



**Australian Bee Research Institute
ABRI
University of New England
Scoping Document 18 July 2014**

Current Situation

- Bees pollinate human food crops worth \$5B annually in Australia.
- Australia is the only country without Varroa and CCD, and these and other endemic pests and diseases threaten the amount and value of Australian food production.
- Incursion of the Asian honeybee may also have a negative impact on honeybees and native bees and exacerbate the introduction of Varroa and CCD.
- The federal government has consistently procrastinated about the use of bumblebees in the Australian protected horticulture industry to the competitive disadvantage of the Australian industry relative to its overseas competitors.
- Recommendations from the 2008 House of Representatives report "*More than Honey*" and the 2014 Senate report *Beekeeping and pollination service industries in Australia* have not been implemented. These recommendations include the establishment of a dedicated bee R&D and E facility.
- Australia is the only bee-producing country that does not have a dedicated bee R&D and E facility - the USA has >20, Europe has >10, South America has several, New Zealand has 3, South Africa has one.
- The Australian commercial bee industry is highly fractured with poor industry representation. People within the industry claims that a central point for bee R&D and E would assist in bringing cohesion to the industry.

Resolution

- The UNE ABRI proposal is \$44M over 10 years (capital works, start-up costs, and annual costs)
 1. which is less than the "*More than Honey*" report recommended; and
 2. cheaper, quicker to establish, less administration, and potentially greater longevity than a CRC.
- UNE has skills and experience in running large, rural industry-focussed R&D and E institutes and centres (Programs 1, 2 and 4).
- UNE also has an international reputation for its distance education and vocational programs (Program 3).
- UNE has a rural property, 'Newholme', where the Institute could be domiciled, thus minimizing any adverse interactions between bees and people.
- By having the ABRI based at UNE we:
 1. tap into the skills base of staff, and have the potential to grow those skill and staff bases;
 2. tap into potential post-graduate student interest in research projects;
 3. position the Institute within the 'heart' of honeybee beekeeper country;
 4. position the Institute in close proximity to Australia's leading protected horticulture facility;
 5. can easily deliver education, training, and extension packages.
 6. build upon and strengthen various government initiatives.
- The establishment of a dedicated bee R&D and E facility is also consistent with government initiatives such as Australia's Farming Future; the Education Investment Fund within the Future Fund; and the Prime Minister's Science, Engineering and Innovation Council's Inquiry into Food Security in Australia; and the Strategic Priorities for Horticulture Innovation Australia. These initiatives are designed to secure Australia's food security within a carbon farming framework.
- The establishment of a dedicated bee R&D and E facility at UNE would assist in bringing cohesion to the highly-fractured Australian bee industry, such as establishing linkages with Australian Honey Bee Industry Council, Federal Council of Australian Apiarists Associations, and Centre for Integrative Bee Research in Western Australia.

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Introduction

Bees are a vital component in Australian agriculture. While the production of honey and associated products represents only \$80 million gross value annually, the value of honey bees to overall agricultural production through pollination is estimated at between \$4 billion and \$6 billion annually.

In addition, native bees are involved in the pollination of many subtropical and tropical food crops. For example, the annual value of mangoes in the Northern Territory alone is \$40 million and this crop is pollinated exclusively by native bees.

The Australian horticultural industry, including protected horticulture, is rapidly expanding and is the country's third largest agricultural industry. In 2011-2012 the gross value of production of horticulture was \$8.7 billion. In addition, just in one glasshouse complex up to 12 million kg of truss tomatoes are produced annually with an economic value of \$45 million and employment of 350 people. Tomatoes are just one of many glasshouse crops that benefit by bee pollination, and if bumble bees were allowed to pollinate glasshouse tomatoes in Australia it is estimated that annual fruit production could increase by 10%.

Therefore any negative impacts on native or exotic bees, either through honey production or as pollinators of Australian crops and pastures, has huge implications for Australia's food security.

The principal honey producing areas of Australia are temperate lands between south-eastern Queensland and central Victoria, with New South Wales producing 41% of the total honey crop. Commercial honey production is the exclusive domain of honey bees.

Despite the importance of bees to Australian food production, the bee and pollination industry is facing unprecedented threats from exotic disease and pests. For example, Australia is now the *only* major honey-producing country in the world that is free of varroa mite and does not suffer from the destructive Colony Collapse Disorder. With the incursion of the Asian honeybee (*Apis cerana*) into northern Queensland in 2007 and now its potential colonization and spread into agricultural and native areas, this clean industry is now under serious threat.

Australia is also the only major honey bee producing nation on Earth that does not have a dedicated Research Institute or Centre devoted to researching these threats and developing control measures, and assisting to secure a sustainable future for the industry. Native bees, with the notable exception of the Blue banded bee, are poorly researched in their ability to pollinate Australian food crops. Bumble bees are prohibited entry to Australia because of misguided Commonwealth interference, even though they have been present in Tasmania since 1992 without causing any documented damage to native bee populations. In summary, bees, both native and exotic species, are fundamental to Australia's food

production and economic viability. Despite this importance, their role in Australian agriculture is poorly understood and they face enormous threats which in turn threaten Australia's food security.

This proposal to establish an Australian Bee Research Institute is an initial step in changing that situation, and is supported by the 2008 House of Representatives *More than Honey* report and the Senate's 2014 report *Beekeeping and pollination service industries in Australia*.

The establishment of a dedicated bee R&D and E facility is also consistent with government initiatives such as Australia's Farming Future; the Education Investment Fund within the Future Fund; and the Prime Minister's Science, Engineering and Innovation Council's Inquiry into Food Security in Australia.

Location

It is estimated that a large proportion (>70%) of the Australian honey production is from southeastern Queensland to central Victoria, with the bulk of that production occurring in New South Wales. This area also supports the greatest concentration of commercial beekeepers. Logically it would be appropriate to establish the ABRI in close proximity to this hub of beekeeping activity.

In addition the largest commercial glasshouse tomato facility in the southern hemisphere is based at Guyra in New South Wales. This facility is already the biggest employer in Guyra, and is rapidly expanding its growing facility. The need for pollination research at this facility is paramount for continued development and productivity.

The University of New England (UNE), based at Armidale on the Northern Tablelands of NSW, is well suited for the establishment of the ABRI. UNE is a well-established node of animal-based research and development with several Co-operative Research Centres for domestic stock all domiciled on the campus. The university also has the well-deserved international reputation as the best University in Australia in delivering distance-based education for students and through the delivery of vocation-based short courses. In this context the establishment of the ABRI on the campus of UNE would allow for research, educational, and extension opportunities.

The climate of the Northern Tablelands minimises the establishment of Small Hive Beetle, and the prevalence other bee diseases such as AFB are limited.

Armidale is well serviced by road, rail, and air facilities making it an ideal position for people to attend courses and seminars at UNE, and for the movement of bees and samples to and from producers.

The establishment of a dedicated bee R&D and E facility at UNE would assist in bringing cohesion to the highly-fractured honeybee industry, such as establishing linkages with Australian Honey Bee Industry Council based in Sydney, Federal Council of Australian Apiarists Associations based in each state, and Centre for Integrative Bee Research in Western Australia.

Structure

- Governing Board consisting of representatives from major components of industry, government, and research agencies.

- CEO and 4 Program Managers answerable to the Board for 5 programs.

Program 1. Genetics and selection (Program Manager plus 3 support staff)

- Pollination efficiency
- Honey foraging efficiency
- Hive hygiene and disease resistance
- Fertility
- Development of Animal Breeding Values for queens and drones
- Semen evaluation and storage

Program 2. Pests and diseases (Program Manager plus 3 support staff)

- Identification service
- Control methods – viruses, bacterial disease, SHB
- Invasive issues – *A. cerana*, varroa, AFB/EFB, viruses
- Role of pesticides in bee health

Program 3. Education and extension (Program Manager plus 3 support staff)

- Undergraduate programs and postgraduate research students
- Short courses for growers
- Written and DVD materials
- Accreditation for chemical handling, etc
- Talks, seminars, field days

Program 4. Product development (Program Manager plus 3 support staff)

- Development of pharmaceutical and medical uses for honey
- Probiotic assessment and assay
- Vaccine development for bee diseases (with program 2)

Program 5. Governance (CEO plus 2 administration staff)

- Administration
- Industry support and liaison
- Development of linkages with:
 - Government and other industry support groups
 - Native bee study and research groups
 - Bumble bee study and research groups

Budget

1. Set-up costs

Infrastructure, equipment, vehicles, staff relocations - \$4 million. Put into context an expenditure of \$4 million relative to the estimated full value of bees (\$5 billion) this initial expenditure represents a benefit:cost ratio of 800:1.

2. Initial staff costs

	CEO	Program managers (4)	Support staff (12)	Admin staff (2)	Total
Salary	\$120644	\$401476	\$742920	\$120212	\$1385252
32.55% on-costs	\$39270	\$130680	\$241820	\$39129	\$450899
Operating funds	\$50000	\$450000	\$1400000	\$30000	\$1930000
Total	\$209914	\$982156	\$2384740	\$189341	\$3766151

It is anticipated that over time development of commercial products from the ABRI could off-set some expenditure.

Timetable

Varroa mite is now established in all major honey-producing countries in the world, except for Australia. For example, the mite is established in New Zealand and countries to the north and north-west of Australia. Simply put, Australia is under imminent threat from the worst pest of the honey bee in the world becoming established in the country – many producers believe it is question of when, not if, varroa will be found in Australia. Therefore the timing for the establishment of the ABRI is urgent and immediate. In the first instance a funding life of 10 years is recommended.

A major impediment to the growth of the Australian glasshouse horticultural industry is the refusal by the Commonwealth government to allow the importation of bumble bees to mainland Australia. There is an urgent and on-going need to address the reputed negative impacts of bumble bees on native flora and fauna, and demonstrate their economic value to the expanding glasshouse horticultural industry.

Native bees are abundant and speciose in Australia, yet little is known about the impacts of global climate change, changing land practices and urbanization on their populations. This lack of knowledge has implications for the viability of bee populations, and their ability to continue to pollinate tropical

field crops. The need to know more about native bees has been recognized for decades yet little has been achieved.

Summary

The Australian bee industry has evolved to be much more than a honey industry focused on the introduced honey bee. The use of bees to pollinate human food crops with an annual value of \$5 billion makes it imperative that the beekeeping industry can select queen bees for a variety of genetic characteristics to cater for this increasingly important endeavour (Program 1), and select healthy bees in the face of endemic and emerging pests and diseases and the impact of pesticides (Program 2).

The Australian commercial beekeeping industry is characterised by small businesses, usually sole traders. The skills base, and ageing of the beekeepers demographic, makes it imperative that the ABRI undertake succession planning and training of the next generation of Australian beekeepers (Program 3).

The options available to beekeepers to treat pests and diseases is limited, so an objective of the ABRI is to develop vaccines against some of the most widespread and virulent diseases, while concurrently developing increased pharmaceutical markets for honey (Program 4).

The Australian bee industry represents the ultimate in sustainable carbon farming – insects reliant on sustainable floral resources which consist primarily of carbon; independent of pesticides; requiring minimal husbandry inputs. Despite these efficiencies the industry is threatened by unprecedented challenges which ultimately threaten Australia's food security, and all without the scientific benefits that a dedicated bee R&D and E facility can generate.

The establishment of a dedicated bee R&D and E facility is also consistent with government initiatives such as Australia's Farming Future; the Education Investment Fund within the Future Fund; the Prime Minister's Science, Engineering and Innovation Council's Inquiry into Food Security in Australia; and two parliamentary enquiries since 2008. Therefore it is an urgent imperative that such a facility is established to assist in securing Australia's food supply into the future.