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Rural Industries Research and Development Corporation

Honeybee R&D News

Chairman's Foreword

Michael Hornitzky, Chairman, HBRDC (RIRDC)

As the new Chairman of the Honeybee Research & Development Committee (HBRDC) I would firstly like to acknowledge the very significant contribution Des Cannon has made on the Committee to progress honeybee research over the past 11 years. Des was a Committee member for 6 years and Chairman for the past 5 years.

Des will continue to produce the Honeybee R & D News for the 2011/2012 financial year. After this edition the newsletter will be reduced to two pages and will focus on HBRDC activities. Des will also continue with his role as a Committee member of the Pollination Research & Development Committee which manages the Pollination Program and is a sub-program of the Honeybee Program. This newsletter will also report on activities of the Pollination Program, which is jointly funded by RIRDC and HAL (Horticulture Australia)

This issue contains brief reports on two completed Honeybee Program projects dealing with the Small Hive Beetle and *Nosema ceranae*. It also contains information on new projects supported by the Honeybee and Pollination Programs for this financial year

Currently industry faces many challenges including the *Apis cerana* incursion, resource access security and the impact of endemic diseases on production. The HBRDC aims to work with industry to foster research which will provide practical outcomes to benefit beekeepers.

For further information about the RIRDC Honeybee Research and Development Program, feel free to browse the RIRDC website (www.rirdc.gov.au) or contact the Program Co-ordinator, Helen Moffett, on 02 6271 4145, or email

Helen.Moffett@rirdc.gov.au

Current R&D Committee

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Honeybee R & D Program Completed Projects 2010-2011

Two research projects have been completed this year.

1. Small hive beetle biology providing control options
2. A study of *Nosema ceranae* in Australia

The Final Reports for both projects have been published (see last page).
A summary of the results for each is shown below

RIRDC Honeybee R&D News is the official newsletter of the Rural Industries Research and Development Corporation Honeybee Program
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Small hive beetle biology providing control options

This project aimed to improve our understanding of several biological and behavioural features of SHB.

Temperatures of ≤15 and ≥45°C prevent SHB ovipositing and also kill SHB eggs. Relative humidity of 34% kills SHB eggs. Strong hives attract more SHB than weak hives. Bee colonies become vulnerable to SHB when bee numbers decline.

Most daily flight activity occurred in the 2 hours prior to nightfall. Over 13 times more SHB were going into the hives than leaving, and the highest level of movements observed occurred in the months of October, April and May. At higher temperatures more SHB were found outside the hives, with the average maximum in February of 44%. In the trial environment SHB population numbers appeared to follow an annual cyclic pattern, peaking in late autumn and bottoming 6 months later. The different washing techniques tried made no difference to the recovery of slimed combs.

This project has provided environmental thresholds that can be used in the honey shed to control and prevent SHB damage. It has also identified SHB population information that can be used in integrated pest management strategies for improved outcomes. For the apiarist there is the knowledge that stronger hives are less susceptible to SHB damage, and that slimed frames can be recovered but the cleaning methods tried for slimed combs were a waste of time – bees can do it themselves.

A study of *Nosema ceranae* in Australia

This study of *Nosema ceranae* was carried out to determine the progress of *N. ceranae* in commercial apiaries in eastern Australia, the development of better tests for nosemosis and to determine whether *N. ceranae* is more lethal to bees than *Nosema apis.*

In monitoring *N. ceranae* in the test apiaries the key observations were:

- *N. ceranae* and *N. apis* are commonly found in all apiaries
- Individual hives are commonly infected with both *N. apis* and *N. ceranae*
- *N. ceranae* is not replacing *N. apis* and
- *N. ceranae* also has a seasonally cyclic nature similar to that observed for *N. apis.*

N. ceranae does not appear to be as virulent a pathogen as has been observed elsewhere and it seems that the impact of *N. ceranae* on honey bee colonies in Australia is similar to that observed for *N. apis*. Availability of pollen to bees is important in prolonging the life of bees infected with *N. ceranae. N. ceranae* is sensitive to cold conditions and is more likely to cause nosemosis in warmer climates.

1. Although *N. ceranae* is a newly discovered pathogen of honey bees in Australia it is well established and cannot be eradicated.
2. The impact of *N. ceranae* on the beekeeping industry in Australia will not be as severe as has been reported in some areas in Europe.
3. As *N. ceranae* proliferates best in warmer climates honey bee colonies in Queensland are more likely to be severely affected that those in the southern states.
4. Access of honey bees to good pollen can mitigate the negative effects of nosemosis on honey bees and honey bee colonies.

New Projects

- Honeybee R&D News will be continued for at least one year but reduced to two pages; it will still be produced on a quarterly basis.
- The Committee gave serious consideration to a project to develop a passive transponder for rapid queen bee detection in the beekeeping industry. Unfortunately, problems to be overcome prevented this project being funded. Any transponder developed has to be small enough that it will not interfere with the queen entering a cell prior to egg-laying, but at the same time be powerful enough that a signal can be transmitted to the bottom of a hive body, and respond back to the transmitter /scanner above the hive body. The Committee was not satisfied that the science behind this project would overcome the physics problems posed.
- Toxicity of Pyrrolizidine alkaloids in Australian honey and pollen. This project will examine the applicability of extrapolating from the impact of PAs in rats to their possible impact on humans. It will also examine the PA's found in Australia, as studies to date have been on PA's not found in Australia.
- Benefit cost analysis for the Honeybee Program. This will be funded by RIRDC itself, not by the Honeybee Program, and is part of RIRDC's statutory governance responsibilities.
- After some delays in solving insurance/OHS issues, a project to train a sniffer dog in detection of AFB in beehives is now under contract and being led by Sharon de Wet from DEEDI, QLD. The use of sniffer dogs to aid in searching has been well documented over the years. Sniffer dogs are now entering new fields such as termite and mould detection in houses and forms of cancer in patients. This project will involve training a dog to detect American foulbrood and demonstrating that is can accurately identify the presence of the disease in bee hives. A male beagle, named Elroy, has been selected for training.
- As part of its commitment to building leadership capacity within the Honeybee Industry, the Committee sponsored Jonathon Monson, from Victoria, to undertake the Marcus Oldham Rural Leadership Course in July.

Pollination R&D Program New Projects

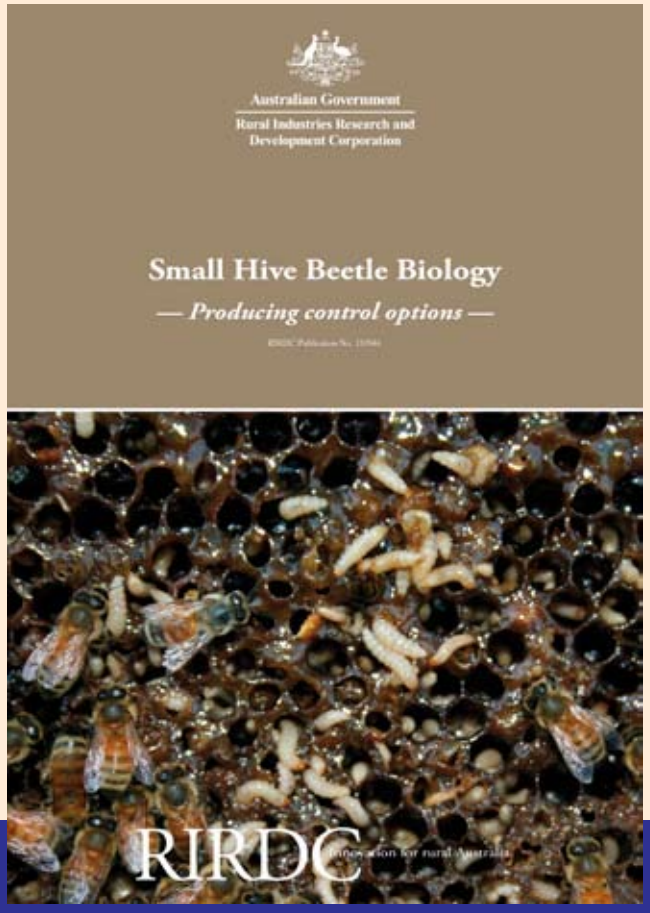
- Pesticide and bees booklet – designed to provide beekeepers and growers with background information on the impact of agricultural chemicals on honeybees. Information on pesticides, fungicides, herbicides and wetting agents will also be included
- Screened bottom boards – to assess the benefits and disadvantages of using screened bottom boards in hives in Australian conditions, and to compare enclosed and non-enclosed screened bottom boards
- Integrated electronic hive monitoring for effective surveillance – a proof-of-concept project on the use of sensors to maintain surveillance of hives; this is aimed at complementing and improving the efficiency of current surveillance methods, to aid in the detection of incursions
- Biosecurity implementation to strengthen Australia's honey bee and pollination response industries - development of a:

1. National industry Biosecurity Plan for the honeybee industry
2. Separate contingency plans for 4 high priority pests of the honeybee industry, including Varroa, Tropilaelaps and Tracheal mites, with a fourth to be selected.
3. Hive Biosecurity Manual for apiarists, outlining practical guidelines for maintaining the hive biosecurity and awareness material for key exotic pest threats to honeybees. This will be designed to support the B-QUAL program. A training module and on-line content for the Farm Biosecurity website will be developed

- Communication for the Pollination Program 2011-13 – a number of press releases will be prepared, designed to inform both pollinators and pollination-reliant plant industries of the Program's outcomes and the importance of pollination services

New RIRDC Honeybee-related Publications

All RIRDC publications can be purchased in hard copy, online from www.rirdc.gov.au , or may be downloaded for free from the same site.



Small Hive Beetle Biology – Producing Control Options

Code: 11-044
Published: 18 May 2011
Author(s): Nicholas Annand
ISBN: 978-1-74254-229-4
$25.00 73 pages

The Small Hive Beetle (SHB) was first identified in Australia in 2002. Since then it has become a major pest of honeybee hives.

Many control strategies are already in use in Australia to minimise the impact of SHB and include modifications to hive designs, improved beekeeping techniques and hygiene procedures. However SHB continues to cause large-scale economic losses within the industry. It is now clear that a better understanding of the biology of the SHB is necessary if beekeepers are to effectively manage this pest.

This RIRDC project highlights the biological and behavioural characteristics of SHB that can be directly related to hive health and management. The knowledge can be used to enhance the effectiveness of current control strategies and to provide the basis for new and improved control strategies for the commercial and amateur beekeeping industry.

A Study of *Nosema ceranae* in Honeybees in Australia

Code: 11-045
Published: 28 Jun 2011
Author(s): Michael Hornitzky
ISBN: 978-1-74254-230-0
$25.00 37 pages

Nosemosis is one of the most widespread adult bee diseases and causes significant economic losses to beekeepers worldwide. This disease was originally thought to be caused by a single Nosema species, *Nosema apis*, a microsporidian which has a range of debilitating effects on honeybee colonies and adult bees. In 1994, a microsporidian similar to *N. apis* was described in Asian honey bees from China. This parasite, called *Nosema ceranae*, was subsequently detected in European honeybees (*Apis mellifera*) in Taiwan. More recently it has been found in South America, USA, Asia and much of Europe.

The discovery of this new and apparently severe pathogen in bees prompted the need to determine the impact and the prevalence of *N. ceranae* in Australia. A survey of apiaries in eastern Australia indicated that *N. ceranae* was widespread and infected bees in every apiary under surveillance. Although *N. ceranae* does not appear to be as lethal as reported elsewhere it is another pathogen that the beekeeping industry needs to contend with.