



Joint FAO/IAEA Centre
Nuclear Techniques in Food and Agriculture

VETLAB NETWORK

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ORIGINS AND EVOLUTION OF VETLAB

Origin and purpose

- Modeled on the successful Rinderpest network (1998), VETLAB was established in 2012 to enhance global veterinary diagnostics and control transboundary animal and zoonotic diseases.
- Aims to improve global veterinary diagnostics, support rapid outbreak response, and foster international collaboration using nuclear techniques.
- Supported by the Joint FAO/IAEA Center of Nuclear Techniques in Food and Agriculture, in collaboration with FAO's Animal Production and Health Division
- 71 laboratories across 45 African and 19 Asian countries.
- Due to funding constraints only 33 laboratories in 30 countries fully participate, while others receive emergency support and technical support based on requests.

ORIGINS AND EVOLUTION OF VETLAB

VETLAB Network's Significant Expansion and Collaborative Efforts



February 2014: First coordination meeting for Africa (10 Labs from 9 sub-Saharan African countries)

March 2015: First coordination meeting for Asia (5 countries)



August 2016:

First joint coordination meeting with Africa and Asia (19 laboratories -18 countries)

1st RCM of the first VETLAB CRP D32032 (facilitate interaction between laboratory directors and CRP experts)

From August 2018: Representatives of key players in veterinary laboratory capacity and research networks are invited to the annual meeting to promote synergies, align better with regional priorities, and avoid duplication (e.g., FAO HQ and regional offices, WOA, ERFAN, and experts involved in innovative approaches for disease surveillance).



As of August 2023: 33 laboratories from 30 countries are fully supported to take part in all VETLAB Network's activities.



Eighth joint coordination meeting³ for Africa and Asia (August 2024)

VETLAB NETWORK TODAY

A global veterinary laboratory NETWORK :

- Strengthen collaboration among veterinary diagnostic laboratories by offering capacity-building, training, and collaborative research opportunities.
- Share knowledge and experience to enhance national and regional capacities for early and rapid diagnosis, improving Member States' emergency response capabilities to control outbreaks of animal diseases.
- React quickly and efficiently to animal health threats.
- Currently includes veterinary laboratories in Africa and Asia.

VETLAB NETWORK TODAY

The Key components are:

- The NETWORK with veterinary labs involved in Joint FAO-IAEA Centre projects
- The technical and advocacy meetings of laboratories heads
- The VETLAB CRPs
- The VETLAB bulletin (Since 2015, twice/year)
- The VETLAB information platform (iVetNet)

BUILDING CAPACITY AND PREPAREDNESS

Enhancing Diagnostic Capabilities

- 2014 to 2023: **16** training courses, training **342** scientists from **31** countries (Africa and Asia).
- 2014 to 2020: **19** field missions in **17** countries (Africa and Asia) to transfer technology and train **195** scientists.
- Follow-Up Actions: Provided reagents to implement newly learned techniques, followed up with discussions and troubleshooting.
- Support: Supplied partners with equipment, consumables, and reagents.



BUILDING CAPACITY AND PREPAREDNESS

Creating Awareness and Supporting Rapid Response to Emerging Diseases

- Increased awareness of PPR, LSD, ASF, and other emerging diseases during all VETLAB Annual Meetings.
- Immediate reaction to support countries and regions with scientific knowledge on the emergence of new threats.
- Training, SOPs sharing, and emergency toolboxes (reagents, positive controls)
- Support sample submission for the virus's genetic characterization

Highlights

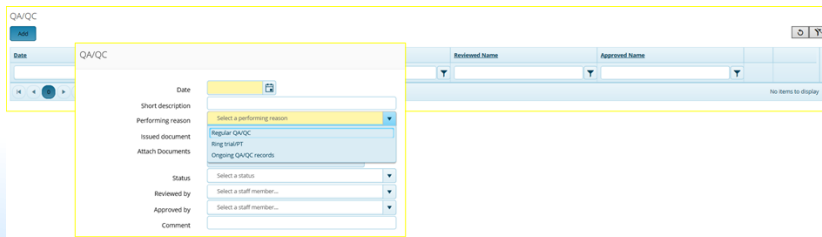
- Several countries were able to diagnose PPR, ASF, LSD, and HPAI and report to WOAHA based on partner laboratories' results.
- Examples include Mongolia: PPR in 2016, ASF in 2019, and LSD in 2021; Botswana and Lesotho for HPAI in 2022; and Senegal and Nigeria for RHD in 2021.

ENHANCING QUALITY SYSTEMS

- Supported quality audits.
- Conducted method validation trainings in collaboration with Sciensano and ACDP (2019).
- Implemented inter-laboratory test PPR and supported participation in other PTs by reference labs.
- VETLAB CRP supported the implementation of quality systems through iVetNET and access to secondary reference materials.
- Leveraged TC projects and partners like the ERFAN network to support VETLAB partners.

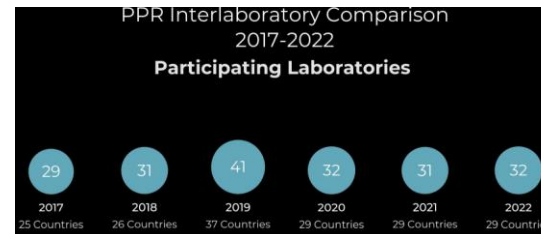
As a result, several partners received ISO 17025 accreditation or expanded their scope of accreditation

- ✓ Examples include AHI and NVI, which received accreditation with VETLAB's support.
- ✓ BNVL, Botswana expanded the number of accredited assays from 22 to 47.
- ✓ Enabled local organization of PT.



The screenshot shows a web-based form for Quality Assurance/Quality Control (QA/QC). The form includes fields for Date, Short description, Performing reason (with a dropdown menu), Issued document (with a dropdown menu), Attach Documents, Status (with a dropdown menu), Reviewed by (with a dropdown menu), Approved by (with a dropdown menu), and Comment. The interface is clean and professional, with a light blue and white color scheme.

iVetNet – Information platform of APH
Support the implementation of ISO 17025



Training Course on Validation, Implementation, Monitoring, and Quality Control for Molecular Assays. 8

ADVANCING PATHOGEN DETECTION TECHNIQUES

Molecular Diagnostics Strengthening

- Molecular diagnostics were strengthened in all partner laboratories.
- Assays targeting single pathogens are well mastered.
- Pathogen typing methods using conventional and real-time PCR have been transferred since 2014.
- Syndromic testing tools were transferred and widely adopted starting from 2014, enabling the detection of important pathogens which were overlooked for years, such as pseudocowpox in cattle in Zambia, Botswana, Tanzania, Nigeria and Camel in Ethiopia.
- Several trainings on conventional sequencing data analysis were conducted to facilitate the use of free-of-charge sequencing services offered through the Joint FAO/IAEA Centre.



Genetic characterization of poxviruses in *Camelus dromedarius* in Ethiopia, 2011–2014

Esayas Gelaye^{a,b,c}, Jenna Elizabeth Achenbach^d, Gelagay Ayelet^e, Shiferaw Jenberie^f, Martha Yami^g, Reingard Grabherr^h, Angelika Loitschⁱ, Adama Diallo^a, Charles Euloge Lamien^{a,c}

Ziba et al. *Virus J.* (2020) 17:152
<https://doi.org/10.1186/s12985-020-01426-7>

RESEARCH Open Access

First detection and molecular characterisation of pseudocowpox virus in a cattle herd in Zambia

Maureen Wakwamba Ziba^{1*}, Chanda Chitala¹, Tirumala Bharani K. Settyapalli², Malama Mumba¹, Giovanni Cattoli², Paul Fandamu¹ and Charles Euloge Lamien²

Modise et al. *Virus J.* (2021) 18:167
<https://doi.org/10.1186/s12985-021-01634-9>

RESEARCH Open Access

First molecular characterization of poxviruses in cattle, sheep, and goats in Botswana

Boitumelo Magret Modise^{1*}, Tirumala Bharani Kumar Settyapalli², Tebogo Kgotlele¹, Dingrong Xue^{2,3}, Kebonyemodisa Ntesang¹, Kago Kumile¹, Ivancho Naletoski⁴, John Frederick Nyange¹, Carter Thanda¹, Kenny Namoiso Macheng¹, Chandapiwa Marobela-Raborokgwe¹, Gerrit Johannes Viljoen¹, Giovanni Cattoli² and Charles Euloge Lamien²



Article

Poxvirus Infections in Dairy Farms and Transhumance Cattle Herds in Nigeria

David Oludare Omoniyi^{1,2*}, Irene Kasindi Meki³, Caleb Ayuba Kudi², Anthony Kojo Sackey², Maryam Aminu⁴, Adeyinka Jeremy Adediji⁵, Clement Adebajo Meseko⁵, Pam Dachung Luka^{5,6}, Olayinka Oluwafemi Asala⁵, Jolly Amoche Adole⁵, Rebecca Bitiyong Atai⁵, Yakubu Joel Atuman⁵, Tirumala Bharani Kumar Settyapalli³, Giovanni Cattoli³ and Charles Euloge Lamien³



Article

Molecular Testing of Zoonotic Bacteria in Cattle, Sheep, and Goat Abortion Cases in Botswana

Boitumelo M. Modise-Tlotleng^{1,2*}, Sununguko W. Mpoloka², Tirumala B. K. Settyapalli³, Joseph Hyera⁴, Tebogo Kgotlele¹, Kago Kumile¹, Mosarwa E. Sechele⁵, Obuile O. Raboloko⁵, Chandapiwa Marobela-Raborokgwe⁵, Gerrit J. Viljoen⁵, Giovanni Cattoli⁶ and Charles E. Lamien^{3,*}

Makoga et al. *Virology Journal* (2020) 21:276
<https://doi.org/10.1186/s12985-024-02588-w>

RESEARCH Open Access

Detection and molecular characterization of lumpy skin disease and bovine papular stomatitis viruses in lumpy skin disease-suspected outbreaks in Tanzania

Fredy T. Makoga¹, Jelly S. Chang'a¹, Irene K. Meki², Charles Mayenga¹, Tirumala B. K. Settyapalli², Stella Bitanyi¹, Bishop Magidanga¹, Emma Peter³, Augustino Chengula², Giovanni Cattoli² and Charles E. Lamien²

ADVANCING PATHOGEN DETECTION TECHNIQUES

Addressing Emerging Challenges

- Validation Harmonization and Transfer of Versatile Tools: Initiated in 2020.
- Challenges with Live Attenuated Vaccines: Differentiating vaccines from field viruses.
- Emerging Diseases: Focused on viral family-based assays to detect variants and new members of viral families.
- Broad Host Range Pathogens: Improving disease surveillance using serological methods, including species-independent serology.
- Next-generation sequencing and nanopore sequencing, along with relevant bioinformatics, have been intensively supported since 2020. The first course 2021 (virtual), then every year.

Multiparametric Detection of Pathogens, 25 September to 6 October 2023, Austria



Next Generation Sequencing Bioinformatics and Molecular Phylogeny, 20 November to 1 December 2023, Austria



FOSTERING REGIONAL COLLABORATION ON EMERGING THREATS

Hosting Trainings

- Partners in Botswana, Ethiopia, Cameroon, Senegal, Thailand, Tunisia Morocco, Tanzania, and Namibia trained scientists on TADs and emerging threats including individual and group trainings (2015-2023)

Offering Support and Advice

- Labs in Senegal, Cameroon, and Namibia supported regional disease detection and reporting:
- Senegal assisted Nigeria in detecting and reporting RHD to WOAHA (2020) and Mauritania for HPAI (2021)
- Namibia support Angola for ASF detection and Characterization (2023).

Promoted and Supported National and Regional Discussions During Emergence of New Diseases

- Equine diseases (2018) and Rabbit Hemorrhagic Disease in West Africa (2020).
- Foot-and-Mouth Disease (FMD), Lumpy Skin Disease (LSD) in Indonesia.
- LSD in North Africa (2023)

FROM SUPPORT TO PARTNERSHIP: Collaborative Research

Collaborative Research: Boosting Diagnostic Capacity in VETALB Labs

- Over 10 assays were developed and validated with support from VETLAB partners through testing or material sharing.
- Five assays were developed by scientists from VETLAB partner laboratories with APHL assistance.
- APHL receives between 400 to 600 samples for diagnostic confirmation and molecular characterization from VETLAB partners.
- IAEA facilitates access to sequencing services.
- Follow-up studies have boosted interest in partner laboratories to establish more diagnostic assays for diagnosis, differential diagnosis, and disease surveillance.
- VETLAB partners (Thailand, Indonesia, Vietnam and Mongolia) are involved in the ZODIAC CRP.

SCIENTIFIC REPORTS

OPEN **A novel HRM assay for the simultaneous detection and differentiation of eight poxviruses of medical and veterinary importance**

Received: 15 September 2016
Accepted: 16 January 2017
Published: 20 February 2017

Esayas Gelaye^{1,2,3}, Lukas Mach², Jolanta Kolodziejek⁴, Reingard Grabherr⁴, Angelika Loitsch⁴, Jenna E. Achenbach¹, Norbert Nowotny^{4,5}, Adama Diallo⁶ & Charles Euloge Lamien⁶

OPEN ACCESS Freely available online



Development of a Cost-Effective Method for Capripoxvirus Genotyping Using Snapback Primer and dsDNA Intercalating Dye

Esayas Gelaye^{1,2,3,6}, Charles Euloge Lamien^{1*}, Roland Silber², Eeva S. M. Tuppurainen³, Reingard Grabherr⁴, Adama Diallo⁶

SCIENTIFIC REPORTS

OPEN **An HRM Assay to Differentiate Sheeppox Virus Vaccine Strains from Sheeppox Virus Field Isolates and other Capripoxvirus Species**

Received: 10 January 2019
Accepted: 15 April 2019
Published online: 30 April 2019

Tesfaye Rufael Chibssa^{1,2,3}, Tirumala Bharani K. Settyapalli⁴, Francisco J. Berguido⁴, Reingard Grabherr⁴, Angelika Loitsch⁴, Eeva Tuppurainen⁵, Nick Nwankpa⁶, Karim Tounkara⁶, Hafsa Madani⁷, Amel Omani⁷, Mariane Diop⁷, Giovanni Cattoli⁸, Adama Diallo⁹ & Charles Euloge Lamien⁹

Chibssa et al. *Virology Journal* (2019) 15:99
<https://doi.org/10.1186/s12983-019-0988-8>

Virology Journal

RESEARCH

Open Access

A gel-based PCR method to differentiate sheeppox virus field isolates from vaccine strains

Tesfaye Rufael Chibssa^{1,2,3}, Reingard Grabherr⁴, Angelika Loitsch⁴, Tirumala Bharani K. Settyapalli⁴, Eeva Tuppurainen⁵, Nick Nwankpa⁶, Karim Tounkara⁶, Hafsa Madani⁷, Amel Omani⁷, Mariane Diop⁷, Giovanni Cattoli⁸, Adama Diallo⁹ and Charles Euloge Lamien⁹

scientific reports

OPEN **A novel multiplex qPCR-HRM assay for the simultaneous detection of four abortive zoonotic agents in cattle, sheep, and goats**

Boitumelo M. Modise^{1,2,3}, Sununguko W. Mpoloka⁴, Tirumala B. K. Settyapalli⁵, Joseph Hyera⁶, Alda Natale⁶, Letizia Ceglie⁶, Nomakorinte Gcebe⁶, Chandapiwa Marobela-Raborokwe⁶, Gerrit J. Viljoen⁶, Giovanni Cattoli⁷ & Charles E. Lamien⁷