

# WOAH Collaborative Centre Reports Activities 2022

## Activities in 2022

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### Centre Information

<b>Title of WOA Collaborating Centre</b>	Animal Production Food Safety
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<b>Name of the writer:</b>	Francesco Pomilio

### 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

FOOD SAFETY	
Title of activity	Scope
EFSA GP/EFSA/ENCO/2020/03 Partnering grants – GA 3	Participation as an operational unit in the project with the

<p>“Listeriapredict: Application of novel predictive microbiology techniques to shelf-life studies on Listeria monocytogenes in ready-to-eat foods”</p>	<p>Universities of Dublin (Ireland) and Cordoba (Spain), and the Polytechnic University of Braganza (Portugal)</p>
<p>FOOD SAFETY</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>EJP on Project Biosecurity practices for pig farming across Europe (Biopegee</p>	<p>The aims of the project are: To develop a biosecurity protocol for the primary production. Additionally, field and intervention studies will be completed in areas where current evidence is weak, e.g. effectiveness of management controls on HEV prevalence; To develop and apply a protocol for slaughterhouse biosecurity and disinfection effectiveness; To develop scenarios on country-specific biosecurity measures and on the measures’ impact on human infection rate will be run. Results will be used to assess the economic profitability of the implementation of standard and specific intervention measures along the pig supply chain and to assess projected future pork-product derived human salmonellosis cases; To develop a catalogue of biosecurity measures based on the findings on the measures’ effectiveness and costs for Salmonella and HEV.</p>
<p>FOOD SAFETY</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>ERFAN (Enhancing Research for Africa Network) Food Safety Working Group project drafting on “Baseline study on Listeria monocytogenes, Salmonella spp. and Klebsiella pneumoniae prevalence and AMR in RTE meat products and environmental samples in Botswana, Italy, Namibia, South Africa and Zambia – LISAK”</p>	<p>Baseline study started in 2021 in collaboration with universities and other institutions in the SADC countries.</p>
<p>FOOD SAFETY</p>	
<p>Title of activity</p>	<p>Scope</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>FOOD SAFETY</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>ERFAN (Enhancing Research for Africa Network) – Research Project SSRP “Isolation and characterization of Listeria monocytogenes from ready - to eat meat, frozen raw broiler chicken, swabs from chicken slaughterhouses and milk products (cheese and ice cream) in Khartoum state”, Central Veterinary Research Laboratory, Soba-Sudan – LIMOS</p>	<p>Technical support to the project.</p>
<p>FOOD SAFETY</p>	

Title of activity	Scope
ERFAN (Enhancing Research for Africa Network) online meetings for the working groups in the SADC region	On line meeting of the Working Group - "Food Hygiene" - Northern Africa /« Sécurité sanitaire des aliments » - GT Afrique du Nord, January 2022; On site meeting of the "Food Hygiene" – WGs Southern and Northern Africa, Windhoek, October 2022.
<b>FOOD SAFETY</b>	
Title of activity	Scope
ERFAN (Enhancing Research for Africa Network) Food Safety Working Group Online Training Course on "Detection of Listeria spp. and Listeria monocytogenes, in food matrices, food-producing environments and animals, according to ISO 11920-1:2017"	Online training and onsite training course addressed to the members of the ERFAN: the most recent ISO laboratory method for detection of Listeria spp and Listeria monocytogenes in foodstuffs, February-March 2022.
<b>FOOD SAFETY</b>	
Title of activity	Scope
ERFAN (Enhancing Research for Africa Network) Food Safety Working Group Online Training Course on "Information Day - Food Hygiene WG: Detection of Klebsiella pneumoniae from different matrices, AMR and NGS"	Online training and onsite training course addressed to the members of the ERFAN Working Group, describing the most recent scientific advances on the detection of Klebsiella pneumoniae in different foodstuffs, February-March 2022.
<b>FOOD SAFETY</b>	
Title of activity	Scope
ERFAN (Enhancing Research for Africa Network) - ERFAN Dialogues - "Analyse des Norovirus et virus de l'Hépatite A dans les denrées agro-alimentaires"	On line asynchronous training course always available at the ERFAN website. <a href="https://www.erfan.it/en/home/">https://www.erfan.it/en/home/</a>
<b>FOOD SAFETY</b>	
Title of activity	Scope
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.
<b>FOOD SAFETY</b>	
Title of activity	Scope
EU Twinning Project "Strengthening the Veterinary Services	The general objective of this project is to strengthen the capacities of the Ministry of Agriculture of Lebanon in the field of veterinary public health in order to protect the health and security of the Lebanese consumers and secure the Lebanese animal production and food industry. In detail, the project aims

and Food Safety Capacities of the Lebanese Ministry of Agriculture (EuropeAid/159778/DD/ACT/LB)" between the ISZAM "G. Caporale" and the Ministry of Agriculture Lebanon

to guarantee: 1) further alignment of Lebanese legislation with international SPS standards in the area of agriculture, live animals and food products; 2) capacity building of the Ministry of Agriculture – Animal Resources Directorate; 3) improvement of the communication with stakeholders (consumers, producers and other interested parties). Online meetings were carried out the year 2022. The meeting aimed to plan the activities.

#### FOOD SAFETY

Title of activity	Scope
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.

#### FOOD SAFETY

Title of activity	Scope
FAO Twinning Project on food safety between Tunisia and FAO and IZSAM on «Appui aux Services de Contrôles Officiels des Produits Animaux et Végétaux» (ASCO)	The ASCO twinning project aims to the creation and implementation of an information system for the Veterinary and Phytosanitary services of the Ministry of Agriculture of Tunisia.

#### FOOD SAFETY

Title of activity	Scope
OIE Twinning between the IZSAM "G. Caporale" and the Republican Veterinary Laboratory of Azerbaijan	The project aims to improve technical knowledge and skills of RVL staff, to enable RVL to become a reference laboratory for food safety and eventually to acquire OIE Collaborating Centre status.

#### DIAGNOSIS, BIOTECHNOLOGY and LABORATORY

Title of activity	Scope
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.

#### DIAGNOSIS, BIOTECHNOLOGY and LABORATORY

Title of activity	Scope
	The FARMED project aims to address AMR by using the ONT

<p>EJP Project on Biosecurity practices for pig farming across Europe (Farmed)</p>	<p>MinION, comparing this technology to other metagenomic sequencing technologies, and assessing its ability for diagnostic use on a range of sample matrices within both the laboratory and the field. The project will develop efficient real-time mapping strategies that identify the origin of the genetic context of AMR genes, identify the host bacterial species to enable specific pathogen detection.</p>
<p>DIAGNOSIS, BIOTECHNOLOGY and LABORATORY</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>EJP Project on Cross-sectoral framework for quality Assurance Resources for countries in the European Union (Care)</p>	<p>The CARE project will focus on developing new One Health concepts for proficiency testing (PT) of laboratories, reference materials and quality/availability of demographic data. The aim of CARE are: to develop new PT schemes that can be used cross-sectorally and thereby used to evaluate the capacity to manage foodborne problems from a One Health perspective; to provide insight to available and desirable RM, identifying sources of both strains and genomic data, including the field of antimicrobial resistance (AMR), provided by reference laboratories and other relevant sources such as online repositories and national collections; to give visibility of the reference material and data associated for the scientific community. The emphasis will be on the availability and sustainability of this reference collection in order to contribute to the long-term needs of the European research; to disseminate more widely the information about the accessibility not only of the reference collection but also of CARE partner microbial collections; to assess the quality and availability of the demographic data and focus on how to improve and make the data better by raising awareness of EU authorities collecting and organizing demographic data.</p>
<p>ZOONOSIS</p>	
<p>Title of activity</p>	<p>Scope</p>
<p>EJP Project EJP UEH2020118P on Connecting dimensions in One -Health surveillance (Matrix)</p>	<p>The MATRIX project aims to promote One Health in Europe through joint actions on foodborne zoonoses, AMR and emerging microbiological hazards. Moreover, it aims to advance the implementation of One Health Surveillance (OHS) in practice, by building on existing resources, adding value to them and creating synergies among the sectors. In particular, identifying and describing existing cross-sectorial OHS programmes or potential programmes, extending the efforts of existing integrative OHEJP projects which focus on separate or only two sectors.</p>
<p>EPIDEMIOLOGY, SURVEILLANCE, RISK ASSESSMENT, MODELLING</p>	
<p>Title of activity</p>	<p>Scope</p>
	<p>Italian national information system includes several applications for recording and analysing the results of activities carried out by the Italian veterinary services, both in the animal</p>

Design and support to the maintenance of Italian national information system

health/welfare and food safety sectors. In 2022 a dashboard has been developed allowing exploring data on prescriptions of veterinary medicines in food-producing and companion animals. Several indicators of the use of antimicrobials in farms have been developed and represented.

## 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
Contribution to the activities of the European Commission on Food Safety	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 2022 were as follows: 1) Information on possible new legislation on control of contaminants in food; 2) EFSA opinion on risks for animal and human health related to the presence of perfluoroalkyl substances (PFASs) in food and discussion on the regulatory follow-up to the EFSA opinion, including analytical aspects; 3) Exchange of views with EFSA to perform a risk-benefit assessment of fish consumption in relation to the presence of Halogenated POPs in fish; Discussion on the review of the maximum levels for dioxins and dioxin-like PCBs in food.	Animal production
Development of analytical criteria to harmonise the European regulations applicable to the surveillance and control of food and feed safety	IZSAM Experts are involved in the network of “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.	Laboratory expertise
European Commission	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.	Animal production

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 OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
EFSA- ECDC	Parma- Stockholm	Europe	<ul style="list-style-type: none"> <li>• Drafting of the European report EFSA/ECDC on Zoonosis (data related to 2021), namely to the chapter on: Campylobacter and Listeria monocytogenes, both the section relating to occurrence in food and animals;</li> <li>• Technical support for the provision of the Campylobacter data visualization dashboard in the EFSA information system;</li> <li>• Drafting and revision of the European report EFSA/ECDC on Zoonosis (data related to 2021), to report data collected in accordance with DIRECTIVE 2003/99/EC 2003/99/CE • EFSA Network on "Biohaz Microbial Risk Assessment".</li> <li>Participation as Member of the Network</li> </ul>
European Reference Laboratory for Campylobacter spp.	Sweden	Europe	<ul style="list-style-type: none"> <li>• EU-RL PT to verify the performance of the laboratory in performing the numbering of Campylobacter spp. on chicken skin (ISO 10272-2:2017) and species identification;</li> <li>• EU-RL PT to detect and identify Campylobacter spp. in pig faeces;</li> <li>• Implement the use of WGS and cluster analysis through distance matrices or phylogenetic trees;</li> <li>• Test the laboratory's ability to address a Campylobacter outbreak based on sequencing data.</li> </ul>
			<ol style="list-style-type: none"> <li>1. "Anses_LSAI_22_10_EURL_Lm_Typing PT on Listeria monocytogenes typing by cgMLST";</li> <li>2. "Anses_LSAI_22_06_EURL_Lm_CT-Fourth EURL Lm PT on challenge-test assessing the growth potential of Listeria monocytogenes in ready-</li> </ol>

<p>European Reference Laboratory for <i>Listeria monocytogenes</i></p>	<p>France</p>	<p>Europe</p>	<p>to-eat foods". • Providing data on temperatures of Italian domestic refrigerators (Ministry of Health funded project), to be used for amendments to the Technical Guidance Document for shelf life studies • Urgent inquiries related to multi-Countries outbreak of Listeriosis • Working group for the revision of the EURL Lm Technical document for conducting shelf-life studies on <i>Listeria monocytogenes</i> • Working group for the revision of the EURL Lm Guideline on environmental sampling for <i>Listeria monocytogenes</i> • Working group for the revision of the EURL Lm Guideline on competence of laboratory performing challenge tests and durability studies related to <i>Listeria monocytogenes</i> in ready-to-eat foods • Working group on "Guide on the implementation of the Standard EN ISO 19036:2019 for the estimation of measurement uncertainty associated with the enumeration of <i>Listeria monocytogenes</i>, coagulase positive staphylococci and <i>Campylobacter</i> in the food chain • Working group of the EURL Lm for the CC determination of <i>L. monocytogenes</i> - "GenoListeria project" • Inter-laboratory validation of the test method ANSES/LSAliments/LSA-INS-1517- Version 00 "GenoListeria Multiplex: Identification by multiplex real-time PCR of 30 major clonal complexes of <i>L. monocytogenes</i> strains"</p>
<p>Human health system of Avezzano, Campobasso, Pescara, and Teramo</p>	<p>Italy</p>	<p>Europe</p>	<p>Characterization of <i>L. monocytogenes</i> strains from clinical cases in Abruzzo region.</p>
<p>Istituto Superiore di Sanità (Rome) - ISS</p>	<p>Italy</p>	<p>Europe</p>	<p>• Building a common database of NGS data containing human and non-human strains of <i>Listeria monocytogenes</i>. • Working group "Export USA" with official labs for testing food intended for USA export.</p>



<p>Istituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise</p>	<p>Italy</p>	<p>Europe</p>	<ul style="list-style-type: none"> <li>• 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".</li> </ul>
<p>Istituto Zooprofilattico Sperimentale della Lombardia e dell’Emilia Romagna</p>	<p>Italy</p>	<p>Europe</p>	<ul style="list-style-type: none"> <li>• Studies on Listeria monocytogenes strains detected in food producing establishments.</li> <li>• Studies on factors influencing the effectiveness of treatment with high hydrostatic pressures (HPP) on the Salmonella and Listeria monocytogenes reduction in some fermented meat products.</li> <li>• Studies on the epidemiology of listeriosis in Lombardy: assessment of the virulence of food isolates and correlation with clinical isolates.</li> </ul>
<p>Istituto Zooprofilattico Sperimentale della Puglia e della Basilicata</p>	<p>Italy</p>	<p>Europe</p>	<p>Research project on Persistence of Listeria monocytogenes in establishments producing traditional and typical foods: study of biocide resistance, biofilm production and virulence factors using genomic and phenotypic techniques as Unit.</p>
<p>Istituto Zooprofilattico Sperimentale della Sicilia</p>	<p>Italy</p>	<p>Europe</p>	<p>Research project on Monitoring and molecular characterisation of Listeria monocytogenes isolates from food matrices and human sources for the Development of a programme considering the veterinary medical integration in the monitoring of listeriosis in Sicily as Unit.</p>
<p>Istituto Zooprofilattico Sperimentale delle Venezie</p>	<p>Italy</p>	<p>Europe</p>	<ul style="list-style-type: none"> <li>• Collaboration to train lab staff on genomic characterization of L. monocytogenes.</li> <li>• Collaboration on the assessment of challenge test and risk analysis related to Listeria monocytogenes in ready-to-eat and</li> </ul>

			not ready-to-eat food Consultancy for the use of <i>Listeria innocua</i> in challenge test in production plants.
Istituto Zooprofilattico Sperimentale dell'Umbria e delle Marche; Istituto Zooprofilattico Sperimentale del Lazio e della Toscana; Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta; University of Modena and Reggio Emilia - Department of Engineering	Italy	Europe	<ul style="list-style-type: none"> <li>• Research project on "Machine learning for <i>Listeria monocytogenes</i> prediction using WGS data (MeLeMaT)" as Principal investigator.</li> </ul>
Istituti Zooprofilattici Sperimentali	Italy	Europe	<ul style="list-style-type: none"> <li>• Establishment of a dedicated working group on microbiological challenge tests that is operational starting from 2023.</li> </ul>
Ministry of Health (Rome) - MoH	Italy	Europe	Participation in the coordinated working group for the drafting of the national guideline on official controls for food.
Ministry of Health (Rome) - MoH	Italy	Europe	<ul style="list-style-type: none"> <li>• Working group on <i>Listeria</i> 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. • Working group with the IZSve for the drafting of a sampling plan for "source tracking" following the detection of <i>Listeria monocytogenes</i> Sequence type 155 in sausages. • Expert opinion to the Ministry of Health and the Veneto Region on the timing and cooking methods of products involved in the outbreak of listeriosis ST155. • Expert opinion to the MoH to conduct investigations relating to an outbreak of listeriosis from strains belonging to ST1 and ST8. • Expert opinion to the MoH for the drafting of a guide on the control of <i>Listeria monocytogenes</i> in</li> </ul>

			establishments exporting meat products to Canada.
University of L'Aquila	Italy	Europe	<ul style="list-style-type: none"> <li>• Studies on Pseudomonas spp. and Klebsiella spp. strains contaminating food production environment.</li> </ul>
University of Milan	Italy		<ul style="list-style-type: none"> <li>• Studies on Listeria monocytogenes typing detected in food producing establishments.</li> <li>• Studies on challenge testing assessment and risk analysis related to L. monocytogenes in ready-to-eat food.</li> </ul>
University of Teramo	Italy		<ul style="list-style-type: none"> <li>• Studies on Listeria monocytogenes strains contaminating food production environment.</li> <li>• Development of genomic methods for the detection of Listeria monocytogenes.</li> <li>• Studies on L. monocytogenes proteomics.</li> </ul>
University of Bologna – Department of Veterinary Medicine	Italy		<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: (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.</p>
WOAH CC on Epidemiology, modelling and surveillance	Italy		Development of risk assessment models in food safety.

## TOR4 AND 5: NETWORKING AND COLLABORATION

5. Did your Collaborating Centre maintain a network with other WOAHA 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
Anses - Agence nationale de sécurité sanitaire de l'alimentation	France	Europe	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
Central Veterinary Laboratory	Azerbaijan	Asia and Pasific	Online assistance on Food safety laboratory quality assurance
ERFAN - Enhancing Research for Africa Network	Italy	Africa	Collaboration with training initiatives and project activities
Istituto Superiore di Sanità (ISS)	Italy	Europe	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
National Veterinary Institute	Zambia	Africa	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Collaboration within the partnership with the University of Teramo for a PhD on Food Hygiene.</li> <li>• Collaboration with the Central Veterinary Research Institute in Lusaka for setting up a laboratory for food microbiology.</li> </ul>

<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 2022, 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>WOAH CC on Biological Threat Reduction</p>	<p>United States of America</p>	<p>Americas Europe</p>	<ul style="list-style-type: none"> <li>• Collaboration in the framework of the OIE Collaborating Centre network on Veterinary Emergencies (OIE EmVetNet)</li> </ul>
<p>WOAH CC on Reduction of the Risk of Disasters in Animal Health</p>	<p>Cuba</p>	<p>Americas Europe</p>	<ul style="list-style-type: none"> <li>• Collaboration in the framework of the OIE Collaborating Centre network on Veterinary Emergencies (OIE EmVetNet)</li> </ul>
<p>WOAH CC on Veterinary Training and Capacity Building</p>	<p>Italy</p>	<p>Americas Europe</p>	<ul style="list-style-type: none"> <li>• Collaboration on international training initiatives with particular focus on the development of e-learning contents on epidemiology, surveillance and risk analysis</li> </ul>

## TOR6: EXPERT CONSULTANTS

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

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Giuseppe Aprea, Alessandra Cornacchia, Luigi Iannetti, Giacomo Migliorati, Francesco Pomilio, Stefania Salucci, Marina Torresi	Expertise in Food Safety and quality management of the laboratories	Subject Twinning project: "EU support to capacity building and gradual Union acquis alignment in the Food safety sector in Bosnia and Herzegovina".
Gabriella Centorotola, Alessandra Cornacchia, Daniela D'Angelantonio, Francesco Pomilio	Expertise in Food Safety	<ul style="list-style-type: none"> <li>• OIE funded initiative "ERFAN": online meetings of the working groups in the SADC Region</li> <li>• OIE funded initiative "ERFAN" Online ERFAN Information Day - Food Hygiene WG: Detection of Listeria spp. and Listeria monocytogenes, in food matrices, food-producing environments and animals, according to ISO 11920-1:2017 (training course)</li> <li>• Online ERFAN Information day "Food Hygiene WG: Detection of Klebsiella pneumoniae from different matrices, AMR and NGS</li> </ul>
Luigi Iannetti, Giacomo Migliorati, Francesco Pomilio	Expertise in Food Safety and quality management	Twinning Project "Strengthening the Veterinary Services and Food Safety Capacities of the Lebanese Ministry of Agriculture (EuropeAid/159778/DD/ACT/LB)" between the IZSAM "G. Caporale" and the Ministry of Agriculture Lebanon
Francesco Pomilio	Expertise in Food Safety and quality management of the laboratories	<ul style="list-style-type: none"> <li>• OIE Twinning between the IZSAM "G. Caporale" and the Republican Veterinary Laboratory of Azerbaijan</li> <li>• EU Twinning Project "Strengthening the Veterinary Services and Food Safety Capacities of the Lebanese Ministry of Agriculture (EuropeAid/159778/DD/ACT/LB)" between the IZSAM "G. Caporale" and the Ministry of Agriculture</li> <li>• EU Twinning project: "EU support to capacity building and gradual Union acquis alignment in the Food safety sector in Bosnia and Herzegovina". Three editions, Banja Luka (February, October and November 2022)</li> <li>• Tutor at Seminar on Foodborne outbreak investigation for Lebanese officials</li> <li>• Tutor at BTSF TRAINING COURSE ON Microbiological criteria and control of zoonoses - Microbiological criteria for Listeria, RTE food and shelf life, 21-24/06/2022 Trim, Ireland; 19-22/09/2022 Trim, Ireland; 7-11/november Sofia, Bulgaria; 12-15 December 2022 Malta.</li> </ul>
		Twinning Project between LITHUANIA, HUNGARY, ITALY and BOSNIA AND HERZEGOVINA "EU's support to capacity

Alessandra Cornacchia, Francesco Pomilio, Roberta Rosato, Stefania Salucci, Marina Torresi	Expertise in Food Safety and quality management	building and gradual Union acquis alignment in the Food safety sector in Bosnia and Herzegovina" EuropeAid/166812/DD/ACT/BA (16-20 May 2022, 4-8 July 2022, 29 August- 2 September 2022). Training course: Foodborne outbreak investigation, three editions: Mostar, Banja Luka, Tuzla.
Luigi Iannetti, Francesco Pomilio	Expertise in Food Safety and quality management	Webinar: "Training course on Practical methods for carrying out shelf life studies and verifying their quality, how to evaluate the shelf life of foods in relation to the risk of Listeria monocytogenes, the challenge test according to the EURL Lm 2021 guidelines and the ISO 20976-1:2019
Gabriella Centorotola, Alessandra Cornacchia, Marina Torresi	Expertise in Food Safety	ERFAN - WOH CC Animal production food Safety: Laboratory Training Course: "Detection and characterization of Listeria monocytogenes, Klebsiella pneumoniae and Salmonella spp.". Central Veterinary Laboratory, Windhoek
Alexandra Chiaverini, Fabrizia Guidi, Luigi Iannetti, Giacomo Migliorati, Francesco Pomilio, Marina Torresi	Expertise in Food Safety	Expert opinion to the Ministry of Health to conduct investigations relating to an outbreak of listeriosis from strain belonging to ST155 including the technical inspection at the food business operator identified as the source of the outbreak.

## TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

*The WOH 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 WOH Members and through specific 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 WOH Member Countries mainly involved in these activities are those belonging to the following geographical areas: North Africa, 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 WOH, to personnel from WOH Members?

Yes

a) Technical visit : 0

b) Seminars : 150

c) Hands-on training courses: 148

d) Internships (>1 month) : 18

TYPE OF TECHNICAL TRAINING PROVIDED (A, B, C OR D)	CONTENT	COUNTRY OF ORIGIN OF THE EXPERT(S) PROVIDED WITH TRAINING	NO. PARTICIPANTS FROM THE CORRESPONDING COUNTRY

b	ERFAN – WOAHC CC Animal production food Safety: "Detection of <i>Listeria</i> spp. and <i>Listeria monocytogenes</i> , in food matrices, food producing environments and animals, according to ISO 11920-1:2017", February-March 2022	Botswana, Mauritania, Libya, Namibia, Republic of South Africa, Mozambique, Ethiopia, Angola, Zambia, Morocco, Tunisia, Algeria, Sudan, Zimbabwe, Tanzania	31
b	ERFAN – WOAHC CC Animal production food Safety: " <i>Listeria monocytogenes</i> deep typing: from the wet to the dry-lab activities", February - March 2022.	Botswana, Mauritania, Libya, Namibia, Republic of South Africa, Mozambique, Ethiopia, Angola, Zambia, Morocco, Tunisia, Algeria, Sudan, Zimbabwe, Tanzania	21
b	ERFAN – WOAHC CC Animal production food Safety: "Detection of <i>Klebsiella pneumoniae</i> from different matrices, AMR and NGS", February-March 2022.	Algeria, Mauritania, Morocco, Mozambique, Senegal, Sudan, Tanzania, Tunisia, Zambia	63
b	Twinning Project "Strengthening the Veterinary Services and Food Safety Capacities of the Lebanese Ministry of Agriculture (EuropeAid/159778/DD/ACT/LB)" between the IZSAM "G. Caporale" and the Ministry of Agriculture Lebanon (remote assistance)	Lebanon	5
b	Webinar lecture: "Training course on Practical methods for carrying out shelf life studies and verifying their quality, how to evaluate the shelf life of foods in relation to the risk of <i>Listeria monocytogenes</i> , the challenge test according to the EURL Lm 2021 guidelines and the ISO 20976-1:2019 standard (part 2)". February 2022	Italy	30
c	BTSF TRAINING COURSE ON Microbiological criteria and control of zoonoses - Microbiological criteria for <i>Listeria</i> , RTE food and shelf life, 21-24/06/2022 Trim, Ireland; 19-22/09/2022 Trim, Ireland; 7-11/novembre Sofia, Bulgaria.	European countries	100
c	ERFAN – WOAHC CC Animal production food Safety: "Detection and characterization of <i>Listeria monocytogenes</i> , <i>Klebsiella pneumoniae</i> and <i>Salmonella</i> spp. and Food Hygiene", Central Veterinary Laboratory, Windhoek. October 2022.	Namibia	26



c	Training on Bacteriophage isolation and basic handling of Campylobacter. Teramo, 2-4 November	AGES (Austrian Agency for Health and Food Safe)	2
c	Twinning project: "EU support to capacity building and gradual Union acquis alignment in the Food safety sector in Bosnia and Herzegovina". Three editions, Banja Luka (February, October and November 2022). Lecture: Principles and techniques to perform HACCP audit for food inspectors.	Bosnia and Herzegovina	20
d	Training on laboratory methods to detect and characterise pathogen (foodborne)	Italy	16
d	Training on study of Antimicrobial susceptibility	Italy	1
d	Training on Listeria monocytogenes	Italy	1
d	Training on viral pathogen agents of foodborne disease	Italy	1

## TOR8: SCIENTIFIC MEETINGS

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

No

## TOR9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

27

1. Abdel-Glil MY, Thomas P, Brandt C, Melzer F, Subbaiyan A, Chaudhuri P, Harmsen D, Jolley KA, Janowicz A, Garofolo G, Neubauer H, Pletz MW. (2022). Core genome multilocus sequence typing scheme for improved characterization and epidemiological surveillance of pathogenic Brucella. *Journal of Clinical Microbiology*, 60(8), e00311-22. [https://doi: 10.1128/jcm.00311-22](https://doi.org/10.1128/jcm.00311-22)

2. Acciari VA, Ruolo A, Torresi M, Ricci L, Pompei A, Marfoggia C, Valente FM, Centorotola G, Conte A, Salini R, D'Alterio N, Migliorati G, Pomilio F. (2022). Genetic diversity of Listeria monocytogenes strains contaminating food and food producing environment as single based sample in Italy (retrospective study)". *International Journal of Food Microbiology* 366 109562.

<https://doi.org/10.1016/j.ijfoodmicro.2022.109562>

3. Annunziata L, Schirone M, Campana G, De Massis MR, Scortichini G, Visciano P. (2022). Histamine in fish and fish products: An 8-year survey. Follow up and official control activities in the Abruzzo region (Central Italy). *Food Control* 133, 108651. Part B, 2022, <https://doi.org/10.1016/j.foodcont.2021.108651>.
4. Aprea G, Di Bartolo I, Monini M, D'Angelantonio D, Scattolini S, Boni A, Truglio G, Di Giacobbe S, Serio A, Antoci S, Di Marzio V, Migliorati G, D'Alterio N, Pomilio F. (2022). The role of staff and contaminated environmental surfaces in spreading of norovirus infection in a long-term health care facility in Italy. *Vet Ital.* 2021 Dec 31;57(4):311-318. doi: 10.12834/VetIt.2479.15150.1. PMID: 35593490.
5. Bennato F, Ianni A, Florio M, Grotta L, Pomilio F, Saletti MA, Martino G. (2022). Nutritional Properties of Milk from Dairy Ewes Fed with a Diet Containing Grape Pomace. *Foods.* 2022 Jun 24;11(13):1878. doi: 10.3390/foods11131878. PMID: 35804692; PMCID: PMC9265667.
6. Cecchi F, Fabbri MC, Tinacci L, Nuvoloni R, Marotta F, Di Marcantonio L, Cilia G, Macchioni F, Armani A, Fratini F, Pedonese F. (2022). Genetic resistance to *Campylobacter coli* and *Campylobacter jejuni* in wild boar (*Sus scrofa* L.) *Rendiconti Lincei. Scienze Fisiche e Naturali* <https://doi.org/10.1007/s12210-022-01052-1>.
7. Ceci R, Diletti G, Bellocci M, Chiumiento F, D'Antonio S, De Benedictis A, Leva M, Piritto L, Scortichini G, Fernandes AR. (2022). Brominated and chlorinated contaminants in food (PCDD/Fs, PCBs, PBDD/Fs PBDEs): simultaneous determination and occurrence in Italian produce. *Chemosphere*, 288(Pt 1):132445. <https://doi.org/10.1016/j.chemosphere.2021.132445>
8. Chiaverini A, Cornacchia A, Centorotola G, Tieri EE, Sulli N, Del Matto I, Iannitto G, Petrone D, Petrini A, Pomilio F. (2022). Phenotypic and Genetic Characterization of *Klebsiella pneumoniae* Isolates from Wild Animals in Central Italy. *Animals (Basel)*. 2022 May 25;12(11):1347. doi: 10.3390/ani12111347. PMID: 35681810; PMCID: PMC9179660.
9. Conesa A, Garofolo G, Di Pasquale A, & Cammà C. (2022). Monitoring AMR in *Campylobacter jejuni* from Italy in the last 10 years (2011-2021): Microbiological and WGS data risk assessment. *EFSA journal*. European Food Safety Authority, 20 (Suppl 1), e200406. <https://doi.org/10.2903/j.efsa.2022.e200406>.
10. Cornacchia A, Chiaverini A, Centorotola G, Di Domenico M, Cocco A, Ancora M, Cammà C, D'Alterio N, Di Francesco CE, Pomilio F. (2022). Whole-Genome Sequences of Two *Klebsiella pneumoniae* Strains (Sequence Types 23 and 35) from Wildlife. *Microbiol Resour Announc.* 2022 Jun 16;11(6):e0014022. doi: 10.1128/mra.00140-22. Epub 2022 May 17. PMID: 35579460; PMCID: PMC9202408.
11. De Angelis ME, Martino C, Chiaverini A, Di Pancrazio C, Di Marzio V, Bosica S, Malatesta D, Salucci S, Sulli N, Acciari VA, & Pomilio F. (2022). Co-infection of *L. monocytogenes* and *toxoplasma gondii* in a sheep flock causing abortion and lamb deaths. *Microorganisms*, 10(8) <https://doi.org/10.3390/microorganisms10081647>
12. De Massis F, Aprea G, Scattolini S, D'Angelantonio D, Chiaverini A, Mangone I, Perilli M, Colacicco G, Olivieri S, Pomilio F, Di Pasquale A, Migliorati G, Di Paolo G, Morgani C, Giammarino A. (2022). Detection of Hepatitis E Virus (HEV) in Pigs and in the Wild Boar (*Sus scrofa*) Population of Chieti Province, Abruzzo Region, Italy. *Appl. Microbiol.* 2022, 2(4), 818-826; <https://doi.org/10.3390/applmicrobiol2040062>
13. Di Marcantonio L, Marotta F, Vulpiani M P, Sonntag Q, Iannetti L, Janowicz A, Di Serafino G, Di Giannatale E, Garofolo, G. (2022). Investigating the cecal microbiota in broiler poultry farms and its potential relationships with animal welfare. *Research in Veterinary Science*, 144, 115-125. <https://doi.org/10.1016/j.rvsc.2022.01.020>
14. Di Marcantonio L, Romantini R, Marotta F, Chiaverini A, Zilli K, Abass A, Di Giannatale E, Garofolo G, Janowicz A. (2022). The Current Landscape of Antibiotic Resistance of *Salmonella* *Infantis* in Italy: The Expansion of Extended-Spectrum Beta-Lactamase Producers on a Local Scale. *Frontiers in Microbiology*, 13, 812481. <https://doi.org/10.3389/fmicb.2022.812481>
15. Di Renzo L, De Angelis ME, Torresi M, Di Lollo V, Di Teodoro G, Averaimo D, Defourny SVP, Di Giacinto F, Profico C, Olivieri V, Pomilio F, Cammà C, Ferri N, Di Francesco G. (2022). First Report of Septicaemic Listeriosis in a Loggerhead Sea Turtle (*Caretta caretta*) stranded along the Adriatic Coast: Strain Detection and Sequencing. *Animals (Basel)*. 2022 Sep 10;12(18):2364. <https://doi.org/10.3390/ani12182364>. PMID: 36139224; PMCID: PMC9495059
16. D'Angelantonio D., Santini N., Ciorba AB, Iannetti L., Pomilio F., Feliziani F., Migliorati G. (2022). Food safety of swine meat and meat products - African swine fever virus. *Rev.0*
17. D'Onofrio F, Visciano P, Krasteva I, Torresi M, Tittarelli M, Pomilio F, Iannetti L, Di Febo T, Paparella A, Schirone M, Luciani M. (2022). Immunoproteome profiling of *Listeria monocytogenes* under mild acid and salt stress conditions. *Proteomics.* 2022 Sep;22(18):e2200082. <https://doi.org/10.1002/pmic.202200082>. Epub 2022 Aug 8. PMID: 35916071.
18. European Food Safety Authority (EFSA). The European Union One Health 2021 Zoonoses Report. 10.2903/j.efsa.2022.7666.
19. Félix B, Sevellec Y, Palma F, Douarre PE, Felten A, Radomski N, Mallet L, Blanchard Y, Leroux A, Soumet C, Bridier A, Piveteau P, Ascensio E, Hébraud M, Karpíšková R, Gelbíčová T, Torresi M, Pomilio F, Cammà C, Di Pasquale A, Skjerdal T, Pietzka A, Ruppitsch W, Canelhas MR, Papić B, Hurtado A, Wullings B, Bulawova H, Castro H, Lindström M, Korkeala H, Šteingolde Ž, Kramarenko T, Cabanova L, Szymczak B, Gareis M, Oswaldi V, Marti E, Seyfarth AM, Leblanc JC, Guillier L, Roussel S. (2022). A European-wide dataset to uncover adaptive traits of *Listeria monocytogenes* to diverse ecological niches. *Sci Data.* 2022 Apr 28;9(1):190. <https://doi.org/10.1038/s41597-022-01278-6>. PMID: 35484273; PMCID: PMC9050667.

20. Guidi F, Lorenzetti C, Centorotola G, Torresi M, Camma C, Chiaverini A, Pomilio F and Blasi G. (2022). Atypical Serogroup IVb-v1 of *Listeria monocytogenes* Assigned to New ST2801, Widely Spread and Persistent in the Environment of a Pork-Meat Producing Plant of Central Italy. 2022. *Front. Microbiol.* 13:930895. <https://doi.org/10.3389/fmicb.2022.930895>.
21. Huber N, Andraud M, Sassu EL, Prigge C, Zoche-Golob V, Käsbohrer A, D'Angelantonio D, Viltrop A, Żmudzi J, Jones H, Smith RP, Tobias T, Burow E. (2022). What is a biosecurity measure? A definition proposal for animal production and linked processing operations. *One Health.* 2022 Sep 16;15:100433. doi: 10.1016/j.onehlt.2022.100433. PMID: 36277103; PMCID: PMC9582555.
22. Ianni A., Bennato F., Martino C., Saletti M.A., Pomilio F., Martino G. (2022). Matrix metalloproteinase-9 activity in ewes' milk and its relationship to somatic cell counts, *International Dairy Journal*, <https://doi.org/10.1016/j.idairyj.2022.105438>.
23. Palma F, Mangone I, Janowicz A, Chiaverini A, Torresi M, Garofolo G, Criscuolo A, Brisse S, Di Pasquale A, Cammà C, Radomski N. (2022). In vitro and in silico parameters for precise cgMLST typing of *Listeria monocytogenes*. 2022. *BMC Genomics* 23, 235 (2022). <https://doi.org/10.1186/s12864-022-08437-4>.
24. Perilli M, Scattolini S, Telera GC, Cornacchia A, Tucci P, Sacchini F, Sericola M, Romantini R, Marotta F, Di Provvio A, Pomilio F, De Massis F. (2022). Distribution of *Salmonella* spp. Serotypes Isolated from Poultry in Abruzzo and Molise Regions (Italy) during a 6-Year Period. *Microorganisms* 2022, 10, 199. <https://doi.org/10.3390/microorganisms10020199>
25. Rodrigues C, Hauser K, Cahill N, Ligowska-Marzeta M, Centorotola G, Cornacchia A, Garcia Fierro R, Haenni M, Nielsen EM, Piveteau P, Barbier E, Morris D, Pomilio F, Brisse S. (2022). High Prevalence of *Klebsiella pneumoniae* in European Food Products: a Multicentric Study Comparing Culture and Molecular Detection Methods. *Microbiol Spectr.* 2022 Feb 23;10(1):e0237621. doi: 10.1128/spectrum.02376-21. Epub 2022 Feb 23. PMID: 35196810; PMCID: PMC8865463.
26. Rossi F, Giaccone V, Colavita G, Amadoro C, Pomilio F, & Catellani P. (2022). Virulence characteristics and distribution of the pathogen *Listeria ivanovii* in the environment and in food. 2022. *Microorganisms*, 10(8) <https://doi.org/10.3390/microorganisms10081679>
27. Schiavano GF, Ateba CN, Petruzzelli A, Mele V, Amagliani G, Guidi F, De Santi M, Pomilio F, Blasi G, Gattuso A, Di Lullo S, Rocchegiani E, & Brandi G. (2022). Whole-genome sequencing characterization of virulence profiles of *Listeria monocytogenes* food and human isolates and in vitro adhesion/invasion assessment. *Microorganisms*, 10 (1). <https://doi.org/10.3390/microorganisms10010062>

b) International conferences:

17

1. Beikpour F, Vicenza T, Suffredini E, Di Pasquale S, Cozzi L, Aprea G, Barile N, Scattolini S, Nerone E, D'Angelantonio D, Del Matto I. "Hepatitis E in different food products and in wild boars in the region of Abruzzo (Italy)". 17th International symposium on food and environmental virology, 16-20 May 2022. Poster presentation
2. Centorotola G, Ziba MW, Cornacchia A, Chiaverini A, Torresi M, D'Angelantonio D, Scacchia M, Fandamu P, Bowa B, Mangambwa P, Muuka GM, Pomilio F. Whole Genome Sequencing of *Listeria monocytogenes* from Zambian Meat Foods: a Focus on Hyper-virulent Clones, in ASM Conference on Rapid Applied Microbial Next-Generation Sequencing and Bioinformatic Pipelines, Baltimora, USA, 16-20 October 2022. Oral presentation
3. De Angelis ME, Torresi M, Di Lollo V, Iannetti I, Scialabba S, Secondini B, Acciari VA, Bosica S, Tieri E, Ruberto A, Sulli N. *Listeria monocytogenes* passive surveillance and strain characterization in wolves. Conservation Medicine and Wildlife health International seminar, 16-17 June 2022, Università degli studi di Teramo. Poster-Oral presentation.
4. Di Renzo L, De Angelis ME, Torresi M, Di Lollo V, Di Teodoro G, Averaimo D, Profico C, Olivieri V, Pomilio F, Camma C, Ferri N, Di Francesco G. First report of septicemic listeriosis in sea turtle (*Caretta caretta*): strain detection and sequencing. Seven Mediterranean Conference on Marine Turtles Tetouan, Morocco, 18-21 ottobre 2022. Poster presentation.
5. D'Angelantonio D, Scattolini S, Mancini V, Serio A, Centorotola G, Anastasio A, Migliorati G, Pomilio F, Aprea G. Potential bacteriophage application against *Listeria monocytogenes* in contaminated basil plants after root uptake. *Virus Of Microbes* 2022 (VoM). 18-22 July 2022. Poster presentation.
6. D'Onofrio F, Bianchi M, Visciano P, Tittarelli M, Pomilio F, Iannetti L, Paparella A, Luciani M, Schirone M. Whole proteomics analysis of a *Listeria monocytogenes* 1/2a strain exposed at different stress conditions. 11th Central European Congress on Food and Nutrition (CEFOOD) Ljubljana, 27-30 September 2022. Poster presentation.
7. D'Onofrio F, Luciani M, Visciano P, Krasteva I, Tittarelli M, Pomilio F, Paparella A, Schirone M. A proteomic approach to analyze the response of *Listeria monocytogenes* to different environmental conditions. FoodMicro 2022 Next Generation Challenges in Food Microbiology – Athens, 28-31 August 2022. Poster presentation
8. Garofolo G., AMR e reti di monitoraggio per la sicurezza alimentare. In L'approccio "One Health" e il contributo delle politiche sanitarie allo sviluppo sostenibile. Aula Acitelli - Centro "Dante Vecchioni". Ordine Medici L'Aquila, 13 October 2022. Oral presentation.
9. Garofolo G, One Health: reti internazionali. In L'approccio "One Health" e il contributo delle politiche sanitarie allo sviluppo sostenibile. Aula Acitelli - Centro "Dante Vecchioni". Ordine Medici L'Aquila, 13 October 2022. Oral presentation
10. Garofolo G, *Campylobacter* in ruminants from Italy. The 17thEURL-Campylobacter workshop, Sigtuna, Sweden, September 27-28,

2022. Oral Presentation. <https://www.sva.se/en/about-us/eurl-campylobacter/workshops/workshop-2022/>

11. Guidi F, Torresi M, Centorotola G, Chiaverini A, Rocchegiani E, Pomilio F, Blasi G. Whole Genome Sequencing study on *Listeria monocytogenes* clinical strains: 9 years of surveillance in Umbria and Marche regions (Italy). ASM Conference on Rapid Applied Microbial Next-Generation Sequencing and Bioinformatic Pipelines, Baltimore, USA, 16-20 October 2022. Poster presentation.
12. Perilli M, Telera GC, Cortazzi N, Marotta F, Iannetti L, De Massis F, 2022. A Survey to Assess Food Safety Knowledge and Habits among Selected Categories of Population in Abruzzo Region (Italy). Proceedings of the 16th International Symposium of Veterinary Epidemiology and Economics (ISVEE), August 7-12, 2022 Halifax, Canada. Poster presentation.
13. Workshop: "16th EURL workshop of the NRLs for *Listeria monocytogenes*". Webinar, 17-18 May 2022 (attended Gabriella Centorotola, Elisabetta De Angelis, Francesco Pomilio)
14. Workshop: Corso di formazione su "Modern predictive microbiology analysis in R (Predmicro 2022)"; Progetto Listeria Predict, Bragança, Portogallo, 27-28 July (attended Patrizia Centorame; Maria Elisabetta De Angelis, Luigi Iannetti).
15. Workshop: Use of quantitative microbial risk assessment tools. Case studies on foodborne pathogens in ready-to-eat foods. Progetto Listeria Predict, University of Cordoba, Spagna, 27-28 October 2022 (attended Patrizia Centorame, Maria Elisabetta De Angelis, Luigi Iannetti).
16. Workshop: One Health EJP Continuing Professional Development Module Rapid diagnostics and harmonisation of diagnostic tests, Statens Serum Institut and DTU Food, Copenhagen and online, 2nd – 4th November 2022. (attended Maria Elisabetta De Angelis).
17. Symposium: One Health Award. Teramo 14-16 October 2022. <https://onehealthaward.it/programma/> (attended Giuseppe Aprea, Maria Luisa Danzetta, Giuliano Garofolo, Francesco Pomilio).

c) National conferences:

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1. Acciari VA. Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, Il fingerprinting (PFGE) di ceppi di *Listeria monocytogenes*, limiti e possibilità di uso in *Listeria monocytogenes* negli stabilimenti di produzione degli alimenti: nuovi approcci analitici di ricerca, tracciabilità genica e nuove metodologie di prevenzione ed eliminazione, webinar, Klareco, martedì 24 maggio 2022. Oral presentation.
2. Annunziata L, Aloia R, Schirone M, Scortichini G, Visciano P. CONTROLLI UFFICIALI PER LA DETERMINAZIONE DELLE BIOTOSSINE MARINE LIPOSOLUBILI IN MITILI ALLEVATI LUNGO LA COSTA ADRIATICA XXXI Convegno Nazionale dell'Associazione Italiana Veterinari Igienisti (AIVI), 22-24 settembre 2022, Università degli studi di Teramo. Poster presentation
3. Beikpour F, Vicenza T, Suffredini E, Di Pasquale, Cozzi L, Aprea G, Barile N, Scattolini S, Nerone E, D'Angelantonio D, Del Matto I, Di Martino B, Martella V, La Rosa G. Low Prevalence Of Hepatitis E Virus In Food Products From A Hyperendemic Region (Abruzzo, Italy). 6th National Congress of the Italian Society for Virology, 3-5 July 2022. Poster presentation.
4. Beikpour F, Barile N, Aprea G, Nerone E, Scattolini S, D'Angelantonio D, Del Matto I, Cozzi L, Suffredini E, Di Pasquale S, La Rosa G, Vicenza T. Virus dell'Epatite E nei molluschi bivalvi della regione Abruzzo (Italy). IX Convegno Nazionale SIRAM - Società Italiana di Ricerca Applicata alla Molluschicoltura. Molluschicoltura, salute e ambiente. Poster presentation.
5. Castellani F, Saluti G, Colagrande MN, Ricci M, Diletti G, Scortichini G. Scenari di esposizione alimentare ad alcuni contaminanti di interesse prioritario nella popolazione generale italiana. Workshop annuale: "I risultati della ricerca corrente condotta dall'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise - anno 2021". On line, 15 June 2022. Oral presentation.
6. Centorotola G. Il sequenziamento dell'intero genoma di ceppi di *Listeria monocytogenes*: clustering e studi di resistenza. In *Listeria monocytogenes* negli stabilimenti di produzione degli alimenti: nuovi approcci analitici di ricerca, tracciabilità genica e nuove metodologie di prevenzione ed eliminazione, webinar, Klareco, martedì 24 maggio 2022. Oral presentation.
7. Chiaverini A. Analisi di sequenze genomiche durante un focolaio: pro e contro delle diverse metodologie. Workshop annuale del Laboratorio Nazionale di Riferimento per *Listeria monocytogenes*, Teramo, 27 October 2022. On line. Oral presentation.
8. Costa A, Gattuso A, Giammanco A, Torresi M, Alio V, Butera G, Fasciana T, Castello A, Cardamone C, Pomilio F. Caratterizzazione molecolare di ceppi di *Listeria monocytogenes* isolati da matrici alimentari e da fonti umane. XXXI Convegno Nazionale dell'Associazione Italiana Veterinari Igienisti (AIVI), 22-24 settembre 2022, Università degli studi di Teramo. Poster presentation.
9. De Angelis M.E. Studio della contaminazione ambientale da campionamento di *Listeria monocytogenes*: i risultati di studi dell'IZSAM in *Listeria monocytogenes* negli stabilimenti di produzione degli alimenti: nuovi approcci analitici di ricerca, tracciabilità genica e nuove metodologie di prevenzione ed eliminazione, webinar, Klareco, martedì 24 maggio 2022. Oral presentation.
10. De Angelis M.E. e Pomilio F. La contaminazione ambientale da *Listeria monocytogenes* nelle aziende destinate all'export. In Il campionamento microbiologico degli alimenti. Dalla norma alla pratica. Ordine dei Med. Vet. di Campobasso. Campobasso 14 June 2022. Oral presentation.
11. De Angelis M.E. Identificazione di specie di *Listeria* spp. mediante MALDI TOF: verifica del metodo. Workshop annuale del Laboratorio Nazionale di Riferimento per *Listeria monocytogenes*, Teramo, 27 October 2022. On line. Oral presentation.

12. D'Onofrio F, Luciani M, Visciano P, Iannetti L, Pomilio F, Tittarelli M, Paparella A, Schirone M. *Analisi dell'intero proteoma di un ceppo di Listeria monocytogenes esposto a differenti fattori di stress* Italian Journal of Food Safety, 2022, 11, Supplement 1 – Abstracts of the 31st AIVI National Congress. Poster presentation.
13. D'Onofrio F, Schirone M, Lolli MG, Sacchini F, Krasteva I, Di Febo T, Pomilio F, Centorame P, Tittarelli M, Luciani M, Iannetti L. *Utilizzo di un metodo citofluorimetrico per la conta di Listeria monocytogenes nei challenge test* XXI Congresso Nazionale Società Italiana di Diagnostica di Laboratorio Veterinaria (S.I.Di.L.V.) Ischia, 7-9 September 2022. Poster presentation.
14. Ianiro G, Pavoni E, Aprea G, Romantini R, Alborali GL, D'Angelantonio D, Garofolo G, Scattolini S, De Sabato L, Ostanello F, Di Bartolo I. *Presence Of Hepatitis E Virus In Italian Pig Farms*. 6th National Congress of the Italian Society for Virology, 3-5 July 2022. Poster.
15. Marchegiano A. *Challenge test con Campylobacter jejuni in latte e prodotti lattiero-caseari*. Workshop annuale: "I risultati della ricerca corrente condotta dall'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise - anno 2021". On line, 15 June 2022. Oral presentation.
16. Marotta F. *Studio dell'eco-epidemiologia di Campylobacter e dell'antibiotico-resistenza in Italia (EcoCampy)*. Workshop annuale: "I risultati della ricerca corrente condotta dall'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise - anno 2021". On line, 15 June 2022. Oral presentation.
17. Marotta F. *Sorveglianza genomica nei ruminanti*. XXI National Congress SIDILV. Ischia, 7-9 September 2022. Oral presentation.
18. Marotta F. *Studio sulla caratterizzazione di Campylobacter tramite Maldi-TOF*, Workshop annuale del Laboratorio Nazionale di Riferimento per Campylobacter, Teramo, 14 November 2022. On line. Oral presentation.
19. Romantini R. *Sorveglianza Campylobacter nell'uomo, negli alimenti e negli animali*, Workshop annuale del Laboratorio Nazionale di Riferimento per Campylobacter, Teramo, 14 November 2022. On line. Oral presentation.
20. Garofolo G. *Attività ed aggiornamenti dal network EURL Campylobacter*, Workshop annuale del Laboratorio Nazionale di Riferimento per Campylobacter, Teramo, 14 November 2022. On line. Oral presentation.
21. Di Timoteo F. *Applicazione del sistema CRISPR-Cas9 come antibatterico*, Workshop annuale del Laboratorio Nazionale di Riferimento per Campylobacter, Teramo, 14 November 2022. On line. Oral presentation.
22. Zilli K. *Risultati Ring-test e attività future*, Workshop annuale del Laboratorio Nazionale di Riferimento per Campylobacter, Teramo, 14 November 2022. On line. Oral presentation.
23. Pomilio F. *La Listeria monocytogenes: una specie e tanti ceppi diversi in Listeria monocytogenes negli stabilimenti di produzione degli alimenti: nuovi approcci analitici di ricerca, tracciabilità genica e nuove metodologie di prevenzione ed eliminazione*, webinar, Klareco, martedì 24 maggio 2022. Oral presentation.
24. Pomilio F. *Patogeni emergenti ed alimenti*, XXXI National Congress A.I.V.I., Teramo, 22 - 24 September 2022. Oral presentation
25. Pomilio F. *Ruolo dell'IZS "G. Caporale" di Teramo in Antropozoonosi batteriche*, Microbiology & Infections, Pescara 2022, 13-15 October 2022, II EDIZIONE, Microbiology & Infections, Francavilla (CH). Oral presentation.
26. Pomilio F. *Focolaio ST155: il ruolo e le attività dell'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise*. Workshop annuale del Laboratorio Nazionale di Riferimento per Listeria monocytogenes, Teramo, 27 October 2022. On line. Oral presentation.
27. Pomilio F. *Aggiornamenti dal Workshop EURL 2022 e circuiti Interlaboratorio*. Workshop annuale del Laboratorio Nazionale di Riferimento per Listeria monocytogenes, Teramo, 27 October 2022. On line. Oral presentation.
28. Pomilio F. *Studi di shelf-life e Listeria monocytogenes in Shelf - life nuovi approcci in sicurezza alimentare e sostenibilità*, 28 October 2022, organised by Università degli Studi di scienze gastronomiche, Pollenzo (CN). Oral presentation.
29. Pomilio F. *I controlli ufficiali e l'allerta Listeria monocytogenes in I trend per la sicurezza alimentare 2023*, MAURIZI Convention online, 28/11/2022. Oral presentation.
30. Pomilio F. *D.Lgs 2 febbraio 2021, n. 27 in Controlli Ufficiali "I controlli ufficiali nella filiera agroalimentare alla luce del regolamento UE 2017/625, del D.LGS 27/21 e del DLGS 32/21"*. AUSL Teramo, 07 June 2022, Teramo. Oral presentation.
31. Schirone M, Florio M, Visciano P, D'Onofrio F, Ianni A, Luciani M, Pomilio F, Tittarelli M., Martino G. *Confronto Del Contenuto Proteico E*

*Lipidico In Tre Differenti Razze Di Bovine Da Latte. XXXI National Congress A.I.V.I., Teramo, 22 - 24 September 2022. Poster presentation*

32. *Torresi M. Monitoraggio di Listeria monocytogenes nelle filiere alimentari ed indagine genomica degli isolati, Convegno "Listeria monocytogenes e listeriosi: sviluppo di un programma di integrazione medico-veterinario in Sicilia", Research project IZS Sicilia 07/19 RC, Istituto Zooprofilattico Sperimentale della Sicilia, Palermo, 8 November 2022. Oral presentation.*

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

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1. *Final meeting Project. One Health EJP Project BIOPIGEE: 6-7th October 2022, Giulianova, Italy. Attendance. <https://onehealthjep.eu/jrp-biopigee/>*

2. *Meeting project. FARMED DTU, Lyngby, Denmark on 20-22 September, 2022. Research results 'presentation on Campylobacter through metagenomics' (Di Marcantonio L.)*

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

4. *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](https://www.izs.it/IZS/Centres_of_excellence/National_Centres/CRN_-_Sequenze_Genomiche)*

5. *National Reference Laboratory for Campylobacter. [https://www.izs.it/IZS/Centres\\_of\\_excellence/National\\_Centres/LNR\\_-\\_Campylobacter](https://www.izs.it/IZS/Centres_of_excellence/National_Centres/LNR_-_Campylobacter)*

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

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

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

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

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

*The COVID-19 pandemic and related travel restrictions have influenced international training and collaboration activities, hampering the organization of face-to-face meetings and residential courses. During two years, 2020 and 2021, almost all initiatives were performed online, taking benefits of different available meeting platforms. In 2022, albeit a certain relaxation in the application of travel restrictions, the experiences gained with on-distance learning and meetings have led to the use of these tools and to continue following online approaches also for this year. In fact, several benefits in terms of costs and number of participants suggest the use of online platform for various type of initiatives. A mixed approach (online and face-to-face) is expected to be followed in the next future, regardless the COVID-19 travel restrictions in place.*