

CIBER: A new research initiative for the study of honeybees in Western Australia

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A global perspective on honeybees

Honeybees (*Apis mellifera*) have a worldwide distribution and are major pollinators of native flowering plants on all inhabited continents. Their domestication and breeding over thousands of years by humans has heavily impacted and manipulated honeybee populations and their distribution. Their agricultural importance is very significant as pollinators for major crops but in the past this has been under-valued and taken for granted in most contexts. Their work as crop pollinators has recently been estimated to contribute AUS\$4-6 billion to the Australian economy. They are also the major source for commercial honey, pollen and wax production internationally for the food and cosmetic industries worth hundreds of millions of dollars annually.

The global importance of honeybees for ecosystems and human food production has been overshadowed in the last few years by devastating global declines in both feral and managed populations, especially in Europe and in Northern America, mostly caused by spreading parasites and pathogens. Many countries have recognized the importance of honeybees and increased their funding towards national honeybee research facilities to address the challenges related to bee breeding and bee pollination.

Australian Honeybee Research and Future Plans

The previous Federal Government initiated a Parliamentary House Standing Committee in 2007 to enquire into future development of the Honey Bee Industry. In June 2008, the House Standing Committee on Primary Industries and Resources of the present Parliament tabled its report "More Than Honey: the future of the Australian honey bee and pollination industries" which can be downloaded from the internet at <http://www.aph.gov.au/house/committee/pir/honeybee/report.htm>.

The report outlines the dire state of neglect in funding honeybee research and development in Australia, the looming threat from global decline through disease that will ultimately also affect Australia, and the unreported importance of honeybees for agricultural crop productivity through pollination. The report clearly states that honeybees are one of the most important contributors to the success of Australian agriculture. The report makes a series of major recommendations, most notably boosting funding towards honeybee research from ~\$1 million to \$50 million annually, and the immediate establishment of critical-mass centres for bee research and development in Australia.

The Unique Position of WA in the International Honeybee Industry

Western Australia is currently the only place in the world with a significant honeybee industry where major destructive diseases such as the Varroa mite, the small hive beetle, tracheal mites, and colony collapse disorder (CCD) are absent. This is presumably due to a combination of Western Australia's geographic isolation, State and National quarantine protocols, and its unique current industry management techniques such as continuous lineage breeding conducted by Better Bees of WA, and the beekeepers' decision not to use chemicals for pest control. Therefore WA possesses a major asset because of the presence of a large population of healthy (although vulnerable) bees. This is true in both feral as well as commercially bred bee populations.

However the Western Australian honeybee industry, along with the industry in the rest of Australia, faces significant challenges in the years to come. It is unprepared for the potential arrival of major threats such as the Varroa mite or colony collapse disorder.

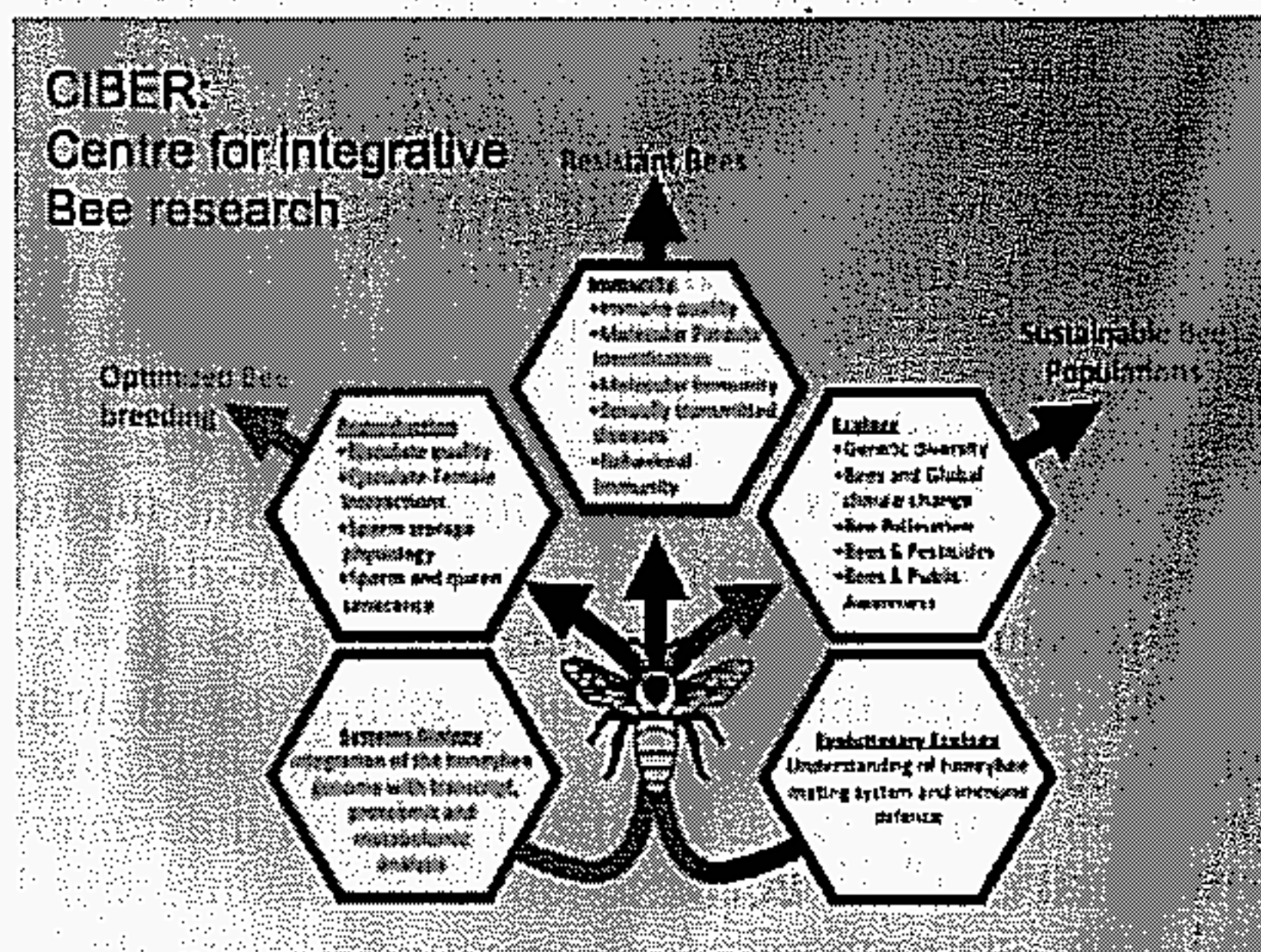
Furthermore, continuing climate change is expected to have a major impact on Australia, and will ultimately also affect honeybees, although there is very little information available at the moment on how bees and their social communities will cope with these additional ecological changes.

CIBER- the Collaborative Initiative for Bee research

The dramatic global losses of honeybees and their worrying effects on human food production are provoking loud calls in the media, by politicians, by scientists, and by the honeybee industry, for immediate action to halt losses and for increased funding for research to ensure the future of the honeybee industry. Beekeeping will ultimately depend on the ability to efficiently breed parasite tolerant bees that are able to survive and reproduce in their changing environments, because they are able to cope with future challenges such as newly invading parasites or global climate change.

Whereas many developed countries in Europe and the Americas maintain large-scale honeybee research facilities, such organizations are currently not established in Australia. For these reasons a group of scientists at the University of Western Australia - in close collaboration with the local honeybee industry through Better Bees of WA - initiated CIBER, the Collaborative Initiative for Bee Research (see www.ciber.science.uwa.edu.au) in late 2008.

CIBER aims to intensify basic scientific research into honeybee reproduction, immunity and ecology. CIBER is dedicated to facilitate interdisciplinary research on honeybees and offers a possibility for scientists to perform collaborative research on honeybees alongside partners such as Better Bees. The ultimate goal is to better understand honeybee reproduction and immunity as a first step to avoid future dramatic losses of Australian honeybees as occurring elsewhere. Over the last few months people from a wide range of fields have joined CIBER (see website for more information). This consortium now combines decades of expertise in beekeeping, sociobiology and its insights into the functioning of bee societies. It also encompasses evolutionary biology and its possibility to understand transgenerational dynamics and molecular biology that provides the necessary tools to harness the honeybee genome and increase our understanding of the functioning of honeybee on a molecular scale.



CIBER is supported by the University of Western Australia and has started collaborations within WA, for example with the Agricultural Department of Western Australia as well as internationally, for example with the University of Leeds (United Kingdom) and the Centre for Social Evolution at

the University of Copenhagen (Denmark). Most recently CIBER has become a partner of COLOSS (see www.coloss.org) a European based initiative where more than 150 researchers from more than 35 countries combine and coordinate their efforts to address the recent challenges for honeybee populations.

Finally CIBER was approached by a Swiss moviemaker, Markus Imhoof, who is undertaking a documentary movie about honeybees using the expertise and facilities of CIBER for the filming. In his movie Imhoof wants to summarize the current dramatic losses of honeybee populations worldwide and provide some details about the potential consequences this could have for humankind. His movie will also present fascinating insights into the biology of the honeybee as it tries to dissect the differences as well as the similarities between human and insect societies. The movie also develops a broader philosophical viewpoint by presenting the honeybee as an example how economic thinking can result in non-sustainable development, that can ultimately have devastating effects for a large number of people.

For more information on CIBER or to keep being updated about new developments please visit the website at www.ciber.science.uwa.edu.au or write an E-mail to the CIBER coordinator Dr. Boris Baer (bcbaer@cyllene.uwa.edu.au)

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