REPORT

The future development of the Australian honeybee industry

Submission to the House of Representatives Agriculture, Fisheries, and Forestry Committee Inquiry

TASMANIAN CROP POLLINATION ASSOCIATION INC

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TABLE OF CONTENTS

1. Current and future prospects

- Pollination has a huge potential to increase in strength as more producers realise the significant increase it makes to the bottom line;
- the industry provides major benefits to the rest of agriculture through pollination services. There is strong demand for these services and the fast growth of the horticulture industry and industries that are 90 per cent reliant on honeybee pollination (for example, cherries, watermelons, blueberries, pumpkins, almonds and Australia's own macadamia nut)) will ensure strong demand for pollination services in the future;
- enthusiastic and migratory commercial beekeepers;
- Tasmania has a good quality assurance program **Tasmanian Crop Pollination (TCPA) Code of Practice**;
- Australia is free from Varroa mite (*Varroa destructor)*, which is destroying honeybee hives in every other honey producing country in the world.

Marketing opportunities

Domestic market

The Australian Honeybee Council has engaged leapfrog marketing to provide a marketing plan.

- The PR campaign would promote the role honeybees play in pollination
- redevelopment of the AHBIC website to meet the needs of industry, consumers, domestic and international market, food service and industrial food and non-food users of honey, research and development organisations and media;
- the development of a marketing toolkit to secure a positive and correct profile of the industry that can be downloaded by industry in order to provide a consistent message and image.

This was only three of the affordable options put to AHBIC. The real benefits of the promotion of honey to the public was out of reach of our budget and AHBIC needs ten times our funds to ensure the viability of our beekeepers who pollinate this nation's crops.

Diversification of the industry

Although the majority of revenue in the honeybee industry comes from the production of honey, there are some significant prospects in the future for the industry to diversify their revenue source and increase profitability. This includes the development of a professional honeybee pollination industry, and exports of queen bees and packaged bees to the US. The US represents a particularly large opportunity as its honeybee industry is currently under pressure by the Varroa mite and Colony Collapse Disorder, both of which are not present in Australia.

Paid pollination services

Paid pollination services represents a large opportunity due to the enormous value it can provide to the production of crops and the increase in demand for horticultural goods in Australia. For example, Australia is the largest commercial producer of almonds in the Southern Hemisphere with a farm gate value of around $85 million per year (PIRSA 2005) and annual growth expected to continue at around 13 per cent (ANIC 2005). The production of almonds is 100 per cent dependent on honeybees. The demand for honeybee hives is expected to increase by at least as much as the annual growth in the industry.

In order to command a premium on pollination services and to maximise the opportunities paid pollination presents, the industry needs to address these impediments. In particular, a recognised and standardised education program on pollination with certification needs to be developed that can be used by the pollinator to indicate they have undertaken the necessary skills training. This will reduce the risk to growers of receiving a sub-standard service. It will also standardise the quality of services, thereby generating greater confidence within the paid pollination market and enabling the pollinator to capture some of the enormous value that pollination services currently provide to growers. The Tasmanian Crop Pollination Association Inc. provide for this in Section 7 (Disputes about Hive Standards). They also covered the strength that the hive needs to be Section 5 (Colony Standards).

Reducing the risk associated with pollination services

Although paid pollination services represents a large opportunity for the honeybee industry, there are many risks that could inhibit the development of this market. Chemical spraying is one such risk. Those who apply chemicals to crops need to be educated on the risk spraying can impose on bee colonies. Better labelling on chemical products would reduce the potential collateral damage from spraying.

In addition, an incursion by Varroa and other mites could have a devastating effect on pollination services throughout Australia. To reduce this risk, the industry, in conjunction with RIRDC, held a workshop in April

2007. The workshop was attended by a broad range of stakeholders, including those who work in the industry, representatives from industries that are reliant on honeybee pollination (horticulture, pasture seeds and grains), research and development service providers, state and federal government representatives (such as AQIS and DAFF), and university research centres.

The objectives of the workshop were to develop possible solutions to address:

- future honeybee and pollination research and development capability and funding;
- education and training requirements to support honeybee and pollination production, research and extension;
- the dissemination of information to organisations, industries, and individuals reliant on commercial beekeeping and pollination; and
- additional quarantine requirements to support the beekeeping industry and pollination services.

Workshop participants then collectively developed a set of key outcomes and recommendations. These are presented in box 1.1. The outcomes and recommendations were also presented to Dr Peter O'Brien, Managing Director, RIRDC, and David Mortimer, Executive Manager, Foods and Agriculture, DAFF, on behalf of the Minister for Agriculture, Fisheries and Forestry.

As evidence of the importance of these issues and the unity established in the workshop, it was also announced on the second day of the workshop that the almond industry (through Timbercorp and Macquarie Horticultural Services) will provide immediate capital to fund part of the strategies that have been developed within the workshop.

In closing off the workshop, participants agreed that the next step was to get RIRDC to develop a funding application in order to create the full proposal. In the first instance it is proposed that funding be sought through DAFF's Industry Partnerships Programme.

1.1 Key outcomes from the honeybee linkages workshop

- Establish a new national alliance for management of these issues:
  - A national alliance to support the strengthening of pollination industry research and development, training and communication had strong buy-in from all present; and
  - Horticulture is the fastest growing Australian agricultural sector. A secure and strong pollination industry has the ability to enhance this industry's productivity and profitability.
- The need for action to protect pollination services is urgent - beekeeping and pollination dependent industries are under prepared:
  - Varroa mite is a food security issue that is on our doorstep. When present in Australia it will seriously affect the honeybee industry, as well as many horticulture, crop and pasture industries dependent on honeybee pollination valued at more than $3.8 billion;
  - Australia must increase its beekeeping and grower skills and viability. The honeybee industry is poorly resourced to manage Varroa mite, it has low profitability levels and low capacity to respond to external shocks; and
  - Quarantine is vital for the pollination industry and a replacement quarantine facility is required for Eastern Creek in Sydney.
- The public and private economic benefits of pollination services and their protection are compelling and the threats to these goods are real and immediate;
- A national alliance to advance key agreed workshop outcomes was proposed;
- The workshop's leaders (RIRDC) will obtain interim government and new industry funding to develop a considered proposal:
  - The workshop's leaders will seek engagement of pollination-dependent industries and other public interests as represented at the workshop.
- A full strategic plan will be developed it will include:
  - a comprehensive risk management strategy;
  - business delivery model development;
  - research and development strategies;
  - education and training strategy; and
  - common messages and communication.
- Workshop leaders will then secure longer term funding for the proposal; and
- Agreement that public benefit warrants public investment to leverage further private resources.

One key outcome that was not enlarged upon is that the most important thing for the pollination industry to multiply is remuneration. Beekeepers will not attempt to pollinate crops if it is not profitable enough.

Queen bees and packaged bees

Diversification into commercial queen bee and package bee production for the domestic and international market represents a viable alternative to honey production and could provide the industry with huge opportunities in the long term. This is especially the case in the US, where the Varroa mite and a new threat in Colony Collapse Disorder continues to affect honeybee colonies.

Packaged bees

The package bee industry was first developed to satisfy the Korean market in the late 1980's but has since expanded to include Canada, the Middle East, Western Europe and most recently the US. This has been primarily driven by the Varroa free status Australian bees enjoy and the capacity for Australian producers to deliver strong colonies at the start of the Northern Hemisphere spring.

Tasmania needs help to transship pallets of packaged bees to the United States etc either in Melbourne or Sydney because Tasmania, like the rest of the world, has the pest Braula Fly. Currently mainland Australia is Braula Fly free.

Recommendations

Recommendation 1 **The resolutions agreed at the national pollination industry workshop of 23 and 24 April 2007 be implemented as agreed.**

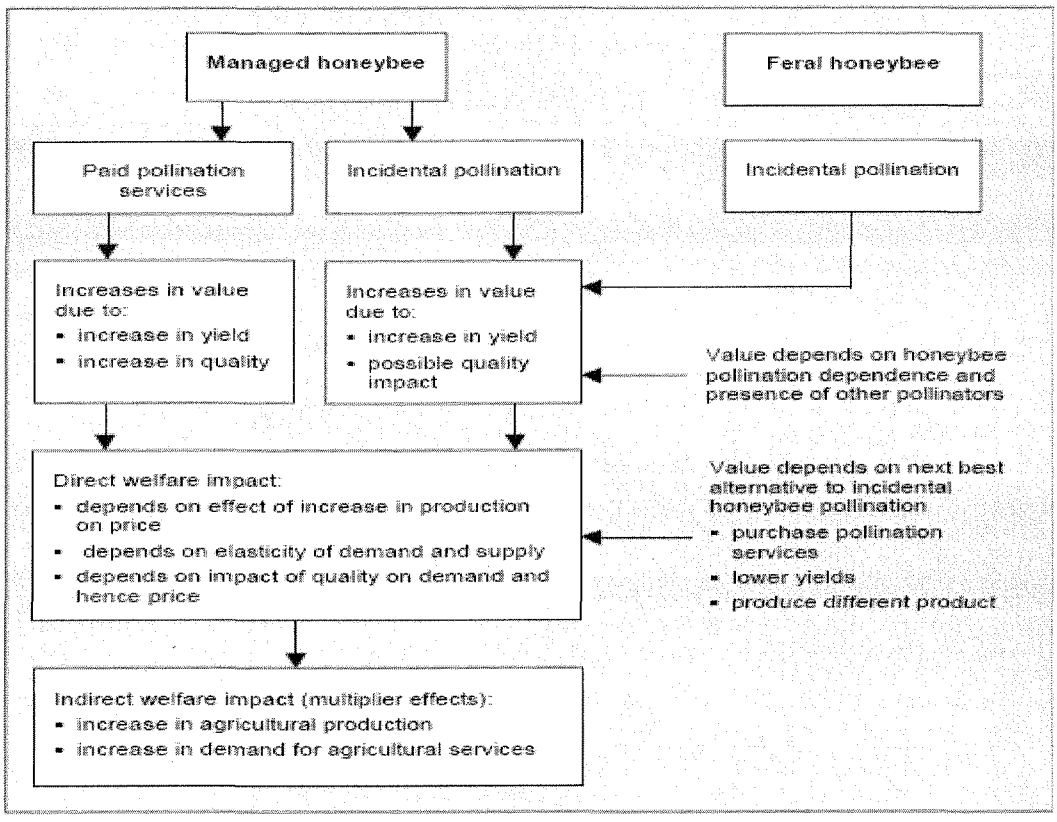
2. Honeybee industry role in agriculture and forestry

The value of pollination in Australian agriculture and forestry

Honeybee pollination is essential for some crops, while for others it raises yield and quality. Honeybee pollination provides significant value to Australian horticulture and agriculture with services being valued at $1.7 billion per annum in 1999 - 2000 for the 35 most important honeybee dependent crops. When other crops, including pastures such as lucerne and clover, are added this is estimated to be $3.8 billion per annum. If honeybee pollination were to stop completely, large losses would be felt in a horticulture sector. This is because approximately 65 per cent of horticultural and agricultural crops produced in Australia require pollination services from honeybees.

Chart 2.1 shows a flow diagram of the role honeybees play in the horticulture and broad acre industries. Pollination can occur through paid pollination services and/or incidental pollination. Paid pollination involves employing an apiarist to place bees on the grower's land in order for the bees to pollinate crops. Honey production is a secondary objective for the apiarist. With incidental pollination, the apiarist's specific purpose is to produce honey, and pollination of crops is a positive externality received by growers.

2.1 **Economic Benefits Attributable to Honeybee Pollination Services**



Data source: Gordon and Davis 2003

Both paid honeybee pollination services and incidental honeybee pollination increase the value of crops to growers through an increase in yield and an increase in quality. This means that pollination has a direct impact on welfare for those growers who benefit from pollination services. In addition, there are positive benefits to the entire agriculture industry due to flow-on effects from an increase in the value of crops, and positive benefits from pollination to consumers as it increases production (thereby putting downward pressure on prices) while providing better quality.

Consequently any loss in honeybee pollination services will mean a loss in welfare to growers and consumers. Losses from the absence of pollination services would be split between producers who would forfeit horticulture and broad acre crop income and consumers who would suffer a sudden and sometimes complete decline in the availability of many fresh fruits, nuts, vegetables and honey. Although some of these crops could be replaced through imports, Australia's capacity to import many of the affected products would be limited by quarantine restrictions. This means prices for the reduced supply of fresh fruits, vegetables, nuts, and honey would be driven up by the reduction in supply, thereby reducing access to these goods and also reducing consumer welfare.

It has been estimated that if honeybee pollination had stopped completely in 1999/2000, the agriculture industry would have experienced a loss of

around $1.7 billion in production and consumption, resulting in the loss of around 9 500 jobs. It was also estimated that there would have been short-term flow-on effects which would add an additional $2 billion loss to agricultural industry output and another 11 000 jobs. Partial loss in pollination services would have still resulted in major economic costs (Gordon and Davis 2003).

The economic impact of Varroa mite establishment in Australia

There are substantial costs to the Australian economy from a Varroa mite incursion. Rather than wiping out honeybees in one fell swoop, it is expected that the Varroa mite will decimate feral honeybee colonies but will spread more slowly through managed honeybee populations as apiarists, agriculturalists and horticulturalist change their behaviour in an attempt to minimise the loss. It is expected that despite these efforts, the cost to the agriculture and horticulture industries will be between $21.9 million and $51.4 million per annum (Cook et al, 2005).

There is a strong case for agriculture and horticulture industries to contribute to the prevention of a Varroa mite incursion and other bee diseases and pests. This is because it is these industries that are expected to experience significant losses if an incursion does occur. For example, of the 25 crops listed in Table 2.2, thirteen will avoid costs of over $1 million per annum from the prevention of a Varroa mite incursion. It has been estimated that up to $21.9 million per annum in total could be spent on a Varroa mite control program that will prevent the establishment of Varroa mite before Australia becomes worse off (Cook et al, 2005).

The bait hive program to enhance the sentinel hive program will cost $1,250 per bait hive to establish (Tasmanian Pilot Bait Hive Program 2006). There are 37 ports throughout Australia x 3 hives per port which equate to approximately 100 bait hives. Cost to establish would be approximately $125,000 plus the pheromones. Maintenance costs would be approximately $125,000 per year.

2.2 **Impact of a Varroa mite incursion on selected crops**

Crop	*Total area*	*Annual gross value of production (5 year average)*	*Proportion of total pollination services delivered by insects*	*Additional hives required in the absence of Feral Apis mellifera*	*Yield loss in the absence of Feral Apis mellifera*
	Ha	*$*	*per cent*	*Hives per hectare*	*per cent*
Almond	4 430	41 759 605	100	2-5	10-30
Apricot	1 085	31 490 850	70	1-2	0-10
Avocado	4 000	78 740 005	100	2	10-30
Blueberry	510	26 823 780	100	1-2	10-30

Crop	*Total area*	*Annual gross value of production (5 year average)*	*Proportion of total pollination services delivered by insects*	*Additional hives required in the absence of Feral Apis mellifera*	*Yield loss in the absence of Feral Apis mellifera*
	Ha	*$*	*per cent*	*Hives per hectare*	*per cent*
Canola	1 909 730	1 502 672 850	15	0	0-5
Cherry	1 270	42 829 140	90	1-2	0-20
Cucumber	1, 05	16 530 650	100	1-2	0-20
Field Pea	422 675	98 764 290	50	0	0-10
Lemon & Lime	1 785	24 523 360	20	0.5	0-5
Lupin	1 347 180	272 872 360	10	0	0-5
Macadamia Nut	14 000	50 675 680	90	2-5	0-20
Mandarin	4 895	86 286 200	30	0.5	0-5
Mango	2 650	100 964 215	50	2	0-10
Nectarine	985	114 537 870	60	1-2	0-10
Orange	30 560	297 818 985	30	0.5	0-5
Peach	1 885	84 923 755	60	1-2	0-10
Pear (Not Nashi)	3 025	106 191 015	50	2	0-10
Plum	835	44 197 390	70	1-2	0-10
Pumpkin	8 995	59 762 785	90	1-2	0-20
Rockmelon	3 940	104 172 020	100	1-2	0-20
Strawberry	905	150 867 890	40	0	0-10
Sunflower	161 545	50 798 325	100	2-5	10-30
Watermelon	4 950	68 058 840	100	1-2	0-20
Zucchini	1 955	32 249 965	100	1-2	0-20
Mango	2 650	100 964 215	50	2	0-10
Nectarine	985	114 537 870	60	1-2	0-10
Orange	30 560	297 818 985	30	0.5	0-5
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Source: Cook et al (in print)

If we had an incursion of Veroa mite Tasmania's thriving cherry crop would be wiped out because Tasmania is struggling to provide enough hives at the moment to pollinate their thriving fruit crops.

Recommendations

Recommendation 2 **All crop industries that derive an economic benefit from pollination services should contribute to exotic pest and disease cost sharing arrangements.**

Recommendation 3 **Education programs should be developed to assist apiarists to correctly price paid pollination services along with the development and implementation of standards.**

Recommendation 4 **That all states adopt and adapt to their own conditions the Tasmanian Crop Pollination Association Code of Practice (including charges) for pollinating various crops.**

3. Biosecurity issues

Exotic mites that pose a real threat to Australia are the Varroa mite (*Varroa destructor*), the mite *Tropilaelaps clareae* and tracheal mite (*Acarapis woodi*). The Asian bees *Apis dorsata* and *Apis cerana* are also vectors for mites as well as being pests in their own right. If they enter Australia and are able to establish, the impact on the honeybee industry and the pollination of horticulture and agriculture could be devastating.

In addition, the honeybee industry faces many diseases. The most serious endemic diseases are:

- American foulbrood (AFB), caused by the bacterium *Paenibacillus larvae*;
- European foulbrood (EFB), caused by the bacterium *Melissococcus pluton*;
- Chalk brood caused by the fungus *Ascosphaera apis*;
- Nosema caused by the protozoan parasite *Nosema apis* Zander;
- Sacbrood caused by the sacbrood virus;
- Small hive beetle (*Aethina tumida*), introduced into Australia in around 2001 in New South Wales and spreading fast; and
- Braula fly in Tasmania.

Pests

Varroa mite

The host of Varroa mite is the Asian honeybee *Apis cerana* and despite current surveillance in place at Australian ports, an incursion of the Varroa mite could easily take place if the Asian bees are transported to Australia undetected (for example, on a ship) and settle in Australia while being infected with Varroa mite. Because of the difficulty in detecting the mite in early stages of infection, and the migratory activities of beekeepers, the mite is likely to spread rapidly even before detection. An eradication attempt would be decided based on the nature of the incursion but would be extremely costly if it was decided that an attempt should be undertaken. Not one country in the world has ever successfully eradicated the Varroa mite. Prevention needs to be boosted with the inclusion of the bait hive program to run alongside the sentinel hive program which is currently managed by DAFF and will be managed by Animal Health Australia from 1 July 2008.

Australia is the only major honeybee producing country in the world where Varroa mite is not present. If the pest became established in Australia it would spread rapidly unless very expensive control measures were enforced. Control costs would substantially add to costs of honey and honeybee product production, having a devastating effect on the industry. It is likely that most small beekeepers would find it uneconomic to continue beekeeping.

The cost of Varroa mite establishing in Australia could be massive. Although it is unlikely that a Varroa mite incursion would wipe out all honeybees within Australia, it is likely that all feral honeybee colonies could be wiped out like they were in New Zealand leaving horticulture and agriculture producers with no option but to purchase pollination services which more than doubled in New Zealand. Although the demand for pollination services by managed bees would increase, it is expected that the price of these services would rise substantially like it did in New Zealand where paid pollination services increased between 100 and 200% in three years, thereby adding a significant amount to growers cost of production and reducing Australia's competitive advantage. This situation is currently occurring throughout the world but would be particularly devastating in Australia due to the heavy reliance by agriculture of pollination by feral bees (see box 3.1)

3.1 Impact of Varroa mite in the US and New Zealand

In the US, the Varroa mite established itself in 1987 but has since spread right across the entire country, destroyed feral bee populations, and had a massive impact on managed bee colonies. The US Agriculture Department's Research Service estimates that the US has lost at least half their managed hives, with as much as 70 per cent of hives being destroyed in some areas (The Times, 2005). Growers are also worried about the reduction in the supply of pollination services, the increased competition for hives, and subsequent rise in price for pollination services. Although beekeepers use miticides (which adds additional cost to their production) to protect their bees, the Varroa mite is becoming resistant to the chemicals.

The same situation is occurring in New Zealand. The Varroa mite established in 2000 but has since spread across the north island and has recently established itself in the south island. This has had a devastating impact on feral bee populations and substantially increased the cost of production for beekeepers as they try to control the mite. Just before Varroa mite established itself in New Zealand the average price to rent a hive was $80. Since then the price has doubled to $160. This is because the cost of control has forced many beekeepers out of the market, with numbers being reduced from around 5 000 when the mite entered the country to approximately 2 800 in 2006. This has also reduced the number of managed hives from around 320 000 to approximately 292 000. Consequently the reduction in hives has increased competition for pollination services and subsequently the cost to growers for pollination services.

Tropilaelaps and tracheal mite

An incursion of Tropilaelaps would have an even more devastating effect on the Australian honeybee industry than the Varroa mite. Its host is *Apis dorsata* the giant honeybee. However, the chances of it being introduced are less than for the Varroa mite because it is not present in countries such as USA and Europe.

Tropilaelaps can be controlled by use of acaricides but it would be expensive to eradicate. If that option was not possible, it would severely impact on the profitability of the industry due to the high control costs.

The Tracheal mite infects bees' tracheas and slowly weakens and eventually kills them. *Apis mellifera* has a reasonable degree of tolerance to the mite and establishment of the pest would not be as serious as Varroa or tropilaelaps.

American Foulbrood

American Foulbrood is the greatest disease concern for the industry as it is highly infectious and actions by one beekeeper whose hives are infected can cause the disease to spread rapidly, thereby imposing costs on many other beekeepers. Most activities of state agencies are directed at controlling this disease.

- Despite all measures to control the disease, evidence suggests that it continues to spread, although to a degree, the reported increase in occurrences could be due to better detection methods – honey can be tested for AFB spores but honey as a rule is not regularly tested with the exception of Tasmania where every beekeeper is encouraged to annually submit batches of honey for testing. If testing is not done the results are not obtaining B Qual Accreditation nor will the beekeepers attain the registration necessary to gain access to the leatherwoods forests for the annual honey production. Leatherwood honey accounts for 70% – 90% of all honey produced in Tasmania. A report on a national approach to management and control of AFB has already been prepared and state agencies are focused primarily on control of this disease. AHA has also prepared a proposal for a nationally coordinated program for the improved management and control of AFB (AHA 2003-04). It is proposed that AHA would manage the implementation of this national program.

Other biosecurity concerns

Colony collapse disorder

Colony Collapse Disorder (CCD) is a relatively new phenomenon affecting the health of bee hives. Although no one knows exactly what causes it, the major symptom is the complete disappearance of adult bees in

colonies while capped brood are still in the colony and the presence of honey and bee pollination. The disappearance of adult bees means all production of honeybee products stops and the brood left in the hive dies.

The size of the problem in the US is huge. Estimates suggesting CCD has caused the loss of about one quarter of the 2.4 million colonies within the last year (The Age, 2007). Although this problem has traditionally been associated with the US, beekeepers in Europe have also experienced similar symptoms.

Although Australian beekeepers have not experienced colony collapse disorder, the unknown nature and the gradual spread of the disorder means it will be very hard to stop coming into the country or to control if there is an incursion. According to US literature there is a belief that the Asian variant of Mosema (Nosema Ceranae) came from imported honey from China. The impact this disorder has had on the US means any incursion into Australia is likely to significantly cost the industry and horticulture and agriculture industries that rely on pollination from honeybees.

There may also be a link between CCD and *nosema ceranae*, although this still requires further research.

Bumblebees

Bumblebees were introduced into Tasmania in 1992 by accident and have since been contained in Tasmania. However some industries such as the tomato industry and those that are grown under similar hydroponics are calling for the introduction of the bumblebee to pollinate their crops. Currently the majority of tomato pollination is done by mechanical vibration.

Tasmanian horticultural tomato growers tried to contain the bumblebees in their hothouses but the bumblebees always escaped. Currently not one of the nine commercial hothouse tomato growers use them.

However there are some concerns held by the honeybee industry regarding the introduction of bumblebees to mainland Australia. Firstly it is unknown whether the bumblebee harbours pests that are dangerous to the honeybee industry (such as the Varroa mite). Nor is it known what other parasites or pathogens bumblebees might carry that are as yet unknown to the honeybee industry.

In addition, the industry is concerned that the bumblebee will compete for nectar and pollen with the honeybee, and because the bumblebee can forage at lower temperatures and can start foraging earlier in the morning, they have a competitive advantage over the managed honeybee. Bumblebees would also increase competition with native species that forage earlier in the day than honeybees.

Bumblebees do rob honeybee hives and honeybee supers loaded on trucks due for extracting. While most of the bumblebees robbing hives are killed, some do manage to escape. It is known that the varoa mite jumps onto beekeepers clothing and varoa mite jumps from bee to bee whilst they are foraging close by. In all the countries where there is bombas terrestis (bumblebee) there is also varoa destructor.

The industry is also concerned that feral bumblebee colonies might be dangerous to the environment. This is because bumblebees specialise in pollinating certain types of flora, which contain many agricultural weeds. This means these weeds become more prolific, thereby invading native plants and in some cases choking rivers.

It is therefore the position of the industry that bumblebees should not be introduced on the mainland of Australia.

Biosecurity programs

Plant and Animal Health deed

There is currently a five year review of the Emergency Animal Disease Response Agreement. The industry therefore supports the Committee of Review recommendations on and proposed changes to the agreement on the basis of ensuring a Response Agreement that ensures protection of Australia's agricultural and pastoral industries from introduced bee diseases and pests. Specifically, the industry supports:

- appropriate response capabilities in respect of an emergency animal disease or pest incursion of the bee pests, *Apis cerana* or *Apis dorsata* and sharing the costs of the response;
- the desire of existing participants to provide a cost sharing mechanism; and
- an agreement between Animal Health Australia and Plant Health Australia for plant industries to contribute to cost sharing.

National Sentinel Hive Program (NSHP)

Following consultations between Biosecurity Australia, state departments of agriculture and AHBIC, the NSHP was established in 2000 to enhance surveillance for exotic honeybee pests, most notably Varroa, in the immediate vicinity of Australian ports. Sentinel hives with sticky strips can trap exotic mites, thus enhancing the chances of detecting an incursion and eradicating it at minimal cost. In addition, the industry uses bait hives at Tasmanian ports. Recently at the Burnie port in Tasmania a swarm was detected in a bait hive. This was frozen overnight and scientifically examined for varoa mite. If a swarm infested with varoa mite issues from an overseas container it will immediately try to establish somewhere to live. It is imperative that bait hives are placed as ports-of-entry as the

first line of defence against invading swarms. These must be vigilantly monitored so that early detection will allow freezing and analysing of invasions.

In 2005 the program was reviewed by Biosecurity Australia. The review covered 20 ports in New South Wales, Victoria, Queensland, South Australia, Northern Territory and Western Australia. The key recommendations of this report include:

- a comprehensive analysis of the benefits of the program to be conducted by the honeybee industry and those horticultural and seed crop and pastoral industries identified as significant beneficiaries of pollination;
- a review of the long term funding and coordination of the program, including the costs;
- surveillance for Asian honeybee be extended to all ports on the eastern seaboard;
- investigating the feasibility of establishing or re-establishing hives at various locations; and
- increasing the intensity of surveillance by more regular sampling of hives at certain locations.

In 2006, responsibility for the NSHP was transferred from Biosecurity to the Office of the Chief Veterinary Officer (OCVO) within DAFF. In February 2007 the Primary Industries Standing Committee (PISC) agreed that DAFF should develop a business plan to map the future of the NSHP and to address the recommendation to conduct a review of the long term funding and coordination of the program, including the costs. It is industry's hope that PISC will support this proposed plan

Since then a draft business plan has been produced and it will be presented to PISC. After completion of the business plan, AHA will take over the management of the NSHP.

The dangers of some of these exotic pests, particularly Varroa and *Tropilaelaps clareae,* becoming established and the relative ease with which incursions could occur in the absence of good surveillance cannot be overstressed. Not only would the beekeeping industry be seriously affected by a successful incursion, but so too would most of Australian agriculture through effects on pollination.

Recommendations

Recommendation 5 **The government should continue to prohibit the introduction of the bumblebee into mainland Australia. This is because it is unknown whether the bumblebee harbours pests that are dangerous to the honeybee industry, and if the bumblebee becomes feral then it could impact the honeybee industry and**

adversely affect the environment through over pollination of introduced weeds. Native bees may also be adversely affected.

Recommendation 6 **If the Eastern Creek quarantine station is relocated in 2010/2015, then the new facility for the inspection of imported honeybees should be run to the same high standards that are currently being undertaken, and that current funding arrangements for the maintenance of the program should continue.**

Recommendation 7 **All recommendations from the 2005 National Sentinel Hive Program review should be implemented and managed by AHA in order to enhance the surveillance for exotic honeybee pests in the immediate vicinity of Australian ports.**

Recommendation 8 **All hive products from countries that are not free from *nosema ceranae* should be banned.**

Recommendation 9 **The bait hive program, to run alongside the National Sentinel Hive Program, be implemented immediately**

5 The impact of land management and bushfires

Access to public land

Without access to leatherwood rich rainforests the commercial beekeeping and pollination industries would not exist. Continued access to native flora on private but more especially public land is the essence of the Australian beekeeping industry.

Access to leatherwood rich rainforests on public land is essential for the honeybee industry – state forests, national parks, Crown lands, provide most of the floral resource on which the industry depends for honey flows. Honeybees are rehydrated in leatherwood rainforests on public lands after completing the pollination services which generate very little honey and on which Australian agriculture and horticulture depend for food production.

Scarcity of floral/timber resources post Regional Forestry Agreements is forcing loggers to work in close proximity to bee sites.

6 Research, development and education needs

Research and development priorities

Industry research and development is principally funded by the research levy on honey currently managed by RIRDC. Apiarists pay a levy for research, which is matched on a dollar for dollar basis by the Australian Government. The levy raises between $350 000 and $450 000 per annum and funds approximately 12 projects per year.

The industry has voted to support an increase in the levy over the life of the new research and development plan. The levy has increased from 0.8 cents/kg of honey sold by apiarists to 1.2 cents/kg in 1 July 2006 and will increase again to 1.5 cents/kg from 1 July 2009. The levy will increase research and development funds available to the industry by approximately $200 000 per annum when Australian Government matching funds are added to the additional levy.

Problems with the current funding levels and mechanisms

As noted above the current plan is based on a total annual budget of between $600 000 and $700 000 per annum and assumes average seasons.

However, the industry's gross value of production falls dramatically after a sequence of drought years and with it, industry's capacity to attract matching funds from the Australian Government. The industry is currently suffering (with less of its own levy resources and less matching funding) at a time in its history when it can be least afforded. The industry is also concerned at the potential loss of levies as a result of the recent development of farmer markets and alternative marketing channels where levies are not collected.

Another issue is that there is no provision in the current levy arrangements for Voluntary Contributions by industry to be recognised by the Australian Government and so attract matching funding for an approved project. Voluntary Contributions with Australian Government matching funding is recognised in horticulture and is a very valuable part

of the Horticulture Australia Limited research and development portfolio. An offer from a major honey packer and marketer to fund research on the therapeutic qualities of honey to the value of $500 000 could not be matched with industry funds even though this project was consistent with the new research and development plan.

The need for national traineeship arrangements for the industry

The industry has recently had a range of competencies endorsed by the Department of Education, Science, and Tourism for the delivery of training to its members. As the industry is dispersed right across Australia, the industry believes that there will be problems getting a critical mass of trainees together for specialised training. While a lot of the training will be based in the workplace there will be a need for trainees to interact with industry specialists and experts.

It is the industry's preferred model to have a designated Registered Training Organisation (RTO), which the industry would support in delivering the traineeship. This RTO would run specialist courses at the most appropriate location and have trainees attend from across Australia. It is the industry's understanding that trainees are fully based on state delivery and it is very difficult if not impossible to enrol trainees from interstate and have them attend a RTO.

This is a real impediment to the up-skilling of the honeybee industry for future changes that are likely to affect it. It is therefore suggested that institutional arrangements be put in place for a Commonwealth traineeship to be run that would enable trainees to attend their training anywhere in the country. The traditional travel support and other arrangements for trainees would therefore be available to these trainees to attend the training.

The industry believes that the current state-by-state arrangements are unnecessarily bureaucratic, and from experience in other industries it seems that they are a real impediment to small industries like the Australian honeybee industry to have a critical mass of trainees for specialised training.

Recommendations

Recommendation 10 **Resources should be found to manage a Varroa and other mites outbreak and the resultant impacts on pollination dependent industries.**

Recommendation 11 **Australian government matched funding for research and development should not be cut in response to drought related drops in industry gross value product.**

Recommendation 12 **Australian government matched funding for research and development should be extended to recognise industry voluntary contributions.**

Recommendation 13 **Institutional arrangements should be put in place for a Commonwealth traineeship that would allow trainees within the honeybee industry to attend training anywhere in the country.**

Recommendation 14 **Assistance should be given to the industry to allow it to promote the benefits of the industry to society.**

7 Existing industry and government work for the Honeybee industry

Recent investment by industry and Government in the Australian honeybee industry includes:

- Industry Partnerships Program:
  - Stage 1 'Taking stock and setting directions'; and
  - Stage 2 ' Developing a National Code of Conduct'.
- CRC Grant for Queen bee breeding - $200 000 to $300 000 grant;
- Emergency Animal Disease/Pest Response:
  - Work with Plant and Animal Health Australia;
  - National Sentinel Hive Program; and
  - Industry Training and Response.
- Honeybee research and development plan – 2007-2012;
- Completion of the development of competency standards:
  - Training materials for EMS units and emergency response; and
  - Training for emergency animal disease/pest response.
- Sought funding for development of course materials for the remainder of apiary competency units; and
- Funding of a workshop to address industry issues and build on recommendations from the Australian Parliament inquiry into Rural Skills, Training and Research.

Pollination - What a Year!

Lindsay Bourke

It has been a disheartening year for beekeepers. Crops were decimated by frost and then many pollinated crops were written-off because of a lack of water. Many farmers who grew certified seed last year did not even attempt seed crops this year because of the drought. It is a dispiriting sight for beekeepers to find hungry stock grazing on a crop their bees have just finished pollinating.

I have attended many workshops and seminars over the last 12 months, including:

- The National Animal Health Performance Standards Workshop, Melbourne.
- Four AHBIC Executive Meetings, Melbourne and Canberra.
- The Australian Queen Bee Breeding Group Meeting, Canberra.
- The Animal Health Australia Media Training Workshop, Canberra.
- An Industry Liaison Officer Training, Workshop, Tocal, NSW.
- National Management Group Training Workshop, Canberra.
- Environmental Management Systems Workshop, Launceston.
- Honeybee Industry Linkage Workshop (two days), Canberra.
- Biosecurity Awareness Workshop, Launceston.
- Consultative Committee on Emergency Animal Disease Meeting, Canberra.

Of over 40 workshops, meetings and seminars I attended this year, I feel the Honeybee Industry Linkage Workshop held in Canberra during April this year, was the most important event for the Pollination Industry. 75 delegates from all different sectors were in one place to discuss the importance of pollinating services to agriculture. I believe that this indicates the increased recognition of how important our pollinating services are to the whole agricultural sector.

What are the Most Important Issues and Where are We Heading?

There are two main threats to the Honeybee Industry: an incursion of the exotic Varroa mite; and a reduction in access to forests in order to maintain a diverse source of pollen and nectar for hive health.

The Honeybee Industry Linkage Workshop identified a number of problems within the pollinating industry, which reduce its ability to mitigate the risks. In particular, it was agreed that the current response plan to a possible Varroa mite incursion is inadequate and that the Honeybee Industry cannot, and should not, manage the risk alone. This is because the current resources available for research and development into the Honeybee Industry are inadequate.

Despite the growing recognition of the importance of our pollinating services, there remains a poor understanding on the role of honeybees in the pollination of crops. The Honeybee Industry, together with agricultural industry representatives, needs to educate growers on the benefits honeybee pollination can provide.

There is a need for more beekeeper professionalism in the provision of pollinating services. This is because some pollinators provide a poor quality service to growers, which reduces the reputation of the industry. It was suggested that the Pollination Industry should adopt *pollination industry standards and quality control measures.*

There also needs to be more education within the Honeybee Industry as a whole, particularly in the pollination side. Beekeepers need to understand the intricacies of pollination and be more consistent in their business operations, especially in pricing their services. Growers need to be able to recognise paid pollinating services that are managed well and the additional benefits a honeybee industry can provide over feral bee pollination.

There is an urgent need for beekeepers to unite under a *code of practice* for pollinating practices and a fee structure for all crop pollinations. This is already happening in Tasmania and could easily be adapted for mainland states.

The importance of honeybee pollination to the agricultural sector has been repeatedly reinforced. To survive in this economic climate, beekeepers should adapt according to market demand, diversify and ensure a better return in the future from pollinating services as well as honey production.

Example: Pollinating Services & Honey Production Case Study

Product/Service	Cost/Return
72 tonnes of honey produced @ $3.20 per kg	$230,400
Cost of production at $2.70 @ per kg	$199,400
Profit	$31,000
Pollination fees	$72,000
Total Profit	**$103,000**

In this example the total profit figure is split between 69.9% from pollinating services and 30.1% from honey production.

In order to generate an equivalent 69.9% profit solely from honey production, approximately 231.5 tonnes of honey would have to be produced. 69.9% of 231.5 tonnes is 161.8 tonnes. This means that to match the $72,000 received from pollination fees in the example, an additional 161.8 tonnes of honey would have to be produced.

Demand for pollinating services is rising and I am very optimistic for the future of the Pollination Industry. Let us hope that we have more rain during the winter months and we all have a profitable year.

Lindsay Bourke
June 2007

Disease Control - Australia Stands Alone
Lindsay Bourke

Varroa destructor – We Don't Need it!

Australia is the only country in the world that does not have the debilitating pest *Varroa destructor.* Light infections of Varroa are sometimes hard to detect and it is thought that Varroa is spread mainly on beekeepers' clothes. The mite jumps from bee to bee, similar to a flea.

Varroa originates from Japan and Korea but has spread around the world. The North Island of New Zealand has been infested since 2000 but in 2006 the disease jumped Cooks Strait to arrive in Nelson, making the South Island the latest casualty. Dr Mark Goodman admitted that by the time beekeepers detected Varroa in their sentinel hives it was too late, the mite was established in the general bee population.

The only good thing that has come out of the New Zealand infestation is that we have learnt how NOT to do it. Having vast numbers of 'commercial' sentinel hives is not the way to go. It was proven that ***'Early Detection'*** was far too late.

Australian beekeepers are faced with an urgent decision - to fully endorse the bait hive program to run alongside the sentinel hive program. If New Zealand had had bait hives they may have had a chance of stopping *Varroa destructor* before it got into the sentinel hives.

There are 37 sentinel hives established throughout Australia with Tasmania hosting the pilot sentinel hive program. The Apiary Liaison Committee believes that the bait hive program should supersede, or at least value-add, the sentinel hive program. This is for two main reasons. Firstly, by the time an exotic disease is detected in a sentinel hive there is a high chance that it has already spread wider afield (as was the case in New Zealand). Secondly, an invading bee colony is more likely to establish itself at a new site, that's why Bait Hives complete with a Pheromone Bait is vital for our defence.

If Varroa gets established in Australia or Tasmania (this is one time I will admit that Tasmania is set apart from mainland Australia) it will devastate our horticultural industry to say nothing of our beekeeping industry.

Common sense tells anyone who knows a little about honeybees and *Varroa destructor* habits, that a bait hive program **must be** started immediately. Benefits of a bait hive program have been proven elsewhere. Bait hives are usually placed at ports-of-entry where for invading bees the first port of call (pardon the pun) is an empty hive with pheromone bait. This hive acts as a big attraction for an invading swarm.

Vigilance from everyone in the near vicinity of a bait hive is needed so that early detection of bee activity is reported immediately to an apiary officer. The swarm can then be promptly frozen and sent to a laboratory for analysing. This happened recently at the Burnie Port in Tasmania.

Biological Control of the Wax Moth

The bacterium *Bacillus thuringiensis* (BT) has been used as a natural insecticide in agriculture for a number of years, especially in the USA. BT produces a protein which is toxic to the digestive system of the target insects.

Bacillus thuringiensis offers a highly effective protection against the wax moth. The Vita product B 401 (also known as 'Certan') is a concentrated solution of BT, which offers up to 100% efficacy.

I first brought this to the AHBIC Board in February 2006. It has taken a while for a new way of controlling the wax moth to be considered in Australia. Due to PDB, *Bacillus thuringiensis* is now getting fast-tracked to be registered in Australia for all Beekeepers to use. (Thanks to Mr Ed Plunken.)

Colony Collapse Disease

This is a disorder affecting bee colonies in the United States and has the potential to devastate the apiary industry. 'Colony Collapse Disorder' is causing bees to leave their hives in numbers which affect honey product and pollination. Exactly what the disease is remains unknown and is still being investigated, but it may be some kind of fungus.

A foreign microsporidium fungus known to affect Asian bees was identified as a probable cause of the significant mortality rate of bee colonies in the U.S. The entry of untreated honey to feed bees is a pathway by which such pathogenic parasites can infect bee colonies.

Training

Some of the training I undertook this year for my disease portfolio included:

- The National Animal Health Performance Standards Workshop, Melbourne.
- The Animal Health Australia Media Training Workshop, Canberra.
- Industry Liaison Officer Training, Workshop, Tocal, NSW.
- National Management Group Training Workshop, Canberra.
- Biosecurity Awareness Workshop, Launceston.
- Consultative Committee on Emergency Animal Disease Meeting, Canberra.

Lindsay Bourke
Chairman
Disease Committee
June 2007

Quarantine Matters
Lindsay Bourke

I have taken over the Quarantine Committee Chair from the late Graeme Mathews who had a passion about quarantine. I worked with Graeme, Paula Dewar and Bruce White for two days in 2006 during the National Animal Health Performance Standards and Threats to our Honeybee Industry Workshop. Graeme contributed enthusiastically throughout the workshop, particularly on Emergency Preparedness and Response.

Sentinel Hives

There are 37 sentinel hive locations throughout Australia of which 25 have been tested this year:

No. of Sentinel Hives Tested	State
9	Queensland
5	New South Wales
4	Tasmania
4	Western Australia
3	Victoria
0	South Australia

In addition to these, five sentinel log-hive sites for *Apis cerana* have been tested in the Northern Territory.

From 1 July 2008, the National Sentinel Hive Program will be managed by Animal Health Australia and this will run until 30 June 2011. It will be known as the Animal Health Australia National Sentinel Hive (AHA NSH) Program.

We are very grateful to those beekeepers who are looking after sentinel hives and regularly sending in tests. AHA recognises the work our beekeepers do looking after the sentinel hives and in their proposed budget they are allocating a few hundred dollars per hive for services rendered.

Varroa mites are listed as a *Category 2 Disease* under AHA's Cost Agreement, which means that the financial contribution is split 80% from the government and 20% from industry. The proposed 20% industry contribution is split equally between the Australian Honeybee Industry Council and the horticulture industries represented by Plant Health Australia.

Apis cerana

Seagoing vessels are considered to present a significant opportunity for the transportation to Australia of exotic bees (and their associated parasites) either in superstructures, containers, equipment, or in vessel holds. *Apis cerana, Apis dorsata, and Apis scutellate* have all been detected in recent years on ships destined for Australia or in overseas port areas. These incidents confirm the potential for incursions by exotic honeybee pests via ocean-going vessels that enter Australian ports.

Apis cerana – Here Now!

Apis cerana was discovered in Cairns on Friday, 4 May 2007. They were coming out of a small opening in an aluminium mast on a ketch. They were hard to get at, so the entrance was blocked and a small number of bees were collected. The hive was destroyed with petrol. The small sample of *Apis cerana* was sent to Dr Dennis Anderson and he had them by Wednesday, 9 May 2007.

On 8 May 2007 the National Co-ordinator of the National Sentinel Hive Program, Mr Ian East, sent Bayvarol strips and sticky mats to the local apiary inspector, Mr Jack Shields from the Queensland Department of Primary Industry (QDPI). These will be placed in the 23 registered beekeepers' hives located in the vicinity. Mr Shields and others from QDPI are searching the area for any swarms that may have dispersed from the boat's mast.

Black Bee Quarantine

Apis mellifera mellifera

In 2002 the Tarraleah Black Bee Reserve was declared by Tasmania's Chief Veterinary Officer Dr R M Andrewartha. The reserve is approximately 61,500 hectares, in size and at the time Dr Andrewartha said:

> *"No honey bees (Apis mellifera) other than those of the kind known as Black Bees (Apis mellifera mellifera) shall be moved into the protected area. A person failing to comply with a requirement of the Animal Health Act 1995 may be guilty of an offence and liable to prosecution."*

Forestry Tasmania harvested two coupes in the Black Bee Reserve in 2005/2006 with a further two coupes in 2006/2007. On average 150 ha will be harvested and regrown each year.

Bee Tree Protection

Forestry Tasmania has contacted the Tasmanian Beekeepers Association regarding the protection of suitable bee nesting trees as part of the selective harvesting process. Mr Leigh Slater, who is registered for Black Bees in the area, is going to assist in the identification of Black Bee nesting trees.

Bumble Bees

Bumble Bees *(Bombus terrestris)* are still quarantined in Tasmania despite other states' green house tomato growers wanting to establish them on the mainland.

Lindsay Bourke
Chairman
Quarantine Committee
June 2007

Biological Control of Wax Moth

Bruce White has come up with good information about Bacillis Thuringiensis, and he has discovered that Diapel (the only product in Tasmania) is not specific for Wax Moth.

1. Bacillus Thuringiensis is a bacterial organism which causes diseases in caterpillars. Once eaten by the caterpillars, it causes paralysis of the stomach and insects stop feeding and starve to death within two (2) days.

2. The natural microbial bacteria Bacillus Thuringiensis offers highly effective protection against wax moth. The Vita product B 401 (also known as Certan) is a concentrated solution of Bacillus Thuringiensis, which offers up to 100% efficacy.

3. Over 90 species of naturally occurring, insect-specific (entomopathogenic) bacteria have been isolated from insects, plants, and the soil, but only a few have been studied intensively. Much attention has been given to Bacillus Thuringiensis, a species that has been developed as a microbial insecticide.

    - Primary hosts: caterpillars; some beetle and fly larvae
    - Key characters: larvae stop eating, become limp and shrunken, die and decompose.
    - Crops: many
    - Commercially available: yes – several species and varieties

    Bacillus Thuringiensis occurs naturally in the soil and on plants. Different varieties of this bacterium produce a crystal protein that is toxic to specific groups of insects. Bacillus Thuringiensis has been available in North America as a commercial microbial insecticide since the 1960s and is sold under various trade names. These products have an excellent safety record and can be used on crops until close to the day of harvest. Bacillus Thuringiensis can be applied using conventional spray equipment but, because the bacteria must be eaten to be effective, good spray coverage is essential.

4. Larvae affected by Bacillus Thuringiensis become inactive, stop feeding, and may regurgitate or have watery excrement. The head capsule may appear to be overly large for the body size. The larva becomes flaccid and dies, usually within days or a week. The body contents turn brownish-black as they decompose. Other bacteria may turn the host body red or yellow.

5. There are traps available for stored product pests such as Indian meal and Mediterranean flour moths. They use synthetic sex attractants and live captured females to trap and eliminate the males. So far a

trap effective against the wax moth has not been developed as males apparently do not rely solely on chemical pheromones to find females; they also use ultrasound. A component of the female sex pheromone Nonanal is also found in beeswax and may help explain how wax moths find beeswax for oviposition.

6. A natural microbial bacteria Bacillus Thuringiensis (Certan ®) has been discovered that is specific for wax moth. It was once available for sale by bee supply companies but is no longer manufactured. Other Bacillus Thuringiensis (Dipel, Thuricide) widely used to control caterpillars are not fully effective against wax moth.

Lindsay Bourke
Chairman
Disease Committee

ADDITIONAL INFORMATION HELD BY THE COMMITTEE

ATTACHMENT TO SUBMISSION NO. 70

ATTACHMENT:

Honey Bees & Pollination