

WOAH Reference Laboratory Reports Activities 2024

This report has been submitted: 30 janvier 2025 04:31

LABORATORY INFORMATION

*Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:	Varroosis (infestation of honey bees with Varroa spp.)
*Address of laboratory:	66 Ward Street, Wallaceville, Upper Hutt 5018, NEW ZEALAND
*Tel:	+6448945600
*E-mail address:	Richard.Hall@mpi.govt.nz
Website:	https://www.mpi.govt.nz/science/laboratories/national-animal-health-laboratory/
*Name (including Title) of Head of Laboratory (Responsible Official):	Dr Joseph O'Keefe, Manager, Animal Health Laboratory
*Name (including Title and Position) of WOAH Reference Expert:	Dr Richard Hall, Principal Scientist
*Which of the following defines your laboratory? Check all that apply:	Governmental

TOR1: DIAGNOSTIC METHODS

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.? (Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
Direct diagnostic tests		Nationally	Internationally
Debris examination	Yes	713	

Richard J. Hall - -

			0
Alcohol-wash test	Yes	5	0
Microscopy	Yes	0	4
PCR/sequencing	Yes	0	2

TOR2: REFERENCE MATERIAL

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by WOA?

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOA Members?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient WOA Member Countries	Country of recipients
Reference samples of archival honey bees (whole adult bees) stored at -80°C. https://www.mpi.govt.nz/dmsdocument/55654-The-MPI-Honey-Bee-Collection-now-welcoming-applications-from-researchers	Testing for acaricides	60 samples	60 samples		1	NEW ZEALAND,

4. Did your laboratory produce vaccines?

Not applicable

5. Did your laboratory supply vaccines to WOA Members?

Not applicable

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
Trial of computational methods to identify varroa during hive debris examination	We continued our trial of an automated counting method (apizoom.app) that can detect and enumerate varroa mites on hive-floor monitoring boards. This method could augment the WOA method of hive debris detection of varroa mites, as it may assist with rapid screening of hive debris. We have trialled the apizoom.app on hive debris examinations from New Zealand hives. For more information refer to: https://www.mpi.govt.nz/dmsdocument/59209-Re-imagining-varroa-monitoring-A-practical-approach Software trialled was: https://www.apizoom.app/

7. Did your laboratory validate diagnostic methods according to WOA Standards for the designated pathogen or disease?

No

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

No

9. Did your laboratory validate vaccines according to WOAHS Standards for the designated pathogen or disease?

No

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOAHS Members?

Yes

Name of WOAHS Member Country seeking assistance	Date	Which diagnostic test used	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
NEW CALEDONIA	2024-01-31	Microscopic examination of external mites from honey bees, AND; PCR and sequencing of varroa DNA for confirmation and species-level characterisation	0	2

11. Did your laboratory provide expert advice in technical consultancies on the request of an WOAHS Member?

Yes

Name of the WOAHS Member Country receiving a technical consultancy	Purpose	How the advice was provided
NEW CALEDONIA	Discussion about varroa risks posed by swarms; and development of education extension materials about varroa and honey bee health	Emails.
AUSTRALIA	Provided technical advice to government departments on varroa detection and surveillance methods	Emails, and in person meeting.
CHINESE TAIPEI	Technical advice and discussion with university laboratory about detection methods for varroa	Emails and online video meeting.
NEW ZEALAND	Request from local authorities to understand the transmission characteristics of varroa; especially in regard to maintaining Chatham Islands as being free from the disease	Emails and online video meeting.
NEW ZEALAND	Examination of PhD thesis on topic of novel methods for varroa control	Emails, report and online video meeting.

Richard J. Hall - -

CHINA (PEOPLE'S REP. OF)	Presentation to visiting official apiculture industry delegation on the activities of our WOAHO Reference Laboratory	In person presentation, and discussions.
HUNGARY	Meeting with government department to discuss methods for varroa control	In person.

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAHO Members other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	WOAH Member Countries involved other than your country
eDNA detection of Varroa destructor in honey bee colonies	1 year	To trial an eDNA method for the detection of Varroa destructor in honey bee colonies, for possible use in early detection activities	CSIRO, University of Canberra, Agriculture Victoria, James Cook University	AUSTRALIA

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAHO?

Yes

Research need : 1

Please type the Research need: Varroa detection methods described in Chapter 3.2.7 of the WOAHO Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, 13th edition (2024) do not include a molecular method for detection or species-level characterisation of varroa mites. It would be helpful for WOAHO member states if there was an agreed method documented for PCR detection and sequencing of varroa mite DNA to aid in surveillance and detection; especially in regard to resolving detections of Varroa jacobsoni versus Varroa destructor.

Relevance for WOAHO Disease Control,

Relevance for the Code or Manual Manual,

Field Epidemiology and Surveillance, Diagnostics,

Animal Category Terrestrial,

Disease:

Varroosis (infestation of honey bees with Varroa spp.)

Kind of disease (Zoonosis, Transboundary diseases)

If any, please specify relevance for Codes or Manual, chapter and title

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

Answer: Chapter 3.2.7 of the WOAHO Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, 13th edition (2024)

Notes:

Answer:

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:

As part of the international COLOSS network (<https://coloss.org/>), we run an autumn annual survey of all beekeepers in New Zealand to determine causes of colony loss; including the collection of epidemiological data as to the impact of varroa on honey bee colonies, including: number of colonies with losses attributed to varroa, attributed reasons for varroa losses (e.g. reinvasion, treatment failure), and assessment of the effectiveness of varroa treatment methods. Results from the New Zealand colony loss survey are made available here: <https://www.mpi.govt.nz/biosecurity/how-to-find-report-and-prevent-pests-and-diseases/bee-biosecurity/bee-colony-loss-survey/>

15. Did your laboratory disseminate epidemiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:

We publish annual reports on national honey bee colony loss data for New Zealand, including honey bee colony losses that have been attributed to varroa. The report of colony losses experienced in 2023, was published in 2024 and is available in the following weblink. The 2024 colony losses caused by varroa will be published in 2025.

<https://www.mpi.govt.nz/biosecurity/how-to-find-report-and-prevent-pests-and-diseases/bee-biosecurity/bee-colony-loss-survey/>

We also publish a quarterly journal (Surveillance) that is open-access, which documents our biosecurity investigations and epidemiological activities, including reports on honey bee health, and the effects of varroa mite.

<https://www.mpi.govt.nz/biosecurity/exotic-pests-and-diseases-in-new-zealand/surveillance-programmes/surveillance-biosecurity-magazine/>

16. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category and list the details in the box)

a) Articles published in peer-reviewed journals:

b) International conferences:

1

"Varroa in New Zealand", Richard Hall. 2024 International Conference on Honey Bee Health. 6-7 September 2024. National Chung Hsing University, Taichung City, CHINESE TAIPEI.

c) National conferences:

3

"Varroa in New Zealand — Monitoring and Treatment", Richard Hall. 123rd Annual Conference of the Victorian Apiarists' Association Inc "Beekeeping with varroa, a new frontier", 4th to 6th June 2024. Wonthaggi Workmens Club, Wonthaggi, Victoria, AUSTRALIA.

"New Zealand WOAHO Reference Laboratory for Bee Diseases: Varroosis and American foulbrood", Richard Hall, presentation to Massey University. 16 May 2024, Wellington, NEW ZEALAND.

"Re-imagining varroa monitoring: a practical approach", Richard Hall. The Beekeepers Conference 2024. 11 August 2024, Whanganui, NEW ZEALAND.

d) Other (Provide website address or link to appropriate information):

9

Vallance S, Hall R, Stahlmann-Brown P, Pragert H (2024) Project Varroa: Better understanding beekeeper and industry-wide challenges in managing varroa. *Surveillance*, Volume 51, Issue 2, 17-21. <https://www.sciquest.org.nz/search/results-2/downloadfulltext/173538>

"Establishment of WOAHO Bee Disease Reference Laboratory" (2024) *Surveillance*, Volume 51, Issue 3, 11-12. <https://www.sciquest.org.nz/search/results-2/downloadfulltext/173868>

"Varroa mite (*Varroa destructor*)" Fact Sheet. <https://www.mpi.govt.nz/dmsdocument/50050-Varroa-mite-Varroa-destructor-Fact-sheet>

Bee Pest Visual ID Guide. <https://www.mpi.govt.nz/dmsdocument/36975-New-Zealand-Bee-Biosecurity-Visual-ID-Guide>

"Bee pests & diseases: a summary" (including varroa) <https://www.mpi.govt.nz/dmsdocument/66096-Bee-pests-and-diseases-a-summary>

Press release on our research activities into varroa management, detection and control: <https://www.mpi.govt.nz/news/media-releases/beekeepers-share-expertise-to-improve-hive-health-2/>

Articles published in media that provide coverage of our varroa research activities:
<https://www.nzherald.co.nz/nz/varroa-mite-research-project-lets-beekeepers-share-expertise-to-improve-hive-health/CWZPJ6HFIVC4LGYCWP6YORZZCE/>
<https://www.farmersweekly.co.nz/technology/think-like-a-bee-to-tackle-varroa-apiarists-say/>
<https://www.stuff.co.nz/rural/350445113/beekeepers-need-work-together-tackle-varroa-mite>

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOAHO Members?

No

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories	Schedule to CERTIFICATE OF ACCREDITATION: for conformance to ISO/IEC 17025 General requirements for the competence of testing and calibration	Certificate of Accreditation AHL Current 2024.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Parasitology 1.02 Diagnostic Tests, Veterinary (c) Parasitology	International Accreditation New Zealand (IANZ) https://www.ianz.govt.nz/

20. Does your laboratory maintain a "biorisk management system" for the pathogen and the disease concerned?

Yes

Our laboratory has permission under Section 52 and 53 of the Biosecurity Act 1993 (New Zealand) to communicate, and propagate unwanted organisms. *Varroa* spp. are officially listed as unwanted organisms in New Zealand, and our processes and procedures for handling varroa are in adherence with the s52/53 permission. Our laboratory operates under, and is audited to the Australia/New Zealand Standard AS/NZS 2243.3:2002 Safety in Laboratories. Part 3: Microbiological Aspects and Containment Facilities. We have an organisational Biological Safety Committee which conducts standardised risk assessment reviews for our laboratory work.

TOR9: SCIENTIFIC MEETINGS

21. Did your laboratory organise scientific meetings related to the pathogen in question on behalf of WOA?

No

22. Did your laboratory participate in scientific meetings related to the pathogen in question on behalf of WOA?

Yes

Title of event	Date	location	Role (speaker, presenting poster, short communications)	Title of the work presented
WOAH Regional Seminar for Focal Points for Veterinary Laboratories for Asia and the Pacific, 18 July 2024	2024-07-17	Tokyo, Japan	Invited speaker	Introduction to Reference Laboratory for Varroosis (infestation of honey bees with <i>Varroa</i> spp.)
4th Regional Meeting for WOA Reference Centres in Asia and the Pacific	2024-07-18	Tokyo, Japan	Invited speaker	Varroa mite detection: collaborative work to support Australian organisations in response to the varroa incursion into New South Wales,

TOR10: NETWORK WITH WOAHP REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOAHP Reference Laboratories designated for the same pathogen or disease?

Yes

24. Do you network (collaborate or share information) with other WOAHP Reference Laboratories designated for the same pathogen?

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAHP REF. LABS
Varroosis (infestation of honey bees with Varroa spp.)	Participant	3	WOAHP Reference Laboratories for Varroosis at: ANSES (French Agency for Food, Environmental and Occupational Health & Safety) ALSO, National Reference Laboratory for Bee Diseases, Friedrich-Loeffler-Institut, Germany.

25. Did you organise or participate in inter-laboratory proficiency tests with WOAHP Reference Laboratories designated for the same pathogen during the past 2 years?

No

There are no inter-laboratory proficiency test programmes available for varroa mites. But in 2025 we have agreed with the other two WOAHP Bee Health laboratories to compile an ILPT between our three laboratories (includes WOAHP Reference Laboratories for Varroosis at: ANSES (French Agency for Food, Environmental and Occupational Health & Safety) ALSO, National Reference Laboratory for Bee Diseases, Friedrich-Loeffler-Institut, Germany).

26. Did your laboratory collaborate with other WOAHP Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

No

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAHP Reference Laboratories for the same pathogen during the past 2 years?

No

There are no inter-laboratory proficiency test programmes available for varroa mites. But in 2025 we have agreed with the other two WOAHP Bee Health laboratories to compile an ILPT between our three laboratories (includes WOAHP Reference Laboratories for Varroosis at: ANSES (French Agency for Food, Environmental and Occupational Health & Safety) ALSO, National Reference Laboratory for Bee Diseases, Friedrich-Loeffler-Institut, Germany).

TOR12: EXPERT CONSULTANTS

28. Did your laboratory place expert consultants at the disposal of WOAHP?

Yes

Richard J. Hall - -

Kind of consultancy	Location	Subject (facultative)
Review of Chapters in Manual of Diagnostic Tests and Vaccines	Electronic review	WOAH listed-diseases; Apinae

29. Additional comments regarding your report:

Yes

Question 2 and Question 3 ask about the distribution of standard reference reagents or diagnostic reagents. It should be noted that the detection methods for varroa that are described in the WOAHP diagnostic manual are all field-based (or simple light microscopy) and do not require specialised reagents. Specifically, the only reagents listed in the WOAHP Manual for varroa detection are: white cardboard (for hive debris), petroleum jelly (or similar grease), commercial miticides (widely available to beekeepers), 70% ethanol, soap detergent, and powdered sugar (sucrose). There is only the opportunity to share archival reference specimens of varroa mites.

Question 4, Question 5, Question 8 and Question 9 ask about the development of vaccines, and we answer 'no' to all four. Only one vaccine has ever been developed for insects, and this occurred in 2023. The product is still subject to clinical trials and a provisional licence, and only for the USA and Canada. The development of vaccines for any insect species is a significant advance for science. Trans-generational immune priming (TGIP) is the basis for the vaccine referred to above, for use in honey bees to prevent American foulbrood. Vaccine development for insects is a highly nascent area of research, and it should not be anticipated as a routine activity for a reference laboratory.

Question 25 and Question 27 ask about the involvement in interlaboratory proficiency testing (ILPT). There are currently no ILPT for varroa, as the mite can readily be identified in the field by visual observation, and the majority of detection methods described in the varroa manual (with the exception of microscopy) are field based methods. However, there is an opportunity to develop a ILPT especially in regard to distinguishing between varroa species, and against other bee mites. For 2025, we are committed to working with the other two WOAHP bee health laboratories, in Europe, to developing and performing an ILPT for varroa.