

Inquiry into Rural Skills Training and Research

Personal Submission Relating to Australia's Beekeeping Industry (3rd May 2005)

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(for details about author see Appendix I)

1. Pertinent Background on Australian Beekeeping

ABARE was commissioned by RIRDC in 2003 to conduct a survey of Australian beekeeping; and its findings are summarized in Appendix III. By any direct measure, the industry is very small compared to the major primary industries; e.g., value of production of honey and other bee products is c.\$60m pa, and the individuals employed directly in beekeeping is c. 3000. Were commercial beekeepers to walk away from the industry, there would be little difficulty in importing the primary honeybee products (honey and wax). Likewise, the loss of export income from honeybee products (bees wax, queen bees and package bees) would be insignificant. So what's the issue?

The true value of honeybees and commercial beekeepers lies in the value added to the 60% of crops that require insect pollination. This impact is mediated in three ways: paid pollination services, free pollination services provided incidentally by honeybees from commercial and amateur hives; and pollination provided by feral bee colonies. **If these three pollination impacts were suddenly withdrawn, the immediate impact would be a loss to agriculture of some \$2 billion annually, and a loss of 11,000 jobs.** These conclusions were reached in a recent study, commissioned by RIRDC, and conducted by the Centre for International Economics (See Appendix II). These authors develop various realistic scenarios to assess the economic and social impact if pollination 'services' are withdrawn over an extended period of time, rather than suddenly. But, again, the impacts are very severe (see Appendix II). The CIE authors conclude **"While these costs would adjust downwards over time, such a loss would see a major restructuring of agriculture in Australia, making the humble honeybee one of the unsung heroes of Australian agriculture."** One might equally include beekeepers themselves in the lists of 'unsung' and poorly paid heroes, as the average rate of return was estimated to be minus 5 per cent.

2. The challenge facing Australian Agriculture

Australian beekeeping is in crisis for a number of reasons. Like other primary industry sectors, commercial beekeepers are an aging population (average age 54 with 25 years experience (Appendix III)) and recruitment of skilled young people into the industry is inadequate. A life of hard work and paltry income are not strong incentives to learn and practice the profession. The prospect of cheap imported honey is an added disincentive. The increasing risk of pests (such as the bee mite *Varroa destructor*) and a suite of diseases entering Australia, will increase production costs and will threaten existing overseas markets that receive Australian honey, queen bees and package bees.

As mentioned earlier, the direct economic consequences of a vanishing commercial beekeeping industry for Australia is small. The problem, the challenge and the opportunity revolve around pollination of several hundred commercial crops by honeybees. It might therefore be argued that the future of Australian beekeeping lies in professional pollination services. And besides there is the incidental pollination provided by feral bee colonies.

The beekeeping industry is better placed than me to comment on the viability of a beekeeping industry solely devoted to commercial pollination services. However, I would be doubtful that such a situation would be viable, in the longer term, without the supporting infrastructure that the more broadly based commercial beekeeping enterprises would supply.

It would also be a courageous decision to rely on incidental pollination from feral bees. The honeybee is an exotic insect and its presence in National Parks and other public lands is seen as inappropriate by various environmental movements – despite substantial scientific evidence that the negative impacts are minor; and despite the fact that the beekeeping industry, historically, has been a major and successful campaigner in preserving much of Australia's natural wilderness from development. There is also the prospect of exotic pests and diseases entering Australia and decimating the feral bee population, thereby reducing its capacity to provide incidental pollination. Without a viable commercial beekeeping industry being around to pressure Governments (both Federal and State) into maintaining strict quarantine, the risk of honeybee pests and diseases entering Australia would probably increase.

Research has played an important role over the past five decades in supporting the beekeeping industry and assisting it remaining competitive. Significant contributions have come in the areas of disease diagnosis and management, genetic improvement of commercial strains of honeybee, efficient

pollination practices, and general hive management. Studies on the impact of feral bees in natural ecosystems have also been important. Beekeepers themselves have accumulated enormous knowledge and expertise which has been passed down the generations, especially in the area of migratory beekeeping – a practice strongly developed in Australia. The research has been mainly funded from the public purse in CSIRO, the State Departments of Agriculture and the university sector; but the industry has paid its way via the R&D rural commodity levy scheme and administered first through the Honeybee R&D Council and, more recently, under the umbrella of RIRDC. With recent developments in world trade arrangements, research and training will become increasingly important to cope with the higher risk of pests and diseases entering Australia; and to assist beekeepers improve profitability in the face of increasing importation of honeybee products.

In summary, there is a serious threat to the 60% of crops grown in Australia that depend on honeybee pollination. This arises from the continuing decline in commercial beekeeping and the increased risk of pests and diseases entering Australia. The major impact will both be economic and social. Research and training will comprise important elements in retaining a viable beekeeping and pollination industry in Australia

3. The makings of a solution

Already, the Commonwealth Government has taken some small but valuable steps to address the problem by supporting various TAFE programs to train young people wishing to become commercial beekeepers. However, these efforts will be more fruitful if two other issues are addressed.

First, commercial beekeeping must become more profitable. In particular, a mechanism needs to be found to enable more commercial beekeepers to capture a fair share of the substantial benefits from the provision of effective pollination of the many crops that depend on insect pollination.

Second, research and training have important roles to play. This can, in part, be achieved by recognizing and supporting an effective honeybee stock improvement program. Quality genetic stock must underpin a successful commercial beekeeping industry. This, in turn, will require continuous importation of suitable overseas genetic material and the integration of this material with existing commercial strains of honeybee in Australia. In particular, the selection of strains resistant or tolerant to pests such as *V. destructor* and diseases (bacterial, viral and fungal) will benefit beekeepers by allowing them to maintain vigorous colonies.

Provision of quality breeding stock requires three conditions to be satisfied.

- **an effective linkage between the existing Wallgrove Honeybee Quarantine Facility at Eastern Creek and a research institution (such as the nearby University of Western Sydney) to import suitable breeding stock without risk of disease introduction;**
- **a national stock improvement program managed by an institution such as UWS in partnership with the industry; and**
- **an industry capability for artificial insemination of breeding queen bees and the supply of inseminated quality queen bees to commercial beekeepers**

I would urge the Committee to recommend leadership and financial support from the Commonwealth Government to allow the above three conditions to be realized. Reliance on the market to achieve these outcomes – that offer substantial public good, economically and socially - will surely fail.

Appendix I

Dr Max Whitten's pertinent qualifications and experience are:

BA (ANU), BSc (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)

I will be traveling overseas from 4 – 24 May but on my return I would be happy to contribute to an industry submission if the deadline for submissions is extended until sometime in June 2005.

Appendix II

Valuing honeybee pollination

A report for the Rural Industries Research and Development Corporation

by Jenny Gordon and Lee Davis

June 2003

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Foreword

The honeybee industry produces a diverse range of valuable commodities including honey, beeswax, propolis and royal jelly, with a contribution to GDP estimated to be around \$60 million. This contribution is small, however, compared to the importance to Australian agriculture of the 'free' pollination services provided by the industry. Around 65 per cent of Australian crops are estimated to be dependent to some extent on honeybees for pollination.

This report was commissioned to update estimates made by Gill in 1989, which put the value of the honeybee pollination services to Australian agriculture as between \$0.6 and \$1.2 billion. This value is estimated as the cost to Australia of a sudden and complete loss of honeybee pollination services. Expanding the number of crops included in the impact estimates to 35 and allowing for adjustments in exports and imports the loss to Australian producers and consumers of the affected crops is estimated to be \$1.7 billion in 1999-2000. The decline in the value of agricultural production would be \$1.6 billion putting 9 500 jobs at risk. And the flow-on impacts of this magnitude of shock to the Australian economy are also potentially high with an additional \$2 billion loss in surplus and 11 000 jobs.

The study points to the need to better understand the potential for the development of commercial pollination services, which is an alternative approach for 'valuing' honeybee pollination.

Constraints on honeybee producers to expand the industry and provide such services will limit

their capacity to respond to demand and result in higher costs imposed on agriculture should an exotic disease incursion arise.

This project was funded from industry revenue which is matched by funds provided by the Federal Government and is an addition to RIRDC's diverse range of over 900 research publications, forms part of our Honeybee, which aims to improve the productivity and profitability of the Australian beekeeping industry.

Simon Hearn

Managing Director

Rural Industries Research and Development Corporation

Executive Summary

HONEYBEE POLLINATION SERVICES are largely provided free to Australian agriculture. Honeybee pollination is essential for some crops, while for others it raises yield and quality. In 1989 Gill estimated that total honeybee pollination services — from farmed and feral honeybees — was worth between \$0.6 and \$1.2 billion. Replicating Gill's work for a 35 largely honeybee pollination dependent crops, and allowing for the adjustments in imports and exports the value of honeybee pollination services was estimated to be \$1.7 billion for 1999-2000 production. In addition to the 35 crops for which data was available, a wide range of pastures, including lucerne and clover, are pollinated by honeybees hence this estimate understates the potential value of the pollination services.

The estimate of \$1.7 billion may look high compared to the value of horticulture, which in 1999-2000 was \$3.8 billion, but this is the cost if farmers were unable to adjust as would be the case of a sudden disease outbreak. With such an outbreak, not only would growers of honeybee dependent crops and pastures suffer, but so too would Australian consumers with the sudden and sometimes complete decline in the availability of many fresh fruits and nuts and some major vegetables such as carrots and onions, not to mention honey. The capacity to import many of the products that would be affected is limited due to quarantine restrictions and prices for what remained would be driven up to the detriment of the consumer.

The direct costs of a loss in pollination services fall roughly equally on Australian consumers and the producers of the honeybee dependent crops. A little over half, or \$877 million, is a loss to producers and \$839 is the loss to consumers due to higher prices and not being able to obtain certain products. The decline in the value of agricultural output of some \$1.6 billion and around 9 500 jobs are directly affected.

In addition to the direct effect on the industries relying on the agricultural inputs, flow-on effects could result in an *additional* \$2 billion loss in industry output and 11 000 jobs following the loss of all honeybee pollination services. These latter losses do not persist over time as unutilised resources will move to other industries in the longer term. They do however have significant implications for regions with high shares of honeybee dependant crops in the few years following a honeybee decline.

The results are highly sensitive to the assumptions about the dependence on honeybees for pollination. But even if the dependence on the honeybee as pollinators is half that reported in the pollination trials then the loss is estimated as \$0.6 billion.

Given that over 65 per cent of horticultural and agricultural crops introduced to Australia since European settlement require honeybees for pollination the impact of a sudden loss of all honeybee populations, commercial and feral, would require considerable adjustment in agriculture. The speed of adjustment to a world without honeybee pollinators, and hence the longer term costs of a major uncontrolled disease outbreak, depends on several factors. One factor is the extent to which other pollinators can replace the honeybee and this varies greatly between crops, with some such as almonds unable to be pollinated by other insects. A second factor is the profitability of the current crops relative to the next best, but not honeybee pollination dependent, crops. A third factor is the impact on market prices of a large scale switch in domestic production, which will depend critically on the scope to export production. While for consumers, the loss will decline if current restrictions on imports, that would no longer be justified for disease control reasons, are lifted.

This paper also estimates the longer term costs to farmers under three scenarios for the loss in income before farmers switch to an alternative. These scenarios assume production can be exported at world prices, and that consumers are able to access imports.

- If farmers absorb a 25 per cent loss in income before they switch to alternative crops, the estimated loss declines to \$1.2 billion.
- If a 10 per cent decline in income results in farmers switching, then the estimated loss declines to \$1 billion.
- Over time if all producers other than those experiencing a decline in income of less than 5 per cent switch to non-honeybee pollinated crops, then the lost producer surplus declines to \$100 million.

In practice, even a problem such as *V.destructor* will not wipe out all honeybees immediately across Australia, so farmers have some time to adjust. So too do honeybee producers, and it is likely that a market for pollination services would develop rapidly in the heavily honeybee dependent industries, lowering the impact of exotic incursions largely to losses incurred from foregone production while honeybee producers expanded supply to meet the demand for pollination services. The final outcome would depend on the costs to the honeybee producers of expanding production. These costs include the additional costs of disease control, the access to areas to rebuild the health of the hives, and the market for honey.

This study did not aim to estimate the potential size of the market for commercial pollination services, nor the price these services would attract. It can be argued that the value of this market is a more accurate way to estimate the value of honeybee pollination services than the approach followed in this paper and by other studies that have attempted to estimate the value of honeybee pollination. The large estimates of value come from the fact that the loss of a critical ingredient – the honeybee pollination service – renders all the other inputs valueless in the case of the 100 per cent honeybee dependent crops, and by a proportional amount for the less dependent crops. While these costs would adjust downwards over time, such a loss would see a major restructuring of agriculture in Australia, making the humble honeybee one of the unsung heroes of Australian agriculture.

Appendix III

Honeybee industry survey

A report for the Rural Industries Research and Development Corporation
by the

Australian Bureau of Agricultural and Resource Economics

by Veronica Boero Rodriguez, Cid Riley, Walter Shafron and Ray Lindsay

May 2003

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Foreword

The honeybee industry is an important Australian industry. In common with many other industries, the honeybee industry faces a number of challenges. These include access to native flora and competition in both export and domestic markets. The industry needs to maintain its competitiveness and comparative advantage as a supplier of high quality honey.

Limited information is available to guide industry decision-making. In particular, little information is available on the physical and financial characteristics of honey producing businesses. In addition, very little information is available on the demographic and socioeconomic circumstances of people involved in the industry.

This report, commissioned by the Australian Honeybee Industry Council presents results from the first comprehensive survey of Australian honeybee businesses. Survey results will assist benchmarking to improve the industry's performance and provide information to target industry efforts to improve productivity and profitability.

In addition to providing valuable information on honeybee businesses, survey results also enable calculation of the economic value of the industry and the resources used by the industry. The report will assist the development of industry policy and planning, providing a factual basis for the further development of the honeybee industry.

This project was funded from industry revenue, matched by funds provided by the Federal Government. The survey of honeybee businesses was conducted in close cooperation with the industry. This report, a new addition to RIRDC's diverse range of over 900 research publications, forms part of our Honeybee R&D program, which aims to improve the productivity and profitability of the Australian beekeeping industry.

Simon Hearn

Managing Director

Rural Industries Research and Development Corporation

Executive summary

Australia has around 9600 registered beekeepers, but the majority of honey is produced by a relatively small number of honeybee businesses. Sixty-two per cent of total honey production is estimated to have been produced by businesses operating more than 500 hives – around 250 businesses. Only 16 per cent of Australian honey production is produced by businesses with 250 hives or less.

Most honeybee operations are small family owned and operated businesses operating fewer than 500 hives and depending on a range of income sources in addition to those related to beekeeping. Typically, smaller operations, particularly those with less than 250 hives, derive the majority of the income for the operator's family from other enterprises, other businesses, investment or government sourced income. Larger operations, those with more than 500 hives, are mainly dependent on the honeybee business as the source of family income.

Australian honeybee businesses produced an average of 17 300 kilograms of honey per business in 2000-01. Businesses received an average of \$32 800 for honey sales in the 2000-01 financial year. Prices received for honey averaged \$1.80 per kilogram nationally, but average prices received by Tasmanian producers almost double this price at \$3.40 per kilogram. Total cash receipts per business averaged \$46 000, including receipts from the sale of bees, wax, propolis, honeycomb and paid pollination services.

Cash costs per business averaged \$30 600 per business, around 67 per cent of total cash receipts, leaving a cash operating surplus of \$15 400 per business. The most important cost items are labour and motor vehicle expenses including fuel. Non-cash costs, in particular, depreciation on motor vehicles, were high relative to other agricultural sector industries.

When non-cash costs including depreciation and the value of the operator, partner and family labour are taken into consideration, the return to capital and management was an average loss of \$13 700 per business. On average, businesses had an estimated \$236 400 worth of capital invested at 30 June 2001. The average rate of return was estimated to be minus 5 per cent. Average rates of return were small for honeybee businesses because of their small size. In fact, rates of return are similar to those recorded for small farms. However, rates of return are relatively high for larger honeybee businesses. Around 10 per cent of honeybee businesses, mainly larger businesses, generated rates of return of more than 10 per cent, which is high, particularly for agricultural sector businesses.

Equity ratios for honeybee businesses were relatively high, averaging 89 per cent at 30 June 2000-01. Average total business debt was only \$25 400 and 40 per cent of businesses had no debt. Over 60 per cent of beekeepers used public land for honey production in the last five years. Larger operations produced more of their honey from public lands than smaller businesses in 2000-01. The proportion of large honeybee businesses using public land was 90 per cent, but only 53 per cent of small businesses used public land.

Nationally, more businesses reported their use of public land to have decreased than reported use to have increased in the past five years. Around 19 per cent of honeybee businesses reported their use of public land to have decreased. However, use increased for 10 per cent of businesses and these were mainly larger businesses producing large quantities of honey. Around one third of honeybee businesses reported their use of public land had not changed in the past five years.

The average age of the operators of Australian honeybee businesses is similar to that of many other agricultural industries. In 2000-01, the average age of operators was 54 and these operators had 25 years of experience in the industry on average. Just over 50 per cent of operators of honeybee businesses attained less than year 11 as their highest level of education.

The majority of beekeepers obtain information for their honeybee business from industry magazines, newsletters, producer bodies and State Department Apiary Officers. Less than 40 per cent obtain information from general media sources.

The survey results lead to an estimate of total Australian honey production in 2000-01 of approximately 27 800 tonnes. In addition, the total gross value of the honeybee industry in 2000-01 is estimated to have been around \$63 million. This estimate is comprised of around \$53 million for honey production, \$3.3 million for paid pollination services, \$3.3 million for queenbee sales and around \$2.5 million for propolis, wax and honeycomb production. Total industry employment, excluding casual employees and family labour below 16 years of age, is estimated to be around 3000 people.