

# OIE Collaborating Centres Reports Activities

## *Activities in 2021*

**This report has been submitted : 2022-01-19 18:00:39**

|  |   |
|--|---|
| <b>Title of collaborating centre:</b>  | Food-Borne Zoonotic Parasites   |
| <b>Address of Collaborating Centre:</b>  | Canadian Food Inspection Agency (CFIA) 116 Veterinary Road<br>Saskatoon Saskatchewan S7N 2R3 CANADA |
| <b>Tel.:</b>   | +1 306 385-7818   |
| <b>Fax:</b>  | +1 306 385-7866   |
| <b>E-mail address:</b>   | brad.scandrett@inspection.gc.ca   |
| <b>Website:</b>  |   |
| <b>Name of Director of Institute<br/>(Responsible Official):</b>   | David McKinnon, Director, CFIA Saskatoon Laboratory   |
| <b>Name (including Title and Position)<br/>of Head of the Collaborating Centre<br/>(formally OIE Contact Point):</b> | Brad Scandrett, Head, Centre for Food-borne and Animal<br>Parasitology, CFIA Saskatoon Laboratory   |
| <b>Name of writer:</b>   | Brad Scandrett  |

**ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories**

**ToR: To identify and maintain existing expertise, in particular within its region**

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

| <b>Disease control</b>  |  |
|---|--|
| <b>Title of activity</b>  | <b>Scope</b>   |
| Ongoing provision of diagnostic services and scientific advice to CFIA Science, Policies and Programs, and Operations Branches  | Domestic or import disease investigations pertaining to food-borne zoonotic parasites, including Cyclospora (non-zoonotic), Cryptosporidium, Toxoplasma, Giardia, Taenia saginata/Cysticercus bovis and Trichinella spp.   |
| <b>Epidemiology, surveillance, risk assessment, modelling</b>   |  |
| <b>Title of activity</b>  | <b>Scope</b>   |
| Ongoing provision of scientific advice pertaining to risk analyses for food-borne parasites   | Risk management of bovine cysticercosis (Taenia saginata), Echinococcus, Trichinella, Cyclospora, zoonotic coccidia, and Giardia   |
| 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   | 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 |
| <b>Training, capacity building</b>  |  |
| <b>Title of activity</b>  | <b>Scope</b>   |
| Ongoing scientific support, proficiency assessment, and capacity building of industry, academic institute, and territorial authorities analysts to perform artificial digestion assay for Trichinella in pork, horse meat or wildlife, including walrus meat (a food safety concern in northern Canada) | Trichinella spp. from domestic and wildlife sources  |
| Ongoing internal training and proficiency assessment of CFIA analysts for the detection of food-borne parasites   | Cyclospora, zoonotic coccidia, Giardia, Taenia saginata, and Trichinella spp.  |
| Ongoing internal capacity building to further enhance expertise in NGS/WGS for food-borne parasites   | Cyclospora and Trichinella spp.  |
| 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  | Trichinella spp., Echinococcus spp. and Toxoplasma   |
| <b>Diagnosis, biotechnology and laboratory</b>  |  |

| Title of activity   | Scope  |
|---|--|
| Ongoing routine diagnosis and monitoring/surveillance of food-borne parasites for domestic disease control, food safety, and import/export purposes | Detection and diagnosis of various food-borne parasites by direct (microscopic examination, digestion assay, PCR) and indirect (serological) methods, including zoonotic coccidia, Cyclospora, Giardia, zoonotic taeniids, and Trichinella   |
| Development, optimization, standardization, and/or validation of methods to detect and identify food-borne zoonotic parasites                       | Optimization and validation of molecular methods to identify and confirm genotypes of single Trichinella larvae from wildlife and domestic livestock; Validation of an in-house-developed Western blot assay as a confirmatory test for the detection of antibodies to Trichinella spp. in swine sera; Application of next-generation sequencing methodology in developing streamlined protocols for high-resolution genotyping of parasites of public health concern; Development and validation of molecular detection methods for Cryptosporidium spp. and Toxoplasma gondii in leafy greens and berry fruits |

**ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty**

**2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare**

| Proposal title   | Scope/Content   | Applicable area   |
|--|---|---|
| Optimization and validation of molecular methods to identify and confirm genotypes of single Trichinella larvae from wildlife and domestic livestock           | Completed validation of ICT-recommended mPCR and ancillary molecular methods (e.g. sequencing) to identify first stage larvae of all Trichinella spp., including the recently described T. chanchalensis                                    | <input checked="" type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare |
| Validation of an in-house-developed Western blot assay as a confirmatory test for the detection of antibodies to Trichinella spp. in swine sera                | Completed validation of WB confirmatory assay for Trichinella in pigs   | <input checked="" type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare |
| Application of next-generation sequencing methodology in developing streamlined protocols for high-resolution genotyping of parasites of public health concern | 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 Trichinella spp. comprising mixed infections in a muscle tissue sample | <input checked="" type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare |
| Development and validation of molecular detection methods for Cryptosporidium spp. and Toxoplasma gondii in leafy greens and berry fruits                      | Ongoing efforts to develop and validate improved molecular methods for the detection and identification of food-borne protozoan parasites   | <input type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare            |
| Development of an international (ISO) standard for the detection of Cyclospora cayetanensis in food (ongoing)  | 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  | <input type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare            |

|  |   |   |
|--|---|---|
| Development and validation of serological assays for the detection of Toxoplasma and Echinococcus spp. in wildlife (ongoing) | Final year of collaboration with University of Saskatchewan, Canada on graduate studies entailing detection of Toxoplasma and Echinococcus spp. in wildlife and other animal host species | <input checked="" type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare |
| Ecology and biology of a new species of Trichinella (T. chanchalensis) in the North American Arctic                          | New collaboration with University of Saskatchewan, Canada on graduate studies entailing detection and further characterization of the recently described Trichinella chanchalensis        | <input checked="" type="checkbox"/> Surveillance and control of animal diseases<br><input checked="" type="checkbox"/> Food safety<br><input type="checkbox"/> Animal welfare |

**ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines**

**ToR: To carry out and/or coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations**

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

Yes

| Name of OIE CC/RL/other organisation(s)  | Location               | Region of networking Centre   | Purpose  |
|--|------------------------|---|--|
| OIE Collaborating Centre for Food-Borne Zoonotic Parasites from the European Region                    | Maisons-Alfort, France | <input type="checkbox"/> Africa<br><input type="checkbox"/> Americas<br><input type="checkbox"/> Asia and Pacific<br><input checked="" type="checkbox"/> Europe<br><input type="checkbox"/> Middle East | Exchange of scientific information on food-borne parasites and proficiency testing (PT) samples (Trichinella) via joint participation in interlaboratory PT, symposium session (European Multicolloquium of Parasitology) on network CC activities, and membership in International Commission on Trichinellosis |
| OIE Collaborating Centre for Food-Borne Zoonotic Parasites from the Asia-Pacific Region                | Changchun, China       | <input type="checkbox"/> Africa<br><input type="checkbox"/> Americas<br><input checked="" type="checkbox"/> Asia and Pacific<br><input type="checkbox"/> Europe<br><input type="checkbox"/> Middle East | Exchange of scientific information on food-borne parasites via joint participation in symposium session (European Multicolloquium of Parasitology) on network CC activities and membership in International Commission on Trichinellosis   |
| OIE Reference Laboratory for Trichinellosis, European Union Reference Laboratory for Parasites (EURLP) | Rome, Italy            | <input type="checkbox"/> Africa<br><input type="checkbox"/> Americas<br><input type="checkbox"/> Asia and Pacific<br><input checked="" type="checkbox"/> Europe<br><input type="checkbox"/> Middle East | Exchange of scientific advice via shared roles as OIE Reference Laboratories for Trichinellosis and membership in the International Commission on Trichinellosis   |

**4. Did your Collaborating Centre maintain a network with other OIE 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   |
|---|-------------------|---|---|
| OIE Collaborating Centre for Research, Diagnosis and Surveillance of Wildlife Pathogens (Canadian Wildlife Health Cooperative/CWHC) | Saskatoon, Canada | <input type="checkbox"/> Africa<br><input checked="" type="checkbox"/> Americas<br><input type="checkbox"/> Asia and Pacific<br><input type="checkbox"/> Europe<br><input type="checkbox"/> Middle East | Exchange of scientific information and collection of wildlife samples for ongoing sylvatic Trichinella surveillance |

**ToR: To place expert consultants at the disposal of the OIE.**

**5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?**

Yes

| Name of expert | Kind of consultancy     | Subject   |
|----------------|-------------------------|---|
| Brad Scandrett | Review of OIE standards | Invited expert review (to be conducted jointly with expert from OIE Reference Laboratory in Rome) of OIE Terrestrial Manual Chapter 3.1.21 'Trichinellosis' |

**ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries**

**6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?**

Yes

- a) Technical visits: 0
- b) Seminars: 4
- c) Hands-on training courses: 2
- d) Internships (>1 month): 3

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

|     |  |         |   |
|-----|--|---------|---|
| b   | Webinars pertaining to Trichinella biology and detection for industry and Nunavik candidate analysts   | Canada  | 4 |
| c,d | Ongoing provision of scientific advice on detection methods for Echinococcus spp. to PhD student in final year(s) of their graduate program (University of Saskatchewan) | Nigeria | 1 |
| c,d | Ongoing provision of scientific advice on detection methods for Toxoplasma to PhD student in final year(s) of their graduate program (University of Saskatchewan)        | Mexico  | 1 |
| d   | Training of new PhD student (University of Saskatchewan) in detection methods for Trichinella spp.   | Canada  | 1 |

***ToR: To organise and participate in scientific meetings and other activities on behalf of the OIE***

**7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?**

No

***ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty***

**8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE**

a) Articles published in peer-reviewed journals: 3

Harms, N.J., Larivee, M., Scandrett, B., Russell, D. 2021. High prevalence and intensity of Trichinella infection in Yukon black (Ursus americanus) and grizzly (Ursus arctos) bears. Journal of Wildlife Diseases, 57(2):429-433

Lalonde, L., Xie, V., Oakley, J.R., Lobanov, V.A. 2021. Optimization and validation of a loop-mediated isothermal amplification (LAMP) assay for detection of Giardia duodenalis in leafy greens. Food and Waterborne Parasitology 23: e00123. Special issue: Protozoa molecular tools.

Pilfold, N.W., Richardson, E.S., Ellis, J., Jenkins, E., Scandrett, W.B., Hernandez-Ortiz, A., Buhler, K., McGeachy D., Al-Adhami, B., Konecsni, K., Lobanov, V.A., Owen, M.A., Rideout, B., Lunn, N.J. 2021. Long-term increases in pathogen seroprevalence in polar bears (Ursus maritimus) influenced by climate change. Global Change Biology, 27(19): 4481-4497.

\*A manuscript entitled 'Performance of indirect enzyme-linked immunosorbent assay using Trichinella spiralis-derived serpin as antigen for the detection of Trichinella spp. infection in swine'(Corresponding Author: Dr. Vladislav Lobanov; Co-Authors: Kelly A. Konecsni, Randy W. Purves, W. Brad Scandrett) was submitted on December 20, 2021 for publication in the journal Veterinary Parasitology.

\*A manuscript entitled 'Are foxes good sentinel species for Toxoplasma gondii? Exposure, prevalence and risk factors in foxes (Vulpes spp.) of northern Canada.'(Corresponding Author: Émilie Bouchard; Co-Authors: Rajnish Sharma, Adrián Hernández-Ortiz, Kayla Buhler, Batol Al-Adhami, Chunlei Su, Heather Fenton, Ellen Avard, Jim Roth, Chloé Warret Rodrigues, Matilde Tomaselli, Carla Pamak, Audrey Simon, Nicholas Bachand, Patrick

Leighton, Emily Jenkins) was submitted on January 13, 2022 for publication in the journal Parasites and Vectors.

\*An invited manuscript entitled 'Validation and implementation of US-FDA method for detection of Cyclospora cayetanensis in fresh produce in a Canadian Food Inspection Agency laboratory' (Laura F Lalonde et al.) has been drafted for submission to a Special Issue in the journal Microorganisms entitled 'Cyclospora cayetanensis and Cyclosporiasis'.

b) International conferences: 3

Nicholas W. Pilfold, Evan S. Richardson, John Ellis, Emily Jenkins\*, W. Brad Scandrett, Adrián Hernández-Ortiz, Kayla Buhler, David McGeachy, Batol Al-Adhami, Kelly Konecsni, Vladislav A. Lobanov, Megan A. Owen, Bruce Rideout, Nicholas J. Lunn. 2021. Climate and long term trends in parasite seroprevalence in polar bears (*Ursus maritimus*) in the western Canadian Arctic. WAAVP (28), virtual oral presentation, 19th-22nd July, 2021, Dublin, Ireland.

Nicholas W. Pilfold, Evan S. Richardson, John Ellis, Emily Jenkins\*, W. Brad Scandrett, Adrián Hernández-Ortiz, Kayla Buhler, David McGeachy, Batol Al-Adhami, Kelly Konecsni, Vladislav A. Lobanov, Megan A. Owen, Bruce Rideout, Nicholas J. Lunn. 2021. Climate and long term trends in parasite seroprevalence in polar bears (*Ursus maritimus*) in the western Canadian Arctic. The Virtual 69th WDA /14th EWDA 2021 Joint Conference, oral presentation, August 31-September 2, Cuenca, Spain.

W. Brad Scandrett\*, Batol Al-Adhami, Kelly Konecsni, Laura Lalonde, Vladislav Lobanov, Patrick Fries. OIE Collaborating Centre Activities at the Canadian Food Inspection Agency's Centre for Food-borne and Animal Parasitology. European Multicolloquium of Parasitology (EMOP XIII), virtual oral symposium presentation (invited), October 12-16, 2021, Belgrade, Serbia.

c) National conferences: 0

d) Other

(Provide website address or link to appropriate information): 4

'Cyclospora cayetanensis testing at the CFIA Saskatoon Laboratory'. Virtual presentation (translated in Spanish/English) in microbiology webinar organized by CFIA International Affairs Branch with Guatemalan industry, government and academia. Laura Lalonde, March 12, 2021.

'CFIA Saskatoon Laboratory Cyclospora Research and Produce Surveillance'. Virtual presentation in U.S. Centre for Produce Safety Research Symposium Webinar Series. Laura Lalonde, June 22, 2021.

'Case Report Photo Quiz (Trichinellosis): 38-year-old man with fever and abdominal symptoms'. Martin Cheung, BSc(1); Daisy Yu, BSc, MLT(1), Tracy Chan, BSc(1), Navdeep Chahil, BSc, RT(1), Christine Tchao, BMLSc(1), Michael Slatnik, MD, MPH(2), Shobhit Maruti, MD, MPH(3), Nina Sidhu, BSN(3), Brad Scandrett, DVM, MSc(4), Natalie Prystajeky, PhD(1,5), Muhammad G. Morshed, PhD(1,5), Catherine A. Hogan MD, MSc(1,5)

1British Columbia Centre for Disease Control Public Health Laboratory, Vancouver, British Columbia, Canada.

2Boundary District Hospital, Grand Forks, British Columbia, Canada.

3Interior Health Authority, Vernon, British Columbia, Canada.

4Canadian Food Inspection Agency, Saskatoon, Saskatchewan, Canada.

5Department of Pathology and Laboratory Medicine, Vancouver, British Columbia, Canada.

'With a little help from my friends: Collaboration between CFIA and US FDA to validate and implement a harmonized method for Cyclospora surveillance in produce'. Virtual presentation at Federal Food Safety and Nutrition Research Forum. Laura Lalonde, December 7, 2021.

## 9. Additional comments regarding your report: