

# Inquiry into the Future Development of the Australian Honey Bee Industry

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(for details about author see Appendix I)

Current and future prospects for beekeeping and its role in agriculture (TOR 1 and 2)

The RIRDC 2007 - 2012 R&D Plan describes the honeybee industry as “a supply-limited producer of a suite of quality products with issues in profitability, resources access and pest and disease management”. This perception, widely accepted for the past 100 years as a fair description of the significance of the honeybee industry, is no longer adequate.

The true economic significance of the beekeeping industry is not the \$65 million worth of honey and related bee products. Instead, its significance stems from the essential role that the introduced European honeybee, *Apis mellifera*, plays in pollinating introduced plants that underpin Australia’s agriculture. A significant proportion of this value has been provided for free since 1820 in the form of incidental and unpaid pollination provided for crops and pastures - mainly by the ubiquitous feral honeybee population.

The CIE estimate of \$1.7billion losses in production (attributed to just 35 identified horticultural crops) - if honeybee pollination services were withdrawn - is probably an underestimate. When one allows for all crops dependent on honeybees for pollination AND if we include improved pastures, especially white clovers and lucerne. Withdraw paid AND incidental pollination, say through the arrival of Varroa mite, the losses might be closer to \$4billion. The much higher figure becomes even more realistic if we add the opportunity cost of our failure to capture the economic benefits to be gained by more effective pollination of horticultural crops and field crops such as canola and cotton.

In the future, regardless of the likely arrival of *Varroa destructor*, and certainly with the presence of *V. destructor*, the economic significance of honeybees is in providing pollination services for those crops dependent, or which would benefit, from honeybee pollination. This re-evaluation of the honeybee industry will require a sea change in thinking by:

- Commercial beekeepers
- Primary producers dependent on pollination services
- Research providers related to honeybees and pollination
- Skills providers related to beekeepers AND users of pollination services
- Funding agencies and investment brokers (eg for almonds), and
- Commodity growers who depend or could benefit from pollination services.

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No longer is it reasonable for commercial beekeepers to be expected to bear the burden of ensuring the delivery of the wider pollination benefits to agriculture. They should not be responsible for arguing the case and providing the levy funds from honey production to address the R&D requirements for pollination services. They should not be held solely responsible for challenging public policy decisions such as access to nectar and pollen resources on public lands; and certainly they should not bear the financial responsibility for doing the related research on impact of migratory beekeeping (or feral bees) on flora and fauna on public lands. The appropriate level and quality of quarantine services and surveillance should not be judged on the direct value of the honey industry, but on the strategic importance of the pollination services that commercial beekeepers will be increasingly required to provide – especially if feral bee populations collapse - if and when Varroa takes a foothold in Australia. And, finally, the training and skills maintenance for beekeepers should give appropriate emphasis to pollination services; and the level of financial support for training and skills maintenance should reflect the much higher value that efficient and effective pollination provides to horticultural and pastoral industries. It should also be recognised that primary producers who will increasingly depend on pollination services will benefit from a solid understanding of the role of pollination in sustainable production.

There will be a bright and secure future for commercial beekeeping in Australia once Governments, research and training providers, funding agencies and the pollination-dependent industries accept the strategic importance of pollination services. If that happens then commercial beekeeping will look very different to today's community of honey producers.

***Recommendation 1 A new comprehensive economic study be conducted on the role and value of incidental and paid pollination for all horticultural crops and pastures that depend on insect pollination, and in particular, pollination provided by the introduced European Honeybee, Apis mellifera.***

***Recommendation 2 The Enquiry should acknowledge that the economic significance to Australian agriculture of the introduced European honeybee, Apis mellifera, is not honey production, per se, but in providing pollination services for those crops dependent on, or which would benefit from, honeybee pollination. Public policies and resource allocations for research, training and skills development, in terms of amount and source, should reflect the strategic significance of those essential pollination services that can only be provided by a viable commercial beekeeping industry.***

Biosecurity issues (TOR 3).

To the layperson, biosecurity might be expected to embrace questions about risk of exotic pests and diseases entering Australia; and how we can manage these risks so that our island nation will continue to be free of unwanted pests and diseases that threaten the competitiveness and sustainability of industries such as beekeeping. Unfortunately the term 'biosecurity' has been corrupted by bureaucrats and scientists to now cover many issues indirectly related or even unrelated to quarantine matters.

For purposes of this submission, the term 'biosecurity' is considered purely in the context of quarantine – the continued exclusion of undesirable pests and diseases. What are the serious threats to Australian apiculture – and therefore to the wider pollination industries – from the future entry of exotic pests and diseases of *Apis mellifera*? Included in the acknowledged list of threats for beekeeping would be undesirable genetic material, ie 'Africanised genes'. How will these health and genetic threats be manifested? Is Australia well prepared to manage these threats? And where it is likely that a major pest (eg *Varroa destructor*) will gain entry what is our capacity to operate in an ecological landscape that includes this pest?

The major pests and diseases threats would include the mites, *Varroa destructor*, *Tropilaelaps clareae* (Asian mite) and *Acarapis woodi* (acarine disease), and the microsporidian fungus, *Nosema ceranae* which has been implicated by some researchers in Spain and the USA with Colony Collapse Disorder (CCD). Some authorities regard *Tropilaelaps* as a more serious pest than *Varroa*. There could also be a number of novel bacterial, viral and fungal diseases of honeybee (or related bee species), yet to be characterised, that could harm managed hives in Australia if they were to gain entry.

The most likely entry of mites and *Nosema* will be on *Apis mellifera* – either arriving as swarms on shipping or through smuggled queens; and to a lesser extent on *Apis cerana* - such as the recent incursion at the port of Cairns. It would be very unlikely that live bees imported through official channels and via the Eastern Creek Quarantine Facility would be the source of new exotic pests or diseases. Another source of diseases would be imported honey, pollen and royal jelly, especially if any of these materials were contaminated and destined for queen rearing or to support package bee operations without appropriate sterilisation.

The major quarantine requirements of the beekeeping industry involve the low-volume and sporadic importation of genetic stock (either as queens or semen) for purposes of stock improvement programmes. It is unlikely that there will ever be a demand for package bees into Australia. However, even if unlikely, that situation could change if demands for pollination services continue to escalate and the number of managed hives continues to decline as has happened in the USA.

The Enquiry should seek answers to a number of quarantine-related issues. These could include the following:

- Does the Commonwealth have in place a clear pathway to replace the Eastern Creek Quarantine Facility before 2015? And is 2010 a significant dateline for a reduction of any quarantine services at Eastern Creek that could impact adversely on the beekeeping industry?
- Does the Commonwealth accept that notions of privatisation of honeybee imports is impractical until such time as commercial beekeeping is transformed into a pollination industry and user-pay principles are applied to those industries that will benefit from honeybee pollination services?
- Are all imported honeybee products, especially pollen and royal jelly, certified to be free of all known bee diseases and contaminating chemicals? And are these products always treated (irradiation?) to ensure that they are pathogen-free?

- Is there prompt feedback to Australian authorities from countries that import package bees from Australia if and when these packages are considered by the importing country to carry pathogens? For example, it has been suggested that some package bees exported from Australia to the USA contained *Nosema ceranae*, along with a viral pathogen. [These pathogens, along with a list of other putative causes - mainly stress related - have been implicated in Colony Collapse Disorder in the USA.] *N. ceranae* is widespread in the USA, but is considered to be absent in Australia. Was Australian authorities notified in a timely fashion of these claims? Was there trace-back to the source of the package bees and appropriate tests conducted to determine if *Nosema ceranae* or other pathogens were present at source?
- What lessons have been learned from the recent detection of five colonies of *Apis cerana* at or near the port of Cairns?
- What was the state of readiness of the pheromone trapping strategy for *A. cerana*? What is the scientific evidence that this procedure is effective? Is it providing a false sense of security that further colonies of *A. cerana* will be detected?
- Were the community and schools (eg via Double Helix) brought into any surveillance exercise, say, by being given specimens of *A. cerana* workers?
- Is the response to detection of swarms of *Apis mellifera* around Australian ports adequate? There have been a number of recent detections of *A. mellifera* in which port authorities have been told to contact a commercial beekeeper (through the yellow pages) to deal with swarms (as indeed also happened with *A. cerana* in Cairns). Given that *Varroa destructor* is more likely to enter Australia on *A. mellifera* than on *A. cerana* this is not a satisfactory first response. **It is probable that a thorough and objective examination will identify a number of serious shortfalls, within and between agencies at State and Federal levels, in our capacity to detect and deal expeditiously and effectively with incursions of *A. mellifera* and *A. cerana*, the two species that are likely to serve as vectors for devastating pests and diseases of honeybees.**
- Is it correct to conclude that beekeeping-related quarantine, generally speaking, drops between the bureaucratic cracks. It is not seen as a prime concern for either Animal Health Australia or Plant Health Australia. AQIS has regarded the recent (ie 2007) incursions of *A. cerana* and *A. mellifera* as post-entry issues and not within their responsibility (which is contrary to AQIS' public advice on the NAQS calendar (see April 2007).

**Recommendation 3** *Given the strategic importance of a viable honeybee industry to meet Australia's pollination needs, an independent assessment of Australia's preparedness to deal with incursions of *Apis cerana* and *Apis mellifera* should be instigated.* [The recent incursion of *A. cerana* and possible incursions of *A. mellifera* should be viewed as opportunities to assess the adequacy of responses by State and Federal Agencies. Were there avoidable delays in determining the origin of the *A. cerana* incursion in Cairns that were attributable to operational issues in Queensland's Department of Primary Industries and CSIRO. Do some honeybee products (eg pollen and royal jelly) enter Australia, destined for use in queen production and package bee production, without appropriate treatment to ensure that they are free of pathogens? Is there feedback and appropriate action taken if and when exported package bees are considered by importing countries to contain diseases previously unrecorded in Australia (eg package bees imported to the USA claimed to harbour *Nosema ceranae* and viral pathogens?)]

The impact of land management and bushfires (TOR 5). The central issue here is declining floral sources for nectar and pollen. This is due to two main causes – land clearing and withdrawal of traditional apiary sites as more public lands are converted to national parks. For example in Queensland “*access to existing beekeeping sites in lands transferred to protected area under the provisions of the South East Queensland Forests Agreement will be maintained until 2024. Amendments were made to the Nature Conservation Act 1992 to support this policy position, with the relevant section being 184 of the Act, which is supported further by regulation (sections 29, 30 & 31).*” In other States, many beekeepers are concerned about future policy changes which will further reduce access for commercial beekeepers on public lands.

In general terms, *Apis mellifera*, is viewed by some State Governments as an exotic animal which should be excluded from public lands and national parks. This attitude is not based on sound evidence of quantifiable impact of foraging honeybees from migratory beekeeping on native biota. And the policy fails to adequately recognise that Australian agriculture is based almost entirely on introduced plants and animals. Food production both for humans and livestock industries relies heavily on the introduced honeybee to pollinate many crops and improved pasture plant. There needs to be a balance between environmental and economic considerations. If *Varroa* establishes in Australia, it seems highly likely that resident feral colonies on public lands will be eliminated which will free up pollen and nectar resources for native fauna that rely on these resources.

Under these circumstances, and even if *Varroa* fails to eliminate feral bees, it is important that the ecological impact of migratory beekeeping on public lands is properly assessed by appropriate research and that these impacts be set against the economic ramifications for industry-wide pollination services when Governments set policies relating to access onto public lands.

#### **Recommendation 4**

***The Enquiry should recognise the urgent need to develop national and state policies relating to access by commercial beekeepers to public lands which are soundly based on empirical evidence of impact of migratory beekeeping on native biota; and where the policies balance the economic and environmental impacts of migratory beekeeping practices. Research should be supported to assist in these outcomes.***

#### **The research and development needs of the industry (TOR 6)**

The R&D needs of the beekeeping industry are very well reflected in RIRDC’s Honeybee R&D Plan (2007 – 2012). It is listed under six headings:

- Pest and disease protection (45%)
- Productivity and profitability enhancement to lift beekeeper income (15%)
- Resource access security and knowledge (10%)
- Pollination research (10%)
- Income diversification including new product development ((10%)

- Extension, communication and capacity building (10%).

The obvious problem with the 5-year R&D plan is not the priority settings. Instead, it is the meagre quantum of funds available; and who is available and able to conduct the necessary research. For example, resource access and pollination research each have been allocated around \$40,000, i.e., 10% of a total budget of some \$400,000. Given that the value of honeybee pollination to horticulture and pastures is somewhere between \$3 and \$4 billion dollars, it is clearly unacceptable to allow this situation to continue.

Pest and disease prevention is the largest ticket item in the 5 - year R&D Plan (45%). The recent Honeybee Industry Linkages workshop concluded that Australia needs to position itself to operate in an ecological and industry landscape where *Varroa destructor* is widespread. This challenge alone will require at least an order of magnitude more funding in order for researchers and beekeepers to devise ways in which commercial beekeeping remains sustainable with Varroa.

It is no longer appropriate to expect Australia's small commercial beekeeping industry alone to carry the burden of arguing the case for a sustainable pollination industry, or to fund, through a levy on honey production, those research, development and training activities where the benefits and threats are largely directed to other industries.

And, as concluded both by the recent Parliamentary Enquiry into Rural Skills, Training and Research, as well as the Honeybee Linkages Workshop, effective collaboration will be needed between research and training providers, funding agencies, beekeepers and commodity growers that depend or will benefit from efficient and effective pollination services. Hopefully, during the course of the current enquiry, it will become known if funding has been provided by DAFF's Industry Partnership Program to facilitate the preparation of a detailed proposal for a National Pollination Network as suggested by the Linkages Workshop.

### **Recommendation 5**

***The Enquiry should continue to encourage the establishment of a national network of research and training organisations whose objectives will cover the R&D needs, training and skills requirements and be a source of information for beekeepers, primary producers that require pollination services, policy makers, schools and the community. The Commonwealth should provide core funding for the network on condition that additional cash and in-kind support is provided by relevant funding agencies, research providers and industries that stand to benefit from activities conducted by the proposed network.***

## **Appendix I**

Dr Max Whitten's pertinent qualifications and experience are:

BA (ANU), BSc Hons (Sydney University), PhD (University of Tasmania)

Fellow, Australia Academy of Science; Australian Academy of Technical Sciences and Engineering

Professor of Genetics, University of Melbourne (1976 – 81)

Chief, CSIRO Division of Entomology (1981 – 1995)

Team Leader, FAO Vegetable IPM in Asia (1996 – 2000)

Consultant to ACIAR (2001 till present)

Chairman of the Honeybee R&D Council (1985 – 1992)

Visitor for CRC for Australian Weeds Management (2000 till present)

Visitor for CRC for Sustainable Production Forestry (2000 till present)

Chair, Advisory Board, Special Research Centre for Environmental Stress and Adaptation (CESAR).