WOAH Collaborative Centre Reports Activities 2022

Activities in 2022

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Centre Information

Title of WOAH Collaborating Centre	Foodborne Zoonotic Parasites
Address of WOAH Collaborating Centre	14, rue Pierre et Marie Curie, 94701 Maisons-Alfort cedex, FRANCE
Tel.:	+33 (0)1 49 77 13 50
E-mail address:	isabelle.vallee@anses.fr
Website:	www.anses.fr
Name Director of Institute (Responsible Official):	Pr Benoit Vallet
Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Dr Isabelle Vallée, Head of the French NRL for Foodborne Zoonotic Parasites
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 WOAH

Disease control	
Title of activity	Scope

Confirmation of diagnosis	Activity of confirmation regarding official control of meat for Trichinella larvae.
Disease control	
Title of activity	Scope
Scientific advises	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.
Epidemiology, surveillance, risk assessment	
Title of activity	Scope
Surveillance of Trichinella circulation within livestock, domestic animals and wildlife	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.
Training, capacity building	
Title of activity	Scope
Training courses for Trichinella detection in meat	Two training sessions were organized on site to train technical staff to detect Trichinella larvae in meat (ISO 18743)
Training, capacity building	
Title of activity	Scope
Organisation of a ring trial for Trichinella detection in meat in French labs	Laboratories' performance was evaluated for Trichinella detection in meat. Successful results allowed laboratories to get their agreement and accreditation delivered by competent authorities according to the ISO 17025 and ISO18743.
Training, capacity building	
Title of activity	Scope
Organisation of an international ring trial for Trichinella detection in meat	This ring test was organised at the request of private or public laboratories in Europe region for the validation of their staff's qualifications.
Training, capacity building	
Title of activity	Scope
	Proficiency samples for Trichinella test habilitation of analysts were provided upon request to laboratories in Europe and the

Provision of reference samples	WOAH CC in Canada. These samples allowed analysts to practice the official tests, to evaluate their individual performance and maintain their habilitation.
Zoonoses	
Title of activity	Scope
Research programs for improvement of foodborne parasites detection	Development of innovative tools to detect foodborne parasites (Trichinella, Toxoplasma, Cryptosporidium, Giardia) in different matrices.
Zoonoses	
Title of activity	Scope
Research programs for innovative and natural treatments	Development of new therapeutic approaches to control Cryptosporidium or Giardia in animals.
Epidemiology, surveillance, risk assessment	
Title of activity	Scope
Risk assessment analysis for Toxoplasmosis prevention	Participation in a EU research program for detection of Toxoplasma oocysts in ready-to-eat salads (passive surveillance) and participation to risk assessment analysis.
Wildlife	
Title of activity	Scope
Epidemiological investigations	Passive collection of data regarding the circulation of Trichinella spp, Toxoplasma gondii, Toxocara spp in wildlife such as wild boars.
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Diagnosis of Foodborne zoonotic parasites	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, Giarda).
Diagnosis, biotechnology and laboratory	
Title of activity	Scope
Reference and expertise activities on foodborne zoonotic	Development of new tools to detect and control parasites (Trichinella spp, Toxocara spp, Toxoplasma gondii,

parasites	Cryptosporidium spp, Giardia duodenalis)

Vaccines	
Title of activity	Scope
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 safety	
Title of activity	Scope
Foodborne protozoan detection on fresh vegetables	Ongoing research programs for improvement of protozoan detection on food matrices such as fresh green leaf salads.

TOR3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main fucus 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.	Animal production

4. Did your Collaborating Centre maintain a network with other WOAH 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
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; - training of Chinese PhD student; - 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 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
WHO Collaborating Centre for Host - Schistosoma Interactions	Perpignan, France	Europe	Scientific research program on biology of schistosoma hybrides, circulating in Africa and emerging in Corsica (France).
European Union Reference Laboratory for Parasites	Roma, Italy	Europe	- Development of tools to improve Cryptosporidium and Giardia detection.

TOR6: EXPERT CONSULTANTS

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

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 in meat to several european countries.

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

Yes

a) Technical visit :

b) Seminars :

c) Hands-on training courses: 1

d) Internships (>1 month) : 1

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
c and d	Training on Toxoplasma Modified Agglutination Test (MAT)	Croatia	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 WOAH?

Yes

NATIONAL/INTERNATIONAL	TITLE OF EVENT	CO-ORGANISER	DATE (MM/YY)	LOCATION	NO. PARTICIPANTS
International	1st Internal meeting of the Foodborne Zoonotic Parasites OIE Collaborating Centres	WOAH CC for Foodborne zoonotic parasites : Canada and RP China	2022-05-24	Virtal	30

TOR9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

11

1/ Ait-Ammar, N., G. Karadjian, F. Foulet, R. Chouk, F. Gaultier, N. Ortonne, H. Yera, and F. Botterel. 2022. "A lesion on the tip of the tongue." Clinical Microbiology and Infection 28 (2): 239-240. https://doi.org/10.1016/j.cmi.2021.04.012.
https://hal.science/anses-03750531.
2/ Bellatreche, A. Y., R. Bouzid, A. Blaizot, D. Aubert, R. Blaga, K. Ait-Oudhia, and D. Le Roux. 2022. "Comparison of a Commercial Enzyme-Linked Immunosorbent Assay (ELISA) with the Modified Agglutination Test (MAT) for the Detection of Antibodies against Toxoplasma gondii in a Cohort of Hunting Dogs." Animals 12 (20). https://doi.org/10.3390/ani12202813.
3/ Boucard, A. S., I. Florent, B. Polack, P. Langella, and L. G. Bermúdez-Humarán. 2022. "Genome Sequence and Assessment of Safety and Potential Probiotic Traits of Lactobacillus johnsonii CNCM I-4884." Microorganisms 10 (2).
https://doi.org/10.3390/microorganisms10020273.
https://hal.science/hal-03880814.
4/ Colombe, P., J. Béguin, G. Benchekroun, and D. Le Roux. 2022. "Blood biomarkers for canine cancer, from human to veterinary oncology." Veterinary and Comparative Oncology 20 (4): 767-777. https://doi.org/10.1111/vco.12848.
5/ Delsart, M., C. Fablet, N. Rose, J. M. Répérant, R. Blaga, B. Dufour, and F. Pol. 2022. "Descriptive Epidemiology of the Main Internal Parasites on Alternative Pig Farms in France." Journal of Parasitology 108 (4): 306-321. https://doi.org/10.1645/21-126.

https://hal.science/hal-03738336.
6/ Estebanez, J., and P. Boireau. 2022. "One Health: A social science discussion of a global agenda." Parasite 29: 17. https://doi.org/10.1051/parasite/2022014.
https://hal.science/hal-03910422.
7/ Jin, X., Y. Liu, I. Vallee, G. Karadjian, M. Liu, and X. Liu. 2022. "Lentinan -triggered butyrate-producing bacteria drive the expulsion of the intestinal helminth Trichinella spiralis in mice." Frontiers in Immunology 13. https://doi.org/10.3389/fimmu.2022.926765.
https://hal.science/anses-03750536.
8/ Karadjian, G., L. Laboutière, A. Chevillot, A. Voisinot, A. Blaizot, M. P. Puech, D. Aubert, V. Risco-Castillo, R. Blaga, and I. Vallée. 2022. "Toxocara cati and Toxoplasma gondii in French Birds of Prey." Journal of Wildlife Diseases 58 (2): 373-379. https://doi.org/10.7589/JWD-D-21-00034. https://hal.science/anses-03750528.
9/ Shi, W., N. Xu, X. Wang, I. Vallée, M. Liu, and X. Liu. 2022. "Helminth Therapy for Immune-Mediated Inflammatory Diseases: Current and Future Perspectives." Journal of Inflammation Research 15: 475-491. https://doi.org/10.2147/JIR.S348079.
10/ Thomas M, D Aubert, S Escotte-Binet, B Durand, C Robert, R Geers, A Alliot, G Belbis, I Villena, and R Blaga. 2022. "Anatomical distribution of Toxoplasma gondii in naturally and experimentally infected lambs." Parasite 29: 3. https://doi.org/10.1051/parasite/2022001. https://hal.science/anses-03576845.
11/ Wang, Anqi, Xiaolei Liu, A Heckmann, G Caignard, D Vitour, E Hirchaud, Mingyuan Liu, P Boireau, G Karadjian, and I Vallée. 2022. "A Trichinella spiralis new born larvae-specific protein, Ts-NBL1, interacts with host's cell vimentin." Parasitology Research. https://doi.org/10.1007/s00436-022-07479-7. https://hal.science/anses-03659181.

b) International conferences:
11
1/ Adjou, K., A. Chevillot, H. Louifi, M. Mammeri, M. Thomas, Y. Blanchard, G. Karadjian, B. Polack, N. M. Dheilly. First identification of Cryspovirus 1 (CSPV1) in various zoonotic subtypes of Cryptosporidium parvum from diarrheic calves, lambs and goat kids in France. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26 août 2022.

2/ Bellinzona G., T. Nardi, M. Castelli, T. Autio, Y. Blanchard, R. Chalmers, R. K. Davidson, A. De Jong, T. Enbom, G. Karadjian, C. Klotz, P. Jokelainen, E. Ostlund, J. Plutzer, S. Ptochos, L. J. Robertson, G. Robinson, A. R. Sannella, J. Sroka, C. R. Stensvold, F. Touzain, K. Troell, P. Vatta, D. Sassera, S. M. Caccio, M. Lalle. A large-scale comparative genomics study of human and ruminant strains of Cryptosporidium parvum from Europe. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26/10/2022.

3/ Chaudhry U., M. Betson, C. R. Stensvold, M. Lalle, I. Villena, R. Chalmers, G. Deksne, J. W. Van der Giessen, J. Plutzer, A. Mayer-Scholl, G. Karadjian, H. Vedel Nielsen, M. Opsteegh, S. Ptochos, E. Ostlund, F. Touzain, A. R. Sannella, P. Vatta, Y. Blanchard, H. Riedel, T. Aesbicher, I. Bujila, H. Waap, L. J. Robertson, M. Hellmér, J. Sroka, B. Zalewska, F. Fritz, B. Koudela, C. H. Schouw, H. Aftab, J. Engberg, R. K. Davidson, G. N. Hartmeyer, M. Lejeune Virapin, P. Jokelainen, C. Klotz, S. M. Caccio, K.Troell. Development of a multi-locus sequence typing scheme for Cryptosporidium parvum. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26/10/2022.

4/ Dámek F., Opsteegh M., Waap H., Jokelainen P., Le Roux D., Deksne G., Deng H., Schares G., Lunden A., Alvarez Garcia G., Betson M., Davidson R., Gyorke A., Antolova D., Hurnikova Z., Wisselink H., Sroka J., Klevar S., Van Spronsen R., Blaga R., Swart A., Systematic review and modelling of the age-dependent prevalence of Toxoplasma gondii in livestock, wild-life and felids in Europe (oral presentation). 6th International Meeting on Apicomplexa in Farm Animals, APICOWPLEXA 2022, 5-7 octobre 2022. Berne, Suisse.

5/ Dámek F., Fremaux D., Aubert D., Thoumire S., Le Roux D., Vuillermet S., Delsart M., Villena I., Blaga R., Detailed anatomical distribution of Toxoplasma gondii in tissues of infected pigs (Poster). 6th International Meeting on Apicomplexa in Farm Animals, APICOWPLEXA 2022, 5-7 octobre 2022. Berne, Suisse.

6/ Dámek F., Koudel B., Thoumire S., da Silva A., Kameník J., Blaga R., Comparison of Toxoplasma gondii distribution in tissues of experimentally infected pigs (Poster). 6th International Meeting on Apicomplexa in Farm Animals, APICOWPLEXA 2022, 5-7 octobre 2022. Berne, Suisse.

7/ Dámek F., Fremaux B., Aubert D., Opsteegh M., Thoumire S., Le Roux D., Vuillermet S., Jokelainen P., Van der Giessen J., Delsart M., Villena I., Blaga R., Tropism and persistence of Toxoplasma gondii: from pork carcass to dry sausage (Poster). 6th International Meeting on Apicomplexa in Farm Animals, APICOWPLEXA 2022, 5-7 octobre 2022. Berne, Suisse.

8/ Dámek F., B. Fremaux, D. Aubert, S. Thoumire, S. Vuillermet, I. Villena, R. Blaga. Detailed anatomical distribution of Toxoplasma gondii in tissues of experimentally infected pigs. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26/10/2022.

9/ Dámek F, M. Opsteegh, H. Waap, P. Jokelainen, D. Le Roux, G. Deksne, H. Deng, G. Schares, A. Lunden, G. Alvarez Garcia, M. Betson, R. Davidson, A. Gyorke, D. Antolova, Z. Hurnikova, H. Wisselink, J. Sroka, S. Klevar, R. van Spronsen, R. Blaga, A. Swart. Modelling of the age-dependent prevalence of Toxoplasma gondii in livestock, wildlife and felines. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26/10/2022.

10/ Dámek F., B. Fremaux, D. Aubert,, M. Opsteegh, S. Thoumire, S. Vuillermet, P. Jokelainen, J. van der Giessen, P. Boireau, I. Villena, R. Blaga. Tropism and persistence of Toxoplasma gondii: from pork carcass to dry sausage. 15th International Congress of Parasitology (ICOPA), Copenhagen, Denmark, 21-26/10/2022.

11/ Karadjian G. : WP4_T1. Development of pre-DNA extraction enrichment strategies: Aptamers. PARADISE consortium Final Meeting, Uppsala, Sweden, 23 juin 2022.

c) National conferences:
4
1/ Brosseau N., Vallée I., Mayer-Scholl A., Ndao M., Karadjian G. Development of an aptamer-based test for Trichinella detection (poster). Journées de l'ED Sciences de la Vie - édition octobre 2022, 19 octobre 2022. Créteil, France.

2/ Brosseau N., Vallée I., Mayer-Scholl A., Ndao M., Karadjian G. Development of an aptamer-based test for Trichinella detection (poster). Journées d'Animation Scientifique du Département Santé Animale INRAE, 18-20 Octobre 2022. Anglet, France.

3/ Dámek F., Opsteegh M., Waap H., Jokelainen P., Le Roux D., Deksne G., Deng H., Schares G., Blaga R., Swart A., on behalf of the OH EJP TOXOSOURCES consortium, Modelling of the age-dependent prevalence of Toxoplasma gondii in livestock, wildlife and felines (Poster). Journées de l'ED Sciences de la Vie - édition octobre 2022, 19 octobre 2022. Créteil, France.

4/ Vallée I. Présentation des activités du LNR Parasites transmis par les aliments et Table ronde sur les Parasites et la sécurité santiaire des aliments. Congrès annuel de la Société française de Parasitologie, 21-23 Juin 2022, Rouen (Invited speaker)

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?
- *Participating in writing or revision of ISO standards in the field of Foodborne zoonotic parasites*
- *Participating in European Union One Health 2022 Zoonoses Report (Toxoplasma, Trichinella sections)*

12. Additional comments regarding your report: