

focus on

# HONEYBEE

Research & Development



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An R&D program managed by the Rural Industries Research and Development Corporation



## At a glance

Honey has played an important role in human history, its value as a prized sweetener dating back thousands of years. Today, the diligent honeybee is kept as much for its honey as for its valuable services in pollinating crops.

About 10,000 registered beekeepers across Australia contribute to the production of between 20,000 and 30,000 tonnes of honey each year, with about one third of this product exported.

The European honeybee (*Apis mellifera*) is the most common species propagated, although Australian bee species are also kept. Australian honey is graded for colour and quality, with lighter honeys considered more valuable.

Many beekeepers focus on providing pollination services, a job that sees, for example, 100,000 hives converging on almond-producing regions in South Australia and Victoria during pollination season.

Other products and services from the industry include beeswax and sales and exports of live bees, including queens.

The Australian Government valued the industry's GVP for the 2011–2012 financial year at \$79 million, although RIRDC research estimates its contribution to the Australian economy through pollination to be closer to \$4 billion dollars. In addition to professional beekeeping, there is an expansive network of Australian recreational apirarists.

## Research and development

The RIRDC Honeybee R&D Program is primarily funded through a statutory levy on honey sales, matched by the Australian Commonwealth Government. It also receives voluntary contributions from industry, adding to a total of between \$800,000 and \$1 million in funding per annum in recent years. During the last decade, \$6.4 million has been invested in R&D for the honeybee industry.

The four objectives of the RIRDC Honeybee Program are:

- Pests and diseases of honeybees
- Productivity and profitability of beekeepers
- The role of flora in honeybee management
- Extension, communication and capacity building

RIRDC also partners with Horticulture Australia Limited to invest in Pollination Research and Development.

Almost half of the honeybee funding is designated for control of pests and diseases such as the varroa mite - a small insect that sucks 'blood' out of bee larvae, and which is present in every beekeeping country in the world except Australia.

The Australian Commonwealth Government also contributes additional funds for emerging industry issues. A recent example is the incursion of the Asian honeybee in 2008, a pest that competes with propagated honeybees and is aggressive to humans. The Australian Commonwealth Government allocated \$2 million to the Department of Agriculture, Fisheries and Forestry in Queensland to assist industry transition to living with Asian honeybees. The beekeeping industry provided \$400,000 to RIRDC for research into this invasive species.

## INDUSTRY CASE STUDY

### Deadly refuge for Small Hive Beetle

When an exotic pest began to cause major damage to beehives in Australia's eastern states, the search for a viable insecticide solution turned to insect psychology.

The Small Hive Beetle, a native of South Africa, was first detected in Australia in 2002, and has since been estimated to cause annual losses of up to \$4.5 million across the country.<sup>1</sup> The damage results from the beetle's larvae, which eat everything around them in the hive, destroying the structure of the honeycomb and resulting in a 'slime out', where the spoiled contents ooze out of the hive. At this point, the bees will often abandon the hive. The beetle has caused devastating losses in the US, and continues to be a major problem there.

After its detection in Australia in 2002, a national response ruled out the possibility of eradication. With the beetle here to stay, powerful control measures needed to be identified.

In an RIRDC-funded project, Dr Garry Levot – an applied entomologist with the New South Wales Department of Primary Industries (DPI) – began by observing the small hive beetle under laboratory conditions. He found that, for all its destructive power, the beetle had a fatal flaw.

"You could tell from its habits that it's quite a shy beetle. I looked at the behaviour and thought, if any insect

would lend itself to a trapping device in a hive, this one would, because it wants to hide in all the cracks and crevices," Dr Levot says. Although it is attracted to the hive as a source of food, the most limiting resource is not food but a safe hiding place from which to escape the harassment of honeybees.

***"You could tell from its habits that it's quite a shy beetle. I looked at the behaviour and thought, if any insect would lend itself to a trapping device in a hive, this one would, because it wants to hide in all the cracks and crevices"***

Dr Levot discovered that the beetle is particularly attracted to fluting in cardboard, where it can fit itself snugly, and developed a prototype refuge trap built around small sheets of cardboard impregnated with the insecticide fipronil. (Fipronil is commonly used in cockroach and ant baits and for broadacre sprays, is undetectable to insects, and does not emanate fumes).

As hoped, the beetles scurried into the cardboard and died within hours. The prototype was then refined with a moulded plastic shell and a

beetle-sized slit so that neither bees, nor beekeepers, could break in.

Now named APITHOR™, the resulting refuge traps are manufactured in Thailand by Ensystex Australasia Pty Ltd and retail for \$99 (excluding GST) for a box of 20. A trap is inserted into the bottom of a hive for three months at a time.

Its uptake has exceeded Dr Levot's expectations, with more than 54,000 traps sold between July 2011 and June 2012. Field trials have demonstrated that APITHOR™ rapidly reduces adult beetle numbers in beehives. Long-term safety and residue studies, again co-funded by RIRDC, have shown no deleterious effects on colony health after six months, or two treatments with APITHOR™.

Royalties from the product flow through to both NSW DPI and RIRDC, with all RIRDC royalties directed back into the RIRDC Honeybee R&D Program.

"There's nothing comparable with APITHOR™ for effectiveness and ease of use," Dr Levot says.

**Source: *Insecticidal control of small hive beetle: Developing a ready-to-use product*, RIRDC Publication No 07/146, Project No DAN 216A.**

<sup>1</sup> Nicholas Annand, *Small Hive Beetle Biology: Producing Control Options*, RIRDC Publication No. 11/O44, Project number PRJ-000510.

## Fact Box

- There are about half a million beehives kept in Australia.
- Most commercial apiarists keep between 400 and 800 hives, although some have in excess of 3,000.
- About 70% of Australian honey is produced by native Australian plants, with a strong reliance on access to native forests on public land.
- Australian honey is consumed in more than 38 countries, including Indonesia, the UK and Saudi Arabia.

Source: *Honeybee RD&E Plan 2012-2017*,  
RIRDC Publication No 12/049.

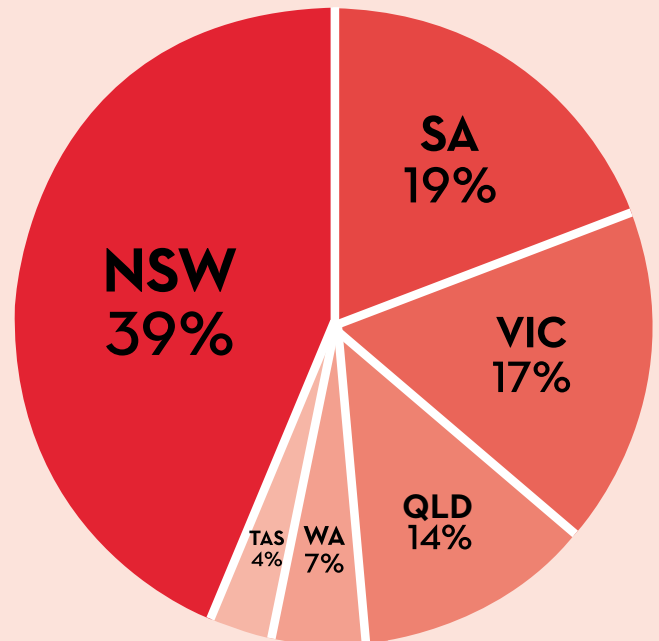
## Money well spent:

A recent analysis of the positive returns arising from three projects from the honeybee program and pollination sub-program has revealed *cost-benefit ratios* of between

**2.05 and 28.61**

Source: *Economic Evaluation of Investment in the Honeybee R&D Program, including the Pollination Sub-program*,  
RIRDC Publication No. 11/164.

## Proportion of Australian registered beekeepers by state:



Source: RIRDC Honeybee Program



The APITHOR™ small hive beetle trap rapidly reduces adult beetle numbers in beehives

Visit [www.rirdc.gov.au](http://www.rirdc.gov.au) to see all of RIRDC's honey bee research projects.

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