

WOAH Collaborative Centre Reports Activities 2023

Activities in 2023

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Centre Information

Title of WOA Collaborating Centre	Food-Borne Zoonotic Parasites Europa
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Name of the writer:	Isabelle Vallée

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

Category	Title of activity	Scope
Disease control (true)	1/ Confirmation of diagnosis 2/ Scientific advises	1/ Activity of confirmation regarding official control of meat for <i>Trichinella</i> spp muscle larvae 2/ Scientists provide advices or expertise at the request of : - the Ministry of Agriculture for regulatory aspects; - Anses for drafting of opinions; - Accreditation body for quality assurance; - routine labs for their accreditation; - EFSA, for writing annual reports on foodborne parasitic zoonosis such as <i>Trichinella</i> and <i>Toxoplasma</i> .
Epidemiology, surveillance, risk assessment, (true)	1/ Surveillance of <i>Trichinella</i> circulation within livestock, domestic animals and wildlife 2/ Risk assessment analysis for <i>Toxoplasmosis</i> prevention	1/ Official test by artificial digestion of meat allows the monitoring of the parasite circulation in pigs, horses and wildboars. A passive surveillance is also carried out through the control of some wild animals such as wolves or foxes. 2/ Participation to EU research program for detection of <i>Toxoplasma</i> oocysts in fresh & ready to eat vegetables and participation to risk assessment analysis.
		1/ A training session was organized on site to train technical staff to detect <i>Trichinella</i> larvae in meat (ISO 18743) 2/ Laboratories' performance was evaluated for <i>Trichinella</i> detection in meat.

Training, capacity building (true)	1/ Training courses for Trichinella detection in meat 2/ Organisation of a ring trial for Trichinella detection in meat in French labs 3/ Organisation of an international ring trial for Trichinella detection in meat 4/ Provision of reference samples	Successful results allowed laboratories to get their agreement and accreditation delivered by competent authorities according to the ISO 17025 and ISO18743. 3/ This ring test was organised at the request of private or public laboratories in Europe region for the validation of their staff's qualifications. 4/ Proficiency samples for Trichinella test habilitation of analysts were provided upon request to laboratories in Europe and the WOAAH CC in Canada. These samples allowed analysts to practice the official tests, to evaluate their individual performance and maintain their habilitation.
Zoonoses (true)	1/ Research programs for improvement of foodborne parasites detection or control: 2/ Research programs for innovative and natural treatments	1/ Development of tools for a/ detection of foodborne parasites (Trichinella, Toxoplasma, Cryptosporidium, Giardia) in different matrices; b/ vaccination of pigs against Trichinella. 2/ Development of new therapeutic approaches to control Cryptosporidium or Giardia in animals.
Wildlife (true)	Epidemiological investigations	Passive collection of data regarding the circulation of Trichinella spp, Toxoplasma gondii, Toxocara spp in wildlife such as wild boars foxes, raccoon dogs.
Diagnosis, biotechnology and laboratory (true)	1/ Diagnosis of Foodborne zoonotic parasites 2/ Reference and expertise activities on foodborne zoonotic parasites	1/ Identification and confirmation analysis of free parasites or within different matrices (meat, serum, feces) by direct methods, serological or molecular typing (Trichinella spp, Anisakidae, Toxoplasma gondii, Cryptosporidium spp, Giardia). 2/ Development of new tools to detect and control parasites (Trichinella spp, Toxocara spp, Toxoplasma gondii, Cryptosporidium spp, Giardia duodenalis)
Vaccines (true)	Development of vaccines to protect target animal species	Research programs are underway to develop vaccines against Trichinella in pigs and Toxoplasma gondii in cats
Food security (true)	Foodborne protozoan detection on fresh vegetables	Ongoing research programs for improvement of protozoan detection on food matrices such as fresh green leaf salads (ready to eat).

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
Development of tests to detect Trichinella infected animals	Improvement of reliable serological tests to detect infected pigs are needed for surveillance of indoors pigs reared in officially recognised holdings applying controlled housing conditions.	Laboratory expertise health management Animal production

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

No

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

Yes

Name of WOAAH CC/RL/other	Region of

organisation(s)	Location	networking Centre	Purpose
WOAH Collaborating Centre for Foodborne zoonotic parasites	Saskatoon, Canada	Americas	- scientific collaborations; - exchange of proficiency samples (Trichinella); - members of the executive committee of the International Commission on Trichinellosis.
WOAH Collaborating Centre for Foodborne zoonotic parasites from Asia-Pacific	Changchun, China	Asia and Pasific	- scientific collaborations; - members of the executive committee of the International Commission on Trichinellosis.
WOAH Reference Laboratory for Trichinellosis	Roma, Italy	Europe	- scientific collaborations; - scientific expertise on trichinella diagnosis; - sharing expertise for EFSA's annual report on Trichinella.
/	/	/	/

TOR4 AND 5: NETWORKING AND COLLABORATION

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

Yes

Name of WOAHC CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WHO Collaborating Centre for Host - Schistosoma Interactions	Perpignan, France	Europe	Scientific research collaborations on biology of schistosoma hybrides, circulating in Africa and emerging in Corsica (France).
/	/	/	/

TOR6: EXPERT CONSULTANTS

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

No

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

We provided reference materials regarding Trichinella detection to several european countries: proficiency samples, and antigens.

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

Yes

a) Technical visit : 1

b) Seminars : 1

c) Hands-on training courses: 0

d) Internships (>1 month) : 0

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
A	Training on Toxoplasma detection	Romania	1
B	Circulation of Toxoplasma and trichinella in Romania	Romania	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?

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	2nd Internal meeting of the Foodborne Zoonotic Parasites OIE Collaborating Centres	WOAH CC for Foodborne zoonotic parasites : Canada and RP China	2023-12-20	Virtual	25

TOR9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

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1. Brosseau, N.E., I. Vallée, A. Mayer-Scholl, M. Ndao, G. Karadjian. 2023. "Aptamer-Based Technologies for Parasite Detection." *Sensors* (2), 562.

<https://doi.org/10.3390/s23020562>.

2. Dámek, F., A. Swart, H. Waap, P. Jokelainen, D. Le Roux, G. Deksné, H. Deng, G. Schares, A. Lundén, G. Álvarez-García, M. Betson, R. K. Davidson, A. Györke, D. Antolová, Z. Hurníková, H. J. Wisselink, J. Sroka, J. W. B. van der Giessen, R. Blaga, M. Opsteegh. 2023. "Systematic Review and Modelling of Age-Dependent Prevalence of *Toxoplasma gondii* in Livestock, Wildlife and Felids in Europe." *Pathogens*, 12(1), 97. <https://doi.org/10.3390/pathogens12010097>.

3. Blaga, R., V. Fabres, V. Leynaud, J. Fontaine, E. Reyes-Gomez, A. Briand, O. Crosaz, I. Lagrange, A. Blaizot, D. Le Roux, V. Risco Castillo, P. Maksimov, J. Guillot, J.-P. Teifke, G. Schares. 2023. "Toxoplasma gondii and Alternaria sp.: An Original Association in an Immunosuppressed Dog with Persistent Skin Lesions." *Case Reports Pathogens* 12(1):114. <https://doi.org/10.3390/pathogens12010114>.

4. López-Ureña, N.-M., R. Calero-Bernal, N. González-Fernández, R. Blaga, B. Koudela, L.-M. Ortega-Mora, G. Álvarez-García. 2023. "Optimization of the most widely used serological tests for a harmonized diagnosis of *Toxoplasma gondii* infection in domestic pigs." *Veterinary Parasitology* (322): 110024. <https://doi.org/10.1016/j.vetpar.2023.110024>.

5. Kauter, J., F. Damek, G. Schares, R. Blaga, F. Schott, P. Deplazes, X. Sidler, W. Basso. 2023. "Detection of *Toxoplasma gondii*-specific antibodies in pigs using an oral fluid-based commercial ELISA: Advantages and limitations." *International Journal Parasitology* 53(9):523-530. <https://doi.org/10.1016/j.ijpara.2022.11.003>.

6. Dámek, F., B. Fremaux, D. Aubert, S. Thoumire, M. Delsart, J.-L. Martin, S. Vuillermet, M. Opsteegh, P. Jokelainen, D. Le Roux, P. Boireau, I. Villena, R. Blaga. 2023. "Inactivation of *Toxoplasma gondii* in dry sausage and processed pork, and quantification of the pathogen in pig tissues prior to production." *Food Waterborne Parasitology* <https://doi.org/10.1016/j.fawpar.2023.e00194>.

7. Paștiu, A. I., V. Mircean, A. Mercier, K. Passebosc-Faure, N. Plault, M.-L. Dardé, R. Blaga, I. Villena, D. L. Pusta, A. Cozma-Petruț, A. Györke. 2023. "Toxoplasma gondii infection in sheep from Romania." *Parasites & Vectors*. 16(1):24. <https://doi.org/10.1186/s13071-022-05634-8>.

8. Adjou, K. T., A. Chevillot, P. Lucas, Y. Blanchard, H. Louifi, R. Arab, M. Mammeri, M. Thomas, B. Polack, G. Karadjian, N. M. Dheilly. 2023. "First identification of *Cryptosporidium parvum* virus 1 (CSpV1) in various subtypes of *Cryptosporidium parvum* from diarrheic calves, lambs and goat kids from France." *Veterinary Research* 54(1):66. <https://doi.org/10.1186/s13567-023-01196-4>.

9. Peju, M., B. Granier, C. Garnaud, M.-P. Brenier-Pinchart, I. Vallée, A. Chevillot, C. Mérel, F. Chereau, M. Deher, O. Rogeaux, H. Yera. 2023. "A *Trichinella britovi* outbreak in the Northern Alps of France: investigation by a local survey network." *Parasite* 30:14. <https://doi.org/10.1051/parasite/2023017>.

10. Li, C., Y. Liu, X. Liu, X. Bai, X. Jin, F. Xu, H. Chen, Y. Zhang, I. Vallée, M. Liu, Y. Yang. 2023. "The gut microbiota contributes to changes in the host immune response induced by *Trichinella spiralis*." *PLoS Neglected Tropical Diseases*. 17(8). <https://doi.org/10.1371/journal.pntd.0011479>.

11. Sahraoui, L., M. Mammeri, M. Thomas, A. Chevillot, B. Polack, I. Vallée, J. Follet, H. Ain-Baaziz, K.T. Adjou. 2023. "Identification of *Cryptosporidium parvum* Ila and IId zoonotic subtype families and *Cryptosporidium bovis* from calves in Algeria." *Revue d'élevage et de médecine vétérinaire des pays tropicaux*. (76): 1-6. <https://doi.org/10.19182/remvt.37159>.

12. Ning, C., A. Heckmann, L. Mateos-Hernandez, G. Karadjian, L. Simo. 2023. "Functional characterization of three G protein-coupled acetylcholine receptors in parasitic nematode *Trichinella spiralis*." *International Journal for Parasitology: Drugs and Drug Resistance*. <https://doi.org/10.1016/j.ijpdr.2023.11.005>.
13. Shi, W., Q. Xu, Y. Liu, Z. Hao, Y. Liang, I. Vallée, X. You, M. Liu, X. Liu, N. Xu. 2023. "Immunosuppressive ability of *Trichinella spiralis* adults can ameliorate Type 2 inflammation in a murine allergy model." *Journal of Infectious Diseases*. <https://doi.org/10.1093/infdis/jiad518>.
14. Cresson P, Bourgou O, Cordier R, Couvreur C, Rouquette M, Gay M. 2023. Fish length, diet, and depth drive Anisakis levels in a zooplankton-feeding fish. *Can J Fish Aquat Sci*, <https://doi.org/10.1139/cjfas-2022-0272>.
15. Duflot M, Cresson P, Julien M, Chartier L, Bourgou O, Palomba M, Mattiuci S, Midelet G, Gay M. 2023. Black spot diseases in seven commercial fish species from the English Channel and the North Sea: infestation levels, identification and population genetics of *Cryptocotyle* spp. *Parasite*, <https://doi.org/10.1051/parasite/2023028>.

b) International conferences:

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1. Adjou K.T., A. Chevillot, P. Lucas, Y. Blanchard, H. Louifi, R. Arab, M. Mammeri, M. Thomas, B. Polack, G. Karadjian, N. Dheilly. 2023. "First identification of *Cryptosporidium parvum* virus 1 (CSpV1) in various subtypes of *Cryptosporidium parvum* from diarrheic calves, lambs and goat kid." Annual meeting of the European Veterinary Parasitology, ENVA, Maisons-Alfort, France. 29-30 June.
2. Mammeri M., A. Chevillot, I. Chenafi, M. Thomas, C. Julien, I. Vallée, B. Polack, J. Follet, K.T. Adjou. 2023. "High occurrence of *Cryptosporidium parvum* zoonotic subtypes in diarrheic calves in France." Annual meeting of the European Veterinary Parasitology, ENVA, Maisons-Alfort, France. 29-30 June.
3. Mammeri M., B. Polack, K.T. Adjou. 2023. « Le concept « One-Health » : exemple de la cryptosporidiose zoonotique en Algérie. » 3e Webinaire International Sécurité Alimentaire et Santé Animale Enjeux et perspectives de la mise en œuvre de l'approche One Health en Algérie. Ecole Nationale Supérieure Vétérinaire d'Alger, Alger, Algérie. 9-10 juillet.
4. Boucard A.S., S. Chaouch, P. Langella, B. Polack, I. Florent, L.G. Bermúdez-Humarán. 2023. "Probiotics against *Giardia*: a promising future control alternative." *Lactic Acid Bacteria Biology, Symbioses and Applications Gordon Research Conference*, Ventura (CA), Etats-Unis, 23-28 July.
5. Vallée I., A. Chevillot, A. Blaizot, A. Heckmann, L.-L. Estevez, M. Laurentie, M. Marsot. 2023. "Analysis of historical data for *Trichinella* proficiency testing: towards the definition of performance evaluation standards for routine laboratories." 16th International Conference on Trichinellosis, Belgrade, Serbie, 30 August-1 September.
6. Mammeri M., B. Polack. 2023. « Communication en parasitologie vétérinaire et médicale sous le concept « One Health » ». 2ème Journée Scientifique Internationale sur les maladies infectieuses zoonotiques des carnivores domestiques : du diagnostic à la thérapeutique, Alger, Algérie, 21 octobre.
7. Adjou KT, A. Chevillot, P. Lucas, Y. Blanchard, H. Louifi, R. Arab, M. Mammeri, M. Thomas, B. Polack, G. Karadjian, N. Dheilly. 2023. "First identification of *Cryptosporidium parvum* virus 1 (CSpV1) in various subtypes of *Cryptosporidium parvum* from diarrheic calves, lambs and goat kid." Ecole Nationale Supérieure d'Alger (ENSV), Alger, Algérie, 14 octobre.
8. Sahraoui, L., M. Mammeri, A. Chevillot, M. Thomas, I. Vallée, B. Polack, H. Ain-Baaziz, K.T. Adjou. 2023. « Étude de l'effet des polysaccharides naturels (chitosans) in vitro sur *Cryptosporidium parvum* caractérisé chez l'agneau en Algérie. » 4th International HASAC Lab Conference on *Cryptosporidium* spp., *Giardia duodenalis* and veterinary public health." Ecole Nationale Supérieure d'Alger (ENSV), Alger, Algérie, 14 octobre.
9. Benseghir, H., D. Hezi, L. Benammar, T. Beloucif, R. Abidi, N. Bazizi, H. Abdelmadji, S. Zaidi, M. Mohamed. 2023. "Epidemiological study of giardiasis and cryptosporidiosis in the Batna region." 4th International HASAC Lab Conference on *Cryptosporidium* spp., *Giardia duodenalis* and veterinary public health." Ecole Nationale Supérieure d'Alger (ENSV), Alger, Algérie, 14 octobre.
10. Mammeri, M., B. Polack. 2023. « La giardiose du chien, quelle est la conduite à tenir ? » 4th International HASAC Lab Conference on *Cryptosporidium* spp., *Giardia duodenalis* and veterinary public health." Ecole Nationale Supérieure d'Alger (ENSV), Alger, Algérie, 14 octobre.
11. Duflot M, Midelet G, Cresson P, Bourgou O, Gay M. 2023. *Metacercariae* infestation levels of *Cryptocotyle* (trematode) isolated from commercial fish species sampled in the English Channel and the North Sea, Collège européen de Parasitologie Vétérinaire, 29-30 juin. Maisons-Alfort, France

c) National conferences:

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1. Mammeri M., A. Chevillot, C. Julien, B. Polack, T. Pollet, K.T. Adjou. 2023. "Effects of live yeast (*Saccharomyces cerevisiae*) supplementation in the prevention of cryptosporidiosis and remodeling gut microbiota in the experimental neonate goat model." 12èmes journées du consortium anti-parasitaire et fongique « Zoonoses : évaluation des risques et stratégies thérapeutiques » - CaPF 2023, Tours, France, 4-5 avril.
2. Florent I., B. Polack, L. Bermúdez-Humarán. 2023. « Probiotics against *Giardia*, which therapeutic future? ». 12èmes journées du consortium anti-parasitaire et fongique « Zoonoses : évaluation des risques et stratégies thérapeutiques » - CaPF 2023, Tours, France, 4-5 avril.
3. Ning C., A. Heckmann, L. Mateos-Hernandez, G. Karadjian, L. Simo. 2023. "Première caractérisation fonctionnelle de récepteurs muscariniques chez *Trichinella spiralis*." Congrès délocalisé des Sociétés Françaises de Parasitologie et de Mycologie Médicale, Marrakech, Maroc, 24-27 mai.
4. Adjou K.T. 2023. « La cryptosporidiose chez les ruminants en France : actualités. » Réunion des Groupements Techniques Vétérinaires de Région PACA & Virbac (en visio), 26 octobre.
5. Adjou KT, A. Chevillot, P. Lucas, Y. Blanchard, H. Louifi, R. Arab, M. Mammeri, M. Thomas, B. Polack, G. Karadjian, N. Dheilly. 2023. « Virus des cryptosporidies. » Séance de l'Académie vétérinaire de France sur les nouveaux paradigmes en parasitologie médico-vétérinaire, Maisons-Alfort, France, 7 décembre.
6. Mammeri M., L. Cartou, A. Chevillot, M. Thomas, C. Julien, I. Vallée, B. Polack, J. Follet, K.T. Adjou. 2023. "First report of *Cryptosporidium parvum* zoonotic hypertransmissible subtype IlaA15G2R1 in diarrheic lambs in France." Journée scientifique ENVA, Maisons-Alfort, France, 18 septembre.
7. K.T. Adjou, A. Chevillot, P. Lucas, Y. Blanchard, H. Louifi, R. Arab, M. Mammeri, M. Thomas, B. Polack, G. Karadjian, N. Dheilly. 2023. "First identification of *Cryptosporidium parvum* virus 1 (CSpV1) in various subtypes of *Cryptosporidium parvum* from diarrheic calves, lambs and goat kids from France." Journée de la Recherche de l'Ecole Nationale Vétérinaire d'Alfort, Maisons-Alfort, France, 18 septembre.
8. Duflot M, Cresson P, Bourgou O, Midelet G, Gay M. 2023. Etude des communautés parasitaires responsables de la maladie des points noirs en Manche Orientale et en mer du Nord, cas spécifique de *Cryptocotyle* spp. chez sept espèces de poissons commerciales. 18ème congrès de la Société Française de Microbiologie. Rennes, France, 4 - 6 octobre.
9. Duflot M, Midelet G, Cresson P, Gay M. 2023. Évaluation des niveaux d'infections et de la diversité de *Cryptocotyle* spp., trématode parasite, de poissons échantillonnés en Manche Orientale et en mer du Nord. Journée de la Recherche de l'école Nationale Vétérinaire d'Alfort. Maisons-Alfort, France, 18 septembre.

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

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

Developp new research expertise on extracellular vesicles as a new tool to a better understanding host-parasites interactions as well as a future tool for sero-detection of infected animals.

12. Additional comments regarding your report: