

WOAH Reference Laboratory Reports Activities 2024

This report has been submitted: 30 janvier 2025 04:28

LABORATORY INFORMATION

| | |
|--|---|
| *Name of disease (or topic) for which you are a designated WOAH Reference Laboratory: | American foulbrood (infection of honey bees with <i>Paenibacillus</i> larvae) |
| *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 |
| Microbial culture | Yes | 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 cultures of <i>Paenibacillus</i> larvae | Microbial culture | 36 | 36 x agar plates | | 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

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

Yes

| Name of the new test or diagnostic method developed | Description and References (Publication, website, etc.) |
|--|---|
| Validation of a qPCR for <i>Paenibacillus</i> larvae | Development and validation of a qPCR assay for <i>Paenibacillus</i> larvae based upon primers and probes published by Kušar et al. 2021 https://pmc.ncbi.nlm.nih.gov/articles/PMC8621733/ |

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

No

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

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

No

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

Yes

| Name of the WOA Member | | |
|------------------------|--|--|
|------------------------|--|--|

Richard J. Hall - -

| Country receiving a technical consultancy | Purpose | How the advice was provided |
|---|--|--|
| NEW CALEDONIA | Request for support for the development of extension materials about honey bee health, including material relevant to American foulbrood. | Emails |
| NEW ZEALAND | Provided guidance to a New Zealand laboratory about qPCR testing for AFB in honey | Emails |
| SRI LANKA | Request for advice and guidance on diagnostic testing | Emails and online meeting |
| NEW ZEALAND | Request from local authorities to understand the transmission characteristics of <i>Paenibacillus</i> larvae; especially in regard to maintaining Chatham Islands as being free from the disease | Emails and online meetings |
| NEW ZEALAND | Request from a New Zealand laboratory for guidance on how to interpret qPCR testing for <i>Paenibacillus</i> larvae | Emails |
| CHINA (PEOPLE'S REP. OF) | Presentation to visiting official apiculture industry delegation on the activities of our WOAHP Reference Laboratory | In person presentation, and discussions. |
| KOREA (REP. OF) | Presentation to visiting government department delegation on the activities of our WOAHP Reference Laboratory | In person presentation, and discussions. |
| UNITED ARAB EMIRATES | Presentation to visiting government department and industry trade | In person presentation, and discussions. |

Richard J. Hall - -

| | | |
|-------------|---|---|
| | delegation on the activities of our WOA Reference Laboratory | |
| NEW ZEALAND | Technical guidance to a New Zealand laboratory that developed a dual-target qPCR assay for <i>Paenibacillus</i> larvae that can be applied to hive debris for the purpose of rapid screening for honey bee colonies for American foulbrood. | In person discussions, emails. The technical contribution is acknowledged in the scientific article published in 2024: https://www.tandfonline.com/doi/abs/10.1080/00218839.2024.2306445 |

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOA 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 |
|---|-----------|--|---|--|
| Study of American foulbrood in honey bees in Fiji | Two years | Surveillance and characterisation of <i>Paenibacillus</i> larvae in Fiji | Animal Health Laboratory, Biosecurity Authority Fiji, Koronivia, Suva, Fiji | FIJI |

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

Yes

Research need : 1

Please type the Research need: To include a validated quantitative PCR test (real-time PCR) in the WOA Diagnostic Manual chapter on American foulbrood. At present there is only a conventional PCR described. In addition, a qPCR test in the manual will also need a clear description of how to interpret the results, so WOA member states and beekeepers can share an agreement about how to interpret qPCR test results from different sample types (e.g. honey, larvae, pupae, adult bees, hive debris) at different bacterial loads (e.g. high Cq result versus low Cq result).

Relevance for WOA Disease Control, Standard Setting,

Relevance for the Code or Manual Manual,

Field Epidemiology and Surveillance, Diagnostics,

Animal Category Terrestrial,

Disease:

American foulbrood (infection of honey bees with *Paenibacillus* larvae)

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: Terrestrial Manual Chapter 3.2.2 — American foulbrood of honey bees (infection of honey bees with *Paenibacillus* larvae)

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:

Collation of prevalence data for American foulbrood in New Zealand.

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 a quarterly journal (Surveillance) that is open-access, which documents our biosecurity investigations and epidemiological activities, including reports on American foulbrood and other honey bee health activities; the annual report on American foulbrood prevalence in New Zealand is published in Issue 3 of 2024, found at the link here:

<https://www.mpi.govt.nz/dmsdocument/65409-Surveillance-Magazine-Annual-report-Volume-51.-No-3.-September-2024>

We publish annual reports on national honey bee colony loss data for New Zealand, including honey bee colony losses that have been attributed to American foulbrood. 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 American foulbrood 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/>

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:

1

*Jauregui R, Barcelo A, Bennett P, et al. Draft genomes of *Paenibacillus* larvae isolated from honeybee colonies (*Apis mellifera*) in Fiji. Microbiol Resour Announc. 2024;13(2):e0103923. doi: 10.1128/mra.01039-23*

b) International conferences:

c) National conferences:

1

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

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

6

"American foulbrood (*Paenibacillus larvae*)" Fact Sheet. <https://www.mpi.govt.nz/dmsdocument/50047-American-foulbrood-Paenibacillus-larvae-Factsheet>

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 American foulbrood) <https://www.mpi.govt.nz/dmsdocument/66096-Bee-pests-and-diseases-a-summary>

"Surveillance programmes and disease control" in: Surveillance. Volume 51. No 4. December 2024.

<https://www.mpi.govt.nz/dmsdocument/66888-Surveillance-Magazine-Annual-report-Volume-51.-No-4.-December-2024>

Surveillance, Annual Report, Volume 51. No 3. September 2024. <https://www.mpi.govt.nz/dmsdocument/65409-Surveillance-Magazine-Annual-report-Volume-51.-No-3.-September-2024>

"Quarterly reports: October to December 2023" in: Surveillance. Voume 51. No 1. March 2024.

<https://www.mpi.govt.nz/dmsdocument/61420-Surveillance-Magazine-Volume-51.-No-1.-March-2024>

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 6

b) Seminars : 6

c) Hands-on training courses: 6

d) Internships (> 1 month) 0

| Type of technical training provided (a, b, c or d) | Country of origin of the expert(s) provided with training | No. participants from the corresponding country |
|--|---|---|
| C | FIJI | 6 |

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 |
|---|--|
| Microbiology 1.02 Diagnostic Tests, Veterinary (f) Microbiology - GENERAL BACTERIOLOGY | 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. *Paenibacillus larvae* (the causative agent of American foulbrood) is officially listed as an unwanted organism in New Zealand, and our processes and procedures for handling *P. larvae* 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?H?

No

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

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 | 2024-07-18 | Tokyo, Japan | Invited speaker | Introduction to Reference Laboratory for American foulbrood (infection of honey bees with <i>Paenibacillus larvae</i>) |

TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

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

Yes

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

Yes

| NETWORK/DISEASE | ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC) | NO. PARTICIPANTS | PARTICIPATING WOA REF. LABS |
|---|--|------------------|---|
| American foulbrood (infection of honey bees with <i>Paenibacillus</i> larvae) | Participant | 3 | WOAH Reference Laboratories for American Foulbrood 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 WOA Reference Laboratories designated for the same pathogen during the past 2 years?

No

Our designation as a WOA Reference Laboratory occurred after the cut-off date for the inter-laboratory proficiency test organised by the European WOA Reference Laboratories for American foulbrood. This ILPT occurs every two years, and is scheduled for 2025, and we will be taking part in this ILPT.

26. Did your laboratory collaborate with other WOA 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 WOA Reference Laboratories for the same pathogen during the past 2 years?

No

Our designation as a WOA Reference Laboratory occurred after the cut-off date for the inter-laboratory proficiency test organised by the European WOA Reference Laboratories for American foulbrood. This ILPT occurs every two years, and is scheduled for 2025, and we will be taking part in this ILPT.

TOR12: EXPERT CONSULTANTS

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

Yes

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

29. Additional comments regarding your report:

Yes

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). Our WOA reference laboratory designation was made in June 2023, and due to this timing we were not able to engage in the regular ILPT that was run in 2023 by the European WOA reference laboratories for American foulbrood (*Paenibacillus larvae*). The American foulbrood ILPT is only run every two years so we could not undertake an ILPT in 2024, but we will enrol in the ILPT for 2025.*