



WOAH Collaborative Centre Reports Activities 2024

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CENTRE INFORMATION

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TOR 1 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 WOAHC

Category	Title of activity	Scope
		Italian national information system

<p>Epidemiology, surveillance, risk assessment, (true)</p>	<p>Design and support to the maintenance of Italian national information system</p>	<p>includes several applications for recording and analysing the results of activities carried out by the Italian veterinary services, both in the animal health/welfare and food safety sectors. The dashboard developed in 2022 for data exploring on prescriptions of veterinary medicines in food producing and companion animals has been maintaining in 2024. Several indicators of the use of antimicrobials in farms have been developed and represented.</p>
<p>Training, capacity building (true)</p>	<p>ERFAN (Enhancing Research for Africa Network) - ERFAN Dialogues - "Analyse des Norovirus et virus de l'Hépatite A dans les denrées agro-alimentaires"</p>	<p>On line asynchronous training course always available at the ERFAN website. https://www.erfan.it/en/home/</p>
<p>Diagnosis, biotechnology and laboratory (true)</p>	<p>AH&W EUP_AHW, HORIZON-CL6-2023-FARM2FORK-01 ecologic approach (SOA-19)</p>	<p>Development of new antimicrobial and antiparasitic compounds and of tools for assessing their efficacy and safety (SOA-19).</p>
<p>Feed safety (true)</p>	<p>ERFAN (Enhancing Research for Africa Network) - "Studies of E. coli, Salmonella spp. Klebsiella pneumoniae and Listeria monocytogenes prevalence and AMR in Raw and RTE meat in Khartoum state - ECOSAKAL</p>	<p>Baseline study started in 2022.</p>
<p>Epidemiology, surveillance, risk assessment, modelling (true)</p>	<p>KlebNet GSP Project</p>	<p>International project KlebNet Genomic Surveillance Platform -Antimicrobial Resistance prediction program.</p>
<p>Epidemiology, surveillance, risk assessment, modelling (true)</p>	<p>Mediterranean network for one Health - MEDNET 4OH (Mediterranean Network for One Health) Project</p>	<p>Enhanced understanding of AMR epidemiology and local capacity. Implementation of a surveillance system for a key resistant pathogen transferable to other healthcare facilities in Tunisia. Improved infection control measures based on surveillance data. Strengthened local capacity for AMR surveillance and outbreak response through training and technology transfer.</p>
<p>Epidemiology, surveillance, risk</p>		<p>Establishment of a surveillance system on selected (re)emergent and at-risk of</p>

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assessment, modelling (true)	EcoSurv Project	introduction zoonoses based on an ecologic approach.
Training, capacity building (true)	ERFAN (Enhancing Research for Africa Network) - ERFAN Dialogues - "Detection of Salmonella spp. according to ISO6579-1 :2017"	On line asynchronous training course always available at the ERFAN website. https://www.erfan.it/en/home/
Training, capacity building (true)	ERFAN (Enhancing Research for Africa Network) - ERFAN Dialogues - "Brucellosis Diagnosis and Control"	On line asynchronous training course always available at the ERFAN website. https://www.erfan.it/en/home/
Training, capacity building (true)	ERFAN (Enhancing Research for Africa Network) - ERFAN Dialogues – "Campylobacteriosis: a public health issue"	This course was provided both in synchronous and asynchronous mode. The on line asynchronous course is always available at the ERFAN website. https://www.erfan.it/en/home/
Training, capacity building (true)	EU Twinning Project between Lithuania, Hungary, Italy and Bosnia and Herzegovina "EU's support to capacity building and gradual Union acquis alignment in the Food safety sector in Bosnia and Herzegovina" EuropeAid/166812/DD/ACT/BA	The objective of the project is to provide Bosnia and Herzegovina for efficient legislation, gradually aligned with Union acquis, and its effective implementation, as well as consolidated procedures related to the official controls across the policy area, in order to ensure consumer health protection are all part of the overall food safety system. Within the project that ended in 2024, a last training was provided (Vilnius 21-27 April 2024)
Training, capacity building (true)	EU Twinning Project MG 19 FED AG 01 21 EuropeAid/173682/DD/ACT/MG. "Support to improve the sanitary and phytosanitary quality monitoring and control system and compliance of agricultural and agri-food products in Madagascar"	The overall objective of the Twinning Project is to contribute to improving food security in Madagascar. The Project forms part of a regional programme intended to support food and nutritional security in the Indian Ocean, the aim of which, amongst others, is to encourage and promote agricultural exchanges between Member States of the Indian Ocean Commission. The Project will therefore indirectly contribute to improving food security in the other countries in the region that are partly dependent on imports to cover the food needs of their citizens.
Training, capacity building (true)	ERFAN (Enhancing Research for Africa	Working group "Food Hygiene" North Africa, April 2024 with Tunisia, Meeting in presence involving the Veterinary Research

	Network) Food Hygiene Working Group Nord Africa	Institute of Tunis (IRVT) and WOA Collaborating Centre for Animal Production Food Safety.
Diagnosis, biotechnology and laboratory (true)	Grant Agreement IZS-Teramo/Amadori-Gesco. Finanziamento 2023-2025	Isolation and characterization of bacteriophages against Salmonella Infantis.
Diagnosis, biotechnology and laboratory (true)	Ricerca Corrente 2021, Ministry of Health	Evaluation of Resensitization to Antibiotics of multi-resistant bacterial strains through the use of different Microbiological approaches (VARIAMI).
Diagnosis, biotechnology and laboratory (true)	Determination of veterinary drug residues and environmental contaminants including pesticides and heavy metals in animal tissues, biological fluids and feeds (Namibia)	A collaboration agreement between Central Veterinary Laboratory and IZSAM was signed for the analytical determination and confirmation of certain veterinary drugs residues and contaminants in food by the chemistry laboratory of IZSAM.
Feed safety (true)	Determination of residues of pharmacologically active substances and antiparasitic compounds in honey	A collaboration between the Lebanese Ministry of Agriculture and IZSAM was signed for the analytical determination and confirmation of residues of pharmacologically active substances and antiparasitic compounds in honey by the chemistry laboratory of IZSAM, in honey samples taken under the umbrella of the Residual Plan of Lebanon.

TOR 3: 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
	On behalf of Ministry of Health, two IZSAM experts are members of the DG Health and Food Safety - Working Group (WG) on Persistent Organic Pollutants in Food". The aim of the WG is to define health guidelines and make proposals in the framework of the EU legislation on chemical contaminants in foodstuffs. Main issues discussed during 2024 were as follows: 1) Feedback from the Member States on their experiences as regards the	

<p>Contribution to the activities of the European Commission on Food Safety</p>	<p>enforcement of the maximum levels for PFAS in food; 2) Discussion on requested modifications on the derogation for dioxins and dioxin-like PCBs in fish from the Baltic region; 3) Discussion on the establishment of maximum levels for non-dioxin-like PCBs in meat and meat products of horse, rabbit, wild boar (<i>Sus scrofa</i>), wild game birds, Cervidae (e.g. venison), liver and derived products of wild game birds; 4) Update on the analysis of chlorinated paraffins by the EURL and discussion on approach for monitoring; Publication of new WHO-TEF values for dioxins and PCBs: Information and exchange of view on the regulatory follow-up.</p>	<p>Laboratory Expertise Animal Production</p>
<p>Development of analytical criteria to harmonise the European regulations applicable to the surveillance and control of food and feed safety</p>	<p>Experts from the IZSAM are involved in the network "European Reference Laboratory and National Reference Laboratories for Halogenated POPs in Feed and Food", in order to harmonise the analytical methods used for the determination of POPs in food and feed. In particular, experts contributed to define/revise analytical criteria for the determination of Brominated Flame Retardants in Food (in particular PBDEs e HBCDDs) and analytical criteria for the determination of Perfluorinated compounds in food and feed.</p>	<p>Laboratory Expertise</p>
<p>European Commission</p>	<p>Working group on "Microbiological criteria", DG-SANTE - for the drafting of a guideline on the "Official controls, under Regulation EC no. 2017/625, concerning microbiological sampling and testing of foodstuffs.</p>	<p>Laboratory Expertise</p>
<p>European Reference Laboratory for <i>L. monocytogenes</i></p>	<p>ANSES/LSAliments/LSA-INS-1517- Version 03 "GenoListeria Multiplex: Identification by multiplex real-time PCR of 30 major clonal complexes of <i>Listeria monocytogenes</i> strains" to other Official laboratories (IZSPLV Turin) e IZSVe (Padova)</p>	<p>Laboratory Expertise</p>
<p>European Reference Laboratory for <i>L. monocytogenes</i></p>	<p>WG32 ANSES ISO/TC 34/SC 9/WG 32 "Improvement of Preenrichment Step in Iso 11290-1"</p>	<p>Laboratory Expertise</p>

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

Yes

—Research need 1—

RESEARCH NEED

Please type the Research need: To date, genomic epidemiology is a discipline characterised by constant and fast developments with several applications on several health issues. In particular, surveillance based on whole genome sequencing (WGS), in various contexts and following innovative approaches (for example wastewater surveillance for SARS-CoV-2 or other pathogens, including zoonotic agents, or for monitoring AMR trends and patterns or for food borne outbreak investigation), has clearly demonstrated to have good accuracy and be able to represent a valid alternative for early warning systems. It could be impacting Codes and Manuals, but more applications are expected in future for animal health, including trade and/or risk-based surveillance (for example for the demonstration of free status).

Relevance for WOA Disease Control, Capacity Building, Facilitation of international collaboration,

Relevance for the Code or Manual Code, Manual,

Field Epidemiology and Surveillance,

Animal Category Terrestrial,

Disease:

Kind of disease (Zoonosis, Transboundary diseases) 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:

Notes:

Answer:

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

Yes

Name of WOA CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
			<ul style="list-style-type: none"> • Technical support for the provision of the Campylobacter data visualization dashboard in the EFSA information system; • Data analysis and validation of data related to Campylobacter and Listeria within the EU collected in 2023 according to DIRECTIVE 2003/99/CE; • Drafting and revision of the European Union One Health report EFSA/ECDC on Zoonosis (data related to 2023), namely the chapter on Campylobacter and Listeria

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<p>EFSA- ECDC</p>	<p>Parma- Stockholm</p>	<p>Europa</p>	<p>monocytogenes, both the section relating to occurrence in food and animals; • EFSA Network on “Biohaz Microbial Risk Assessment”. Participation as Member of the Network • Working group on prolonged multi-country cluster of Listeria monocytogenes ST155 infections linked to ready-to-eat fish products • Joint ECDC-EFSA Rapid Outbreak Assessment related to Prolonged multi-country cluster of Listeria monocytogenes ST155 infections linked to ready-to-eat fish products. • Joint ECDC-EFSA Rapid Outbreak Assessment related to Prolonged multi-country outbreak of Listeria monocytogenes ST1607 linked to smoked salmon products • Joint ECDC-EFSA Rapid Outbreak Assessment related to Prolonged multi-country outbreak of Listeria monocytogenes ST173 linked to consumption of fish products.</p>
<p>European Reference Laboratory for Campylobacter spp.</p>	<p>Sweden</p>	<p>Europa</p>	<p>The EU-RL for Campylobacter’s staff is involved in the following activities: • Participation in the EU-RL PT36 “to verify the performance of the laboratory in performing the enumeration of Campylobacter spp. on chicken skin (ISO 10272-2:2017) and species identification (the latter on voluntary basis)”; • Participation in the EU-RL PT38 on “Campylobacter genome sequencing and Campylobacter cluster analysis”; • Participation to the “Joint Training Course of the inter EURLs Working Group on NGS: Introduction to Bioinformatics for genomic data mining”, organised by EURL VTEC, EURL Listeria monocytogenes, EURL Salmonella, EURL Coagulase Positive, Staphylococci, EURL Parasites, EURL Foodborne viruses, EURL AMR, EURL Campylobacter, at the Swedish Veterinary Agency and Swedish Food</p>

			<p>Agency, Uppsala, Sweden. • Working Group CEN/TC 463/WG 3 'Campylobacter' to discuss technical aspects related to the evaluation of the composition of candidate enrichment broths for Campylobacter spp to be applied in ISO 10272:2017. • Participation in the EU-RL Campylobacter workshop, presenting findings from a study on genomic surveillance in Italy, based on data from the process hygiene criterion and the EnterNet laboratory surveillance system. • Implement the use of WGS and cluster analysis through distance matrices or phylogenetic trees; • Test the laboratory's ability to address a Campylobacter outbreak based on sequencing data.</p>
<p>Istituti Zooprofilattici Sperimentali (Official Labs) and Private laboratories</p>	<p>Italy</p>	<p>Europa</p>	<p>In 2024 the LNR Lm organized the following PT and provided to other laboratories: • Identification of Salmonella through the USDA/FSIS method, ID number 25/2024; • First PT inter-laboratory PT for challenge test for the assessment of Listeria monocytogenes growth potential in a ready-to-eat product. • First WGS interlaboratory test, jointly organized by LNRLm, CRN GENPAT and CRN for salmonellosis at IZS Venezie in Padua: Interlaboratory test for quality assurance in the production of whole genome sequencing data of bacterial micro-organisms by Official laboratories (IIZZSS) • 11/2024 "Detection of Brucella spp. from milk and dairy products" according to WOAH Terrestrial Manual 2022-Chapter 3.1.4. – Brucellosis- Sections 1.2.3.3, 1.2.3.4</p>
			<p>In 2024 the LNR for Campylobacter spp. organized the following PT and provided to other laboratories: • 14/2024 "Detection of Campylobacter spp. from stool</p>



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<p>Official Labs - Istituti Zooprofilattici Sperimentali</p>	<p>Italy</p>	<p>Europa</p>	<p>samples" according to ISO 10272-1:2023 – AMD 1 or other methods in use. • 14-2024 "Campylobacter Food for the enumeration of Thermotolerant Campylobacter numeration in chicken meat" with the aim of verifying the performances of the attending laboratories in numbering Campylobacter spp. from chicken meat matrix according to ISO 10272-2:2023 - AMD 1 or other method in use in laboratories. • 02/2024 "Molecular Identification of Campylobacter foetus according to own laboratory method. In 2024 the LNR for Campylobacter spp. participated in the PT provided by IZS delle Venezie "AQUA MA 4-24" for the detection (ISO 10272-1:2017, AMD 2023) and enumeration (ISO 10272-2:2017) of Campylobacter spp. in milk powder and the detection of Campylobacter spp. (ISO 10272-1:2017, AMD 2023) in freeze-dried meat.</p>
			<ul style="list-style-type: none"> • Participation at the EU-RL Lm PT: - Anses_LSAI_24_04_EURL_Lm_Typing Proficiency test on Listeria monocytogenes typing by cgMLST and molecular serotyping by PCR. - Inter-laboratory validation trial for the identification of the molecular serotype and 30 clonal complexes of Listeria monocytogenes by real-time PCR using the ANSES in-house method GenoListeria LSA-INS-1517. - Anses_LSAI_23_09_EURL_LM_CT_2024 Fifth EURL Lm Proficiency test on challenge test assessing the growth potential of Listeria monocytogenes in ready to eat food. • Participation at the EU-RL Lm WG32 ANSES ISO/TC 34/SC 9/WG 32 "Improvement of Preenrichment Step in Iso 11290-1". • Participation at the pre-study regarding the comparison of alternative broths for

European Reference Laboratory for <i>Listeria monocytogenes</i>	France	Europa	<p><i>Listeria</i> (pre-) enrichment, sensitivity study. on 12 ready-to-eat food matrices belonging to three categories (meat products, fruit and vegetables, milk products). Artificial contamination with <i>Listeria monocytogenes</i> strains, detection and enumeration of <i>Listeria monocytogenes</i> by semi-quantitative method under 11 different conditions. • Participation at the EU-RL Lm WG32 ANSES ISO/TC 34/SC 9/WG 32 "<i>Listeria monocytogenes</i> and <i>Listeria</i> spp." • Technical operational meeting with EUR Lm to agree on the contents of the oral presentation at "28th International ICFMH Conference FOOD MICRO 2024". Title: "An inter-laboratory validation test on a real time multiplex PCR method that allows the identification of 30 main multi locus sequences characterising clonal</p>
University College of Dublin	Ireland	Europa	<p>Research project within the EU-FORA (European Food Risk assessment Fellowship Program) 2023-2024: "ListeriaControl".</p>
Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise	Italy	Europa	<p>Research project on "CRISPR-Cas" as antimicrobial in ESBL producing Enterobacteriaceae (CRISPone)</p>
Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise	Italy	Europa	<p>Research project on the effectiveness of different treatments with probiotics and prebiotics in counteracting colonization by <i>Campylobacter</i> spp. in chicken (CAMPYBIOTICS).</p>
Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise	Italy	Europa	<p>Launch of the project on Development of a rapid diagnostic test for the detection of <i>Campylobacter</i> in livestock production and food based on</p>

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			CRISPR-Cas and lateral-flow technology. (CAMP-RADAR)
Human health system of Abruzzo and Molise	Italy	Europa	Characterization of L. monocytogenes strains from clinical cases in Abruzzo region.
Istituto Superiore di Sanità (Rome) - ISS	Italy	Europa	<ul style="list-style-type: none"> • Building a common database of NGS data containing human and non-human strains of Listeria monocytogenes. • Working group "Export USA" with official labs for testing food intended for USA export.
Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise	Italy	Europa	Research project on the Development of an optimised Antimicrobial Resistance monitoring strategy for wastewaters (DeARM-WATER). The project aims to define practical guidelines for wastewater monitoring and validation of standardized protocols as well as to determine threshold values for risk assessment related to the presence of specific resistance genes".
Istituti Zooprofilattici Sperimentali: Lombardia e dell'Emilia Romagna, Piemonte Liguria e Valle d'Aosta, Venetie, Lazio e Toscana, Umbria e Marche, Sardegna, Mezzogiorno, Puglia e Basilicata, Sicilia	Italy	Europa	Research project IZSLER 10/23 RC Assessment of emerging hazards in meat substitutes (MicrobioPrepVeg).
College of Milan – Department of Veterinary Medicine and Animal Sciences	Italy	Europa	Research project GR-2021-12374382 "Towards a fair and sustainable production in marginal areas: novel indicators to improve animal welfare"
College of Milan – Department of Veterinary Medicine and Animal Sciences	Italy	Europa	Research project PRIN "Campylobacter in the Italian poultry meat chain: prevalence, risk assessment, and consumer's role in food handling – CAMPITALY"

Istituto Superiore di Sanità (Rome) - ISS	Italy	Europa	CCM Program 2022 – Central Actions – Project "Genomic Analysis of Salmonella spp. and Campylobacter spp. Isolates in the Human Sector"
Istituto Zooprofilattico Sperimentale delle Venezie	Italy	Europa	<ul style="list-style-type: none"> • Clustering analysis between clinical case's strain and strains isolated from food. • Collaboration to train lab staff on genomic characterization of L. monocytogenes. • Collaboration on the assessment of challenge test and risk analysis related to Listeria monocytogenes in ready-to-eat and not ready-to-eat food Consultancy for the use of Listeria innocua in challenge test in production plants.
Ministry of Health (Rome) - MoH	Italy	Europa	Participation in the coordinated working group for the drafting of the national guideline on official controls for food.
Ministry of Health (Rome) - MoH	Italy	Europa	Participation in the coordinated working group for the drafting of the national guideline on foodborne outbreak investigation.
Ministry of Health (Rome) - MoH	Italy	Europa	<ul style="list-style-type: none"> • Working group on Listeria DGISAN - with the Istituto Superiore di Sanità (Roma) and competent Authorities involved in outbreak's investigation of human listeriosis caused by ST155, ST8 e ST1. • Working group of the MoH (coordinated by the ISS) on national microbiological criteria related to food. • Expert opinion to the MoH to conduct investigations relating to outbreaks of listeriosis in Italy. • Expert opinion to the MoH concerning the presence of Listeria monocytogenes in olive oil, sampling of olive oil for the detection of Listeria monocytogenes in the national official control plan, accreditations of laboratories carrying out the tests for the detection of Listeria monocytogenes.

			<ul style="list-style-type: none"> • Listeria Cluster CC9 -ST763. E-mail communication of 22 December 2023 on the genomic correlation between a clinical strain of Listeria monocytogenes, isolated in 2023 • Listeria ST1 CLuster_291. E-mail communication made on 29 March 2024. Isolation of a clinical case related to the ST1 Cluster_291 outbreak (correlating with black olives baked)
Department of Prevention, Food and Nutrition Hygiene Service (SIAN Taranto)	Italy	Europa	<ul style="list-style-type: none"> • Expert opinion to the Competent Authority on the validity of the challenge test studies for Listeria monocytogenes concerning "Tramezzino prosciutto cotto e maionese" and "Tramezzino tonno e maionese".
ASL Ancona	Italy	Europa	<ul style="list-style-type: none"> • Expert opinion to the Veterinary Competent Authority on challenge test study on Listeria monocytogenes in cold smoked wild salmon fillets from Lithuania.
College of Naples "Federico II"	Italy	Europa	<ul style="list-style-type: none"> • Genomic characterisation of ESKAPE pathogens isolated in clinical settings in the Campania region and in water intended for human consumption and study of antibiotic resistance profiles.
College of Bologna – Department of Veterinary Medicine	Italy	Europa	<p>Research project on MALDI-TOF and Artificial intelligence for bacterial typing, direct diagnosis and antimicrobial rapid detection (MALD-IA). To develop a MALDI-TOF MS spectra analysis system based on machine learning algorithms for the:</p> <p>(i) identification and rapid typing of Brucella, Campylobacter and L. monocytogenes; (ii) identification of the main etiological agents of mastitis from milk; (iii) rapid identification of antibiotic resistance in the pathogens of interest (MALD-IA).</p>

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Anses - Agence nationale de sécurité sanitaire de l'alimentation	France	Europa	Project for provision of support to EFSA and to ECDC in the production of the EU One Health Zoonoses report and in related zoonoses online interactive data visualisation dashboards and zoonoses
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TOR 4 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
ERFAN - Enhancing Research for Africa Network	Italy	Africa	<ul style="list-style-type: none"> Meeting between the Veterinary Research Institute of Tunis (IRVT) Tunisi and the staff of WOAHC CC Animal production and food safety (24-25 April 2024) to share common experiences to strengthen and promote future scientific collaboration (training and projects) in line with those activities the two Institutions carried out within the framework of a WOAHC a Twinning Project on food safety. Collaboration with training initiatives and project activities
Istituto Superiore di Sanità (ISS)	Italy	Europe	<p>Project for provision of support to EFSA and to ECDC in the production of the EU One Health Zoonoses report and in related zoonoses online interactive data visualisation dashboards and zoonoses. On line call and provision of sequences.</p> <ul style="list-style-type: none"> Research project on
			<ul style="list-style-type: none"> Research project on

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Central Veterinary Institute (CVRI)	Zambia	Africa	Prevalence studies on <i>Listeria monocytogenes</i> , <i>Salmonella</i> spp. and <i>Klebsiella</i> spp. in food for human consumption, including AMR of detected strains. • Collaboration with the Central Veterinary Research Institute in Lusaka for drafting a scientific paper.
University of Namibia (UNAM)	Namibia	Africa	• Research project on Prevalence studies on <i>Listeria monocytogenes</i> , <i>Salmonella</i> spp. and <i>Klebsiella</i> spp. in food for human consumption, including AMR of detected strains. • Collaboration with the University of Namibia (UNAM) for drafting a scientific paper.
Central Veterinary Laboratory of Namibia (CVL)	Namibia	Africa	• Research project on Prevalence studies on <i>Listeria monocytogenes</i> , <i>Salmonella</i> spp. and <i>Klebsiella</i> spp. in food for human consumption, including AMR of detected strains. • Collaboration with the Central Veterinary Laboratory of Namibia (CVL) for drafting a scientific paper.
National Veterinary Laboratory (BNVL)	Botswana	Africa	• Research project on Prevalence studies on <i>Listeria monocytogenes</i> , <i>Salmonella</i> spp. and <i>Klebsiella</i> spp. in food for human consumption, including AMR of detected strains.
Central Veterinary Research Laboratory		Africa	• Baseline study on the prevalence of <i>Listeria monocytogenes</i> from frozen ready to eat (RTE) meat, frozen raw broiler chicken and

(CVRL)	Sudan (Khartoum state)		milk products (cheese and ice cream) • Collaboration with the Central Veterinary Research Laboratory (CVRL) for drafting a scientific paper.
Italian and Madagascar Ministry of Agriculture	Madagascar, Italy	Africa	European Twinning project on food safety funded by the EU with the Ministry of Agriculture and the Ministry of Education and Scientific Research of Madagascar "Appui au renforcement du dispositif de surveillance et de contrôle de la qualité et conformité sanitaire et phytosanitaire des produits agricoles et agroalimentaires à Madagascar". A collaboration with the colleagues of the Italian Ministry of Agriculture was established within the project and the WOAHC Animal production and Food safety coordinated the activities.
Albania, Macedonia, Kosovo, Algeria, Tunisia	Albania, Macedonia, Kosovo, Algeria, Tunisia, Italy	Africa Europe	The Reference Center WOAHC has activated during 2024 a dialogue with these countries to plan future collaborations within the framework of AMR, Sequencing and bioinformatics, including food safety. In particular, in 2024, the IZS of Teramo was identified as a partner for participation in the TANIT programme to improve food security in Tunisia. The TANIT programme, funded by the Italian Government (Mattei Plan), aims to modernise the Tunisian agricultural sector, improve water management and promote innovation in the agri-food sector.

<p>OIE CC University of Pretoria, National Central Veterinary Laboratories, and some Faculties of Veterinary Science of other African countries: Angola, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe</p>	<p>Various countries in Africa. Regional meetings in Windhoek (Namibia) and Tunis (Tunisia)</p>	<p>Africa</p>	<p>ERFAN is a network to facilitate and strengthen collaboration among countries of the SADC Region and Arab Maghreb Union (UMA) as well as IZSAM in the Animal health and food safety domains. The main task is to allow the Parental Laboratory to support the Candidate Laboratory once the OIE Twinning Project is concluded, and the aims are to tackle some issues, as Efficiency of “Regional Pole of excellence” and Sustainability post OIE Twinning Project. During 2023, the ERFAN network continued its activities through regular online and in site meetings of the working groups, a general ERFAN meeting and organizing online activities and courses.</p>
<p>Water Research Institute - National Research Council of Italy (CNR-IRSA), Molecular Ecology Group (MEG)</p>	<p>Italy</p>	<p>Europe</p>	<p>Collaboration for the genomic characterisation of antibiotic resistance genes, mobile genetic elements (MGE) and CRISPR-Cas systems of strains of <i>Klebsiella pneumoniae</i> isolated in sea water in Abruzzo.</p>
<p>Abruzzo Region, food business operators</p>	<p>Italy</p>	<p>Europe</p>	<ul style="list-style-type: none"> • Research project on the use of a natural preservative for the Abruzzo salami: challenge test for the study of inactivation and growth potential of <i>C. sporogenes</i>, <i>Listeria monocytogenes</i> and <i>E. coli</i> • Research project on the “Arrosticino d’Abruzzo DOP”: challenge test for the study of the inactivation of <i>E. coli</i> and <i>S. aureus</i> through three different cooking methods.

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Abruzzo Region	Italy	Europe	Molecular epidemiological study on strains of <i>Klebsiella pneumoniae</i> , <i>Staphylococcus aureus</i> , <i>Enterococcus faecium</i> isolated in hospitals of the Abruzzo Region. Collaboration with the Laboratory of Clinical Pathology and Microbiology of the G. Mazzini Hospital in Teramo.
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TOR 6: EXPERT CONSULTANTS

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

Yes

Name of expert	Kind of consultancy	Subject
Francesco Pomilio, Giacomo Vincifori	Expertise in Food Safety	Training course on behalf of the Lithuanian Food Authority in-person, presentations on: Official Sampling of Foods, Sampling for Microbiological Testing of Foods, Counterevidence and Dispute.
Gabriella Centorotola, Alessandra Cornacchia, Francesco Pomilio, Marina Torresi	Expertise in Food Safety	OIE funded initiative "ERFAN": online meetings of the working groups in the SADC Region
Alessandra Cornacchia, Maria Luisa Danzetta, Francesco Pomilio	Expertise in Food Safety and quality management	European Twinning project on food safety funded by the EU with the Ministry of Agriculture and the Ministry of Education and Scientific Research of Madagascar "Appui au renforcement du dispositif de surveillance et de contrôle de la qualité et conformité sanitaire et phytosanitaire des produits agricoles et agroalimentaires à Madagascar"

TOR 7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

The WOA?H CC provide advice and/or services mainly in the establishment of the surveillance systems, including the design and development of supporting information systems, and risk assessment methodologies, providing advice to the Competent Authorities of

WOAH Members and through specific training and capacity building initiatives. These activities are carried out in the framework of various projects upon different funding lines and other opportunities provided by international workshops and conferences. The WOA Member Countries mainly involved in these activities are those belonging to the following geographical areas: North Africa, eastern coast of Africa - Madagascar, the Balkans, the Middle East and Arabic Peninsula. Sub-Saharan countries are involved through the ERFAN initiative.

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 : 4

b) Seminars : 7

c) Hands-on training courses: 5

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	Analysis of chemical contaminants in fish and fish products Teramo, 5-6 March 2024	Lebanon	2
A	SAFIAL - Institutional strengthening of the Ministry of Agriculture and Rural Development for the management of food safety. Teramo, 30 May 2024	Albania	7
A	Jumelage européen : appui au renforcement du dispositif de surveillance et de contrôle de la qualité et conformité sanitaire et phytosanitaire des produits agricoles et agroalimentaires à Madagascar. 16-23 June 2024	Madagascar	10
A	Ministère de l'Agriculture, des Ressources hydrauliques et de la Pêche de la Tunisie, 24-28 June 2024	Tunisia	4
B	Training in Food Law through an innovative methodology using new information and communication technology tools" (TRIFLIM) L'Aquila, 26 February 2024	Italy	59
	The results of the "Current Research		

B	carried out by IZS-TERAMO (Year 2023)". 29 May 2024	Italy	76
B	The National Reference Laboratory for <i>Listeria Monocytogenes</i> . Teramo, 12 June 2024	Italy	110
B	One Health Award 2024. AFRICAN FRONTIERS Teramo, 11 October 2024	Italy	190
B	Seminar on Brucellosis Roma. 14-15 October 2024	Italy	175
B	The National Reference Laboratory for <i>Campylobacter</i> on line. 6 November 2024	Italy	209
B	The National Reference Centre for Whole Genome Sequencing of microbial pathogens: database and bioinformatic analysis. Teramo, 7-8 November 2024	Italy	70
C	Inspection of food safety systems in the production of ready-to-eat products (introduction). online 13-17 May 2024 (I edition). 9-13 September 2024 (II edition)	Italy	210
C	Inspection of food safety systems in the production of ready-to-eat products Teramo, 3-7 June 2024 (I edition); Parma, 17-21 June 2024 (II edition); Parma, 16-20 September 2024 (III edition); Teramo, 23-27 September 2024 (IV edition); Brescia, 7-11 October 2024 (V edition); Brescia, 21-25 October 2024 (VI edition); Angri, SA 2-6 December 2024 (VII edition)	Italy	257
C	Beekeeping Health Epidemiology, Laboratory Diagnosis of Bee	Italy, Maroc, Tunisie, Mauritanie	33

	Diseases and Honey Quality Analysis. 21-22 October 2024 on line		
C	Application of EC Reg. "New Hygiene Package Teramo, 23-24 October 2024	Italy	32
C	Auditor/Lead Auditor of Food Safety Management Systems (specific module) Teramo, 4-6 December 2024	Italy	30

TOR 8: 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?

No

TOR 9: 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:

7

1. Di Renzo L., De Angelis, M. E., Torresi, M., Mariani, G., Pizzurro, F., Mincarelli, L. F., Esposito, E., Oliviero, M., Iaccarino, D., Di Nocera, F., Paduano, G., Lucifora, G., Cammà, C., Ferri, N. & Pomilio, F. 2024. Genomic Characterization of *Listeria monocytogenes* and Other *Listeria* Species Isolated from Sea Turtles. *Microorganisms*, 12(4) doi:10.3390/microorganisms12040817
2. D'Onofrio F., Butler, F., Krasteva, I., Schirone, M., Iannetti, L., Torresi, M., Di Pancrazio, C., Perletta, F., Maggetti, M., Marcacci, M., Ancora, M., Di Domenico, M., Di Lollo, V., Cammà, C., Tittarelli, M., Sacchini, F., Pomilio, F., D'Alterio, N. & Luciani, M. 2024. Integrative analysis of transcriptomic and immunoproteomic data reveals stress response mechanisms in *Listeria monocytogenes*. *Heliyon*, 10(21) doi:10.1016/j.heliyon.2024.e39832
3. Dubbert T., Meester M., Smith R.P., Tobias T.J., Di Bartolo I., John R., Pavoni E., Krumova-Valcheva G., Sassu E., Prigge L., Aprea G., May H., Althof N., Ianiro G., Żmudzki J., Dimitrova A., Alborali G. L., D'Angelantonio D., Scattolini S., Battistelli N., Burow E. 2024. Corrigendum: Biosecurity measures to control hepatitis E virus on European pig farms (*Frontiers in Veterinary Science*, (2024), 11, (1328284), 10.3389/fvets.2024.1328284).
4. Félix B., Capitaine, K., Te S., Felten, A., Gillot, G., Feurer, C., van den Bosch, T., Torresi, M., Lancz, Z. S., Delannoy, S., Brauge, T., Midelet, G., Leblanc, J. -. & Roussel, S. 2023. Identification by High-Throughput Real-Time PCR of 30 Major Circulating *Listeria monocytogenes* Clonal Complexes in Europe. *Microbiology Spectrum*, 11(3) doi:10.1128/spectrum.03954-22
5. Purgatorio C., Buccioni, F., Maggio, F., Rossi, C., Torresi, M., Pomilio, F., Paparella, A. & Serio, A. 2024. *Thymbra capitata* L. hydrolate as a washing solution for controlling *Listeria monocytogenes* and spoilage microorganisms on rocket salad. *Food Control*, 159 doi:10.1016/j.foodcont.2024.110285
6. Tirloni E., Centorotola, G., Pomilio, F., Torresi, M., Bernardi, C. & Stella, S. 2024. *Listeria monocytogenes* in ready-to-eat (RTE) delicatessen foods: Prevalence, genomic characterization of isolates and growth potential. *International Journal of Food Microbiology*, 410 doi:10.1016/j.ijfoodmicro.2023.110515
7. Veneri C., Brandtner D., Mancini P., Bonanno Ferraro G., Iaconelli M., Suffredini E., Petrillo M., Leoni G., Paracchini V., Gawlik B.M., Marchini A., SARI Network, La Rosa G. 2024. Tracking the Spread of the BA.2.86 Lineage in Italy Through Wastewater Analysis. (2024)

16:449–457, <https://doi.org/10.1007/s12560-024-09607-1>

b) International conferences:

15

1. Aprea G., Battistelli N., Tittarelli F., D'Angelantonio D., Scattolini S., Acciari V.A., Olivieri S., Centorotola G., Pomilio F., D'Alterio N., Migliorati G. Risk posed in food safety by irrigation waters contaminated with *Salmonella* Typhimurium and efficacy of bacteriophages in crop decontamination. *Viruses of Microbes 2024*. Cairns, Australia; 15- 19 July 2024; Poster
2. Bucciacchio, A., de Ruvo, A., Chiaverini, A., Torresi, M., Cammà, C., Pomilio, F. & Di Pasquale, A. Automated Genomic Surveillance Pipeline for Early Detection and Reporting of *Listeria monocytogenes* clusters. *21st International Symposium on Problems of Listeria and Listeriosis (ISOPOL)*. Norwich, UK; 10-13 September, 2024; Poster
3. Capitaine, K., Te, S., Guidi, F. & Felix, B. Inter-Laboratory Validation Trial on a multiplex real time PCR method allowing the identification of 30 major multi locus sequence typing clonal complexes of *Listeria monocytogenes* circulating in food in Europe. *28th International ICFMH Conference FOOD MICRO 2024*. Burgos, Spain; 08-11 July, 2024; Presentazione Orale
4. Centorame, P., Iannetti, L., Hunt, K., Centorotola, G., Pomilio, F. & Butler, F. Comparing observed iso- and non-isothermal *Listeria monocytogenes* growth with model predictions under dynamic conditions. *European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE)*. Stockholm; 20-22 November, 2024; Poster
5. Centorotola, G., & Cornacchia, A. Case study on the prevalence of *Listeria monocytogenes*, *Salmonella* spp. and *Klebsiella pneumoniae* and antimicrobial resistance in ready-to-eat meat products and environmental samples from Botswana, Namibia and Zambia. *One Health Award 2024*. Teramo, Italy; 12 October, 2024; Presentazione Orale
6. Centorotola, G., Ziba, M. W., Shilangale, R. P., Mohammed, N. M., Mtonga, S., Kabunda, O., Cornacchia, A., Chiaverini, A., Ferrara, M., Torresi, M., Ancora, M., Cammà, C., Ntahonshikira, C., Hemberger, Y., Scacchia, M., Khaiseb, S., Muuka, G. & Pomilio, F. Preliminary results on *Listeria monocytogenes* strains in ready to eat meat foods and samples from food producing environments in Namibia, Sudan and Zambia: a focus on genomic characterization of strains. *21st International Symposium on Problems of Listeria and Listeriosis (ISOPOL)*. Norwich, UK; 10-13 September, 2024; Poster
7. Chiaverini, A., Centorotola, G., Guidi, F., De Angelis, M. E., Cornacchia, A., Salucci, S., Sulli, N., Costantini, B., Centi, S., Marino, L., Del Matto, I., Petrone, D., Addolorato, R., Proroga, Y., Torresi, M. & Pomilio, F. Hypervirulent *Listeria monocytogenes* clones in wildlife: a snapshot from Central and Southern Italy. *21st International Symposium on Problems of Listeria and Listeriosis (ISOPOL)*. Norwich, UK; 10-13 September, 2024; Poster
8. D'Onofrio, F., Krasteva, I., Iannetti, L., Torresi, M., Perletta, F., Valentinuzzi, S., Tittarelli, M., Pomilio, F., Paparella, A., Del Boccio, P., Sacchini, F., Di Pancrazio, C., Schirone, M., D'Alterio, N. & Luciani, M. Proteomic Analysis of *Listeria Monocytogenes* Strains Implicated In Outbreaks In Italy: Identification Of Virulence Biomarkers. *The 9th International Conference on Emerging Zoonoses (ZOO)*. Palermo, Italy. 9-13 June. 2024; Presentazione Orale
9. Guidi, F., Danzetta, M. L., Felix, B., Capitaine, K., Centorame, P., Centorotola, G., Chiaverini, A., Ferrara, M., Di Marzio, V., De Angelis, M. E., Pomilio, F., Gattuso, A., Scavia, G., Fiore, A., Ortoffi, M. F., Ciccaglioni, G., Lena, R., Iuliano, L., Santini, N., Chelli, R., Mattalia, G., Gaglione, S. P. & Marina Torresi. A novel real time-PCR as rapid screening method for *Listeria monocytogenes* clonal complex identification during two extended outbreaks occurred in Italy between 2022 and 2023. *28th International ICFMH Conference FOOD MICRO 2024*. Burgos, Spain; 08-11 July, 2024; Poster
10. Iannetti L., Bogdanova T., Rota Nodari S., Amati S., Finazzi G., Matteucci G., Di Marzio V., Ferrara M., Centorotola G., Di Marcantonio L., Scattolini S., Acciari V. A., Podaliri Vulpiani M. Animal welfare and microbiological meat safety at religious and conventional slaughtering: a comparative study. *75th EAAP Annual Meeting*. Firenze, Italy; 01-05 September 2024; Poster
11. Manucci A., Rosato R., Ricci M., Castellani F., Cerasoli F., Podaliri M., Centorotola G., Iannetti L., Dalla Costa E., Atallah E., Saluti G. Determination of stress-related hormones in horse hair and sheep wool by means of liquid chromatography coupled to hybrid high resolution mass spectrometry: validation and application to real samples. *IEEE 2024 International workshop on Measurements and Applications in Veterinary and Animal Sciences (MEAVEAS)*. Torino, Italy; 22- 24 April 2024; Poster
12. Torresi, M., Chiaverini, A., Centorotola, G., Guidi, F., Scavia, G., Fiore, A., Gaglione, R., Lena, R., Pilati, S., Bolzoni, L., Cibin, V., Di Taranto, P., Russini, V. & Pomilio, F. Listeriosis outbreaks in Italy in 2022-2023: management and source identification. *21st International Symposium on Problems of Listeria and Listeriosis (ISOPOL)*. Norwich, UK; 10-13 July, 2024; Poster
13. R. Di Romualdo, F. Marotta, F. Di Timoteo, E. Di Domenico, A. Abass, G. Foschi, M. Ancora, L. Villa2, M. Napoleoni, A. Garcia-Fernandez. POULTRY SUPPLY CHAIN IMPACT ON CAMPYLOBACTERIOSIS SURVEILLANCE IN ITALY OVER ONE YEAR *7th Congress of the*

European Association of Veterinary Laboratory Diagnosticians. Padova, Italy. 21-23 October, 2024; Presentazione orale.

14. Di Pancrazio, C., Marotta, F., Merola, C., Cocco, A., D'Innocenzo, V., Petrini, A., Sacchini, F., Villani, C., Perletta, F., Maggetti, M., Krasteva, I., Felicioni, E., Salucci, S., Luciani, M. & Garofolo, G. Enhanced immune response and tolerance mechanisms in *Campylobacter jejuni*-infected chickens with probiotic treatment. 7th Congress of the European Association of Veterinary Laboratory Diagnosticians. Padova, Italy. 21-23 October, 2024; Poster

15. Marotta, F., Di Romualdo, R., Di Domenico, E., Janowicz, A., Di Timoteo, F., Di Marcantonio, L., Villani, C., Zilli, K., Abass, A., Romualdi, T., Felicioni, E., Foschi, G., Ancora, M., Villa, L., Napoleoni, M., Garcia-Fernandez, A. & Garofolo, G. Poultry Supply Chain Impact on *Campylobacteriosis* Surveillance in Italy Over One Year. The 9th International Conference on Emerging Zoonoses (ZOO). Palermo, Italy; 9-12 June, 2024; Poster

c) National conferences:

8

1. Acciari V. A., Scattolini S., Battistelli N., Tittarelli F., Olivieri S., D'Angelantonio D., Iannetti L., Pomilio F., Aprea G. Detection of potentially zoonotic viruses in feces of bovines and ovines at slaughterhouses. 8th National Congress of the Italian Society for Virology, One Virology One Health (SIV-ISV). Bologna, Italy 15- 19 July 2024.

2. Garofolo, G. Identificazione, caratterizzazione di isolati di *Campylobacter* spp. di origine veterinaria e comparazione con isolati di origine umana. Evento "Analisi Genomica Degli Isolati di *Salmonella* Spp. e *Campylobacter* Spp. in ambito umano" organizzato dall'Istituto Superiore di sanità-Dipartimento Malattie infettive nell'ambito del Progetto esecutivo Programma CCM 2022 Azione Centrale 2022. Roma, Italy; 23 April, 2024; Presentazione Orale.

3. Marotta, F. *Campylobacter* e antibiotico-resistenza nell'ambiente: studio sui Mammiferi e sugli Uccelli selvatici nelle regioni Abruzzo e Molise verso una sorveglianza One-Health. I Risultati Della Ricerca Corrente Condotta Dall'istituto Zooprofilattico Sperimentale dell'Abruzzo E Del Molise- Anno 2023. Teramo, Italy; 29 May, 2024; Presentazione Orale.

4. Pomilio F. Generalità su listeriosi animale, listeriosi umana e igiene degli alimenti. Seminario per Scuola di Specializzazione, Università di Padova in presenza, "Listeriosi alimentare e presenza di *Listeria* negli alimenti: come gestire due differenti livelli di rischio sanitario". Aula Magna Trentino School of Management, via Giusti 40, Trento. 12 April 2024.

5. Seminario residenziale "I centri di eccellenza incontrano il territorio: esperienze di campo a confronto nelle malattie a trasmissione alimentare". Personale coinvolto: Marina Torresi. IZSUM, Ancona 19 giugno 2024.

6. Workshop residenziale "Seconda giornata di aggiornamento sulla sorveglianza della Listeriosi", presentazione su Il ruolo del laboratorio nazionale di riferimento per *Listeria monocytogenes* nel contesto gestione delle epidemie di listeriosi: stato dell'arte. Istituto Superiore di Sanità, Aula Nitti - Bovet Roma, 09 ottobre 2024. Personale coinvolto: Francesco Pomilio.

7. Workshop annuale in odalità online "Il Laboratorio Nazionale di Riferimento per *Campylobacter*", 06/11/2024. Personale coinvolto: G. Garofolo, R. Di Romualdo, M. Luciani, K. Zilli, C. Villani

8. Condivisione del Workshop per Corso di formazione su *Campylobacter* ai soci della Società di Diagnostica di Laboratorio Veterinaria (SIDILV) 2024. Il workshop si è tenuto online il 06 Novembre 2024.

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

35

PUBLICATIONS IN EFSA JOURNAL:

1. The European Union One Health 2023 Zoonoses Report, EFSA Journal. EFSA and ECDC (European Food Safety Authority and European Centre for Disease Prevention and Control), (2024). The European Union One Health 2023 Zoonoses report. EFSA Journal, 22(12), e9106. <https://doi.org/10.2903/j.efsa.2024.9106>

OTHER TRAINING PROVIDED:

2. Corso di formazione residenziale ISO/IEC 17025:2018 Selezione, verifica e validazione dei metodi di prova: Fascicolo di validazione. Tre edizioni: 11-12 dicembre 2023, 23-24 dicembre 2023, 29-30 Gennaio 2024. Cifiv, IZSAM, Teramo.

3. Corso di formazione a distanza: *Listeria monocytogenes*: la conosciamo? Relazione dal titolo: Gli errori nella gestione del pericolo *Listeria monocytogenes*, organizzato da "In formare", 9 febbraio 2024.

4. Corso di formazione per conto di Autorità Alimentare della Lituania in presenza, presentazioni su: Il campionamento ufficiale degli alimenti, il campionamento per il controllo microbiologico degli alimenti, Controperizia e controversia. Vilnius, dal 21 al 27 Aprile 2024 (due edizioni).
5. Corso di specializzazione residenziale dell'Università di Milano, Facoltà di Medicina Veterinaria, relazione dal titolo Indagini in corso di focolaio di malattia trasmessa dagli alimenti, Lodi, Università di Milano, Facoltà di medicina veterinaria, 10 maggio 2024.
6. Master di II Livello in Emergenza veterinaria nelle catastrofi, a distanza, A.A. 2023-2024, Relazione su Esempi di gestione dei focolai di malattia trasmessa dagli alimenti in situazioni di emergenza. Università di Parma, Dipartimento di Scienze medico-veterinaria, 27 maggio 2024. Personale coinvolto: Francesco Pomilio.
7. Seminario Neogen residenziale, relazione su Gestione del pericolo *Listeria monocytogenes* in aziende della filiera alimentare. Milano, 6 giugno 2024. Personale coinvolto: Francesco Pomilio.
8. Evento ECM formazione residenziale interattiva, Ispezione e controllo degli alimenti: nuove competenze e modalità di campionamento e analisi" presentazione dal titolo Rischio microbiologico negli alimenti: metodi di analisi ed espressione del risultato analitico, con particolare riferimento all'interpretazione del risultato nel controllo ufficiale, Dipartimento di Medicina Veterinaria dell'Università degli Studi di Bari Aldo Moro, Valenzano Bari. 18 giugno 2024. Personale coinvolto: Francesco Pomilio.
9. Master di II Livello in Emergenza veterinaria nelle catastrofi a distanza, A.A. 2023-2024, Relazione su Agenti causa di malattia trasmessa dagli alimenti nei campi di accoglienza – Alimenti maggiormente a rischio nei campi di accoglienza. Università di Parma, Dipartimento di Scienze medico-veterinaria, 23 giugno 2024. Personale coinvolto: Francesco Pomilio.
10. Evento formativo residenziale Malattie a trasmissione alimentare: esercizi pratici per la gestione dei focolai. Relazione su Focolai di listeriosi 2023 in Italia. IZSPLV, 25 settembre 2024, sala conferenze Carlo Rossi, via Bologna 148, Torino. Personale coinvolto: Francesco Pomilio.
11. Giornata di formazione di Assoindustria veneto a distanza PERSISTENZA DI MICRORGANISMI PATOGENI IN AMBIENTE DI PRODUZIONE ALIMENTARE Aspetti legali, di gestione e nuove tecniche di analisi. Relazione su Persistenza di microrganismi patogeni in ambiente di produzione alimentare: *Listeria monocytogenes*, 25 ottobre 2024. Personale coinvolto: Francesco Pomilio.
12. Corso di formazione residenziale «Sorveglianza e gestione dei casi di tossinfezione alimentare». Personale coinvolto: Francesco Pomilio, Alessandra Cornacchia, Alexandra Chiaverini. IZS Mezzogiorno, Napoli, 29/30/31 ottobre 2024.
13. Corso di Formazione residenziale «Validazione dei metodi di laboratorio». Personale coinvolto: Marina Torresi. Cifiv, Teramo, 30 Ottobre 2024.
14. Corso di formazione Assoittica a distanza, presentazione su La gestione di *Listeria monocytogenes* lungo la filiera ittica, 6 novembre 2024. Personale coinvolto: Francesco Pomilio.
15. Evento formativo AIVI residenziale su Malattie a trasmissione alimentare: dalle investigazioni alle azioni conseguenti. Relazione su I recenti focolai di Listeriosi. Acquasparta (TR), 22 novembre 2024. Personale coinvolto: Francesco Pomilio.
16. Corso residenziale su Metodi e tecniche dei controlli ufficiali: il campionamento. Relazione su Campionamento degli alimenti per gli accertamenti Microbiologici. IZS Sassari, Cagliari, due edizioni, 2 e 3 dicembre 2024. Personale coinvolto: Francesco Pomilio.
17. Incontro informativo con Beretta salumi a distanza, presentazione su Generalità su *Listeria monocytogenes* e Gestione di *Listeria monocytogenes* in aziende della filiera alimentare, 18 dicembre 2024. Personale coinvolto: Francesco Pomilio.
18. Corso di formazione Assoittica a distanza, presentazione su Metodi di campionamento per le procedure in autocontrollo per le aziende ittiche, 30 ottobre 2024. Personale coinvolto: Francesco Pomilio.

THESIS DISSERTATION:

19. Gianmario Carlucci. Studio di proteomica in un ceppo di *L. monocytogenes* sottoposto a varie condizioni di stress. Laurea Triennale, Università degli Studi di Teramo, Dipartimento di Bioscienze e Tecnologie Agro-Alimentari e Ambientali. 2024. Mirella Luciani
20. Federica D'Onofrio. Genomic, transcriptomic and proteomic study on hypovirulent and hypervirulent strains of *Listeria monocytogenes* subjected to several modulatory agents of virulence. Dottorato di Ricerca in Scienze degli alimenti, Università degli studi di Teramo, Bioscienze e Tecnologie Agro-Alimentari e Ambientali. 2024. Mirella Luciani
21. Maria Elisabetta De Angelis. Growth ability and GWAS studies of *L. monocytogenes* strains to develop machine learning algorithm for source attribution. XXXVI cycle - PhD course in Cellular and Molecular Biotechnologies, Università degli Studi di Teramo. 2024. Cesare Cammà
22. Antonella Libbi. Gestione di un focolaio di listeriosi verificatosi in Italia nel 2022: whole genome sequencing come strumento a supporto dell'indagine epidemiologica, Università degli studi dell'aquila dipartimento di medicina clinica, sanità pubblica, scienze della

vita e dell'ambiente, Corso di laurea magistrale in biologia della salute e della nutrizione. 2024

23. Francesco Paolo Delvecchio. "L. monocytogenes species identification" Facoltà di Bioscienze e Tecnologie Agro-alimentari e Ambientali- Master degree in Food Science and Technology. Università degli Studi di Teramo. 2024.

24. Davide Pessina. Sorveglianza ambientale per *Listeria monocytogenes*: applicazione del metodo "seek and destroy" in un impianto riconosciuto di prodotti della pesca. Università degli Studi di Milano, Dipartimento di medicina veterinaria, Scuola di specializzazione in sanità animale, allevamento e produzioni zootecniche. 2024.

25. Andrea Ricciardi. "Indagini in corso di focolaio di malattia trasmessa dagli alimenti" Facoltà di Bioscienze e Tecnologie Agro-alimentari e Ambientali-Corso di studi in Scienze e Tecnologie Alimentari. Università degli Studi di Teramo. 2024.

ARTICLES RECEIVED FOR PEER-REVIEW PROCESS:

26. Bacteremia Due to *Listeria Ivanovii* in an Elderly Patient with Uncontrolled Diabetes and Chronic Kidney Disease, *BMJ Case Reports*. bcr-2024-262764

27. Emerging Infection of *Listeria* Species from Organically Grown Food Crops and Potentialities for Misdiagnosis in Developing Countries: Calls for Polyphasic Approach to Detection, *Frontiers in Microbiology*. 1305441

28. Assessment of elements (toxic and essential) concentrations and methicillin resistance in *Staphylococcus aureus* strains isolated from raw milk in the Kurdistan province, *International Journal Dairy Technology*. IJDT-56

29. Influence of Cheddar Cheese whey peptides on the growth performance, haematological traits, serum biochemistry, faecal and caeca microbiota of broiler chickens: Valorisation of dairy waste as poultry feed supplementation, *International Journal Dairy Technology*. IJDT-91

30. Control of *Pseudomonas fluorescens* in dairy products by a novel bacteriophage YZU_PF006. *International Journal Dairy Technology*. IJDT-125

31. Probiotic effects of human milk-derived *Lactiplantibacillus plantarum* M660 on mice with antibiotic-associated diarrhea and constipation, *International Journal Dairy Technology*. IJDT-154

32. Bacteriophages of Thermophilic 'Bacillus Group' Bacteria—A 2 Review, update 2023, *International Journal Molecular Microbiology*. ijms-2866891

33. Harnessing methods, data analysis, and near-real-time wastewater monitoring for enhanced public health response using high throughput sequencing, *Science of the Total Environment*. STOTEN-D-24-09293

34. Comparative genomics analysis to explore the biodiversity and mining novel target genes of *Listeria monocytogenes* strains causing meningitis from different regions. *Frontiers in microbiology*, 19 giugno 2024, Volume 15 – 2024

35. Increased incidence and mortality from *Listeria monocytogenes* infection in Spain. *International Journal of Infectious Diseases*. Volume 145, 2024, 107089, ISSN 1201-9712, <https://doi.org/10.1016/j.ijid.2024.107089>.

RELEVANT WEBSITES:

National Reference Laboratory for *Listeria monocytogenes*. <https://www.izs.it/IZS/Engine/RAServePG.php/P/256410010520/L/1>

National Reference Centre for Whole Genome Sequencing of microbial pathogens: database and bioinformatic analysis.

https://www.izs.it/IZS/Centres_of_excellence/National_Centres/CRN_-_Sequenze_Genomiche

National Reference Laboratory for *Campylobacter*. https://www.izs.it/IZS/Centres_of_excellence/National_Centres/LNR_-_Campylobacter

SINVSA (National Veterinary Information System for Food Safety): accessible through the National Veterinary Information System VETINFO <http://www.vetinfo.sanita.it>

SINVSA Export USA: accessible through the National Veterinary Information System VETINFO <http://www.vetinfo.sanita.it>

SINVSA Export to other Third Countries: accessible through the National Veterinary Information System VETINFO

<http://www.vetinfo.sanita.it>

SEAP (Information system for the epidemiological surveillance of food pathogens): <https://sorveglianza.izs.it/seap/common/reset.do?locale=it>

Prove interlaboratorio: <http://proveinterlaboratorio.izs.it/>

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

Innovative approaches and methodologies for data analysis are renewing the discipline of epidemiology, especially those linked to WGS, machine learning and analysis of big data. This WOAHC is following different and specific approaches to advance in our area of expertise, including (i) the participation of personnel to national and international training initiative on innovative methods, (ii) to strength the collaboration with international institutions specialised in specific innovative methodologies, and (iii) the acquisition of specialised personnel (including PhD students).

12. Additional comments regarding your report: