Pembentangan Laporan
Kursus Luar Negara Siri 2/2024

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Veterinary Research Institute

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OUTLINE

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INTRODUCTION

TRAINING COURSE FOR VETERINARY DIAGNOSTIC LABORATORY NETWORK PARTNERS ON THE DETECTION AND CHARACTERIZATION OF PATHOGENS CAUSING MAJOR TRANSBOUNDARY ANIMAL DISEASES AND ZOONOSES

16 – 27 September 2024

LOCATION: Animal Production and Health Laboratories (APHL), Joint FAO/IAEA Laboratories, Seibersdorf

~40 km south-east from Vienna

Objectives of the Training

This course module includes lecture and practical laboratory training with the objective of sharing specific information about avian and swine diseases for veterinary diagnostic laboratories that are crucial in Asian and African countries.

- ❑ Importance of pathogen detection and control in transboundary animal diseases and zoonoses.
- ❑ Enhancing lab diagnostic capabilities.
- ❑ Equip diagnostic partners with updated methods.
- ❑ Strengthen collaborative responses to global disease threats.

Key topics covered

Avian diseases

External experts:
Mr. Timm Harder,
Friedrich-Loeffler-Institute (FLI)

1st week lecture

- Pathogenesis of Highly Pathogenic Avian Influenza Virus (HPAIV)
- HPAIV H5 global situation
- Classical and molecular diagnosis of AIV
- HPAIV H5 mammalian infection (MooFlu): serology testing

Key topics covered

Swine diseases

External experts:
Mr. Giovanni Franzo,
University of Padova

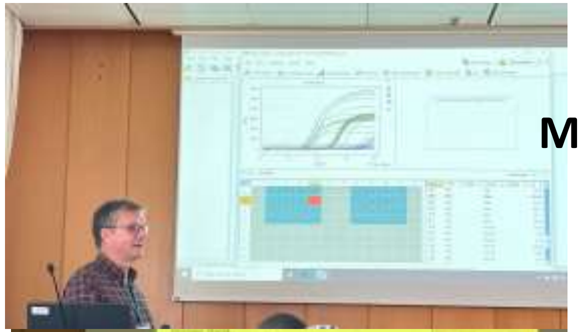
2nd week lecture

- Work on African Swine Fewer (ASF) at Animal Production and Health Laboratory (APHL) and field experience
- ASF overview and current global situation
- Molecular epidemiology of porcine viruses at the APHL
- Porcine Reproductive and Respiratory Syndrome Viruses (PRRSv) overview
- Porcine circoviruses (PCV) overview
- Porcine parvoviruses (PPV) overview
- Swine gastroenteritis, corona viruses

Key topics covered

IAEA Molecular Epidemiology experts:

Mr. Charles Lamien
Ms. Irene Meki



Mr. William Dundon

Mr. Bharani Settypalli

- Real-time PCR
- Avian virus multiplex (Avian Influenza Virus, Newcastle Disease Virus, West Nile Virus)
- Sequence and phylogenetic analysis for AIV and NDV pathotyping
- Multiplex and High Resolution Melt (HRM) assays developed at APHL
- Molecular epidemiology and genotyping of ASFV

Practical Hands-On

Main Teaching Laboratory
Group of 4

The comprehensive lab work highlights a focus on the molecular detection, genotyping, and pathotyping of avian and porcine pathogens through techniques like RT-qPCR, multiplex assays, and sequencing-based approaches.

Lab Work Activities

Avian Viruses

1. RNA and Amplicon Purification:
    - Extracted RNA and purified amplicons for downstream assays, including pathotyping.
2. RT-qPCR and Duplex Assays:
    - Conducted RT-qPCR for Type A Influenza, H7 viruses, H9 AIV, and H5N1 duplex analysis.
3. Multiplex Testing:
    - Performed avian virus multiplex analysis for AIV, NDV, IBV, ILTV, and other pathogens (e.g., West Nile Virus).
4. Gel Electrophoresis
    - Loaded agarose gels for AIV and NDV pathotyping.
5. Pathotyping:
    - Used M-gene sequencing results for further characterization.

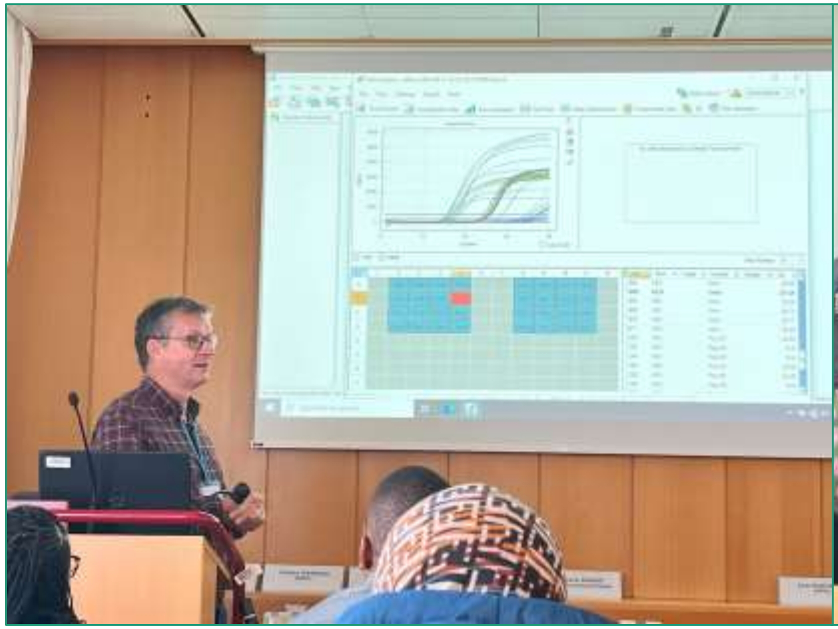
Porcine Viruses

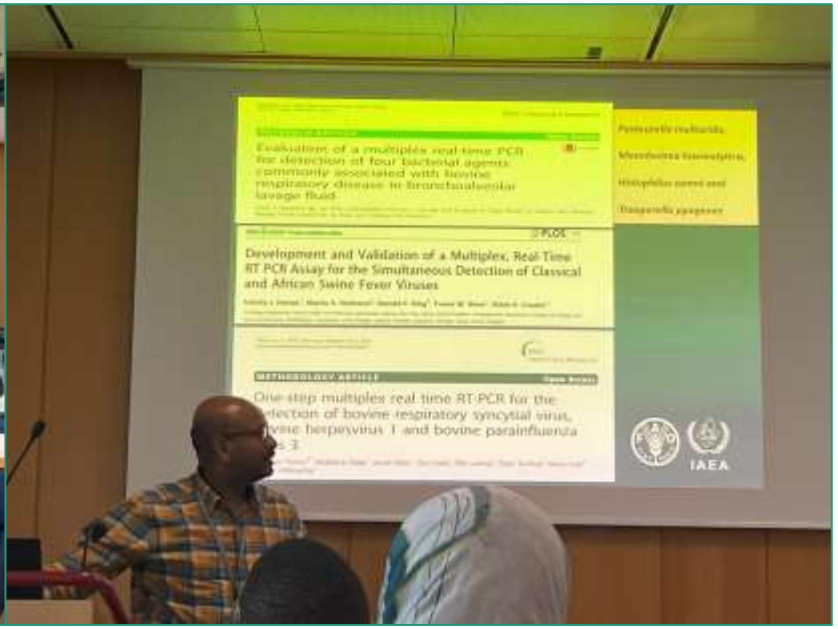
1. Nucleic Acid Purification:
    - Purified total nucleic acids for qPCR analysis of porcine diseases.
2. Multiplex and RT-qPCR Assays:
    - Set up and analyzed results from multiplex assays, including the red panel and PCV-2, PCV-3, PPV1, and Pseudorabies detection.
    - Conducted RT-qPCR for genotyping PRRSv.
3. Conventional PCR:
    - Performed PCR for ASFV typing.

Laboratory Methods and Technologies

Results Analysis

- Assay sensitivity
- application scenarios for each diagnostic method.





Strategies for Preventing and Managing Animal Diseases and Zoonoses

Biosecurity Measures:
Enhancing farm hygiene, controlling access, and implementing disinfection protocols.

Public Awareness and Education:
Educating farmers and workers about best practices to prevent the spread of infection.

Surveillance and Monitoring:
Regular sampling and testing to detect and monitor transboundary animal diseases and zoonoses infections.

Testing methods:
Developing and utilizing precise and reliable testing method for early detection, proper identification, and effective management of animal diseases and zoonoses.

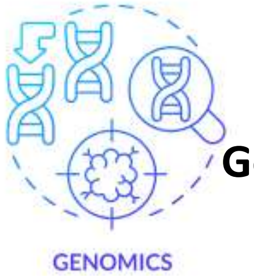
Vaccination Programs:
Implementation of effective vaccination strategies to prevent infections.

Research and Development:
Investing in research to develop new diagnostic tools, vaccines, and treatments.

APHL Research and Developments

Epidemiological Surveillance

Molecular Diagnostic Method



Genomics: Molecular Epidemiology

Animal Vaccines Development

Key Takeaways

Course content that benefits DVS

Protocols & Procedures

Common Issues

Improved Method

Collaboration Networking

Pathogen detection and characterization
Veterinary Diagnostic Laboratory Network
Data and Resource Sharing: can speed up response times and improve outbreak containment.

- Detection Techniques: Molecular PCR diagnostic methods.
- Pathogen Characterization: Techniques for identifying pathogen strains and variants.
- Epidemiology and Surveillance: Importance of tracking and reporting for effective containment.
- Data Sharing and Networking: Building a network of diagnostic labs and improving information flow.


THANK YOU