

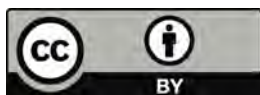
# Asian honey bee Transition to Management Program

North Queensland apiarist survey report

This publication has been compiled by Brett Ross-Reid, Brenda Foley and Dr. Anna Koetz of Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry.

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## Summary

Officers from the Asian honey bee Transition to Management (AHB T2M) Program have engaged the beekeeping industry through attendance at monthly local beekeeper club meetings, facilitating local industry liaison meetings, participation in teleconferences on both state and national levels, conducting AHB T2M workshops to distribute detection and destruction tools to beekeepers, and a joint and united approach during the far north Queensland show circuit in 2012.

An early survey of apiarists/beekeepers was attempted in January and February 2012. However, this survey suffered from poor question design and a lack of respondents. The extension of the AHB T2M Community Engagement team in 2012 enabled scientific research outcomes to be converted into tools for industry to use in the management of Asian honey bees (AHB). A new survey was developed and conducted during October and November 2012 to encourage beekeepers to provide feedback on whether the information and tools currently available were comprehensive and sufficient for their needs, or whether additional tools were needed to help them manage the impacts of AHB.

North Queensland beekeepers were given the opportunity to participate in the survey and suggest what they thought was important in the development of additional management tools. Comments received indicate the industry felt strongly that the development of a specific AHB trap is necessary to assist the industry to manage the pest bee. However, the majority of respondents gave no response when asked to suggest tools that could assist and support their industry in the management of AHB.

In general, it was found that beekeepers in north Queensland (Cairns and Townsville) are most concerned about a new incursion of AHB introducing Varroa mites or exotic bee diseases.

## Introduction

Following the detection of the Asian honey bee (AHB; *Apis cerana* Java genotype) in Cairns, Queensland, in May 2007, the beekeeping industry raised concerns about the negative impact AHB may have on honey production. These concerns included possible competition for resources, robbing of European honey bee (EHB) hives and the introduction of unspecified bee pests and diseases.

An apiarist/beekeeper survey (herein referred to as 'survey') was conducted with north Queensland apiarists/beekeepers and responses were collected. The target audience ranged from beginner to professional beekeepers from within the Known Infested Area (KIA) (Appendix 1) and from Townsville, outside the KIA. The survey aimed to evaluate and assist the future delivery of several AHB T2M deliverables, particularly those that required stakeholder engagement and collaboration:

AG2Bi - Develop integrated control strategies for different industries to minimise impacts of AHB, including identifying any off-target impacts (especially the balance between AHB and commercial EHB in the same environment to minimise impact and honey production)

AG2Bii – Develop the timing of implementing these methods and strategies to maximise effectiveness of control methods

AG3Bi – Development of management strategies. Based on outcomes of project 2, develop and test management strategies targeted at limiting impact of AHB on honey production in areas where AHB are established

AG3D – Develop technology to assist industry to mitigate AHB impacts. Stakeholder and industry engagement to identify needs and priorities for technology development

AG3F – Develop approaches with the honey industry for adoption and implementation of management strategies

This survey was designed to determine what additional tools or information the honey bee industry requires to manage the impacts of AHB.

# Survey methods

## Development

The survey was designed to encourage succinct answers and was aimed at gathering information from beekeepers in the Cairns and Townsville regions (referred to as north Queensland) about their observed and perceived impacts of AHB. The survey clearly identified that it was developed by the Department of Agriculture Fisheries, and Forestry and was conducted as a paper-based questionnaire (refer Appendix 2).

## Questions

The survey consisted of 16 questions, some of which were subdivided. Most questions were closed questions, where participants could only choose answers from the options available (e.g. “Yes/No” or “tick one box or multiple boxes”). Some closed (Yes/No) style questions also gave participants the option to specify “other” and provide relevant details. Closed questions were used to assist with analysis, so that each answer could be given a numerical value and be analysed or graphed. One question in the survey (Question 16) was an open style question, which gave participants the opportunity to respond with their own thoughts and opinions (refer Appendix 2).

## Delivery

Cairns participants were given a number of opportunities to participate in the survey. The survey was made available at:

- a specially organised monthly meeting where AHB T2M officers presented Program outcomes, explained the purpose and importance of the survey, and distributed copies of the survey;
- monthly meetings following the specially organised meeting;
- the premises of the president of the Cairns Beekeeping Club.

Participants could either complete the survey *in situ* and place it in a labelled survey box, or they could take the survey away and return it to the president of the club or to the AHB T2M Program’s main office in Redden Street, Cairns. AHB T2M officers reminded club members about the return of survey forms on a number of occasions.

Townsville members were given the opportunity to complete the survey during a specially organised monthly meeting, held by the Townsville Beekeeping Club, at which AHB T2M Program officers attended and presented. At the end of the Townsville meeting, club members were asked if they could assist the AHB T2M Program by filling out the survey and placing it inside a labelled survey box.

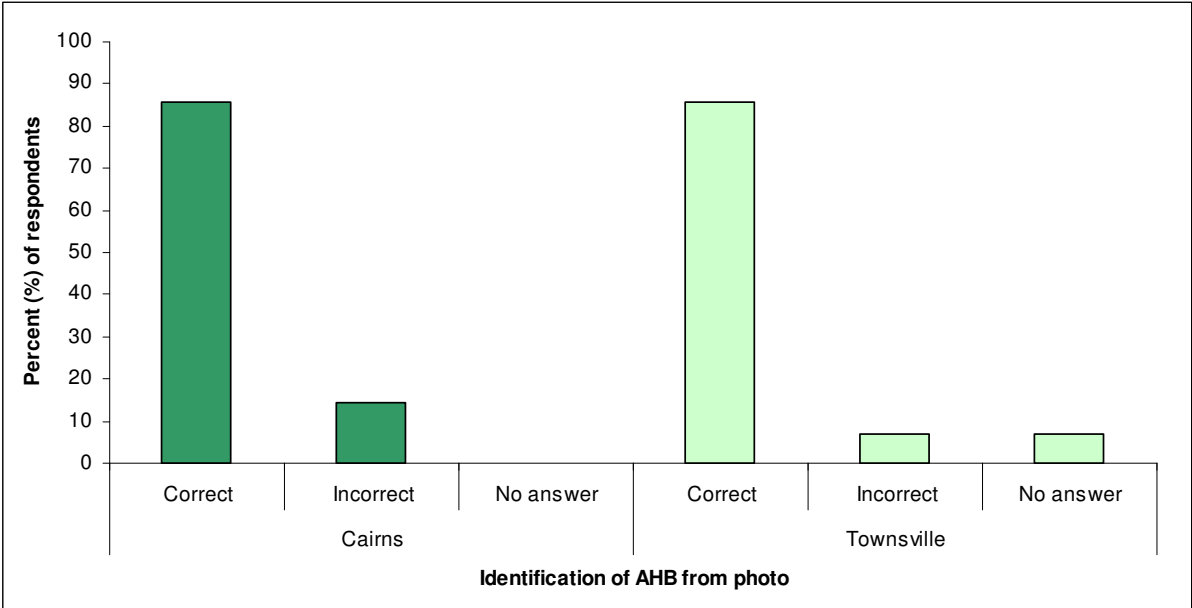
## Analysis

All closed style questions were analysed by calculating the percentage of respondents who answered ‘Yes’ or ‘No’ and results were displayed on a graph. The survey data was analysed as a whole for Questions 1 and 14 as well as comparisons made between Cairns and Townsville respondents. Questions 9, 10, and 11 were all analysed by counting the total number of responses against the number of participants surveyed. Question 16 of the survey was an open question and respondents’ suggestions were summarised in the survey results section of this report.

# Survey results

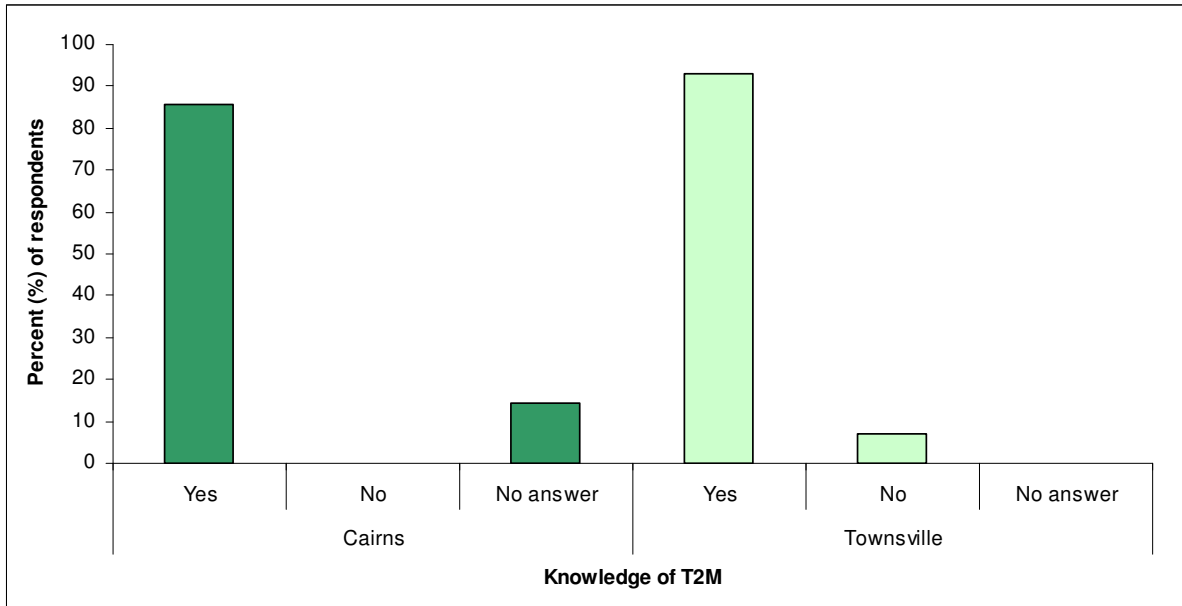
## Questions 1-3

86% of participants from both Cairns and Townsville correctly identified the picture of the Asian honey bee (Image A) when it was compared to the European honey bee. 14% of Cairns respondents incorrectly marked Image B as AHB, with 7% of incorrect answers from Townsville respondents. 7% of respondents from Townsville did not answer the question (Figure 1).



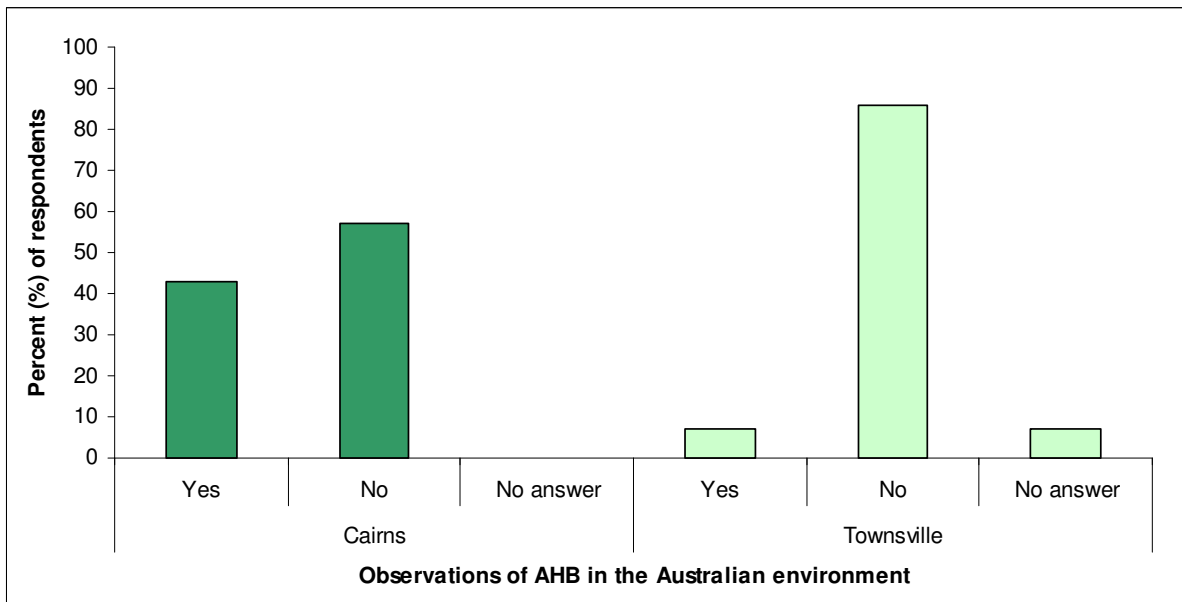
**Figure 1: Comparison of correct identification of AHB from two photos showing AHB (photo A) and EHB (photo B). Percentage of respondents answering correctly, incorrectly and giving no answer shown for Cairns respondents (dark green) and Townsville respondents (light green).**

Question 2 of the survey questioned participants' awareness that the current AHB Program is in a transition to management (T2M) phase. The results illustrate that both regions have knowledge of the Program's status. 86% of Cairns beekeepers answered 'yes' (indicating awareness of T2M) and the remainder of the respondents gave no response. Similarly, 93% of Townsville beekeepers answered 'yes' (indicating awareness of T2M) and 7% answering no. Overall 90% of respondents surveyed answered 'yes' (indicating awareness of T2M) with 5% answering 'no' or not responding (Figure 2).



**Figure 2: Knowledge of Program status – Percentage of respondents answering ‘yes’ (having knowledge of Program status), ‘no’ (not having knowledge of Program status) and giving no answer for Cairns respondents (dark green) and Townsville respondents (light green).**

Question 3 of the survey asked participants if they had seen AHB in the ‘wild’ (i.e. in the environment). Results differed dramatically for this question as many beekeepers from Townsville have not travelled to and/or observed AHB in the KIA. 43% of Cairns respondents answered ‘yes’, compared to 7% from the Townsville respondents’. 57% of the Cairns respondents had not seen AHB in the environment, compared to 86% of the Townsville respondents. All respondents from Cairns answered Question 3, while 7% of the participants from Townsville gave no response (Figure 3).



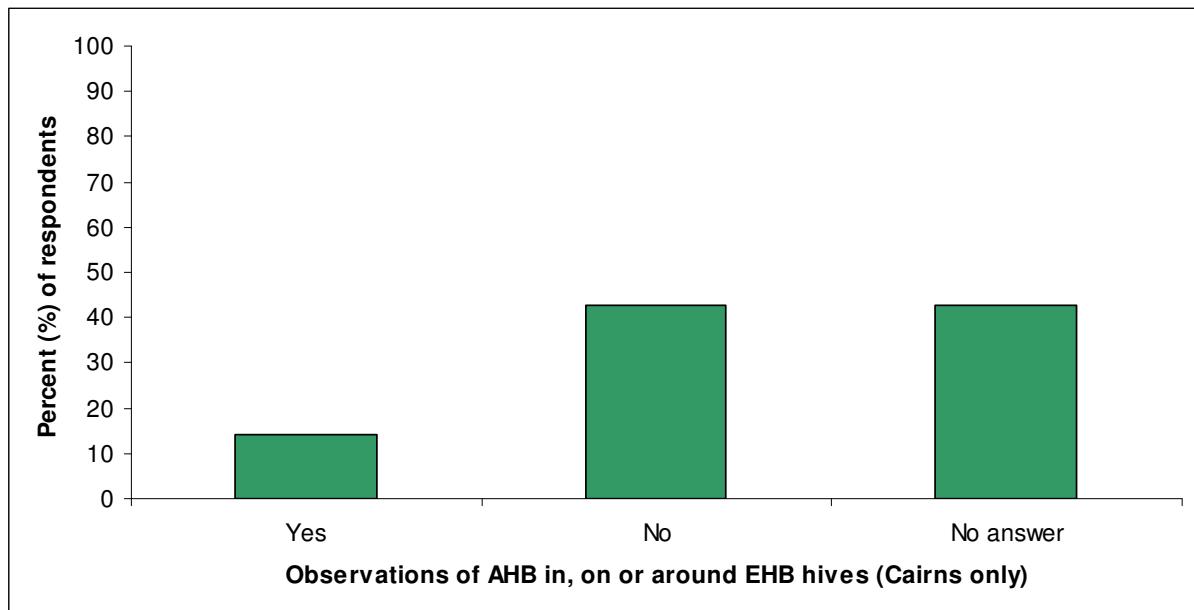
**Figure 3: Observations of AHB in the Australian environment – Percentage of respondents answering ‘yes’ (having observed AHB in the environment), ‘no’ (not having observed AHB in the environment) and giving no answer for Cairns respondents (dark green) and Townsville respondents (light green).**



## Questions 4 - 7

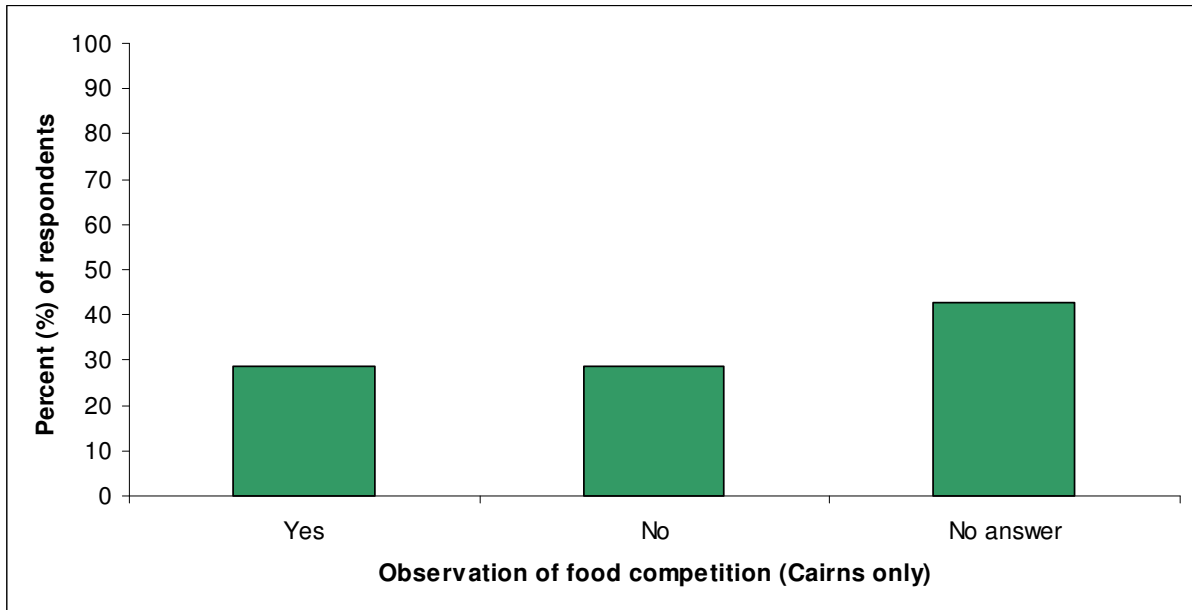
Questions 4 to 7 relate to several different examples of AHB observations. In all of these questions, no Townsville respondents gave an answer of 'yes' for observing AHB around their hives, competing for food, or displaying aggressive behaviour between the two species. This is not surprising given AHB are yet to establish in the area.

As a result, the following graphs only display results from Cairns beekeepers' observations. Results from Question 4 showed that 14% of Cairns beekeepers had observed AHB in, on or around EHB hives. 43% of Cairns respondents answered 'no observations' and an equal percentage gave no response to this question (Figure 4). 64% of Townsville respondents answered 'no observations' of AHB near EHB hives, along with 36% giving no response.



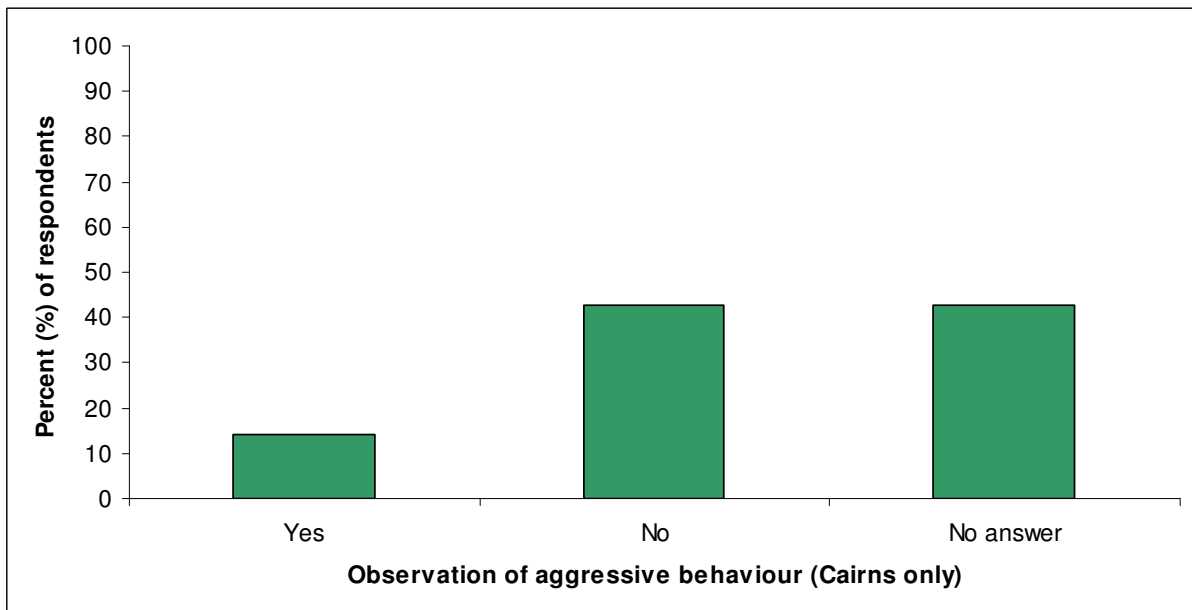
**Figure 4: Hive observations from Cairns beekeepers – Percentage of respondents answering 'yes' (having observed AHB in, on or around EHB hives), 'no' (not having observed AHB in, on or around EHB hives) and giving no answer for Cairns respondents.**

Question 5 of the survey asked whether competition for food had been observed between EHB and AHB. Results show that 29% of Cairns respondents had observed competition for a food source, whereas 29% had not observed competition for a food source. 43% of respondents from Cairns gave no response (Figure 5). 64% of Townsville respondents marked 'no observations' and the remaining 36% gave no response.



**Figure 5: Food competition observations from Cairns Beekeepers between EHB and AHB – Percentage of respondents answering ‘yes’ (having observed food competition), ‘no’ (not having observed food competition) and giving no answer for Cairns respondents.**

Questions 6 and 7 asked beekeepers if they had observed aggressive behaviour of AHB towards EHB (Question 6) and vice versa (Question 7). The results were the same for both questions. 14% of Cairns respondents observed aggressive behaviour in AHB towards EHB as well as in EHB towards AHB, whereas 43% had not observed any aggressive behaviour and the remaining 43% gave no response (Figure 6). 64% of the Townsville respondents marked ‘no’ and the remainder gave no response to Questions 6 and 7.



**Figure 6: Observations of aggressive behaviour between AHB and EHB from Cairns Beekeepers – Percentage of respondents answering ‘yes’ (having observed aggressive behaviour), ‘no’ (not having observed aggressive behaviour) and giving no answer for Cairns respondents.**

## Questions 8 - 11

Question 8 asked beekeepers if they had observed AHB demonstrating any of the following behaviour: AHB robbing of EHB hives; AHB fighting EHB; AHB taking over EHB hives; and/or AHB entering or exiting EHB hives.

Most of the participants from both Cairns (86%) and Townsville (71%) gave no response to Question 8. However, 14% of Cairns respondents indicated that they had observed the above behaviours, and 29% of Townsville respondents answered 'no' (i.e. they had not observed any such behaviour).

Question 9 asked participants if they had seen any negative impacts of AHB on honey production or foraging behaviour of EHB. There were no observed impacts on honey production or foraging behaviour of EHB by any of the participants from the survey. Only four people out of 21 answered this question. However, these four respondents answered the question incorrectly by writing 'no' instead of ticking one or two of the two available boxes. Therefore, it can be concluded that none of the respondents had observed a negative impact on honey production or foraging behaviour of EHB.

Question 10 asked 'what impacts do you perceive the AHB will have?' Respondents indicated that they thought AHB could have an impact on the following: robbing EHB hives; fighting EHB; reduced honey production; taking over EHB hives; competition for native fauna and flora; and introducing new diseases. Of these options, introduction of new diseases was identified as the number one perceived impact to industry with 16 out of 21 respondents ticking this box.

Question 11 was similar to Question 10 in that respondents were given the opportunity to indicate what they believed to be the biggest perceived threat to the honey bee industry. Results indicated that respondents were more concerned about Varroa mites being introduced to Australia than they were about the current infestation of AHB in North Queensland (which have no Varroa mites). 18 of the 21 beekeepers from both Cairns and Townsville believe that new infestations of AHB carrying Varroa mites would be the honey industry's biggest threat. 15 beekeepers believed that EHB carrying Varroa mites into the country would be the biggest threat to their industry. Only three out of 21 respondents believe that the current AHB incursion will be the biggest threat.

## Questions 12a - d Tools for industry

12 out of 21 respondents answered 'yes' to Questions 12a and 12b, indicating that they felt they needed tools to manage the impacts of AHB. They indicated that the recently developed *Guideline for industry destroying swarms and nests of AHB* provides adequate information to manage some of these impacts. Only one person out of the 21 answered 'no' with the remainder of the respondents giving no response.

14 out of 21 respondents answered 'yes' to Question 12c, indicating that a video depicting AHB destruction techniques would be a helpful tool for industry. Only one person out of the 21 answered 'no' with the rest of the respondents giving no response. When respondents were asked to specify what additional tools they believe industry may require in relation to managing AHB, minimal responses were given. Three respondents answered "specific trap", "public need more awareness" and "recent information on spread impact".

## **Questions 13-14 How do beekeepers access information?**

Questions 13 to 14 were included in the survey to establish by what means north Queensland beekeepers access information on the established population of AHB. These questions do not contribute to the AHB T2M deliverables stated in the introduction. However, the information collected was used to assist the Program with provision of further AHB information to regional beekeeper clubs in north Queensland. The results from Questions 14 show that overall, 57% of all respondents surveyed had sourced AHB information from the Biosecurity Queensland (BQ) website, with 33% sourcing information elsewhere and 10% giving no answer.

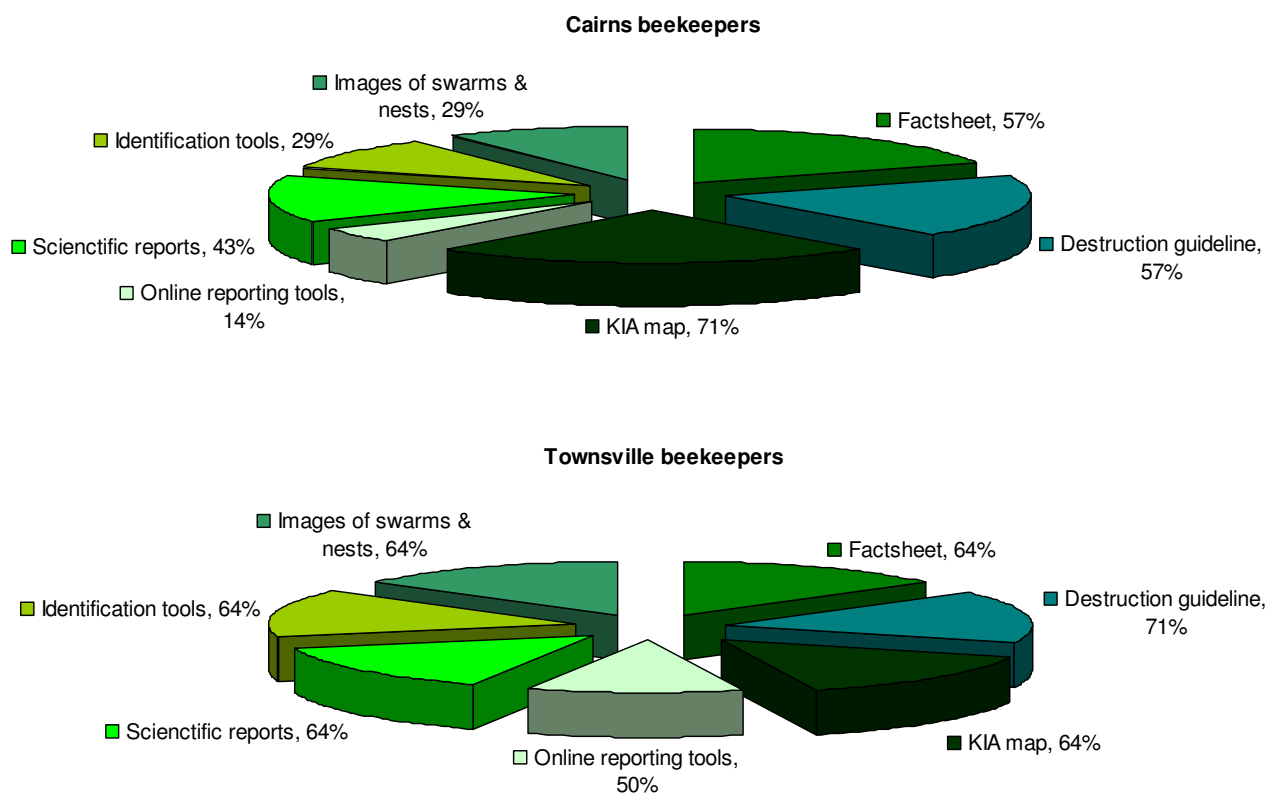
## **Questions 15a –g Awareness of the tools and information available**

North Queensland beekeepers were asked to indicate their knowledge of AHB information and tools available to the industry, through the BQ website, by marking 'yes' to seven items (AHB factsheet, AHB destruction guideline for industry, KIA map, scientific reports, identification tools, images, online reporting tools). The results were then illustrated in two pie charts (Figure 7).

When asked if the Cairns respondents were aware that printable information such as the AHB factsheet, AHB destruction guideline for industry and the KIA map were available online, 57% answered 'yes' to the first two items and 71% answered 'yes' to the latter. However, Townsville respondents appeared to have greater awareness with 64% knowing of the factsheet and 71% answering 'yes' to the guideline and the map. Similarly, only 14% of the Cairns respondents compared to 50% of Townsville participants knew that they could report AHB sightings using an online reporting tool.

Regarding awareness that scientific reports completed by the Program were available online, Cairns respondents showed less knowledge than those in Townsville with 43% and 64%, respectively.

Again, Cairns respondents fell behind on the knowledge stakes regarding the improved online species identification tools and images of nests and swarms on the website with 28% and 29% answering 'yes', respectively. However, Townsville showed a far greater awareness in general with 64% answering yes to both questions (Figure 7).



**Figure 7: The percentage of participants that responded 'yes' to having knowledge of online information and tools, including AHB factsheets, AHB destruction guidelines for industry, KIA maps, scientific reports, identification tools, images, online reporting tools.**

## Questions 16 Industry suggestions

Question 16 asked participants for suggestions that could help with the current infestation. The majority of the Townsville participants (71%) answered this question, whereas only 28% of Cairns participants responded to this question. The following responses were provided:

“Interaction and cooperation with as many areas as possible”

“Keep it going”

“Destroy all AHB Hives”

“Be aware; keep watching - just the bleeding obvious”

“Wipe them out by whatever means”

“Haven't got a hive of EHB at the moment, just getting started”

“If you see a swarm of AHB, report to the president of Townsville beekeeper association”

“The same time spray with poison, kill them”

“Information given quickly to members”

“Education”

“Stay alert and keep records of sightings”

“Carry on, good work”

“Better public awareness”

## Discussion

It is noteworthy that Cairns and Townsville beekeepers have reasonable identification skills regarding AHB and a good understanding that the current AHB Program is in a transitioning to management phase.

The new identification tools available on the BQ website (including comparative images of different bee species) will improve beekeepers', other stakeholders' and the community's ability to detect and report suspect AHB. Further, beekeepers from both regions have been made aware of the various tools that are available online to assist them in the detection and reporting of AHB should there be a new incursion or the pest bee spreads to their area.

Beekeepers from both regions appeared satisfied with the current management of the AHB infestation. Townsville, in general, appeared to have a greater understanding of the AHB T2M Program and what is available to their industry in regard to online tools for AHB management. This could be due to recent detections and publicity in the area and wanting to be proactive against any bee related threats to their region.

Cairns has a much greater understanding of AHB and the KIA, which is understandable considering it was Cairns where AHB were first detected and community engagement activities have been concentrated in this area since May 2007. Another key factor is the efforts of the AHB T2M Program through a range of activities including liaison with an AHB-specific industry committee, presence at regular monthly beekeeper club meetings, the legislative requirements regarding movement of bees, and beekeepers in the Cairns region being subjected to more intensive interactive displays at the 2012 far north Queensland show circuit.

Findings from the observational questions in the survey show that beekeepers still do have concerns regarding possible negative impacts from the pest bee but are generally more fearful of a new incursion bringing exotic mites and bee diseases into the country. A low number of respondents indicated that they had observed aggressive behaviour of AHB to EHB and vice versa. This may be explained by the fact that some beekeepers reported verbally (during monthly meetings) that they had observed AHB going into EHB hives, but EHB successfully defending their hive. This is consistent with research overseas that showed that fights between AHB and EHB were always won by the much larger and stronger of the two species: EHB (reviewed in Koetz, 2013).

It should also be noted that Cairns participants have been exposed to AHB for six years prior to the survey, but the bee is yet to establish in the Townsville region. Therefore, only Cairns beekeepers' responses regarding AHB behaviour are relevant here.

The majority of respondents who answered the questions regarding the need for tools to manage or minimise the impact of AHB found the newly developed *Guideline for industry destroying swarms and nests of AHB* to be adequate for their needs. Industry do encourage and support the idea of a video depicting AHB destruction techniques being developed and this is currently on track to be available on the BQ website this year (2013).

Beekeepers that responded to the survey did indicate their ongoing desire for development of an AHB specific trap to support their industry. However, the majority of respondents gave no response when asked to suggest additional tools that could assist and support their industry in the management of AHB.

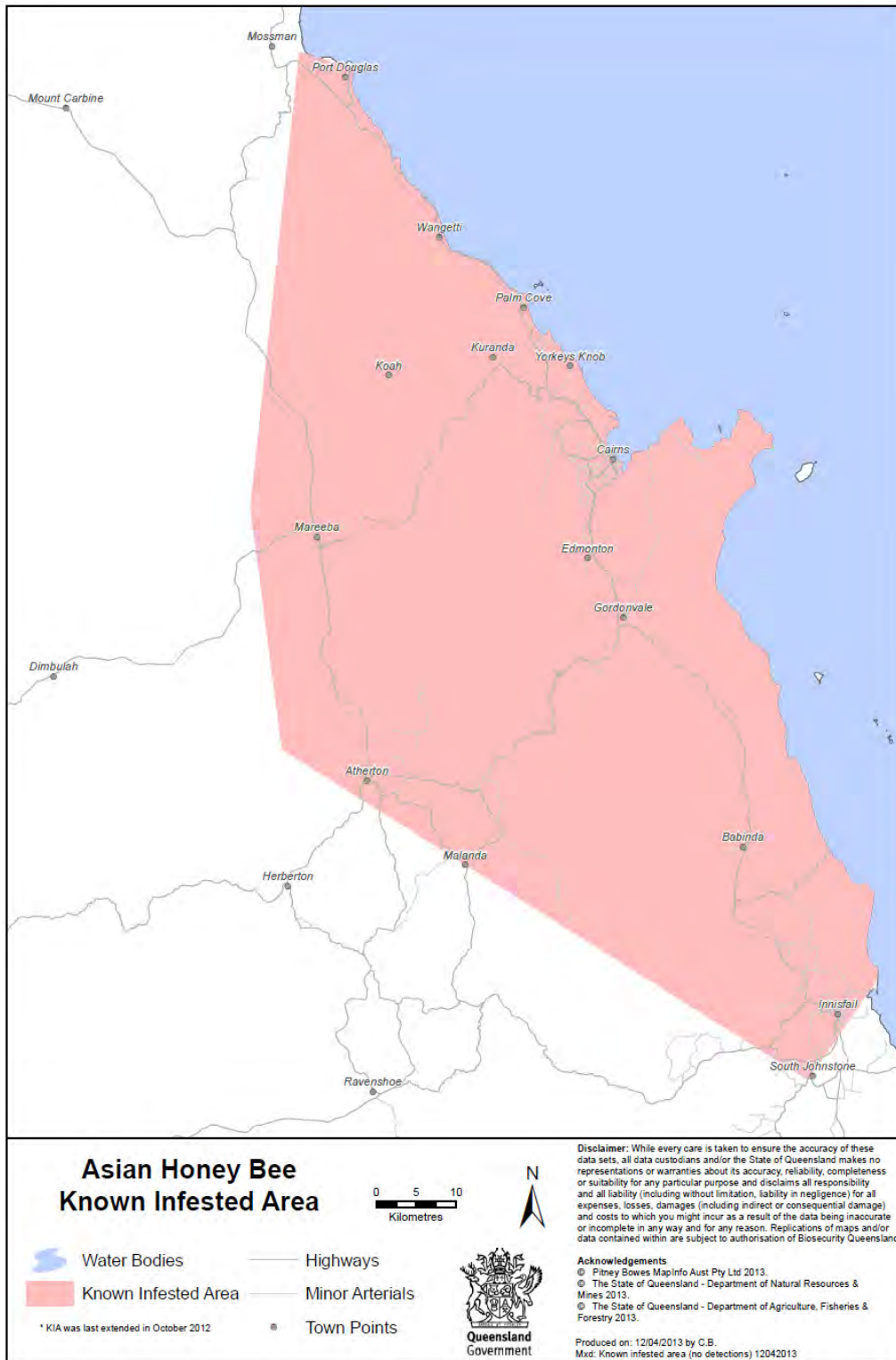
As can be seen from the comments provided for Question 16, most respondents are happy with AHB T2M Program's efforts with comments including "Carry on the good work". No negative comments were recorded for this question.

Interestingly, Townsville beekeepers were more aware of where and what tools are available on the BQ website than those in the Cairns region. This may reflect their geographical proximity to the established population and their apprehensions regarding the pest bee and to what extent it might impact their industry. Their willingness to educate themselves may also be due to the low level of face-to-face contact the club has had with the AHB T2M Program. Finally, the style of the survey proved appropriate to the audience (closed or multiple choice questions) as most closed questions were rewarded with an answer, while very few participants took the opportunity to provide comments or more detail when given the opportunity.

In conclusion, the survey targeting north Queensland beekeepers and conducted by AHB T2M Program staff fulfilled its objective of gathering important information from beekeepers to assist with some of the deliverables of the AHB T2M Program. Ideally, the sample size of the survey would have been larger and more representative of the whole of the beekeeping community to give the findings of this report more substance. However, the information provided is an invaluable insight into what attitudes and knowledge beekeepers in both the Cairns and Townsville regions have regarding the AHB T2M Program.




# Appendix 1 Asian honey bee Known Infested Area (KIA)




## Appendix 2 Survey for apiarists/beekeepers

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### Apiarists/beekeeper Survey



\* Please circle your answer to the following questions

1. Which bee would you identify as the Asian honey bee?	A / B
2. Are you aware the AHB program is Transition to Management?	YES / NO
3. Have you seen AHB in Australia in the wild? (if no, go to Q10)	YES / NO
4. Have you seen AHB in/on/around your European hives?	YES / NO
5. Have you observed competition for nectar/pollen between European Honey bees (EHB) and AHB?	YES / NO
6. Have you observed aggressive behaviour from AHB to EHB?	YES / NO
7. Have you observed aggressive behaviour from EHB to AHB?	YES / NO

\* Please tick one or multiple boxes for the following questions


8. Have you observed AHB;		
Robbing EHB hives	<input type="checkbox"/>	Taking over EHB hives <input type="checkbox"/>
Fighting EHB	<input type="checkbox"/>	Entering or exiting EHB hives <input type="checkbox"/>

9. Have you seen any negative impact on;		
Honey production	<input type="checkbox"/>	Foraging behaviour of EHB <input type="checkbox"/>
Other (specify)	_____	

10. With the most recent information extended from the program, what impacts do you perceive the Asian honey bees will have;		
Robbing EHB hives	<input type="checkbox"/>	Taking over EHB hives <input type="checkbox"/>
Fighting EHB	<input type="checkbox"/>	Bringing new diseases <input type="checkbox"/>
Reduced honey production	<input type="checkbox"/>	Native fauna and flora <input type="checkbox"/>

**Please turn over the page and continue**  
**Thank you for filling out this survey.**  
 For more information regarding Asian honey bees in Australia please visit [www.biosecurity.qld.gov.au](http://www.biosecurity.qld.gov.au)

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\* Please tick one or multiple boxes for the following questions

11. What do you perceive as the biggest threat to your industry?	
a) The current infestation of AHB	<input type="checkbox"/>
b) A new infestation of AHB carrying varroa	<input type="checkbox"/>
c) A new infestation of EHB carrying varroa	<input type="checkbox"/>
Other (specify)	_____

\* Please circle your answer to the following questions

12. Do you think that;		
a) You need tools to manage, control or minimise the impact of AHB on the commercial honey industry?	YES / NO	
b) The "Guideline for industry destroying swarms and nest of AHB" provides adequate information to destroy colonies?	YES / NO	
c) A video depicting destruction techniques be helpful?	YES / NO	
d) Are there additional tools the industry requires (specify)		_____

13. Do you attend local beekeeping meetings?	YES / NO
14. Do you access information about AHB from the Biosecurity Queensland website?	YES / NO
If no, where do you access information about AHB (specify)	_____

15. Did you know that the following tools are available on our website?		
a) An Asian honey bee Fact Sheet	YES / NO	
b) A Guideline for industry destroying swarms and nests of AHB	YES / NO	
c) A 'Known Infested Area' map	YES / NO	
d) Access to completed AHB scientific reports	YES / NO	
e) Online identification tools	YES / NO	
f) An online reporting tool to help track the spread of the bee	YES / NO	
g) Images of Asian honey bees/swarms and nests.	YES / NO	

16. What suggestions can you make to help with managing the current infestation?	_____
	_____

## References

Koetz A.H., 2013. The Asian honey bee (*Apis cerana*) and its strains - with special focus on *Apis cerana* Java genotype - Literature Review. Asian honey bee Transition to Management Program, Department of Agriculture, Fisheries and Forestry (DAFF), Cairns

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