World Organisation for Animal Health

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WOAH Collaborative Centre Reports Activities 2025

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CENTRE INFORMATION

***Title of WOAH Collaborating Centre**	Epidemiology Emerging Avian Diseases
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***Name of the writer:**	Paolo Mulatti

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 WOAH

Category	Title of activity	Scope
Disease control (true)	1. Control measures for HPAI introduction and spread in the poultry production sector 2. GIS and spatial analysis services 3. West Nile Disease (WND) control activities in Northeast Italy	1. Support to the Italian MoH for the drafting of Provisions to prevent the introduction and spread of AI into, and within, the poultry sector, following the implementation of the new European Animal Health Law (Regulation 429/2016/EC) 2. Support the management of H5N1 Highly Pathogenic Avian Influenza (HPAI) outbreaks by means of GIS applications, technical support services, desktop GIS and web-based GIS services 3. Support to 2025 WND surveillance and control activities in Northeast Italy. The main aim is to obtain information on the circulation of WND virus in the area through i) entomological surveillance, ii) clinical surveillance of WND virus in equine farms, iii) passive and active surveillance of WND virus in wild birds
		1. Support the planning of 2025 AI surveillance activities in Italy by using a risk-based approach to define the risk level of different regions and poultry categories and the sample size for both domestic

Epidemiology, surveillance, risk assessment, (true)	1. National surveillance plan for avian influenza (AI) 2. Epidemiological support for HPAI in domestic poultry 3. Artificial Intelligence Approaches for Early Detection of HPAI in poultry	poultry and wild birds, with a particular focus on the application of active surveillance in wild birds 2. Support for the collection and processing of epidemiological information and risk contacts during outbreaks of HPAI in poultry farms during the H5N1 HPAI epidemic in northern Italy; Application of statistical and mathematical models to assess the potential spread of HPAI, to further inform the implementation of disease control measures 3. Exploration of application of Artificial Intelligence approaches for early detection of circulating Avian Influenza viruses in poultry, exploiting the daily mortality rates and environmental variables
Zoonoses (true)	1. Collaboration with the Regional Public Health Service for the prevention of WND transmission to humans 2. National surveillance plan for Aborvirus infections	1. Based on information of WNV circulation in 2023 in Veneto and Friuli Venezia Giulia regions, definition of the best time interval to implement WNV controls on human blood donors maximizing the benefit-cost ratio 2. Early warning for WNV circulation in vectors, equine and wild birds acting as trigger factor for organs transplantation and/or blood transfusion in human
Wildlife (true)	1. Active surveillance for avian influenza (AI) in wild birds 2. Active surveillance for AI in hunted wild birds 3. Maintenance of network for collaborating with Wild life Rescue Centres located in geographical areas classified at high-risk of AI exposure 4. Participation in the EFSA – Sentinel wild bird project 5. Environmental surveillance for HPAI 6. Study of the wild–domestic bird interface for spill-over of avian infectious diseases	1. Implementation of an active surveillance plan in wild birds in the geographical areas classified at high-risk of AI exposure, by means of tracheal, cloacal and feather swab collection from trapped wild waterfowl 2. Implementation of a plan to monitor the AI presence in asymptomatic hunted birds, in geographical areas considered exposed to a higher risk of AI introduction and with higher wild birds density 3. Scientific support for implementation of diagnostic protocols and biosecurity protocols in Wild life Rescue Centres to avoid introduction and spread of HPAI infection among animal patients (avian and mammal species) and pathogen dissemination into the environment. Specific protocol for the workers of the Wild life Rescue Centres for prevention of human infection by potential zoonotic HPAI strains and pathogen dissemination into the environment/domestic birds 4. Coordinating the consortium (IZSVe – ISPRA) for Node 7 (Veneto Region) of the SENTINEL project; designing pilot surveillance activities: definition of area of study and sampling plan, collection and processing of samples from wild waterfowl, definition of a communication plan 5. Development and application of environmental surveillance methods for HPAI, including passive water samplers and environmental sample (faeces) collection, to support an early warning system for the detection of HPAI circulation in wild birds. 6. Approval and preparatory phase of a research project aimed at characterising the interface between wild and domestic birds, with particular focus on alternative rearing systems (organic, backyard, free-range), and incorporating sociological aspects related to risk perception of avian influenza transmission from wild birds. Core research activities are scheduled to start in 2026.
		1. Monitoring the minimum inhibitory

Avian diseases (true)	1. Study of Minimum inhibitory concentration in avian bacterial pathogens 2. Pathogens detection in biological matrices sampled from wild birds (active-passive surveillance) through collaboration with others National Research Institutions 3. Evaluation of the genetic characteristics of avian reoviruses in the North-East of Italy 4. Assessment of the impact of viral immunosuppressive diseases in broilers	concentration in avian bacterial pathogens isolates in our competence area 2. Detection of relevant pathogens in wild birds harbouring the local wildlife, transboundary production (interface wild-domestic) and zoonotic potential 3. Molecular investigation on the genetic characteristics of avian reoviruses affecting broiler flocks in the North-East of Italy and comparison of field strains with available vaccine strains. 4. Assessment on prevalence, genetic characteristics and impact on performances, immune status and antimicrobial use in broilers
Animal welfare (true)	1. Risk factors associated with keel bone and foot pad disorders in laying hens	1. Evaluation of the prevalence of keel bone disorders (severity of deviation and/or deformation and/or protrusion) and foot pad lesions in laying hens (white feathered breed vs brown feathered breed) reared in different housing systems (aviary system vs cage system vs free range), by visual scoring at the abattoir and the application of artificial intelligence
Diagnosis, biotechnology and laboratory (true)	1. Application of molecular methods for the genetic typing of avian mycoplasmas to support epidemiological surveillance of circulating strains 2. Development, optimization, and application of a standardized method to assess biofilm-forming capacity in avian Mycoplasma species for research and epidemiological applications.	1. Application and standardization of molecular genotyping technique in avian mycoplasma species for epidemiological purposes 2. Development and application of a new method for the evaluation of biofilm synthesis ability in avian mycoplasma species.

TOR 3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main fucus area for which you were designated

Proposal title	Scope/Content	Applicable Area
Implementation of a standard for the collection and sharing of zone geographic component (GeoZone)	The aim of the project is to develop a data model to spatially represent a zone, to explore both its applicability and validity, and to evaluate the resources needed for its full-scale implementation. GeoZone project – Development of the GeoZone data product specification document	Training and Education Health Management

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

No

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

Yes

Name of WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
Italian Institute for Environmental Protection and Research (ISPRA)	Italy	Europa	Designing and optimising Surveillance activities for Avian Influenza in Wild

National Veterinary School (ENVT)- University of Toulouse	France	Europa	Co-directing a PhD for experts working in the CC on genetic and epidemiological approaches to study HPAI dynamics

TOR 4 AND 5: NETWORKING AND COLLABORATION

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

Yes

Name of WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WOAH Collaborating Centre for Diseases at the Animal/Human Interface	Italy	Europe	Studies and training activities on West Nile Virus
WOAH Reference laboratory for Avian mycoplasmosis	Italy	Europe	Studies and training activities on avian mycoplasmosis
WOAH-FAO Reference Laboratory for Avian Influenza and Newcastle Disease	Italy	Europe	Studies, training activities on Avian Influenza and Newcastle Disease
WOAH Collaborating Centre for Diagnosis and Control of Animal Diseases and Related Veterinary product assessment in Asia	Japan	Asia and Pacific	Partnership in the GeoZone WOAH Project
WOAH Collaborating Centre for Diagnosis, Epidemiology and Control of Animal Diseases in Tropical Regions	France	Europe	Partnership in the GeoZone WOAH Project
WOAH Collaborating Centre for Veterinary Epidemiology and Public Health	New Zealand	Asia and Pacific	Partnership in the GeoZone WOAH Project
WOAH Collaborating Centre for Animal Disease Surveillance Systems, Risk Analysis and Epidemiological Modelling	United States of America	Americas	Partnership in the GeoZone WOAH Project
WOAH Collaborating Centre for Epidemiology, modelling and surveillance	Italy	Europe	Partnership in the GeoZone WOAH Project

WOAH Collaborating Centre for Risk Analysis & Modelling (Royal Veterinary College and Animal and Plant Health Agency)	United Kingdom	Europe	Collaborating partners within the Work package 5 of KAPPA-FLU: Ecology and biology of highly pathogenic avian influenza H5 viruses - Horizon Europe research and innovation programme under grant agreement No 101084171

TOR 6: EXPERT CONSULTANTS

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

Yes

Name of expert	Kind of consultancy	Subject
Matteo Mazzucato, Claudia Casarotto, Nicola Ferrè	WOAH-WHAIS administrative boundaries geospatial data update	To support WOAH GIS technician in updating the WOAH-WHAIS administrative boundaries geospatial data
Mazzucato Matteo, Bonato Paola, Mulatti Paolo, Trolese Matteo, Sbettega Federica, Tomasin Alberto, Lorenzetto Monica, Ferrè Nicola, Scolamacchia Francesca, Fornasiero Diletta	GIS-Mapping project	Enhance geospatial data management and communication within WOAH

TOR 7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

Technical support to the WOAH Collaborating Centre for Field Epidemiology at the Centre national de veille zoosanitaire (CNVZ), Tunis, for the definition of surveillance activities for avian influenza in wild birds.

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

Yes

a) Technical visit : 0

b) Seminars : 1

c) Hands-on training courses: 2

d) Internships (>1 month) : 1

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
B	Advancing Geospatial Data in Veterinary Medicine: Zoning for Disease Response and International Trade	Italy	60
C	GIS course: The use of GIS in animal disease response - https://www.izsvenezie.com/online-training-course-gis-oie/	Italy	20

C	From preparedness to response: integrating zoning and outbreak management in VPH systems" in the context of the25th ECVPH Annual Conference and AGM	ECVPH members (multiple countries)	30
D	Internship on the ecology of Avian Influenza reservoir and effect of climate change on their migratory behaviour	Italy	1

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 WOAH?

Yes

National/International	Title of event	Co-organiser	Date	Location	No. Participants
Internationally	Advancing Geospatial Data in Veterinary Medicine: Zoning for Disease Response and International Trade	WOAH, Istituto Zooprofilattico Sperimentale delle Venezie	2025-05-23	Padua, Italy	60
Internationally	Global Forum on Zoning	WOAH	2025-12-08	Paris, France	0

TOR 9: DATA AND INFORMATION DISSEMINATION

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

a) Articles published in peer-reviewed journals:

10

1. Continuous phylogeography reveals shifting environmental drivers of Highly Pathogenic Avian Influenza H5 spread. Virus Evolution [Under Review]

2. Surveillance systems evaluation in the context of avian diseases: a scoping review on current approaches and attributes. Avian Pathology, 1–17. https://doi.org/10.1080/03079457.2025.2565234

3. Exploring the Use of Passive Samplers for the Surveillance of Avian Influenza Viruses in Wetlands: A Laboratory and Field Validation Study. Food Environ Virol 17, 37 (2025) doi: 10.1007/s12560-025-09649-z

4. Exploring the Role of Wild Bird Species in the Transmission of Avian Influenza to Poultry. Transbound. Emerg. Dis., vol. 2025, no. 1, Jan. 2025, doi: 10.1155/tbed/2288535

5. Precision Livestock Farming: YOLOv12-Based Automated Detection of Keel Bone Lesions in Laying Hens. Poultry 4, 43. doi: 10.3390/poultry4040043

6. The highly pathogenic avian influenza epidemic 2021–2022 from the point of view of an Italian network of Wildlife Rescue Centres. Bird Study, 1-12. https://doi.org/10.1080/00063657.2025.2452309

7. Integrated One Health Surveillance of West Nile Virus and Usutu Virus in the Veneto Region, Northeastern Italy, from 2022 to 2023. Pathogens, 14(3), 227. doi: 10.3390/pathogens14030227

8. Advancing standardization of diagnostics and antimicrobial susceptibility testing for pathogenic mycoplasmas of livestock origin: insights from the MyMIC network. BMC Vet Res. 2025 Dec 29;21(1):712. doi: 10.1186/s12917-025-05154-4.

9. Molecular detection of antimicrobial resistance in livestock mycoplasmas: current status and future prospects. 2025 Front. Vet Sci. 12:1699077 doi: 10.3389/fvets.2025.1699077.

10. Mycoplasma gallisepticum and Mycoplasma synoviae in commercial poultry: current control strategies and future challenges. Avian Pathol. 2025 Apr;54(2):168-174. doi: 10.1080/03079457.2024.2419037. Epub 2024 Nov 25. PMID: 39471302.

b) International conferences:

12

1. Savegnago E., Cavicchio L., Salomoni A., Dianati M., Giussani E., Sartori A., Zamperin G., Ormelli S., Palumbo E., Schivo A., Salviato A., Varotto M., Fornasiero D., Scolamacchia F., Mulatti P., Bortolami A., Terregino C., Monne I., Fusaro A. (2025). The 2024-2025 highly pathogenic avian influenza H5N1 epidemic in Italy: origin, evolution and spatial spread. ESWI 10th Influenza Conference, 20-23 October 2025, Valencia, Spain, p. 271

2. Bortolami A., Zambon I., Boscolo L., D'Anna A., Vianello L., Fornasiero D., Mulatti P., Terregino C., Bonfante F. (2025). A novel peptide-based ELISA for differential detection of H5 HPAI antibodies in poultry and wild birds. XIIIrd World Veterinary Poultry Association Congress, 6-10 October 2025, Sarawak, Malaysia, O-424

3. Martelli L, Fornasiero D, Martinez-Lanfranco JA, Spada A, Scarton F, Scolamacchia F, Manca G, Mulatti P (2025). Exploring which wild bird species are most commonly associated with transmitting avian influenza to poultry. 31st Annual Meeting of the National Reference Laboratories for Avian Influenza and Newcastle Disease of European Union Member States. 16-17 October 2025 - Treviso, Italy

4. Nisaa Z., Häsler B., Bennani H., Jorquera R., Scolamacchia F., Alarcon P. (2025) Identifying the non-financial impact of Highly Pathogenic Avian Influenza (HPAI)

outbreaks ISSESSAH Conference 14-16 October 2025, Utrecht – The Netherlands
5. Chiarello G., Fornasiero D., Accordi S., Gobbo F., Borella S., Mazzucato M., Mulatti P., Montarsi F. (2025). Long-term changes in mosquito biodiversity in a WWF wetland reserve, Northeast Italy. 9th SOVE International Congress, 12-17 October 2025, Chania, Crete, p. 174
6. Scolamacchia F. Toson M. Gagliazzo L, Tomasin A, Zambon I, Mazzucato M, Bortolami A, Manca G, Ruocco L, Sordilli M, Mulatti P (2025). From Field to EFSA: how Italy streamlines Avian Influenza surveillance. 25th ECVPH Annual Conference and AGM "Integrating Veterinary Public Health, Sustainability of Food production, and Environmental Challenges in the Green Deal Era". 17-19 September 2025, Messina, Italy
7. Urbani R., Bergamasco T., Nalesso G., Tregnaghi V., Menegon F., Bassan M., Manca G., Di Martino G. (2025). Computer Vision Techniques To Support Animal Welfare and Veterinary Public HealthProceedings of the 29th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2025) 9-12 Settembre ~ Virtual Conference.
8. Fornasiero D, Fusaro A, Zecchin B, Monne I, Gambaro F, Dellicour S, Manca G, Ducatez M, Mulatti P, Guinat C (2025). Leveraging Continuous Phylogeographic Analysis to Uncover Environmental and Ecological Drivers of Highly Pathogenic Avian Influenza in Italy. 11th International Symposium on Avian Influenza. June 24-26, 2025, St. John's, Canada
9. Panzarin V., Crimaudo M., Marciano S., Berto P., Bofill Mas S., Rusiñol M., Bonfante F., Mazzetto E., Fortin A., Bortolami A., Pascoli F., Fornasiero D., Terregino C. (2025). Surveillance of avian influenza in the wild: can passive samplers be an option? 11th International Symposium on Avian Influenza, 24-26 June 2025, St. John's, Canada, p. 184.
10. Urbani R., Bergamasco t., Nalesso G., Menegon F., Trocino A., Pravato M., Sparesato S., Manca G., Di Martino G. (2025). Development of an image analysis system at the slaughterhouse to assess laying hens' welfare on farm. ASPA 26th Congress, 17–20 giugno, Torino, Italy.
11. Martelli L, Crimaudo M, Marciano S, Panzarin V, Scolamacchia F, Faustini G, Manca G, Bortolami A, Terregino C, Mazzucato M, De Conti G, Tata A, Zancometti C, Montarsi F, Mulatti P, Fornasiero D (2025). Environmental Sampling Protocol for HPAI Contamination and Spread: Preliminary Insights from the 2024 H5N1 Outbreak in Veneto, Italy. INF-ACT Conference 2025 "One Health Basic and Translational Actions Addressing Unmet Needs on Emerging Infectious Diseases – a step ahead". 3-5 April 2025, Naples, Italy
12. Savegnago E, Cavicchio L, Salomoni A, Dianati M, Giussani E, Sartori A, Zamperin G, Ormelli S, Palumbo E, Schivo A, Salviato A, Varotto M, Fornasiero D, Scolamacchia F, Mulatti P, Bortolami A, Terregino C, Monne I, Fusaro A (2025). Racking the Origin, Evolution and Spatial Spread of the Italian Highly Pathogenic Avian Influenza H5N1 Viruses, 2024-2025. INF-ACT Conference 2025 "One Health Basic and Translational Actions Addressing Unmet Needs on Emerging Infectious Diseases – a step ahead". 3-5 April 2025 , Naples, Italy

c) National conferences:
7
1- Martelli L, Fornasiero D, Martinez-Lanfranco JA, Spada A, Scarton F, Scolamacchia F, Manca G, Mulatti P (2025) Indagine sulle specie di uccelli selvatici più comunemente associate alla trasmissione dell'influenza aviaria al pollame. Aggiornamenti sull'influenza aviaria e la malattia di Newcastle. 19 December 2025, Webinar. Legnaro, Padova, Italy
2- Bergamasco T., Ambrosi A., Tregnaghi V., Urbani R., Nalesso G., Menegon F., Bassan M., Trocino A., Pravato M., Bordignon F., Sparesato S., Bonfatti V., Alborali G.L., Manca G., Di Martino G. (2025).Tecniche di Computer Vision a Supporto del Benessere Animale e della Sanità Pubblica Veterinaria. XXIII Congresso Nazionale SIDiLV, 15-17 ottobre, Palermo, Italia.
3- Rinaldi E., Gastaldelli M., Tondo A., Picchi M., Colò B., Prataviera D., Giacomelli M., Catania S. (2025) Micoplasmosi avicole: dieci anni di isolamenti per indagare persistenza e trasmissione nei diversi sistemi produttivi. 64° CONVEGNO NAZIONALE SIPA – 12-13/09/2025 Napoli
4- Stefani E., Morales-Arce A.Y., Nai G., Righetti V., Gastaldelli M., Colò B., Prataviera D., Giacomelli M., Catania S. (2025) Analisi MLST di Mycoplasma synoviae in allevamenti italiani: dinamiche di diffusione e trasmissione in 14 anni di osservazioni.– 12-13/09/2025 Napoli
5- Stefani E., Morales-Arce A.Y., Nai G., Righetti V., Gastaldelli M., Colò B., Prataviera D., Giacomelli M., Catania S. (2025) MLST di ceppi di Mycoplasma synoviae isolati in allevamenti industriali e rurali in italia: 14 anni di osservazioni. XXIII Congresso Nazionale SIDiLV – 15-17/10/2025 Palermo
6- Colò B., Picchi M., Prataviera D., Tondo A., Barberio A., Morales- Arce A., Nai G., Righetti V., Bottinelli M., Catania S. (2025) Influenza degli antimicrobici sulla formazione del biofilm in batteri del genere Mycoplasma. XXIII Congresso Nazionale SIDiLV – 15-17/10/2025 Palermo
7- Bottinelli M., Tondo A., Picchi A., Colo' A., Prataviera D., Morales Arce A.Y., Nai G., Stefani E., Catania S. (2025) Resistant or just persistent? evaluating the potential for phenotypic reversion in antibiotic-free environments. 53° Congresso Nazionale della Società Italiana di Microbiologia (SIM) – 19-22/09/2025 Catania

d) Other (Provide website address or link to appropriate information):
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11. What have you done in the past year to advance your area of focus, e.g. updated technology?
1. Strengthened collaborations with ornithologists, both within and beyond the framework of the EFSA SENTINEL Wild Birds project, enhancing the spatial coverage and capillarity of surveillance activities for emerging avian diseases in wild waterbirds. These collaborations have improved access to field expertise and are supporting the development of new projects aimed at tracking wild bird movements and improving ecological understanding of wild bird reservoirs.

2. Progress of the second year of a PhD programme at the National Veterinary School of Toulouse (ENVT), focusing on epidemiological approaches to genomic analyses to investigate the dynamics of highly pathogenic avian influenza (HPAI), and on the application of latent class models to assess the performance of environmental sampling as an early warning system for avian influenza circulation in wild birds.

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12. Additional comments regarding your report:
A staff member of the CC (Dr Nicola Ferrè) was invited to deliver an oral presentation ("GeoZone") at the WOAH Global Forum on Zoning (December 2025, Paris). The presentation was intended to disseminate the final results of the WOAH-funded GeoZone project and to contribute to international discussions on zoning strategies and geospatial standardisation. Although the CC did not participate in the organisation of the event, this contribution reflects the CC's active involvement in WOAH-led initiatives and its role in supporting the implementation of WOAH standards. r comment