keeps away from the farm's 200 hives. After years of poisonings and vandalism, his heart has gone out of beekeeping.

"I feel so bad for the beekeepers today," says Bill, who returned from the Second World War with the sole ambition of building up his hives. "It has become so nasty now; I don't like to think about it. The sweetness has gone."

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Contacts: email sydneybranch@nswaa.com.au for information or registration form

Jane 0413769411 Mike 0438 316 040 Martin 0477383482

THE FROST REPORT

Elizabeth Frost
Honey Bee Education Officer
Tocal Agricultural College, NSW Dept. of Primary Industries
T: 02 4939 8821 M: 0437 731 273 E: elizabeth.frost@dpi.nsw.gov.au

TOCAL AGRICULTURAL COLLEGE 2016 YEAR IN REVIEW

Course Delivery

Tocal College was well and truly migratory in 2016, delivering nationally accredited beekeeping courses in every region of NSW. Courses delivered throughout NSW in 2016 were Beginning in Bees, Rear Queen Bees, Pests & Diseases of Honey Bees and Swarm Management. Multiple courses were delivered at Camden, Gosford, Mt. Annan, and Paterson. Here's how we went by region.

New England:	Armidale, Bingara
North Coast:	Grafton
Hunter:	Paterson (Tocal College)
Central Coast:	Grafton
Sydney:	Camden, Mt. Annan, Richmond
South Coast:	Berry
Riverina:	Yanco
Western:	Dubbo, Mudgee, Orange, Wellington

NSW broken up by region according to Training Services NSW, a branch of NSW Dept. of Industry responsible for government-funded vocational education and training in NSW.

This reach for our courses in 2016 was achieved through the hard work of NSW DPI trainers Doug Somerville, Nick Annand, Danielle Lloyd-Prichard, myself and contractors Bruce White and Mark Page. Grading for our 200 students in the Online Course: Pests & Diseases of Honey Bees was managed by Danielle Lloyd-Prichard and myself.

Certificate III in Beekeeping (non-traineeship)

In 2016 Tocal College enrolled 15 beekeepers in the Certificate III in Beekeeping (AHC32010). Current students hail from the Northern Rivers, New England, Hunter Valley and Sydney Basin so far, many with aspirations to increase their sideline beekeeping business or to quit their day job and have a go at commercial beekeeping. Skill levels vary widely, so Tocal College assesses beekeeper skills in the following ways depending on experience:

- Workplace assessment
- Recognition of prior learning (RPL)
- Skills observation
- Interviews
- Written assessment tasks

We've also seen a supersedure of the Certificate III in Beekeeping 2010 qualification by the 2016 qualification which is an increase of 6 core units of competency and a decrease of one elective unit. Despite this increase of 6 units of competency, the 2010 qualification is equivalent to the 2016 qualification. Tocal College can enrol applicants into the 2010 qualification until June 2017 at which point we'll only accept enrolments to the 2016 qualification as we transition from the old qualification.

At time of writing it is imminent that NSW Smart & Skilled, the funding body for the Cert III in Beekeeping subsidies in NSW, will pull funding for the 2010 qualification. Tocal College is given no advance notice of the end date of funding for the Cert III in Beekeeping 2010 qualification, so I urge you to contact me if you want a chance to enrol in the 2010 qualification at a subsidised rate.

The core unit requirement for the Certificate III in Beekeeping 2016 qualification are the following 12 units of competency:

UNIT TITLE	DELIVERY TYPE
Contribute to work health and safety processes	Online
Manage honey bee swarms	Face to Face, RPL, Workplace Assessment
Remove a honey crop from a hive	Face to Face, RPL, Workplace Assessment
Extract honey	Face to Face, RPL, Workplace Assessment
Comply with industry quality assurance requirements	Online
Manage pests and disease within a honey bee colony	Face to Face, Online
Use a bee smoker	Face to Face, RPL, Workplace Assessment
Open and reassemble a beehive	Face to Face, RPL, Workplace Assessment
Construct and repair beehives	Face to Face, RPL, Workplace Assessment
Manipulate honey bee brood	Face to Face, RPL, Workplace Assessment
Re-queen a honey colony	Face to Face, RPL, Workplace Assessment
Select and establish an apiary site	Face to Face, RPL, Workplace Assessment

Certificate III in Beekeeping Traineeship

2016 saw the enrolment of two Beekeeper Trainees who are full-time employees of beekeepers, one in New England, one in the North Coast. Training has commenced with these two with for the Certificate III in Beekeeping 2016 qualification. In 2016 they got stuck in with the Online Course: Pests & Diseases of Honey Bees, Beginning in Beekeeping or Workplace Assessment for the units "Use a bee smoker" and "Open and reassemble a beehive" and Rear Queen Bees elective unit. Workplace Assessment for "Extract honey" and "Remove a honey crop from a hive" will occur when there's enough honey to warrant extraction in their respective regions.

Publications

Two new AgGuides were produced by the Education Delivery Team at Tocal College in 2016. The Queen Bee Breeding AgGuide, which I organised and rewrote from DPI Queen Course notes and wrote additional chapters for on hygienic behaviour, controlled mating and artificial insemination is the definitive publication on queen bee breeding in the Australian context. Full disclosure, the second edition will have contain fewer Americanisms. This guide is provided to every student taking a Rear Queen Bees Course, otherwise can be purchased as a hard copy for $35 at shop.nsw.gov.au, over the phone at 1800 025 520, or as an eBook or iBook at Google play or iTunes.

The second AgGuide, "Australian native bees," produced in 2016 was co-authored by my colleague and co-trainer for Beginning in Bees Courses, Danielle Lloyd-Prichard and a number of Australia's leading native bee researchers. This guide is a world first in terms of expanding access to knowledge of Australian native bee husbandry, identification and enjoyment of our native pollinators. The photographs of some of Australia's 1,600 native bees within this book are stunning. This AgGuide is available as a hard copy for $35 plus shipping. Order online at shop.nsw.gov.au or place an order over the phone at 1800 025 520.

Danielle Lloyd-Prichard at Tocal College with the "AgGuide: Australian native bees" she co-authored and managed coordination of additional native bee researcher authors for.

Under development

By the DPI holiday shutdown in December, Doug Somerville, Bill Winner and myself will have handed over the final draft of the upcoming "AgGuide: Honey" to the graphic designer at Tocal College for its final transformation into a publication in 2017. This guide will complement the Certificate III in Beekeeping units of competency related to honey extraction and food safety, in particular the core unit of competency: Comply with industry quality assurance requirements. This unit will be mapped to an online course, to be developed early 2017, in which beekeepers will examine extracting facilities for hygienic fault and work health and safety risks. In this online course beekeepers will also upload photos or videos of their own facilities, to examine how their honey shed stands up to hygiene and WHS standards with the help of the course lecturer.

Courses currently under development for delivery in 2017 include:

- Contribute to work health and safety processes (Open enrolment, online delivery)
- Honey bee pollination services (1-day face to face course, $475 per person, March 2017, tentative in Riverina, North Coast, Hunter)
- Artificial insemination of queen bees (2-day face to face course, $725 per person, February 2017, 2nd course based on demand TBD, at Tocal College)

As always, if you have enquiries related to beekeeper training, queen breeding or artificial insemination of queen bees don't hesitate to contact me. Hope everyone has a happy and productive holiday and keep an eye out in 2017 for Tocal College hauling bees and course delivery equipment across the state in our new trailer.

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2017 SYDNEY ROYAL NATIONAL HONEY SHOW

Calling all honey producers and enthusiasts! The Sydney Royal National Honey Show will be open for entries at the end of December for the 2017 competition which will be held against the vibrant backdrop of the Sydney Royal Easter Show, 6-19 April.

The organisers of the Show, the Royal Agricultural Society of NSW (RAS), have a long association with Australian apiculture, with competitions taking place as early as 1888.

The competition receives entries from across the country and includes a variety of different classes to enter such as honey (comb, creamed, chunk, liquid and granulated), beeswax, small producers and collections, candles, wax moulds, mead and pollen. Just like the 2016 Show, the 2017 Sydney Royal National Honey competition will include two schools classes.

The Honeyland stand in the Woolworths Fresh Food Dome is always a Show-time favourite; here, all the exhibits will be shown, honey tasting will be offered to the public along with the rare opportunity for them to see the inner-workings of a hive at the Bee-Zeebo exhibition.

Judging for the Sydney Royal National Honey Show will take place 3-4 April, with results available on the Sydney Royal website after Midday on Wednesday 5 April.

Why enter?

The Sydney Royal National Honey Show offers producers a chance to benchmark products against the industry. By entering, you will:

- Receive assurance of independent assessment of your product by an esteemed panel of industry professionals
- Have a variety of perspectives and palates assessing your product
- Attain quality feedback: a breakdown of your score by each attribute to help you improve your product
- Commercial class medallists, receive Sydney Royal medal artwork which can be used in marketing collateral

To enter the 2017 Sydney Royal National Honey Show, or for Schedule information, visit: www.sydneyroyal.com.au/honey. Online entries close 25 January 2017.

For further information: Contact Kirsty Speed on 02 9704 1019 or kspeed@rasnsw.com.au

"BEEKEEPERS SWARM IN TAMWORTH"

Over 110 Beekeepers and "Beeks" of all ages gathered at the Tamworth Field Day on Saturday 26 November, to look at a wide variety of beekeeping issues, network and stock up on those all-important bee goods.

Ray Hull, Kootingal Beekeeper and President of the Tamworth Branch of NSWAA and organisers of the event commented "It's great to see a 50% increase in attendance on last year and it shows the continued increase in the popularity of beekeeping."

"We want to engage with all beekeepers regardless of size or experience to keep their bees in the best possible shape and join us at the local level " he went on to say.

The event was sponsored by Pender Beekeeping Supplies, Valley Industries, Tamworth Beekeeping Supplies, Rob and Raelene Mitchie, Duncs Honey and Dairy Farmers.

The outside sessions proved popular enabling attendees to get a close look inside a hive for pest and diseases and learn how to check for Varroa mites .

The industry's leading experts Dr Doug Somerville, Nick Annand and Elizabeth Frost presented sessions on bee nutrition, good management practices, bio-security, training and raising queens. Mid North Coast Amateur Beekeepers Association, Vice President Allan Thomas ran an informative session on frame selection, assembly and use. Tamworth Branch Secretary Norm Maher and President Ray Hull did a tag team session on sustainability and future challenges.

President Ray Hull also commented "I would like to thank the local branch members for all their efforts and the support shown by the Amateur Beekeeping Association for promoting the day in their newsletters and at meetings. "

For information on Tamworth Branch activities contact Secretary Norm Maher - Email: normmaher@hotmail.com or 0447 603 245.

Norm Maher
Secretary - Tamworth Branch NSWAA

Media Contact: President - Ray Hull 0407 469 176

AUSTRALIAN HONEY BEE INDUSTRY COUNCIL

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BEECONNECTED
Have you downloaded and put your sites on the BeeConnected app? With the cotton season almost upon us it is crucial that you take advantage of this app to allow farmers and applicators to know where your bees are. This way there should not be accidental spraying of bees.

DRONE BEE SEMEN IMPORTATION
At this time we have not had a satisfactory result from the Department. We are still working to have an acceptable protocol in place which does not jeopardise our industry biosecurity.

FAILING IMPORTED FOOD
As part of the random inspection of imported honey in June 2016 organic honey from India failed due to adulteration with C4 sugar.

Enquiries by AHBIC revealed this honey was destroyed.

CATEGORISATION
AHBIC had to answer two questions for the PHA Board in their consideration of the Categorisation of *Varroa destructor*. We await the decision of the Board.

EUROPEAN FOULBROOD FOUND IN THE NT
Reports out of the Northern Territory report the first find of European foulbrood (EFB) in the NT at Katherine.

NEW CERTIFICATION FOR HONEY AND BEE PRODUCTS TO THE EU
Advice has been received from Canberra that there are changes to the certification for honey and bee products for human consumption to the European Union (EU). They come into effect on 3 December, 2016. If you want a copy let me know and I will send the information.

COMMERCIALISATION OF BUMBLE BEES IN TASMANIA
The push is still on to have the commercialisation of bumble bees in Tasmania for tomato pollination to go ahead. See http://www.abc.net.au/news/2016-11-27/senate-probes-commercial-bumblebeepollination/8061554

Whilst it may seem innocuous in the first instance, because the population is inbred in Tasmania, the situation would most likely arise where the next push will be to introduce better genetic stock. This is where there is a risk to our industry.

We know that bumbles bees vector varroa and the countries from where the new genetic material would be sourced have *Varroa destructor*.

MEETINGS WITH ALMOND INDUSTRY
Ian Zadow went to the Almond Growers conference in Melbourne in November and presented a paper from the beekeepers perspective. It was well received.

As a follow up to the conference Ian was invited to attend a meeting of the Almond Board of Australia. Discussion took place on producing a brochure for growers on production plus also the possibility of having joint field days with almond growers and beekeepers so each can understand the others industry.

More information on these and other aspects of the co-operation between our industries as they come to hand.

HONEY EXPORTS TO SAUDI ARABIA
Still no joy here. In fact the situation is getting worse with the Gulf Cooperation Council GCC) putting out a Guide for the Control of Imported Food which requires honey and bee products to be from countries that do not have varroa, European foulbrood or American foulbrood. This would rule out all countries in the world. Also, as most of the countries in the GCC have at least one of the above, it would seem that this is in contravention of the WTO Rules.

NEW HONEY BEE PEST IN THE USA
Reports from the USA list a new pest of honey bees. It is *Brachypeplus basali* which they call the Australian sap beetle.

The following is an extract from an article that will appear in the December issue of the American Bee Journal:

In 2015 the California Department of Food and Agriculture published a pest rating proposal for the Australian beetle Brachypeplus basalis, *which had been discovered in beehives in four California counties, the earliest discovery taking place in 2010. This CDFA report (Leathers 2015) observed that the beetle had not been collected outside of beehives. Then, in 2013, a report from Montana State University (Schutter Diagnostics Laboratory Annual Report 2013) noted the presence of* B. basalis *in a sample submitted by a Montana beekeeper. In 2015 and 2016 the beetle was identified infesting stored bee equipment in two separate Oregon beekeeping operations. The 2015 sighting constitutes the first record of a* B. basalis *infestation (in bee boxes with frames stored outside) in Oregon. A scientific manuscript pertaining to this sighting is currently under review. A commercial beekeeper of about 8,000 colonies discovered the 2016 infestation in a portion of his stored beekeeping equipment, especially combs containing pollen and/or honey. He estimates that during the summer of 2016 he destroyed $20,000 worth of beetle infested combs. As yet, the beetle has not been documented in active honey bee colonies in Oregon.*

Brachypeplus basalis has a reasonably wide distribution in Australia but there have not been reports of it causing any significant problems in Australia, even in stored material. One reason for not causing problems in stored material is that Australian beekeepers take provisions to prevent damage to stored combs from wax moth and small hive beetle and these measures would probably stop any damage by *Brachypeplus basalis.*

NEW POLICY FRAMEWORK FOR APIARY SITES ON PUBLIC LANDS IN NSW

November 2016

Overview

The NSW Government is developing a whole-of-government policy framework for the management of apiary sites on public lands, including State forests, travelling stock reserves and National Parks.

The framework will streamline administrative arrangements and support industry growth and development through:

- A fair and transparent allocation system via an Expression of Interest (EOI) process that promotes and rewards best practice management by apiarists
- A fee structure that takes into account the role and value of apiculture in supporting agricultural industries through pollination services
- Permit terms that provide certainty of tenure, while balancing the interests of apiarists within the industry
- Development of a central online portal that will simplify administration and improve access to information.

DPI is leading development of the framework in consultation with industry and the key agencies responsible for the sites - Forestry Corporation of NSW (FCNSW), Local Land Services (LLS), and the National Parks and Wildlife Service (NPWS). The framework will be implemented progressively in 2017.

Benefits for industry

The policy framework will deliver multiple benefits to industry, including:

- A common framework for the administration of public land sites across NSW
- A consistent and transparent process for allocation of sites
- A single pricing structure across all public land types
- Long-term permits with greater clarity around tenure
- A central point of information on site location and availability
- Standard permit conditions.

Key elements

Policy area	Proposal	Rationale
Allocation	• Sites to be allocated in an open and competitive process via scheduled Expression of Interest (EOI) rounds, where there is demonstrated demand. • EOI to assess a number of factors including capacity, industry experience, compliance history and regional activity. • Final criteria and procedure for conducting EOI rounds to be determined in consultation with agencies and industry. • 'Interim permit' to be granted where a permit for a vacant site is requested in between scheduled EOI rounds - valid up until the next scheduled round. • Some circumstances where a permit can be allocated directly to an apiarist, for example: o where there is no other demand for the site, or o where an apiarist identifies a previously unregistered or long-term vacant site and the relevant agency confirms it to be an appropriate site for beekeeping.	• Establishes a competitive process where there is demonstrated demand. • Allows for merit-based allocation through assessment of apiarists' capacity, experience, compliance history and regional activity. • Consistent with relevant legislation and policy regarding competitiveness and transparency in the allocation of public resources.

Policy area	Proposal	Rationale
Pricing	• DPI to lead a comprehensive economic analysis of the value of access to apiary sites on public lands in consultation with the agencies and industry over the next 12 months. • Analysis to form the basis of a recommended pricing structure that ensures an appropriate return to government while supporting a viable apiculture industry in NSW. • Pricing structure to be reviewed every 5-years and subject to annual CPI increases. • Fixed annual fee of $145.00 (exc. GST) to be applied to all new and renewed permits while analysis is underway.	• Provides for a pricing structure that recognises the external benefits of a viable apiculture industry while ensuring an appropriate return to government. • Provides a single pricing structure across all public land types.
Permit term & renewals	• Permits to be issued for five year term. • Renewal rights to be determined based on further consultation with industry and relevant agencies.	• Standard terms and renewals policy will provide greater certainty of tenure to support informed business planning and investment decisions.
Online Portal	• Agencies currently working to develop central Online Portal to display information on location and availability of apiary sites on public land. • Agencies also scoping opportunities to expand functionality of the Online Portal to streamline administrative procedures and provide a 'single desk' for the industry.	• Improves transparency and access to information. • Promotes greater utilisation of existing and new sites.
Standard permit conditions	• Agencies working in consultation with industry to develop standard set of permit conditions to apply across all public land apiary sites. • Each agency may have specific additional conditions relevant to their land type, however major conditions will be consistent.	• Simplifies permit administration. • Provides certainty and consistency for industry.

Existing permits

Permits issued before 1 October 2016 will be able to be converted to five year permits on their expiry, with a right of renewal for a further five years.
Sites that become vacant on or after 1 October 2016 will be available on an 'interim permit' for a period of 12 months. The permit may be extended up until the next scheduled EOI round if one has not occurred before its expiry.
An interim annual fee of $145.00 (exc. GST) will be applied to all new, renewed and interim permits, until the new pricing structure is determined.

Next steps

DPI is leading implementation of the framework in consultation with industry and relevant agencies. Key areas of work over the next six months include:

- Designing the EOI process, including criteria and assessment procedures

- Consolidating agency data on site location and availability
- Undertaking comprehensive economic analysis to inform future pricing
- Scoping suitable online platforms to deliver the Online Portal
- Standardising permit terms and conditions across agencies.

The framework will be implemented progressively through 2017.
In the longer term, DPI will work with industry to develop an Industry Strategy that will evaluate the opportunities and constraints facing the industry as well as identify actions to position the industry for future prosperity.

Background
It is estimated that 40 per cent of apiary sites used by commercial apiarists in NSW are on public lands. The key agencies responsible for managing these sites are FCNSW, LLS and NPWS. Of the estimated 9,000 site permits issued, the current distribution is approximately 45 per cent FCNSW, 33 per cent LLS and 22 per cent NPWS.
Existing apiary policies vary between agencies. Different systems of site allocation, pricing, permit tenure and conditions have created administrative burdens and uncertainty for industry. Agencies and industry are in agreement that a consistent and transparent policy framework is needed.
In response to these concerns, DPI has led the development of a whole-of-government policy framework for the management of apiary sites on public lands. The framework has been developed in consultation with relevant agencies and the NSW Apiarists' Association (NSWAA).
The framework will streamline regulatory arrangements by establishing a standard procedure for allocation of sites, pricing, permit tenure and conditions. While individual permits will continue to be issued under the legislative framework of the relevant land manager, agencies will work together to streamline administrative procedures.

BEE BIOSECURITY VIDEO SERIES

Australia has a healthy honey bee population and there are things that every beekeeper can do to keep it that way.

The Bee Biosecurity Video Series has been developed to let you know how you can help as well as the ways in which government, research organisations, plant industries, private companies and organisations with an interest in honey bees are all contributing to preparing for an incursion of the exotic pest varroa destructor.

The series of 12 videos covers a broad range of topics including honeybee biosecurity and surveillance programs, a hypothetical varroa destructor incursion in Australia and what it might mean for beekeepers and crop producers,information about the life cycle of varroa, hive inspections and ways in which varroa can be controlled if it enters and becomes established in Australia.

The videos are short—5 minutes or less each. Unlike others available, the videos have been produced for Australian beekeepers and growers.

Plant Health Australia (PHA), the coordinators of the government-industry partnership for plant and bee biosecurity in Australia and Plant & Food Research New Zealand produced the videos. They were sponsored by a partnership including: Australian Government Department of Agriculture and Water Resources, Horticulture Innovation Australia, Australian Honey Bee Industry Council, Wheen Bee Foundation, Capilano Honey, Bayer Crop Science & Syngenta.

PHA and partners have undertaken a suite of honey bee biosecurity projects. Some are efforts to prevent an incursion, while others aim to assist our industries, including plant producers, to prepare for the changes that varroa destructor is likely to bring.

For more information on bee biosecurity and to view the videos go to **beeaware.org.au**.

Whats Happening to the Bees? - Part 5

IS THERE A DIFFERENCE BETWEEN DOMESTICATED AND FERAL BEES?

by Randy Oliver - ScientificBeekeeping.com

First published in: American Bee Journal, June 2014

I mentioned previously how impressed I am by the difference in vigor between the Southern California feral bees and commercial domesticated stock. I also made the bold statement that the honey bees produced by most commercial queen breeders could be considered to be domesticated animals. Such statements call for some serious supporting evidence. Is there truly a difference between domesticated and wild/feral honey bees? The obvious question is:

But Aren't All Feral Bees Nothing More Than Escaped Swarms?

In areas in which the honey bee was not endemic (native), this would *initially* of course be the case. But once those introduced swarms set up housekeeping in hollow trees, we then have two key questions to answer:

Question #1: Can those introduced feral populations remain self-sustaining, or does their continued survival depend upon a recurrent influx of escaped swarms from managed apiaries? And *if* those feral populations are indeed self-sustaining,

Question #2: Do *established* feral populations differ genetically from the sympatric (living in the same area) population(s) of managed bees? In other words, do the genetics of the feral populations simply reflect that of the swarms and drones to which they are continually exposed, or do the ferals maintain genetic integrity independent of the managed bee populations?

Practical application: answering the latter question is critical if we are to evaluate whether there is any substance to the argument that we beekeepers should view the feral populations of honey bees as potential sources of genetically useful "survivor stock."

Other Domesticated Animal Models

Honey bees are hardly the only animal (or plant) that has been domesticated (or perhaps I should use the term "managed") by humans [1], so as a first step in answering the above questions, perhaps we should see what's been found regarding other common domesticated species. Charles Darwin wrote two fascinating volumes about his observations on the phenotypical [2] variation in species under domestication [3], from which I'll share some excerpts:

From a remote period, in all parts of the world, man has subjected many animals and plants to domestication or culture…Although man does not cause variability and cannot prevent it, he can select, preserve, and accumulate variations given to him by the hand of nature in almost any way which he chooses; and thus he can certainly produce a great result. Selection may be followed either methodically or intentionally, or unconsciously and unintentionally. Man may select and preserve each successive variation, with the distinct intention of improving and altering a breed in accordance with a preconceived idea; and by thus adding up variations, often so slight as to be imperceptible by an uneducated eye, he has effected wonderful changes and improvements. It can, also, be clearly shown that man, without any intention or thought of improving the breed, by preserving in each successive generation the individuals which he prizes most, and by destroying the worthless individuals, slowly, though surely, induces great changes.

Jumping ahead a hundred years, a more modern scientist [4], using today's more technical terminology, observes:
In contrast to wild species, which have typically evolved phenotypes over long periods of natural selection, domesticates rapidly gained human-preferred agronomic traits in a relatively short-time frame via artificial selection.

Ah, the test of time. Any species extant today is by definition a "survivor"—the product of an *unbroken line* of survivors dating back to the beginning of life (any single break and that line would have gone extinct). On the other hand, any and all *domesticated* breeds of animals have existed for only a few thousand years, and only by the grace of man's facilitation of their niche.

Riding our time machine back to Darwin, he keenly observed that those "wonderful changes and improvements" come at a cost—the ability to survive in the wild.

As the will of man thus comes into play, we can understand how it is that domesticated breeds show adaptation to his wants and pleasures. We can further understand how it is that domestic races of animals…often exhibit an abnormal character, as compared with natural species; for they have been modified not for their own benefit, but for that of man.

So key to my initial questions, is what happens when managed honey bees (or other livestock) escape captivity and attempt to revert to life in the wild? Of interest are Darwin's lengthy observations on such "reversion" of domesticated species back to wild type characteristics:

Reversion To Wild

A **feral** animal (from Latin fera, "a wild beast") is an animal living in the wild but descended from domesticated individuals [5]. Darwin points out that:
…we have seen that characters often reappear in purely-bred races without our being able to assign any proximate cause; but when they become feral this is either indirectly or directly induced by the change in their conditions of life.

Even purebred breeds hide aspects of their genetic heritage from us [6]. Two factors may cause these hidden traits to come to the fore: environmental factors or crossbreeding.

Darwin noted that the first generation of escaped domestic animals might exhibit minor phenotypical changes, in response to environmental cues, such growing more hair when it got cold. But what really caught his (and should catch our) attention was what could happen when two purebred breeds were "crossed." The resulting hybrid [7] offspring are often noticeably different from either parent:

With crossed breeds, the act of crossing in itself certainly leads to the recovery of long-lost characters, as well as those derived from either parent form…From what we see of the power and scope of reversion, both in pure races, and when varieties…are crossed, we may infer that characters of almost every kind are capable of reappearing after having been lost for a great length of time.

He further noted that the most common form of reversion, "a*lmost universal with the offspring from a cross,* [is to go back] *to the characters proper to either pure parent form."*

I share Darwin's fascination with this clearly observable phenomenon.

Practical application: when queens of a managed stock mate with drones of other stocks, the resulting offspring may exhibit wild-type traits that had long lain dormant. Could this be the basis of a wild-type feral population, originally founded by escaped swarms from a variety of domesticated lines?

The Mechanics Of Domestication

Clearly, species have the ability to carry "hidden" genes for many generations. How can this be?

The process of selective breeding creates genetic bottlenecks, in which some allelic diversity is lost, and the frequency of some deleterious alleles is increased. But for the most part, any domesticated breed retains a full complement of the wild-type genes necessary for basic bodily functions and behaviors [8]. The difference is that in domesticated animals, the ***expression*** of certain genes is differentially ***regulated***.

Nature is very conservative with the genetic code. Honey bees share a set of generic genes common to all insects for most of their operational systems (and indeed share some with humans). The ***genetic*** differences between species are often trivial (for example, the DNA of any reader of this article is 98.8 percent identical to that of a chimpanzee (and not just because we're beekeepers) [9]). What makes species and races different is the ***regulation*** of those genes.

As a crude analogy, think of a wild-type animal as being a tough military-grade 4WD pickup truck. Different domesticated breeds of that animal are analogous to consumer options on the basic truck model, such as a different body type, paint color, larger tires, leather upholstery, radio and air conditioning, or a supercharged engine. All those models are simply minor variations of the basic truck to suit the customer—none involve fundamental changes in the chassis or drive train.

Given an assortment of models to strip and reassemble, a team of backyard mechanics could easily recreate the wild-type truck (or perhaps an improvement). And this is what appears to happen when an assortment of breeds of a domesticated animal escape into the wild—their offspring tend to revert to wild type. The fundamental genes were always there; the crossing of strains simply changed the *expression* of those genes back to "normal."

Practical application: the reversion to "wild type" does not appear to require major genetic reengineering—rather, all that may be necessary is the tweaking of only a few critical regulatory genes.

My impression is that this is exactly what happens when one crosses races of *Apis mellifera* or when feral colonies start swapping drones. The result is the production of a more ancestral wild type bee population, with a larger degree of genetic variation. This population now experiences selective pressure from nature, rather than from man, which strongly selects for genetic and epigenetic combinations that are successful in that particular environment (fitness). Hence, we may find feral populations, despite the fact that they were founded from stocks selected for domestication, reverting to wild-type characteristics (Fig. 1).

Figure 1. An escaped swarm of domesticated stock can easily take up residence in a hollow tree and fill the cavity with combs. But can a bee bred for almond pollination and the filling of quadruple-high Langstroth hives, facilitated by feeding and medication by its keeper, survive for long in natural tree cavities in the wild?

A point of interest is that when one crosses a gentle strain of the Dark Bee (*A. m. mellifera*) with gentle Italian (*A. m. ligustica*) stock, the hybrid offspring are often reported to be fiercely "hot." This suggests to me that defensiveness is an innate trait that has been epigenetically downregulated in domestic stocks; hybridization may allow the default trait to express itself fully (and painfully).

It certainly appears that feral populations of bees founded from escaped swarms can indeed be self-sustaining. Strong evidence in support of this comes from a study by a team headed by Australian researcher Ben Oldroyd [10]. They found that established feral colonies reproduced (sent out swarms) at a higher rate than their death rate, meaning that their populations would be mathematically self-sustaining.

The above study followed necessary scientific rigor. But pretty much every beekeeper is aware of the fact that *Apis mellifera* has rapidly invaded and colonized virtually any continent or island to which they've been introduced, including varroa-free Australia, which continues to support a robust feral population (of "black bees") independent of managed stocks (of "yellow bees") [11].

Practical application: I find no support whatsoever for the argument that feral populations are dependent upon continual support from escaped swarms of managed bees (in fact, as I'll argue later in this series, the nearby presence of managed bees actually may harm the feral or wild populations of honey bees).

The Establishment Of A Feral Population
Just because the ferals were founded from inbred domesticated bees does not mean that they can't quickly revert back to a more genetically diverse wild type population. But it's hardly a straightforward process, as there are a number of sometimes competing factors involved:

1. A small founder population invariably carries only a portion of the totality of the original species' gene pool. This *bottlenecking* event may or may not reduce the invasive success of the introduced species in the new habitat [12] (many intentional introductions of various species fail). In the case of honey bees, of the twenty-some races of *Apis mellifera*, only eight were originally introduced into the U.S. [13]. Thus, our feral population started with only a fraction of the "gene ocean" present in the bees' homeland.
2. Due to the haploid/diploid mating system and the sterility of diploid drones, nature strongly selects against inbred lines of bees. This can negatively affect the establishment of a founder population of honey bees. On the other hand, it can also quickly weed out *nonadaptive* (less fit) genetic combinations.
3. Bees have an unusual potential for skirting the above "founder effect," since each queen carries not only the genes (and epigenes) of her mother, but also those of all the drones that she mated with. So even a single colony may carry a wide diversity of alleles to start with. The problem is in getting this diversity into the next generation, since it can occur only via daughter queens, not directly from that stored sperm (since drones come from unfertilized eggs).
4. Founder populations that rapidly expand in an environment may not suffer from loss of allelic diversity [14]. But again, bees are a special case. Keep in mind that the mother queen leaves with the first swarm, leaving behind a colony headed by one of her daughters. But the genetic diversity of the drone pool available to that first generation of daughters would be limited to that of the foundress mothers alone, and couldn't take advantage of the diversity of the sperms in their spermatheca [15]. But each virgin daughter produced by a foundress queen would likely have been sired by sperm from a different father, so the most diversity would be preserved if the foundress queens, *in their remaining lifetimes*, were able to produce multiple swarms and afterswarms.
5. And then such an expanding founder population may suffer from random *genetic drift*—permanently losing some beneficial alleles, or increasing the proportion of some deleterious alleles [16].
6. Additional introduction or immigration of stock can prevent that loss of diversity from genetic drift [17]. In the U.S., numerous early imports, coupled with the relatively recent importation of Buckfast, Yugo, Australian, and Primorsky Russian bees, legal importations of semen by Cobey and Sheppard, other illegal importations by beekeepers, and the invasion of Africanized stock have all added additional alleles to the population.
7. Finally, the introduction of multiple races of a species may actually result in *greater* genetic diversity in the resulting feral population than that found in the native populations in their homelands [18]. And this appears to be the case with honey bees. A recent study by Harpur [19] "found that managed honey bees actually have higher levels of genetic diversity compared with their progenitors in East and West Europe, providing an unusual example whereby human management increases genetic diversity by promoting admixture."

Practical application: Harpur's findings in populations of *managed bees* in Ontario and France are surprising. Who would have thought that despite the bottlenecking due to the small founding populations, the genetic drift due to strong selection by bee breeders, and the fact that a relative handful of queen breeders produce the majority of queens from only a few hundred mothers each year [20], that *managed bees* would exhibit greater genetic diversity than their wild counterparts in Africa, West-, and Eastern Europe? The question now remains, how does the genetic diversity of the *feral* population in North America compare to that of our managed bees? We'll get to that soon…

Quid Pro Quo
One wouldn't think of honey bees as being fully domesticated, since escaped swarms easily survive in the wild (as *feral* bees). Or do they?

Domestication of a species typically creates (at the genetic level) a *dependency* upon human husbandry such that the animal finds it difficult to live in the wild [21]. The reason for this is that when we select for certain characteristics desirable by humans, there is a quid pro quo—something must be given up for something in return (a zero sum game). That something given in return for high honey production, color, or docility may be a reduced ability to survive in the wild.

For example, humans have bred the silkworm for thousands of years, developing hundreds of varieties selected for higher silk production (more than tripling that production since the year 1800 [22]). But such improvement came at a considerable cost—the domesticated silkworm is no longer able to survive in the wild.

Humans today create domestic dependency in managed bees by our *facilitation of the bees' niche* through our provision of an expanded nest cavity, the transporting of hives to better pasture or wintering areas, by our supplemental feeding of sugar and/or protein during dearth, our chemical control of varroa with miticides, and our medicating for other diseases. The question then is, how wimpy are those bees when forced to fend for themselves in an unforgiving natural environment–do escaped swarms from managed stock actually survive long enough in the wild to pass their genes into the wild populations of bees, and to what extent if they do?

Gene Flow Between Managed And Wild Stocks
There are a number of fully domesticated animals that, similar to the honey bee, are commonly expected to forage for themselves in the wild (and thus retain the potential to "go feral"). Some analogous examples would be sheep, goats, cattle, pigs, dogs, cats, chickens, ducks, or turkeys. In many areas, wild populations of these animals are able to interact and mate with domesticated animals of the same species.

So what happens when domesticated animals mate with wild stocks—do the genes of the domesticated animals *introgress* into the wild populations? This phenomenon, termed "genetic pollution," is of great concern to wildlife biologists. So our question should be, in which direction do genes tend to flow—from domestic to wild, or the other way around?

As an example, let's take a look at the wolf, which lives sympatrically with its domesticated form, the dog, in both Europe and North America (Fig. 2).

Figure 2. I ask you the rhetorical question, "How many Dalmatians would one need to introduce into the Canadian wolf population each year until you started to notice spotted, short-haired wolves?" Obviously, that's not likely to happen, since despite the fact that Dalmatians are about the same size, and fully able to hunt, wolves are far better adapted to the habitat and lifestyle (they exhibit greater fitness in the Canadian environment). Plus, as with other dog breeds, inbreeding has allowed deleterious alleles to accumulate–Dalmatians display a propensity towards deafness, allergies and urinary stones [23].

Despite the fact that domesticated dogs can mate with wolves (and wolves with coyotes, both resulting in fertile offspring), the races (and species) have long continued to remain genetically distinct. Even in the extreme case of the situation in Europe, where wolves (after being hunted nearly to extinction) have successfully recolonized dog-inhabited regions,

Genetic data showed that, despite occasional hybridization, wolf and dogs remain genetically distinct, suggesting that introgression in nature might be strongly counteracted by selection or by ethological factors [24].

The same researcher also studied the introgression of domesticated genes into wild populations of two other native European species—the European Wildcat (ancestral type of the domestic cat), and the introduced Chukar (related to the Red-Legged and Rock Partridges), and found that the degree of genetic introgression depends upon the amount of human influence in the environment, as well as the selective force of nature in the region [25].

He found that despite there being widespread occurrence of free-ranging domestic cats in Italy, the wildcat population remains genetically isolated. However, in some other countries there is sporadic hybridization; and in agriculturally-fragmented Scotland and Hungary, the wildcat population is deeply introgressed by domestic genetics. Similarly, captive-bred Chukars breed freely with wild partridges, but the survival of their offspring appears to be constrained by natural selection in alpine habitats.

Bottom line: it appears that wild-type populations of animals typically maintain genetic integrity despite an influx of domestic stocks, so long as nature applies strong selective pressure upon the population. However, those wishing to preserve the genetic purity of the races of *Apis mellifera* in their native ranges have every reason to be concerned about genetic pollution from introduced managed bees.

Back To Honey Bees

So, can established feral honey bee populations maintain their genetic integrity, despite an influx of swarms and drones from managed colonies? For an answer, we need only contemplate the legendarily successful invasion of Africanized bees (a feral hybrid of African and European races) in the New World. From a relatively small, but genetically diverse mixture of different original introductions, a well-adapted "superbee" was created, which quickly displaced all other honey bee races in the tropical and subtropical habitats of the Americas. Despite the continued introduction of domesticated European stocks into currently Africanized territory, the Africanized feral population shows no sign of being "diluted" by the domesticated bees.

The process of the genetic introgression of the Africanized bee into habitats to which they were better adapted than the preexisting (but poorly adapted) European races is nicely detailed by Pinto [26]. One should note that the Africanized bee has *not* displaced the European ferals in temperate areas of the Americas, to which the European races are better adapted (although I expect that there will eventually be some degree of genetic introgression).

Practical application: fitness in one environment does not imply fitness in *all* environments—a strong argument for propagating regionally-adapted stocks.

Along that line of thought, a study that years ago caught my eye (Daly 1991 [27]), was one of feral bees in California. The researchers wondered

...whether clinal [gradual] *geographic variation* [of the feral population] *possibly could have developed during the past 138 years in the presence of a large, mobile beekeeping industry from which queens and drones must contribute annually to the gene pool of feral populations.*

So they performed meticulous morphometric analysis [28] of 278 samples of feral bees and 49 samples of managed bees from all over the State, and compared them to those of known races of bees, as well as hive bees, from other states and countries . The results were fascinating. This was before Africanization, so all the samples appeared to derive from Central Mediterranean European races.

Their analysis segregated the sampled bees into different *operational taxonomic units*, as I've shown below (Fig. 3):

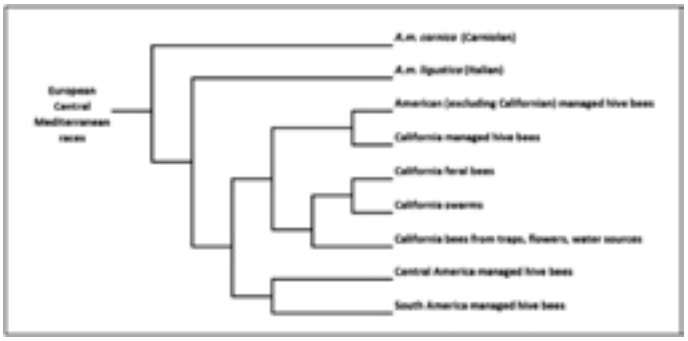


Figure 3. A phenogram [29] of the morphometric segregation of California feral and managed bees, relative to other bee populations. Note how all the samples had some similarity to pure Italians (not surprising in California's Mediterranean climate), but were distinctly different. Then note the clear separation between the feral colonies and managed bees. Not shown are the African and Western Mediterranean reference samples, which segregated out separately. Phenogram reworked for clarity from Daly (1991).

Of interest is that only 8% of the feral bees morphometrically resembled managed stocks. What I found most interesting (and hardly surprising) is that they also found (not shown) that the clinal variation of feral bees over the diverse California landscape appeared to be morphologically similar to native races of bees living in climatically similar European habitats.

Practical application: in the heart of US beekeeping and breeding, feral populations of bees appeared to have evolved into established discrete regionally-adapted *landraces* [30] similar to those in Europe, despite what one would think to be an overwhelming influx of swarms and drones from the immense population of managed hives. Unfortunately, the ferals were decimated when varroa invaded California [31], but now appear to be slowly recovering [32].

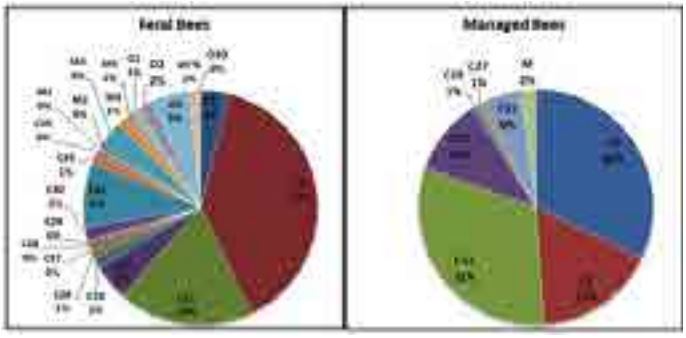
A few years later, Schiff [33] genetically analyzed samples from 692 feral colonies from the southern US and found that 37% had descended from the (long unpopular) Dark Bee (*A.m. mellifera*), and 2% had descended from an Egyptian race (*A.m. lamarckii*) imported prior to 1860. Schiff observed that:
The discovery of significant heterogeneity among US feral honey bees implies that this population may represent a source of genetic variation for breeding programs [of great interest due to then concurrent invasion of varroa].

Practical application: the question then is, was the genetic diversity of the US feral population lost when varroa wiped them out, or does the recovering feral population continue to retain its genetic diversity?

Drs. Steve Sheppard and Debbie Delaney have followed the genetic changes in the feral and domestic populations of honey bees since varroa. They are seeing what appears to be a recovery of genetically-distinct ferals throughout the country [34].

So what's the bottom line? The most recent study by Roxane Magnus and Allen Szalanski [35] reviews previous studies, and appears to me to be the most up-to-date status report on the genetic diversity of US honey bees. They analyzed samples of European worker bees collected (from 2005 – 2009) from 203 feral colonies and 44 swarms from 77 counties over 12 states, plus samples of 140 colonies from 14 queen breeders (their analysis of Africanized colonies was published separately [36]).

They used a particularly sensitive method to analyze the mitochondrial DNA [37], which is inherited directly and solely through the maternal line. What they found was a diversity of markers (*mitotypes*) from 3 main lineages of European bees. Their results deserve close study (Fig. 4):



, and labeled the name and percentage of the maternal lineages found in each group of sampled stocks. The various "C" lineages are from eastern European races, including Italian, Carniolan, and Caucasian stocks; these constituted 84% of the ferals and 98% of the managed bees. "M" is the Western European lineage, commonly known as the "German" or "Dark Bee"; found in 7% of the ferals, and 2% of managed. "O" is the Middle Eastern lineage (perhaps derived from long-ago importation of A.m. syriaca), found only in the ferals (about 10%).

Of note is the far greater genetic diversity of the feral bees (23 mitotypes) than in the managed bees (only 7 mitotypes total, with 82% of the diversity represented by only 3 mitotypes). Of interest is that the stocks of both western and southern queen producers tend to be predominated by only three C mitotypes [39], which likely flow into the feral populations (thus bolstering their proportions).

Practical food for thought: I find it of special interest that despite the fact that the C1 line ("yellow" Italian [40]) accounts for a third of the mitotypes in managed bees, that it does not appear to persist in the wild (only 4% of ferals carry it). *Could it be that we tend to select for stock that lacks fitness under natural selective pressure?*

The nomenclature and origins of the C2 group (which has a number of subgroups) is being sorted out [41], but appears to include Carniolan, Caucasian, and perhaps Cyprian stocks. Of interest is that this group was the most prevalent in the samples of ferals in this study.

I can't find where C11 comes from, but C12 may be Anatolian [42].

Also, what happened to the M line of "dark bees"?

The US feral population was originally founded solely from *A.m. mellifera* stock, but has since been largely supplanted by the C and O lines, which were introduced at later dates. So why is that? Was it solely due to the introgression pressure via escapees from managed stocks; or were the other lines simply better adapted to North American habitats? In answer, keep in mind that as of 1994, Schiff found that 37% of ferals to still retained M-line heritage, so the M line appeared to be able to hang in there despite massive introgression from managed stocks. Surprisingly then, by 2009 only 7% of Magnus's feral samples were type M. What happened in the interim? Did varroa take the type M's out? Or did *Nosema ceranae* [43]?

There is some evidence that some lineages are innately more resistant to certain parasites [44]. The question that haunts me is to what degree our recent elevated rate of colony mortality might be due to the limited gene pool of our managed stocks, which may simply be lacking critical genes for resistance to the onslaught of our recently-introduced parasites and the associated virus issues. Such a problem would likely be self-correcting if it weren't for the nearly universal reliance upon medications by our queen producers [45].

Perhaps of most practical application: a recent study by Tarpy [46] found that colonies that were less genetically diverse were 2.86 times more likely to die by the end of the study when compared to colonies that were more genetically diverse. This raises the serious question of whether our managed bees are a bit too inbred.

The above data certainly suggest that unbroken maternal lines of "survivor" bees appear to have persisted in the US since their importations prior to 1922, despite having to recover from their devastation by varroa concurrent with beekeepers flooding the continent with roughly a million commercially-produced queens of domesticated stock each year.

Also of interest is that the authors make clear that:

It should be noted based on these results that mitochondrial DNA genetic variation does not reflect a specific phenotype; thus one mitotype may have multiple phenotypes.

This point deserves further explanation. Mitochondrial analysis is excellent for tracking genetic lineages (since it is only transmitted by the mother), but it's not clear to what degree the random mutations in mitochondrial DNA affect the phenotypic appearance or performance of that line of bees [47]. Mitochondrial analysis does not take into account the genetics of the nuclear DNA, which codes for most of the proteins involved in an organism's growth and behavior, and which is also transmitted by the drones, nor does it reflect epigenetic differences [48]. However, analysis of mitotypes is certainly useful as an indicator of overall genetic diversity and the persistence of mother lines in a population.

Practical application: What's in a name? Pedigree may mean little to the phenotype which we observe in the honey bee. From a base pool of imported races, breeders can select for color or other characteristics atypical of the parental lines [49]. In the U.S., unless the parental line was recently imported (and maintained by instrumental insemination), any "breed" is likely mongrel stock selected for appearance and performance.

Bottom Line
In answer to my original questions:

1. Yes, most managed breeds of honey bees can be considered to be domesticated (or at least *semi-domesticated*) animals, with their genetics largely controlled by human breeders rather than by nature.
2. Domestication of an animal comes at a cost in fitness; i.e., a lessened ability to survive in the wild without human assistance (case in point, the C1 mitotype).
3. Yes, there is truly a genetic difference between domesticated stocks and feral bees. Feral populations are *not* simply escaped swarms.
4. Domesticated bees, by various mechanisms, may revert to a hybrid wild type that may be more genetically diverse and exhibit greater environmental fitness than the original parent races.
5. Yes, US feral bees maintain constantly-evolving, self-perpetuating populations (akin to "landraces" of other species, which tread the line between being wild, feral, and domesticated [50]). Strikingly, certain maternal lines appear to have persisted in the US since at least the 1800's, despite the introductions of chalkbrood, tracheal mite, Small Hive Beetle, *Nosema ceranae*, and who knows what else. The ferals are tough, and appear in many areas to be rebounding from the catastrophe of varroa.
6. There is likely some degree of gene flow (mainly of C1 and C11) from the managed into the feral population, but appears to be little in return.
7. Our American breeds of honey bees, be they called "Italians" or something else, are likely mongrels selected for particular characteristics and coloration, rather than genetic pedigree [51].
8. I am in no way critical of our commercial queen producers, who deserve every penny for their excellent queens, which are typically bred for high productivity under best management practices.
9. There is perhaps reason to be concerned about the paucity of genetic diversity in our managed bees. Every aspect of natural bee reproduction promotes genetic diversity; selective breeding from a limited gene pool goes against what has made the honey bee such a successful species.
10. Our locally-adapted "survivor" feral populations may be an invaluable resource for bee breeders, offering the prospect of being our salvation from the varroa/virus complex.
11. My strong feeling is that feral survivor stocks deserve far more of our attention than we have been giving them.

Acknowledgements
Thanks as always to Peter Borst for his generous assistance in my literature research, and to Dianne Behnke of Dadant for scanning old issues of ABJ. And thanks to those who donate to ScientificBeekeeping.com to allow me to continue my research and writing. And I thank my sons Eric and Ian for their patience as I barely squeaked out this article—written during an intensive April of California queen rearing and swarm management.

References And Footnotes
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[7] The term "hybrid" has several different taxonomic meanings. It can refer to offspring resulting from the interbreeding of either (1) different species (or even genera), (2) different subspecies or races, or (3) different populations or domesticated breeds. All races of Apis mellifera readily hybridize.
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These articles were originally published in the American Bee Journal. All of Randy's bee articles can be found at: www.scientificbeekeeping.com. If you find these articles of use Randy appreciates donations to fund his efforts.

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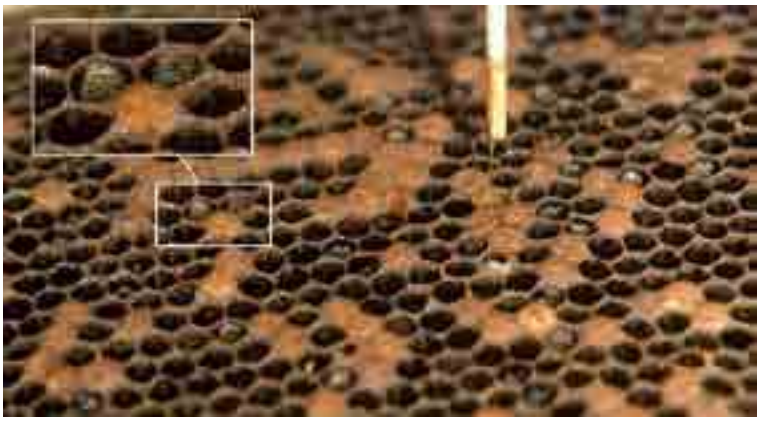

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STERITECH QLD
Glenn Robertson
QLD General Manager
Tel: 07 3293 1566
Email: grobertson@steritech.com.au

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BIOSECURITY ACT 2015

NSW GOVERNMENT

Biosecurity Regulation 2016

Proposed management approach

BEES

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The new biosecurity framework and tools will safeguard our economy, environment and community.

GENERAL BIOSECURITY DUTY

OUTCOME IS TO PREVENT, ELIMINATE & MINIMISE RISKS

- Beekeepers are responsible for managing biosecurity risks that they know about or could reasonably be expected to know about
- Australian Honey Bee Industry Code of Practice sets out good biosecurity guidelines
- People dealing with bees should know how to minimise the impact and spread of brood disease by ensuring good hygiene is practiced when handling apiary products

REGISTRATION

- Registration is compulsory for all people who keep honey bees (*Apis mellifera*)
- Even if you only have one hive you must register with NSW DPI
- Any existing registration under the *Apiaries Act 1985* will continue under the new Biosecuirty Act
- When your current registration expires, you apply for a new registration under the Biosecurity Act

MANDATORY MEASURES

OUTCOME IS TO MANAGE AND CONTROL THE RISK OF BRAULA FLY

- Regulate the importation into NSW from Tasmania of potential carriers
- Carriers include bees, comb honey, used apiary equipment

PROHIBITED MATTER

OUTCOME IS TO PREVENT ENTRY INTO NSW

- Listed in Schedule 2 of the Biosecurity Act
- Includes acariasis tracheal mite, tropilaelaps mite, varroa mite, braula fly, Africanised honeybee, dwarf honeybee, giant honeybee, Asian honeybee
- Duty to notify presence or suspected presence
- Authorised Officers can accept a Biosecurity Undertaking from a beekeeper or issue a Biosecurity Direction to manage a disease or pest
- Offence to deal with or possess Prohibited Matter

MANAGEMENT APPROACH IS DETERMINED BY LEVEL OF RISK

MODERATE RISK	MANAGE AND MINIMISE RISK	MEDIUM RISK	HIGH RISK	EXTREME RISK

Prioritisation of biosecurity risks is guided by National and State strategies and agreements and NSW DPI risk assessments.

DEFINITIONS

General Biosecurity Duty

The general biosecurity duty provides that any person who deals with biosecurity matter or a carrier, who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity duty to ensure that the risk is prevented, eliminated or minimised – so far as is reasonably practical.

Registrable dealings

Registration will be required to engage in a registrable dealing under the Act. Currently the Act identifies dealing with bees and dealing with certain non-indigenous animals as registrable dealings.

Mandatory measures

Mandatory measures are made by regulation and will generally apply across the whole of NSW. The actions covered by a mandatory measure include refraining from doing a thing or adopting any procedures or programs. Mandatory measures may be prescribed for as specific biosecurity risk.

Prohibited matter

Prohibited matter is high risk matter we do not want in NSW and is not established in NSW, although we may occasionally have infestations that are quickly eradicated. Examples of prohibited matter include Foot and Mouth Disease, Highly Pathogenic Avian Influenza, Hendra Virus infection (other than in pteropid bats), Citrus Canker, and Parthenium Weed.

Notification obligations apply with respect to prohibited matter. It is also an offence to deal with prohibited matter.

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Consultation is open from 14 November 2016 to 5pm - 29 January 2017

- Submit comments on the proposed regulation and Regulatory Impact Statement via the feedback survey link on www.dpi.nsw.gov.au/biosecurityact or email your feedback to submissions.biosecuritylegislation@dpi.nsw.gov.au
- Post comments to:
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  NSW Department of Primary Industries
  Locked Bag 21, Orange NSW 2800

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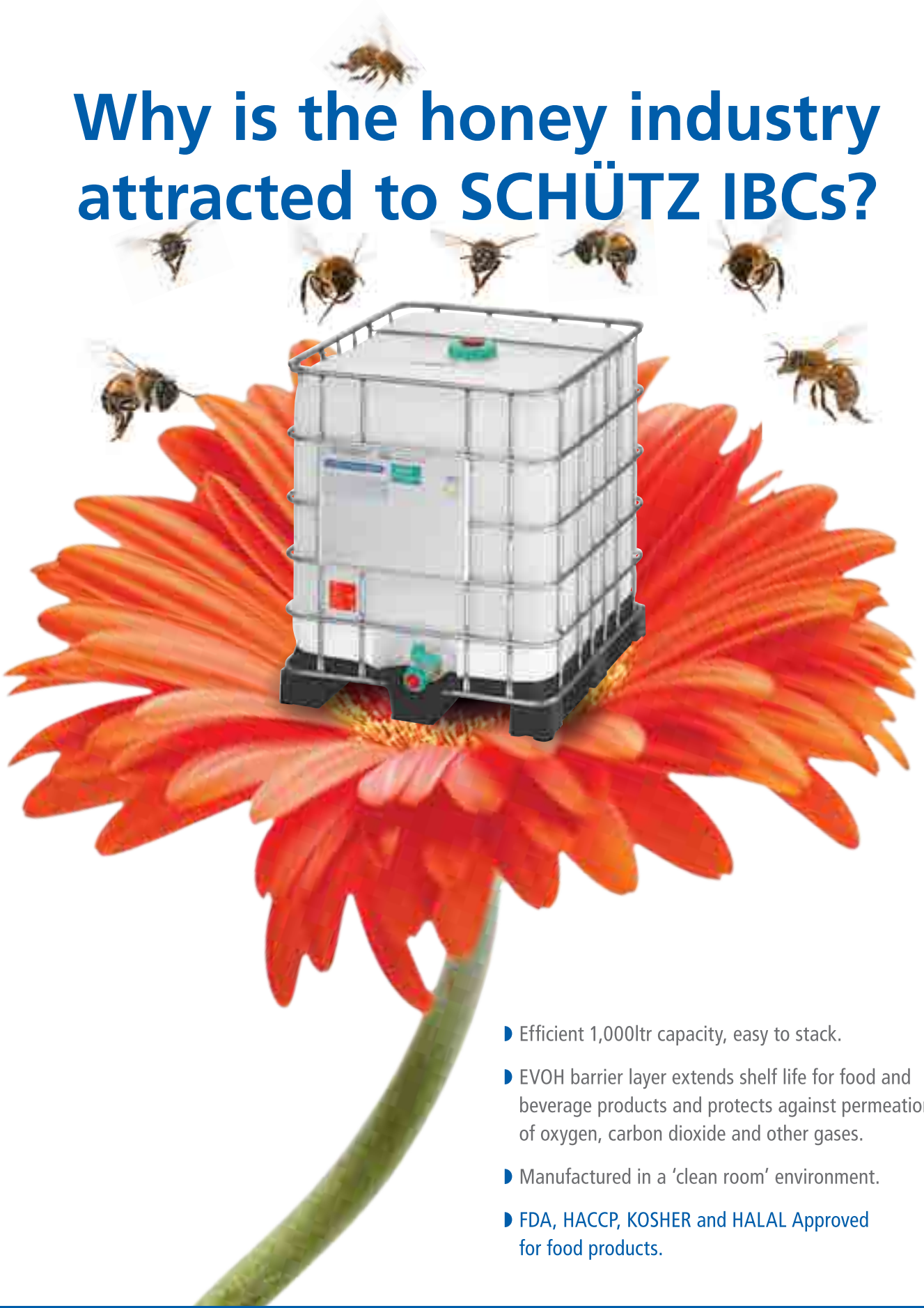

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