

# Molecular Characterisation of Fowl Adenoviruses Associated with Inclusion Body Hepatitis and Gizzard Erosion in Broiler Chickens in Sabah, Malaysia

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## INTRODUCTION & AIM

• Inclusion Body Hepatitis (IBH) and adenoviral gizzard erosion (AGE) are major viral diseases with significant health concerns in poultry production worldwide (Sohaimi & Ugwu, 2021).

• Both conditions are linked to fowl adenoviruses (FAdVs), but serotypes circulating in Sabah remain poorly characterised.

AIM: To identify and characterise FAdV serotypes associated with IBH and AGE in broiler chickens between 2019 and 2023.

## METHOD

### SAMPLE COLLECTION SITE



FIGURE 1: Map of Sabah, Malaysian Borneo and location of sample collection throughout the state.

- A total of 66 liver and gizzard samples collected from suspected IBH or AGE cases (2019–2023).
- PCR screening for FAdV using hexon-targeting primers (Meulemans *et al.*, 2001).
- Samples underwent partial sequencing of the hexon gene, a major capsid protein used for FAdV serotyping.
- Sequence analysis was performed to detect non-synonymous amino acid variants within serotypes.

## RESULTS & DISCUSSION

- 49 of 66 samples tested positive for FAdV.
- Three serotypes identified: FAdV-8b, FAdV-1, FAdV-11.

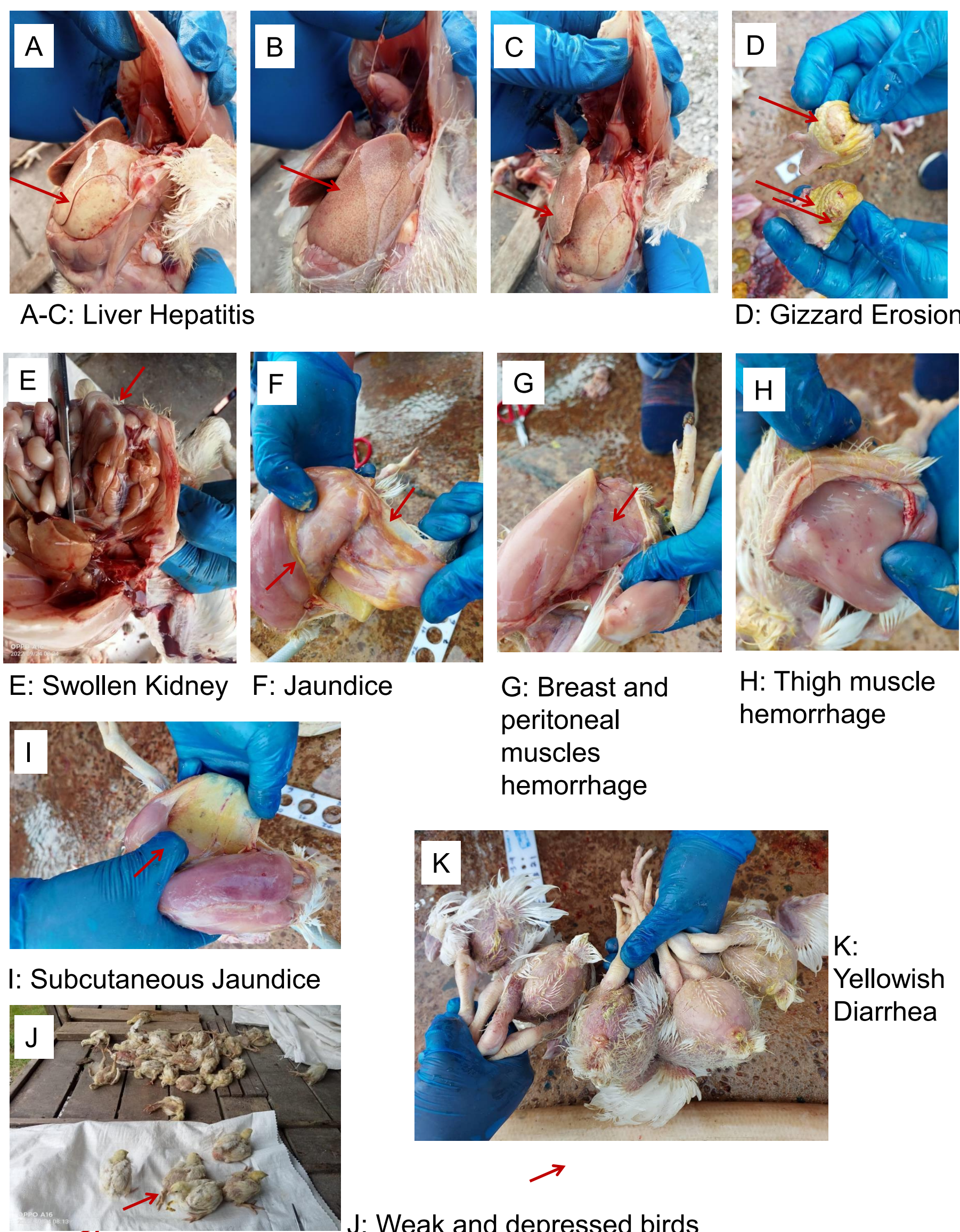


FIGURE 2: Morphological features and physical symptoms of IBH and AGE Includes A) Liver Hepatitis, B) Jaundice, C) Gizzard Erosion, D) Swollen Kidney, F) Haemorrhage of the Breast, Thigh and Peritoneal Muscle, G) Yellowish Diarrhoea, H) Weakness and Depression

### PCR Amplification of the Hexon Gene

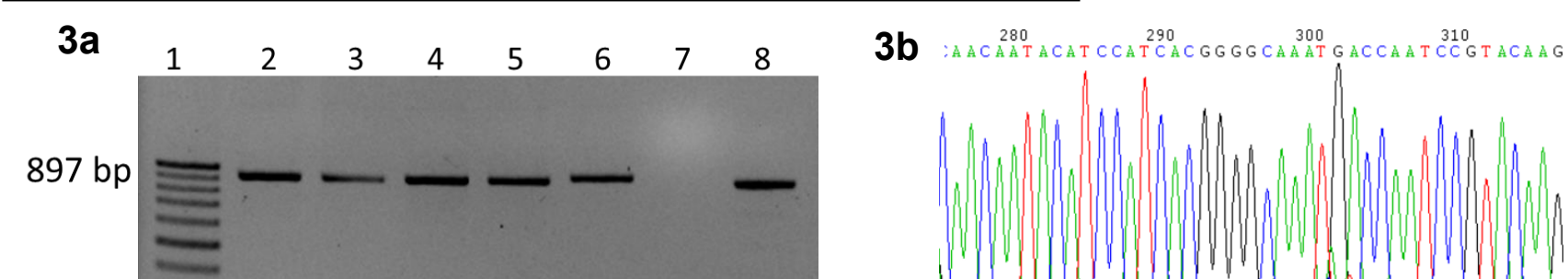
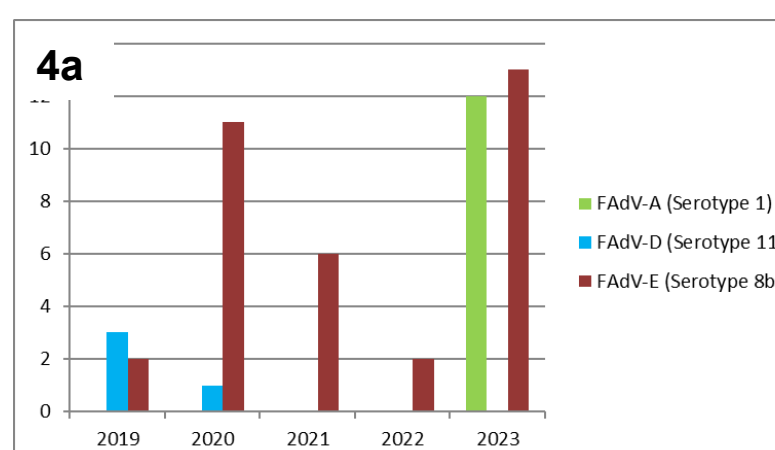


FIGURE 3: a) PCR amplification of the Hexon gene showing an expected 897 bp amplicon. Lane 1: 100 bp DNA ladder; Lanes 2–6: liver tissue samples; Lane 7: negative control; Lane 8: positive control. b) DNA sequence chromatogram of the Hexon gene.

### Distribution of FAdV Serotypes Detected in Sabah (2019–2023)



- FAdV-11 restricted to 2019–2020.
- FAdV-1 detected only in 2023, coinciding with AGE-like gizzard lesions.
- Surge in IBH cases in 2023 aligned with increased FAdV-8b detection.

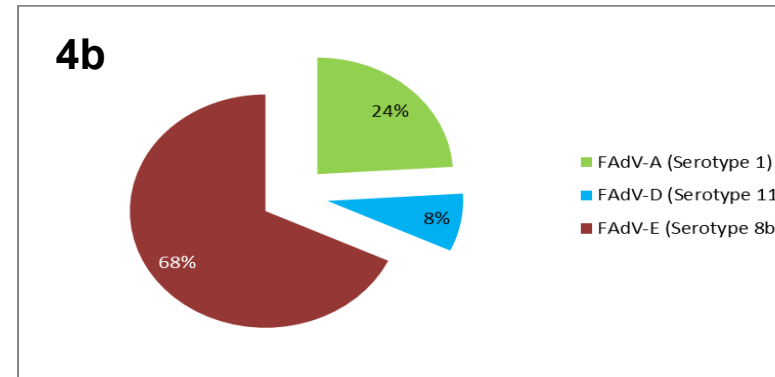


FIGURE 4: a) Annual distribution of detected Fowl adenovirus serotypes from 2019 to 2023 show distinct temporal patterns, with FAdV-E predominating across multiple years. b) Overall proportion of FAdV serotypes detected across all sampled years.

### ML tree of the 49 Field Isolates Mapped to Reference Strains.

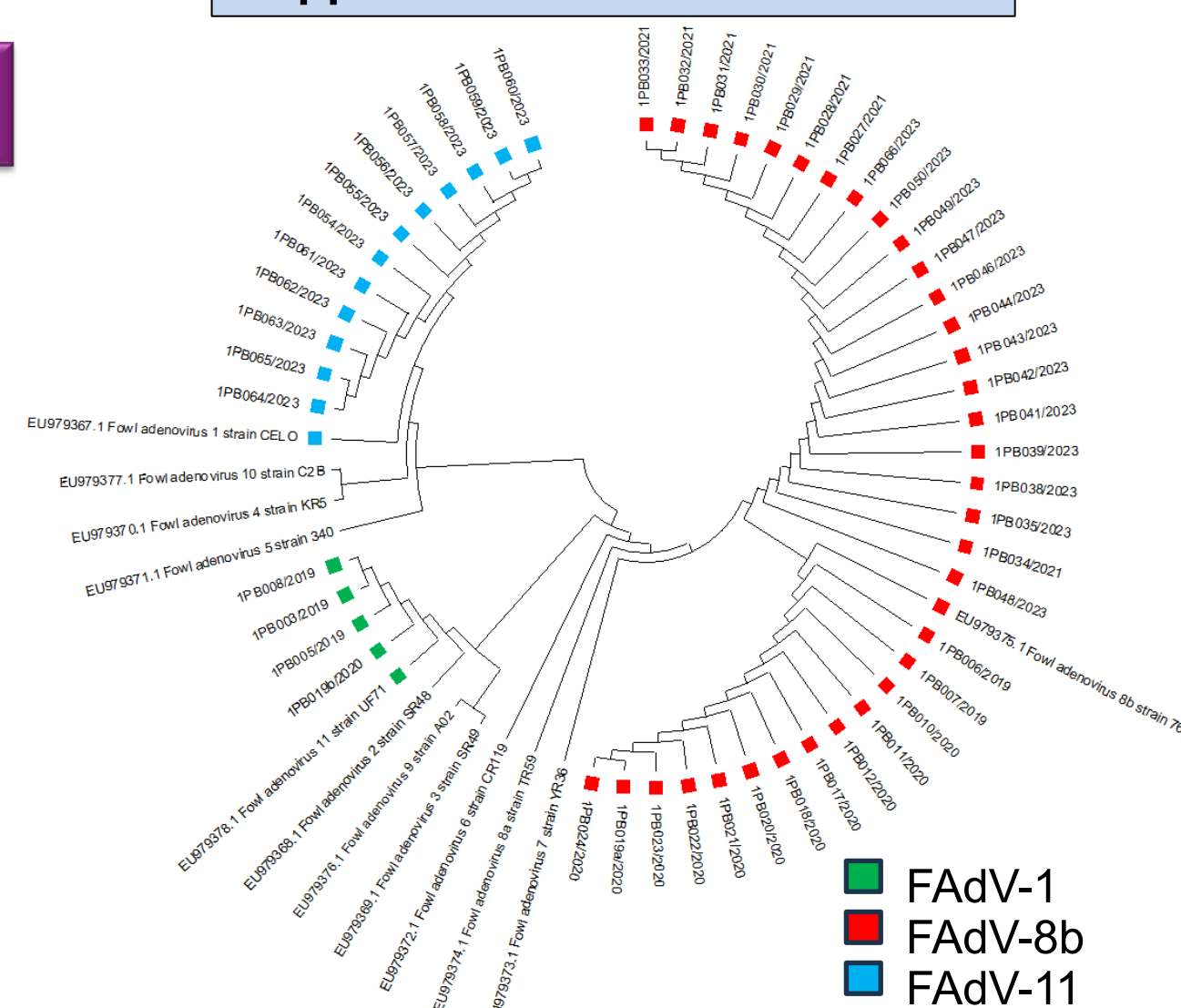


FIGURE 5: Maximum Likelihood phylogenetic tree (using the Tamura-Nei model) clearly delineates the 49 samples into FAdV-1, FAdV-8b and FAdV-11 serotypes.

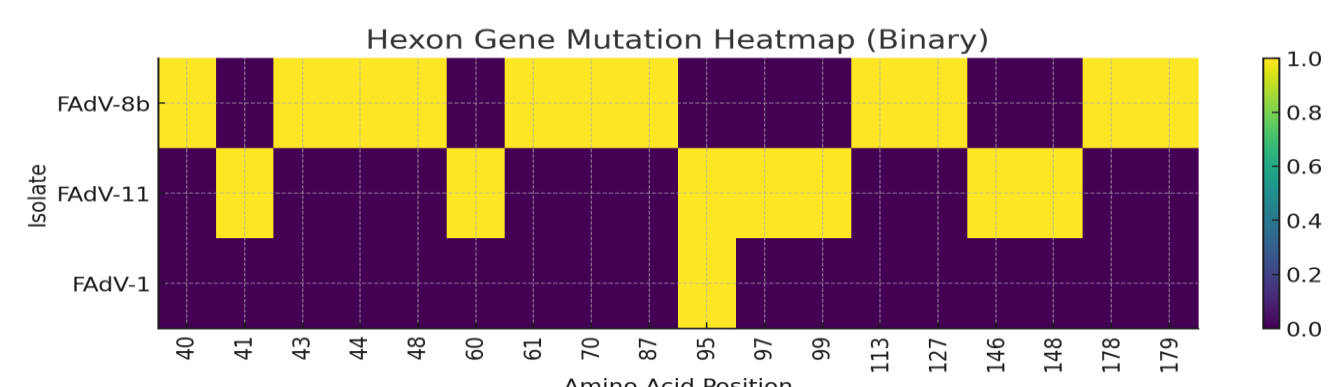


FIGURE 6: Amino acid heatmap indicating location of Mutations in the Sabah isolates of the FAdV-1, FAdV-11 and FAdV-8b stains (Yellow = mutations; Purple = Reference strains- Wildtype).

## CONCLUSION

- First molecular evidence of circulating FAdV-1, -8b, and -11 in Sabah broiler flocks.
- Serotype prevalence shifted over the 5-year period, with FAdV-8b becoming dominant.
- Mutation Hexon mutations observed in Sabah isolates indicate antigenic variation, which may influence immune recognition.
- Findings highlight the need for routine molecular surveillance and improved farm biosecurity (Kardoudi *et al.*, 2025).

## REFERENCES

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## ACKNOWLEDGEMENTS

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