

WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

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Centre Information

Title of WOA Collaborating Centre	Food-Borne Zoonotic Parasites
Address of WOA Collaborating Centre	Canadian Food Inspection Agency (CFIA) 116 Veterinary Road, Saskatoon SK, S7N 2R3, CANADA
Tel.:	+1 306 385-7818
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Website:	https://inspection.canada.ca/science-and-research/our-laboratories/saskatoon/eng/1549576715254/1549576742564
Name Director of Institute (Responsible Official):	David McKinnon, Director, CFIA Saskatoon Laboratory
Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Brad Scandrett, Head, Centre for Food-borne and Animal Parasitology, Saskatoon Laboratory
Name of the writer:	Brad Scandrett

TOR1 AND 2: SERVICES PROVIDED

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by WOA

Disease control	
Title of activity	Scope

<p>Ongoing provision of diagnostic services and scientific advice to CFIA Science, Policies and Programs, and Operations Branches</p>	<p>Domestic, import and/or export disease investigations pertaining to food-borne zoonotic parasites, including Cyclospora (non-zoonotic), Cryptosporidium, Toxoplasma, Giardia, Taenia saginata/Cysticercus bovis and Trichinella spp.</p>
<p>Epidemiology, surveillance, risk assessment, modelling</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Ongoing provision of scientific advice pertaining to risk analyses for food-borne parasites</p>	<p>Risk management of bovine cysticercosis (Taenia saginata), Echinococcus, Trichinella, Cyclospora, zoonotic coccidia, and Giardia</p>
<p>Epidemiology, surveillance, risk assessment, modelling</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Ongoing monitoring and surveillance for food-borne parasites in animals, animal products and fresh produce for domestic disease control and food safety, and import/export purposes</p>	<p>National Microbiological Monitoring Program for detection of Trichinella in domestic swine via digestion assay; research surveillance of wildlife in proximity to domestic swine production in Canada for Trichinella spp. via digestion assay; National Microbiological Monitoring Program and targeted surveys for detection of Cyclospora and Giardia contamination of imported fresh produce via qPCR and LAMP assay</p>
<p>Epidemiology, surveillance, risk assessment, modelling</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>The Canadian Arctic One Health Network. (https://arcticnet.ulaval.ca/project/the-canadian-arctic-one-health-network/)</p>	<p>This project (2019-2024) aims to build on an existing network of researchers and community partners to monitor, model, and mitigate One Health threats across the changing Canadian North</p>
<p>Epidemiology, surveillance, risk assessment, modelling</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>GRDI (Genomics Research and Development Initiative) Shared Priority Projects-Sub-Project Title: Transmission patterns of zoonotic and emerging pathogens in Canada's North related to climate change (https://grdi.canada.ca/en/projects/genomic-adaptation-resilience-climate-change-genarcc-project)</p>	<p>This federal interdepartmental study (2022-2027) will use genomics to monitor ongoing spatial and temporal climate-associated changes in the transmission of established, emerging and novel pathogens in Canada's North and aims to determine the prevalence and molecular characteristics of zoonotic parasites, emerging and novel viruses, and bacteria in Northern country foods, focusing on food safety and security, and the potential risks to human health due to emerging threats</p>
<p>Training, capacity building</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>Ongoing scientific support, proficiency assessment, and capacity building of industry, academic institute, and territorial authorities analysts to perform artificial digestion</p>	<p>Trichinella spp. from domestic and wildlife sources</p>

assay for <i>Trichinella</i> in pork, horse meat or wildlife, including walrus meat (a food safety concern in northern Canada)	
Training, capacity building	
Title of activity	Scope
Ongoing internal training and proficiency assessment of CFIA analysts for the detection of food-borne parasites	Cyclospora, zoonotic coccidia, <i>Giardia</i> , <i>Taenia saginata</i> , and <i>Trichinella</i> spp.
Training, capacity building	
Title of activity	Scope
Ongoing internal capacity building to further enhance expertise in NGS/WGS for food-borne parasites	Cyclospora and <i>Trichinella</i> spp.
Training, capacity building	
Title of activity	Scope
Ongoing training and mentoring of PhD candidates (at the University of Saskatchewan, Canada) conducting research studies involving food-borne parasites, via participation on graduate student advisory committees	<i>Trichinella</i> spp., <i>Echinococcus</i> spp. and <i>Toxoplasma</i>

TOR3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main focus area for which you were designated

Proposal title	Scope/Content	Applicable area
Application of next-generation sequencing methodology in developing streamlined protocols for high-resolution genotyping of parasites of public health concern	Ongoing use of genomics to identify and characterize food-borne parasites, including deep amplicon sequencing of the ITS-1 region to effect high-resolution detection of all <i>Trichinella</i> spp. comprising mixed infections in a muscle tissue sample (manuscript in preparation)	Laboratory expertise
Development and validation of molecular detection methods for <i>Cryptosporidium</i> spp. and <i>Toxoplasma gondii</i> in leafy greens and	Ongoing efforts to develop and validate improved molecular methods for the detection and identification of food-borne protozoan parasites	Laboratory expertise

berry fruits		
Development of an international (ISO) standard for the detection of Cyclospora cayetanensis in food	Ongoing participation as member of food-borne parasites working group (ISO/TC34/SC9/WG6) to develop international standard for the detection of Cyclospora cayetanensis in foods	Laboratory expertise

4. Did your Collaborating Centre maintain a network with other WOAHO Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same speciality, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WOAH Collaborating Centre for Food-Borne Zoonotic Parasites from the European Region	Maisons-Alfort, France	Europe	Exchange of scientific information on food-borne parasites and proficiency testing (PT) samples (Trichinella) via joint participation in interlaboratory PT, First meeting (virtual) of the OIE (WOAH) Network of Collaborating Centres for Food-borne Zoonotic Parasites (Americas, European and Asia Pacific Regions), and membership in International Commission on Trichinellosis
WOAH Collaborating Centre for Food-Borne Zoonotic Parasites from the Asia-Pacific Region	Changchun, China	Asia and Pasific	Exchange of scientific information on food-borne parasites, First meeting (virtual) of the OIE (WOAH) Network of Collaborating Centres for Food-borne Zoonotic Parasites (Americas, European and Asia Pacific Regions), and membership in International Commission on Trichinellosis
WOAH Reference Laboratory for Trichinellosis, European Union Reference Laboratory for Parasites	Rome, Italy	Europe	Exchange of scientific advice via shared roles as WOAHO Reference Laboratories for Trichinellosis and membership in the

(EURLP)		International Commission on Trichinellosis
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TOR4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAH Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WOAH Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens (Canadian Wildlife Health Cooperative/CWHC)	Saskatoon, Canada	Americas	Exchange of scientific information and collection of wildlife samples for ongoing sylvatic Trichinella surveillance
The Canadian Arctic One Health Network. (https://arcticnet.ulaval.ca/project/the-canadian-arctic-one-health-network/)	Canada	Americas	This project (2019-2024) aims to build on an existing network of researchers and community partners to monitor, model, and mitigate One Health threats across the changing Canadian North
GRDI (Genomics Research and Development Initiative) Shared Priority Projects-Sub-project Title: Transmission patterns of zoonotic and emerging pathogens in Canada's North related to climate change (https://grdi.canada.ca/en/projects/genomic-adaptation-resilience-climate-change-gonarcc-project)	Canada	Americas	This federal interdepartmental study (2022-2027) will use genomics to monitor ongoing spatial and temporal climate-associated changes in the transmission of established, emerging and novel pathogens in Canada's North and aims to determine the prevalence and molecular characteristics of zoonotic parasites, emerging and novel viruses, and bacteria in Northern country foods, focusing on food safety and security, and the potential risks to human health due to emerging threats

University of Saskatchewan	Canada	Americas	Ongoing collaboration with the Dept. of Veterinary Microbiology, Western College of Veterinary Medicine, U of S to elucidate the biology and ecology of a new species of <i>Trichinella</i> (<i>T. chanchalensis</i>) in the North American Arctic
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TOR6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOA?H?

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Brad Scandrett	Review of OIE standards	Invited expert review (conducted jointly with expert from WOA?H Reference Laboratory in Rome) of WOA?H Terrestrial Code Chapter 8.17 'Infection with <i>Trichinella</i> spp.' for alignment with previously-reviewed Terrestrial Manual Chapter 3.1.21 'Trichinellosis'

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

*Ongoing training and/or proficiency assessment of Canadian industry analysts to perform the artificial digestion assay for *Trichinella* and to facilitate effective oversight of industry labs performing this testing on horse meat or pork to meet requirements for export and domestic food safety (i.e., ready-to-eat products).*

*Ongoing provision of scientific advice and proficiency assessment to Canadian territorial (Nunavik, Nunavut) analysts performing the artificial digestion assay for *Trichinella* in walrus meat, a food safety concern in the Arctic.*

*Ongoing provision of *Trichinella* artificial digestion assay proficiency testing samples and assessment of results (France, New Zealand).*

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOA?H, to personnel from WOA?H Members?

Yes

- a) Technical visit : 0
- b) Seminars : 6
- c) Hands-on training courses: 2
- d) Internships (>1 month) : 3

TYPE OF TECHNICAL TRAINING PROVIDED (A, B,	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH	NO. PARTICIPANTS FROM THE
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C OR D)		TRAINING	CORRESPONDING COUNTRY
b	Webinars pertaining to Trichinella biology and detection	Canada (industry and Nunavik candidate analysts)	6
c	Hands-on training provided for the Trichinella digestion method	Canada (industry candidate analysts)	2
d	Ongoing provision of scientific advice and training on Trichinella delivered via participation on PhD candidate's advisory committee	Canada (PhD candidate at University of Saskatchewan)	1
d	Ongoing provision of scientific advice on Echinococcus delivered via participation on PhD candidate's advisory committee	Nigeria (PhD candidate at University of Saskatchewan)	1
d	Ongoing provision of scientific advice on Toxoplasma delivered via participation on PhD candidate's advisory committee	Mexico (PhD candidate at University of Saskatchewan)	1

TOR8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOA?H?

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	First meeting (virtual) of the OIE (WOAH) Network of Collaborating Centres for Food-borne Zoonotic Parasites (Americas, European and Asia Pacific Regions)	WOAH Collaborating Centre for Food-borne Parasites from the European Region (ANSES, France)	2022-05-24	Virtual	25

TOR9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOA?H that may be useful to Members of WOA?H

a) Articles published in peer-reviewed journals:

3

Lobanov V.A., Konecni K.A., Purves R.W., Scandrett W.B. 2022. Performance of indirect enzyme-linked immunosorbent assay using *Trichinella spiralis*-derived Serpin as antigen for the detection of exposure to *Trichinella* spp. in swine. *Veterinary Parasitology* 309. DOI: 10.1016/j.vetpar.2022.109744

Émilie B., Sharma R., Hernández-Ortiz A., Buhler K., Al-Adhami B., Su C., Fenton H., Avaré E., Roth J., Rodrigues C.W., Tomaselli M., Pamak C., Simon A., Bachand N., Leighton P., Jenkins E. 2022. Are foxes good sentinel species for *Toxoplasma gondii*? Exposure, prevalence and risk factors in foxes (*Vulpes* spp.) of northern Canada. *Parasites and Vectors* 15: 1-14.

Lalonde L., Oakley J., Fries P. 2022. Verification and use of the US-FDA BAM 19b method for detection of *Cyclospora cayetanensis* in a survey of fresh produce by the CFIA laboratory. *Microorganisms* 10(3):559.

*Additionally, the following 2 articles have been accepted for publication:

Martin Cheung, Daisy Yu, Tracy Chan, Navdeep Chahil, Christine Tchao, Michael Slatnik, Shobhit Maruti, Nina Sidhu, Brad Scandrett, Natalie Prystajek, Muhammad Morshed, and Catherine Hogan. *The Brief Case: An infectious hazard of hunting*. Accepted July 10, 2022 for publication in the *Journal of Clinical Microbiology*.

Émilie Bouchard, Rajnish Sharma, Adrián Hernández-Ortiz, Thomas S. Jung, N. Jane Harms, Caitlin N. Willier, Rudy Boonstra, Yasmine N. Majchrzak, Michael J. L. Peers, Géraldine-G. Gouin, Batol Al-Adhami, Audrey Simon, Patrick Leighton and Emily J. Jenkins. *Canada lynx (*Lynx canadensis*) as potential reservoirs and sentinels of *Toxoplasma gondii* in northern Canada*. Accepted January 4, 2023 for publication in *Zoonotic Diseases*.

b) International conferences:

0

c) National conferences:

0

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

1

First meeting (virtual) of the OIE (WOAH) Network of Collaborating Centres for Food-borne Zoonotic Parasites (Americas, European and Asia Pacific Regions), held May 24, 2022.

11. What have you done in the past year to advance your area of focus, e.g. updated technology?

Evaluation of the published CDC's next-generation sequencing genotyping method for *Cyclospora cayetanensis* (eight marker sequence typing) for use with DNA of this parasite isolated from oocyst-contaminated produce samples.

Extensive evaluation of an in-house ITS-1 amplicon-based next-generation sequencing method for the high resolution identification of all *Trichinella* taxa present in mixed infections, using wildlife-derived isolates and preparations of laboratory strains of different genotypes mixed in varying proportions.

12. Additional comments regarding your report: