



RESEAU CRISTAL
SANTÉ ANIMALE



RECENT DEVELOPMENTS IN DUCK PRODUCTION IN FRANCE: THE NEW HPAI CRISIS AND OTHER EMERGING ISSUES

Matthieu Pinson, BVPA Spring 2026





PRESENTATION OUTLINE

- I) Duck production context in France
- II) HPAI Crisis 2025-2026
- III) Focus on 3 diseases of interest



I) DUCK PRODUCTION CONTEXT IN FRANCE

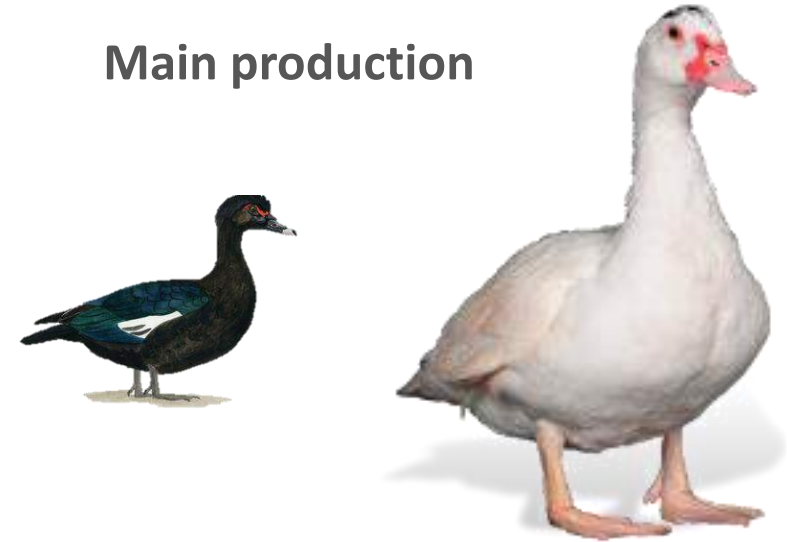


FRENCH DUCK PRODUCTION

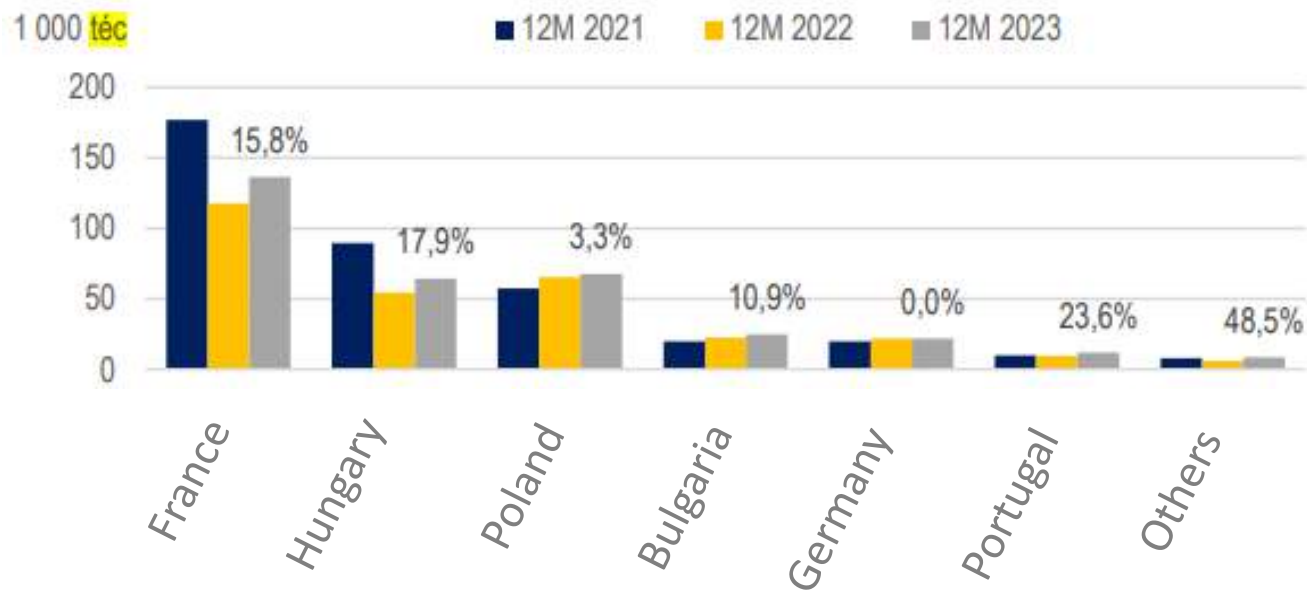
1st European producer of roasting ducks

Muscovy ducks - *Cairina moschata*

Main production

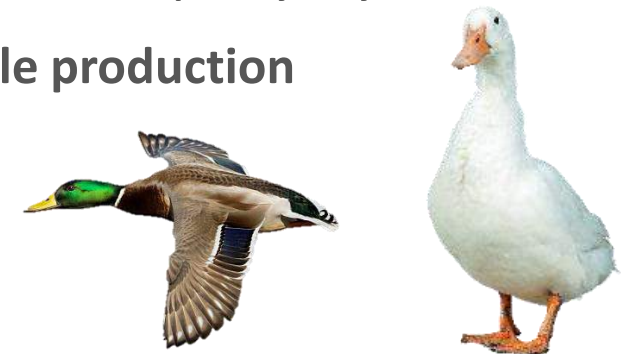


Duck slaughtering trends in 1,000 carcass-equivalent tonnes (téc) between 2021 and 2023



Pekin ducks - *Anas platyrhynchos*

Little production



Source: ITAVI from Eurostat, national sources

1) Duck production context in France

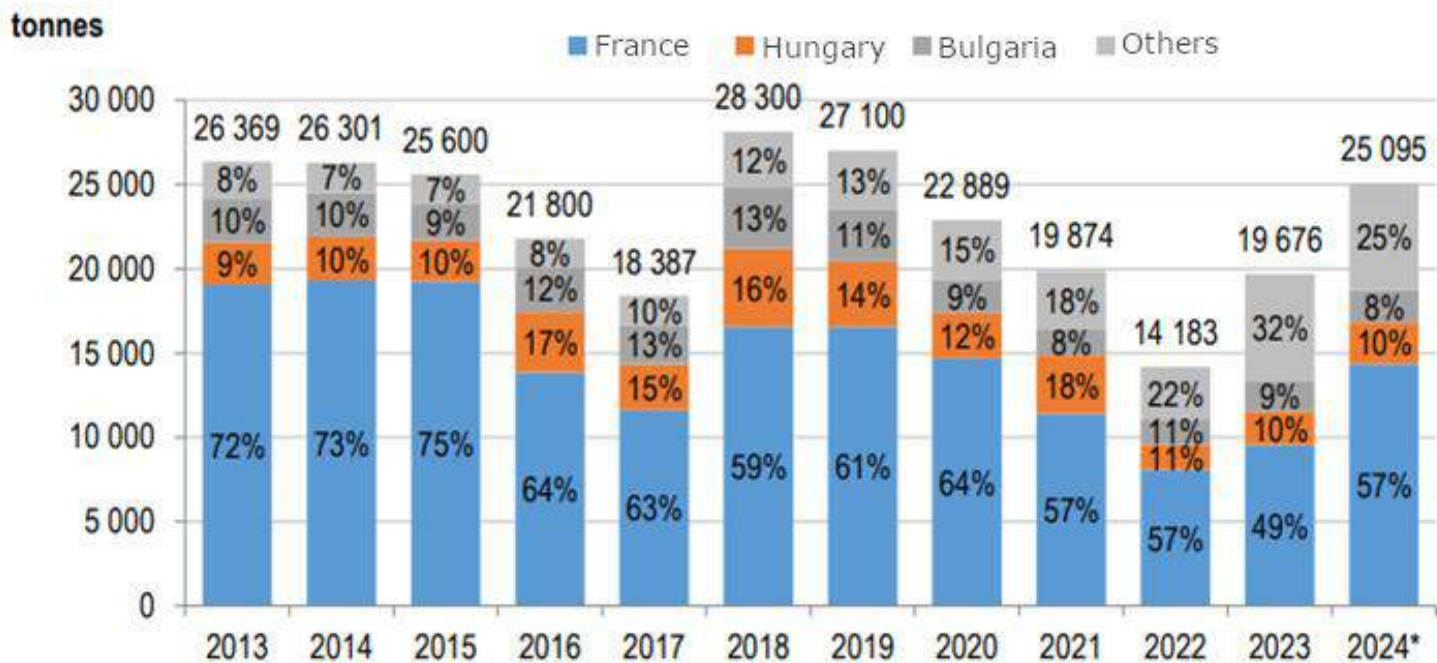


FRENCH DUCK PRODUCTION

1st world producer of foie gras ducks

« fattened duck liver »

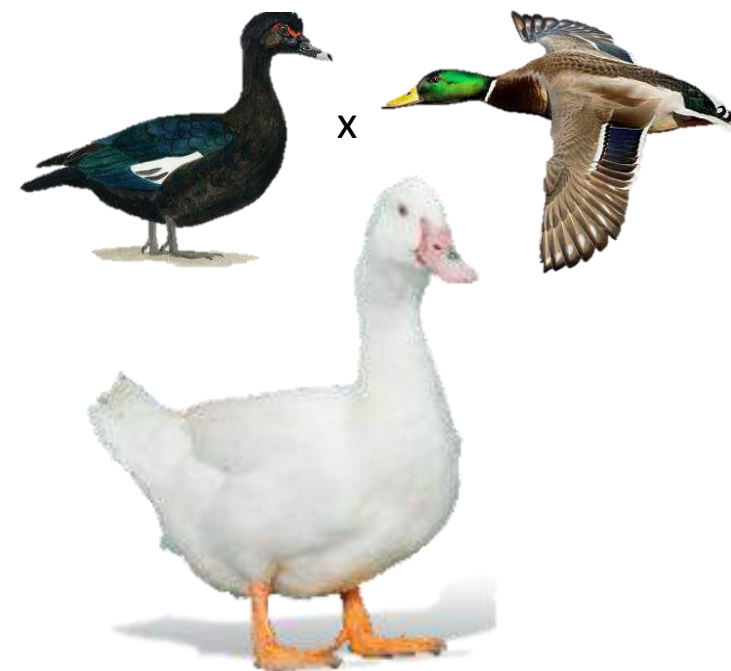
Global foie gras production between 2013 and 2024



Source: CIFO, SAA and ITAVI estimates for 2024

Mule ducks

Cairina moschata x
Anas platyrhynchos

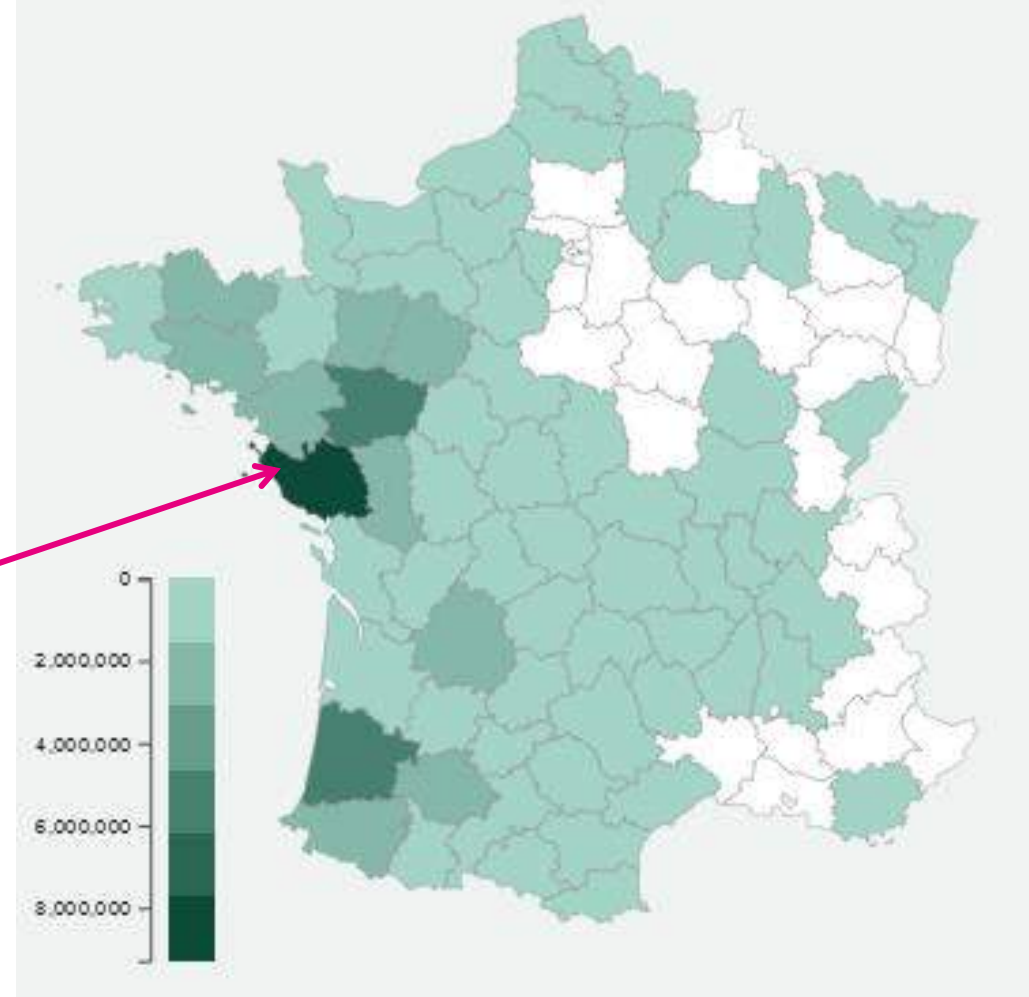




WHERE ARE DUCKS RAISED IN FRANCE?

- HPAI vaccination = mandatory vaccination
- Number of vaccinated ducks = total number of ducks raised in France
- Unevenly distributed production with **2 production areas**
- I work here

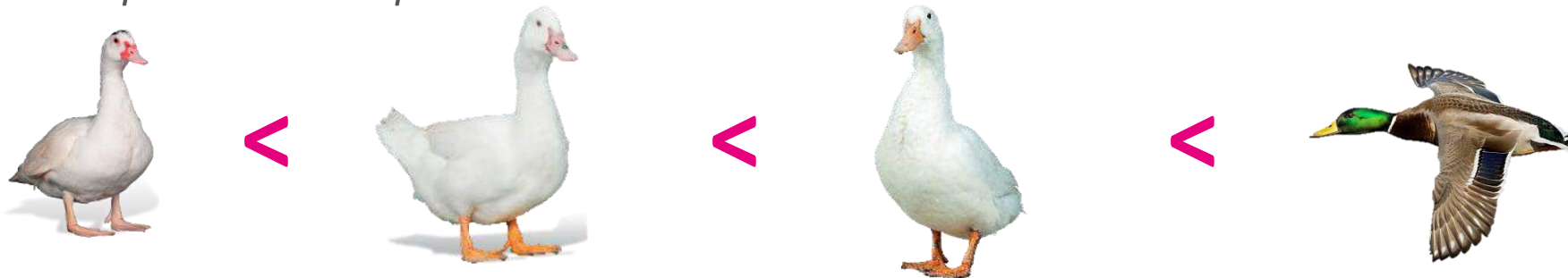
Number of ducks that received a second dose of HPAI vaccine by department between October 2024 and September 2025





INCREASED RISK OF DUCKS WITH H5N1

- Ducks are **more susceptible**
 - *Lower viral infectivity in ducks than in chickens*
- Ducks are **more resistant**
 - *Mean Death Time higher in ducks than in chickens*
 - *Our experience: it depends on the duck strain*



- Ducks are **bigger shedders**
 - *Fast and efficient spread from infected ducks compared to chickens*
- **Therefore, ducks excrete HPAI in greater quantities and for longer periods**

JOURNAL OF
GENERAL VIROLOGY

RESEARCH ARTICLE
James et al., Journal of General Virology 2023, 104, 001852
DOI 10.1099/jgv.11.001852



Clade 2.3.4.4b H5N1 high pathogenicity avian influenza virus (HPAIV) from the 2021/22 epizootic is highly duck adapted and poorly adapted to chickens

Joe James^{1,2*}, Elizabeth Billington¹, Caroline J. Warren¹, Dilhani De Silva¹, Cecilia Di Genova¹, Maisie Airey¹,
Stephanie M. Meyer^{1,2}, Thomas Lewis^{1,2}, Jacob Peers-Dent¹, Saumya S. Thomas¹, Abigail Loftis^{1,2}, Natalia Furman¹,
Alejandro Nunez², Marek J. Slomka¹, Ian H. Brown^{1,2} and Ashley C. Banyard^{1,2*}



- **Marked tropism for the feather epithelium** in Anseriformes
 - *Accumulation of infectious viral particles in feather dust*
 - *Potential for feather debris to persist in the environment*



Emerging Microbes & Infections

ISSN: 2222-1751 (Online) journal homepage: www.tandfonline.com/journals/hem20

The feather epithelium contributes to the dissemination and ecology of clade 2.3.4.4b H5 high pathogenicity avian influenza viruses in ducks

Nicolas Galde, Fabien Filaire, Kateri Bertran, Manuela Crispo, Malorie Dirat, Aurélie Secula, Charlotte Foret-Lucas, Bruno Payré, Albert Perlas, Guillermo Cantero, Natàlia Majó, Sébastien Soubies & Jean-Luc Guérin

Additional mechanism of environmental contamination and transmission



<https://doi.org/10.1038/s42003-025-08687-4>

Poultry farm density and proximity drive highly pathogenic avian influenza spread

Check for updates

Claire Guinat^{1,2}, Cecile Valenzuela Agui^{1,2,3}, François-Xavier Brind^{1,2}, Debapriya Chakraborty^{1,2}, Lisa Fournier¹, Sébastien Lambert¹, Andrea Jimenez Pellicer¹, Séverine Raubereau¹, Guillaume Gerbier¹, Louis du Plessis^{1,2}, Tanja Stadler^{1,2}, Estérelle Grébédet¹, Mathilde C. Paul¹ & Timothée Vergne¹

<https://doi.org/10.1038/s42003-025-08687-4>

Article

• Risk factors for influenza cases

- *Number and proximity between duck farms*
- *Presence of water areas*

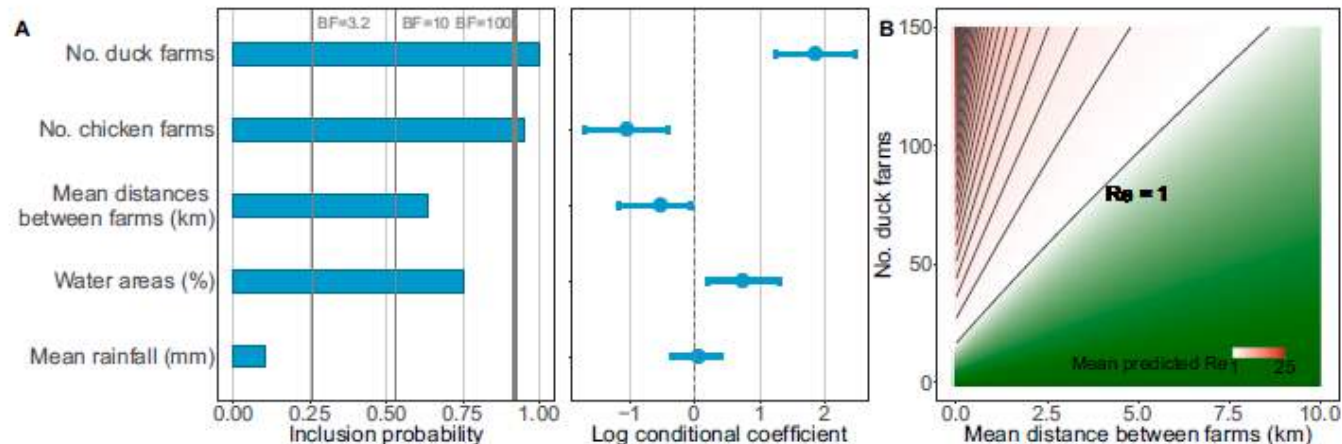


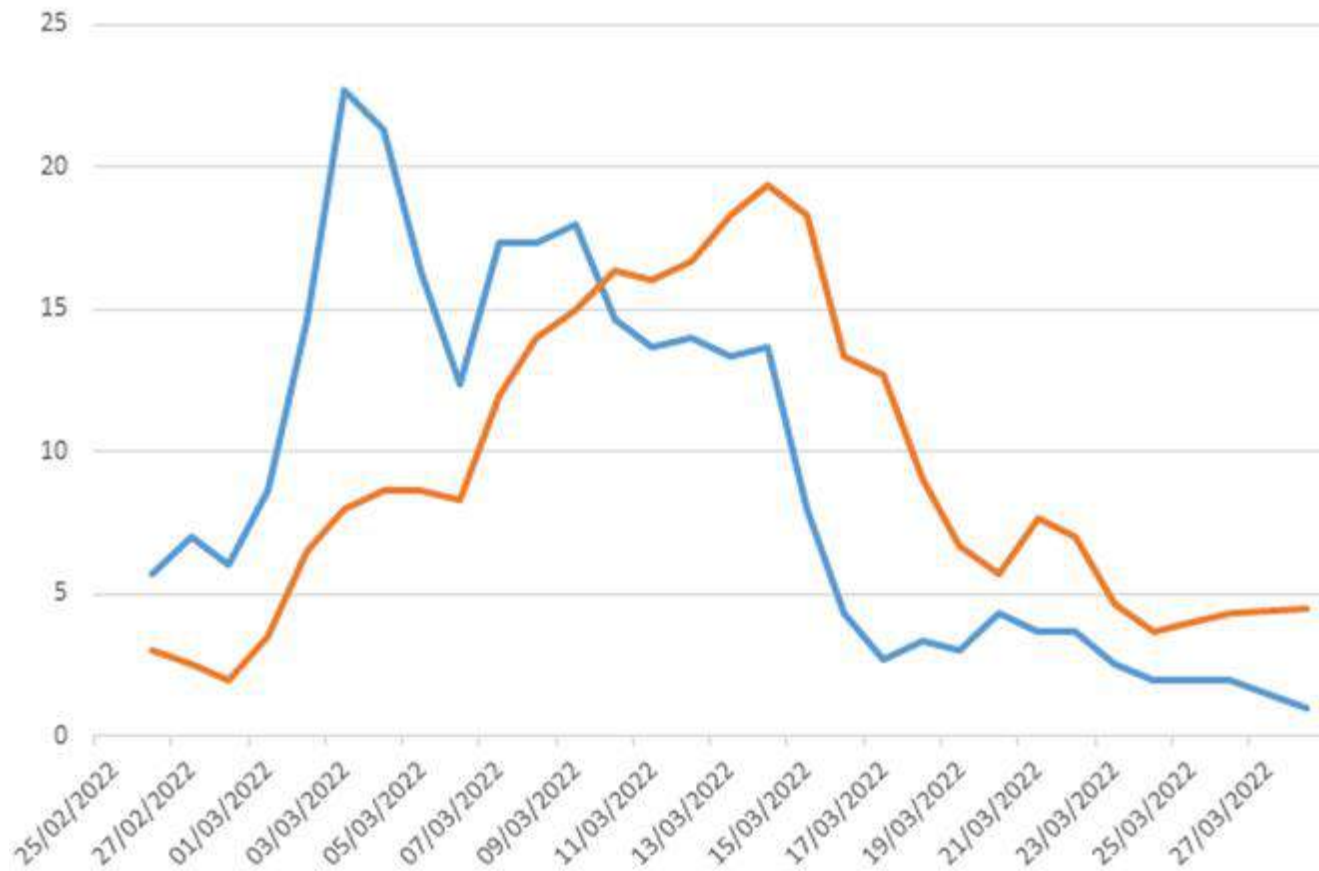
Fig. 3 | Drivers of HPAI H5N8 clade 2.3.4.4b transmission between farms in southwestern France, 2020–21. The left and middle panel A shows the inclusion probability of the tested predictors for the weekly estimates of the effective reproductive number (R_e) from the extended GLM birth-death-sampling model. This probability represents the proportion of the posterior samples in which each predictor was included in the model. Bayes Factors (BF) were used to determine the contribution of each predictor in the generalised linear model (GLM). BF quantify the likelihood of the posterior inclusion probability compared to the prior inclusion probability for each predictor. A cutoff of 3.2, 10 and 100 was used to indicate

substantial, strong and decisive contribution of a predictor in the GLM, respectively⁴⁷. It also shows the log conditional median coefficients (points) and 95% highest posterior density interval (horizontal bars) for the predictors of R_e , representing the (log) contribution of each predictor when it was included in the model. The right panel B shows the farm density and proximity thresholds to mitigate HPAI H5N8 clade 2.3.4.4b transmission between poultry farms in southwestern France, 2020 and 2021, with the predicted high 95% HPD R_e values as a function of the number of active duck farms and the mean distance between active poultry farms (km). The black lines indicate increases in R_e values by increments of 1.



2022 HPAI CRISIS

1) Duck production context in France



- Daily HPAI cases during the first crisis of 2022
 - *Blue : waterfowls HPAI cases*
 - *Orange : gallinaceous HPAI cases*
- **Time difference between waterfowls and others poultry species**



MEASURES TAKEN FOR DUCKS

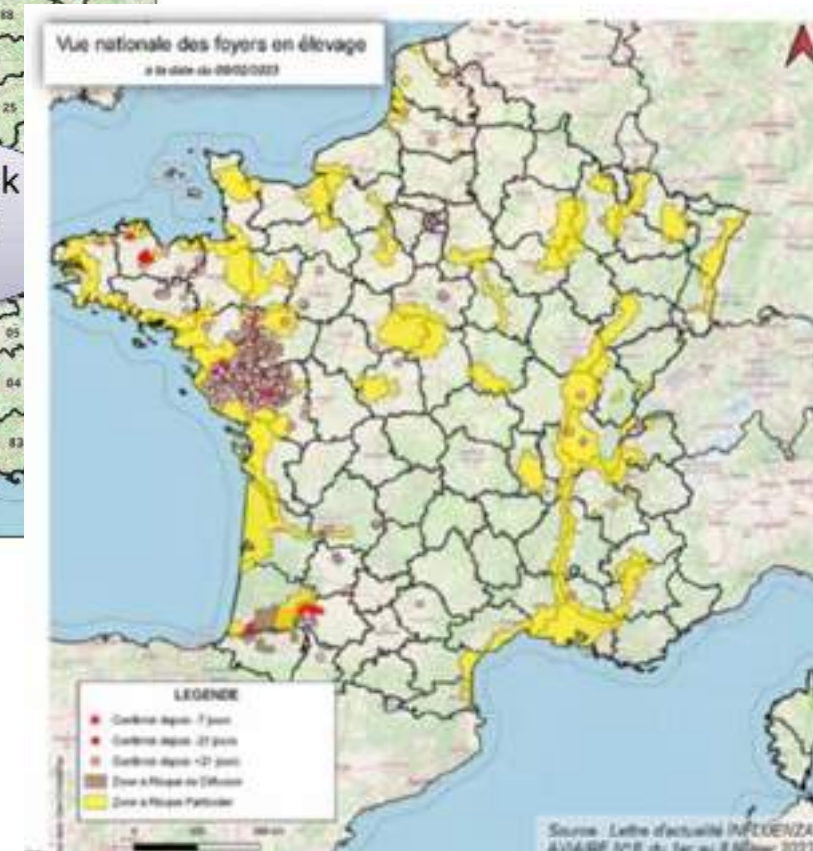


→ A dangerous species when the virus is present

- **Creation of 2 RDZs (Risk Diffusion Zones)**

- *Zones with high duck density*
- *Reinforced biosecurity measures*

- **Winter 2022-2023 crisis** → Overlap with RDZs
- **Validation by experience** of the modeling of the high-risk level of these 2 zones





HPAI VACCINATION: CONSEQUENCES ON PROPHYLAXIS

I) Duck production context in France

- Mandatory vaccination
 - *All year round*
 - *Throughout France*
 - *All ducks*
- 2 available vaccines
 - *Immunization against H5*
- Vaccination audits
- Surveillance measures to avoid silent circulation
- Addition to existing vaccination plans

Species	Mandatory vaccination	Systematic vaccination	Context-dependent vaccination
Muscovy duck	HPAI	Parvovirosis	Colibacillosis, Riemereiosis
Mule duck	HPAI	-	Derzsy disease (GPV), Colibacillosis, Pasteurellosis



VACCINATION IMPACT: WINTER 2023-2024

I) Duck production context in France

- Prediction of the number of influenza cases based on data from previous years
- Winter 2023-2024
 - *France: actual number of cases much lower than predicted number*
- **95,9% reduction attributable to vaccination**

EMERGING INFECTIOUS DISEASES*

ISSN: 1060-6059

Volume 31, Number 7—July 2025

Research Letter

Promising Effects of Duck Vaccination against Highly Pathogenic Avian Influenza, France, 2023–2024

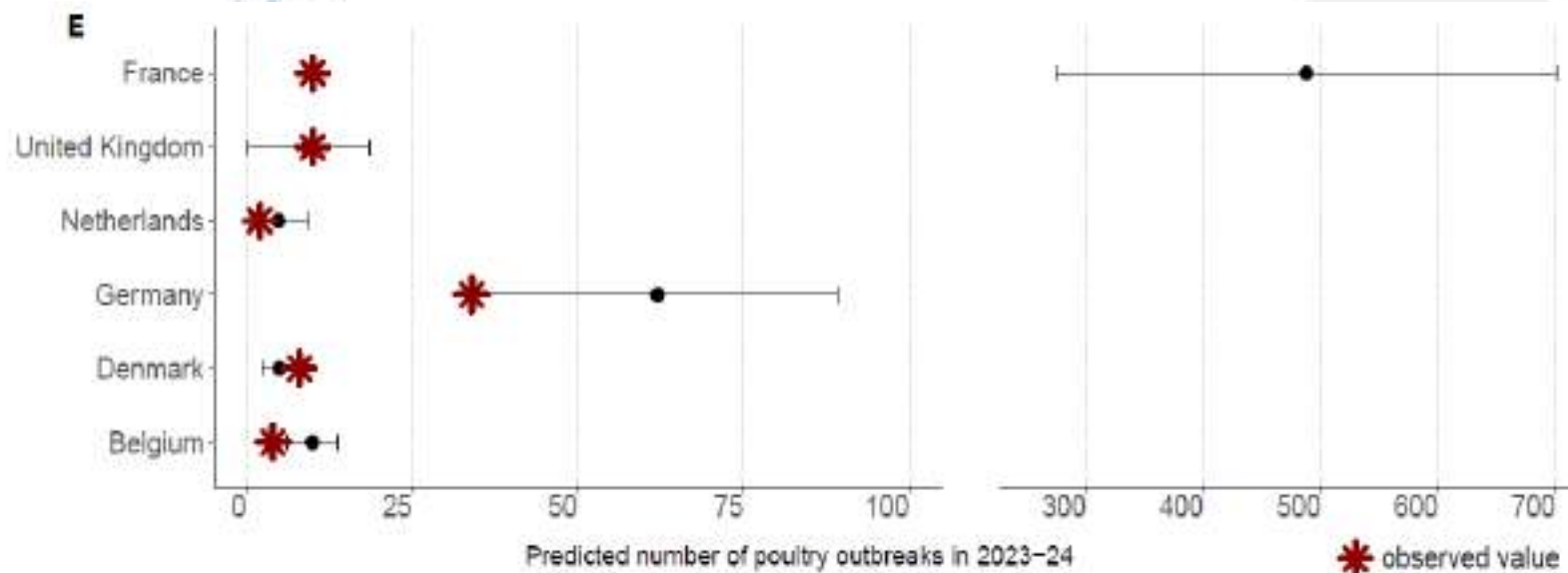
Claire Guinat, Lisa Fourtune, Sébastien Lambert, Eva Martin, Guillaume Gerbier, Andrea Jimenez Pellicer, Jean-Luc Guérin, and Timothée Vergne

Author affiliation: Interactions Hôtes-Agents Pathogènes, Université de Toulouse, INRAE, ENVT, Toulouse, France (C. Guinat, L. Fourtune, S. Lambert, E. Martin, J.-L. Guérin, T. Vergne); Direction Générale de l'Alimentation, Ministère de l'Agriculture et de la Souveraineté Alimentaire, Paris, France (G. Gerbier, A. Jimenez Pellicer)

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Research Letter

On This Article





HPAI: CONSEQUENCES ON BIOSECURITY

I) Duck production context in France

Please contact orvia company at contact@orvia.fr



HPAI: CONSEQUENCES ON BIOSECURITY

I) Duck production context in France

Please contact orvia company at contact@orvia.fr



ANIMAL WELFARE CONSIDERATIONS

- Interventions previously performed on farms now moved to hatchery

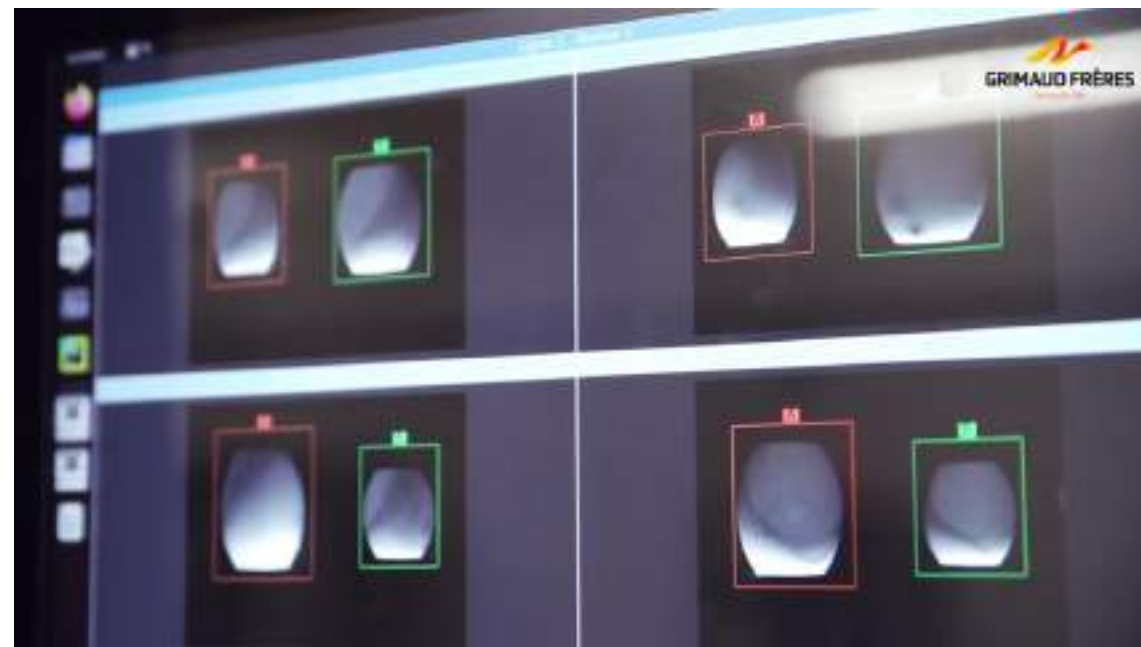
- **Claw trimming**
- **Beak trimming**



- Evolution of starting practices in farm
 - *More water and feed points*
 - *Paracetamol and/or vitamin C supplementation*

- **In ovo sexing**

- *Unique technology developed for ducks*
- *Technology based on the difference in eye colors between males and females*



Credit: Grimaud Frères Sélection

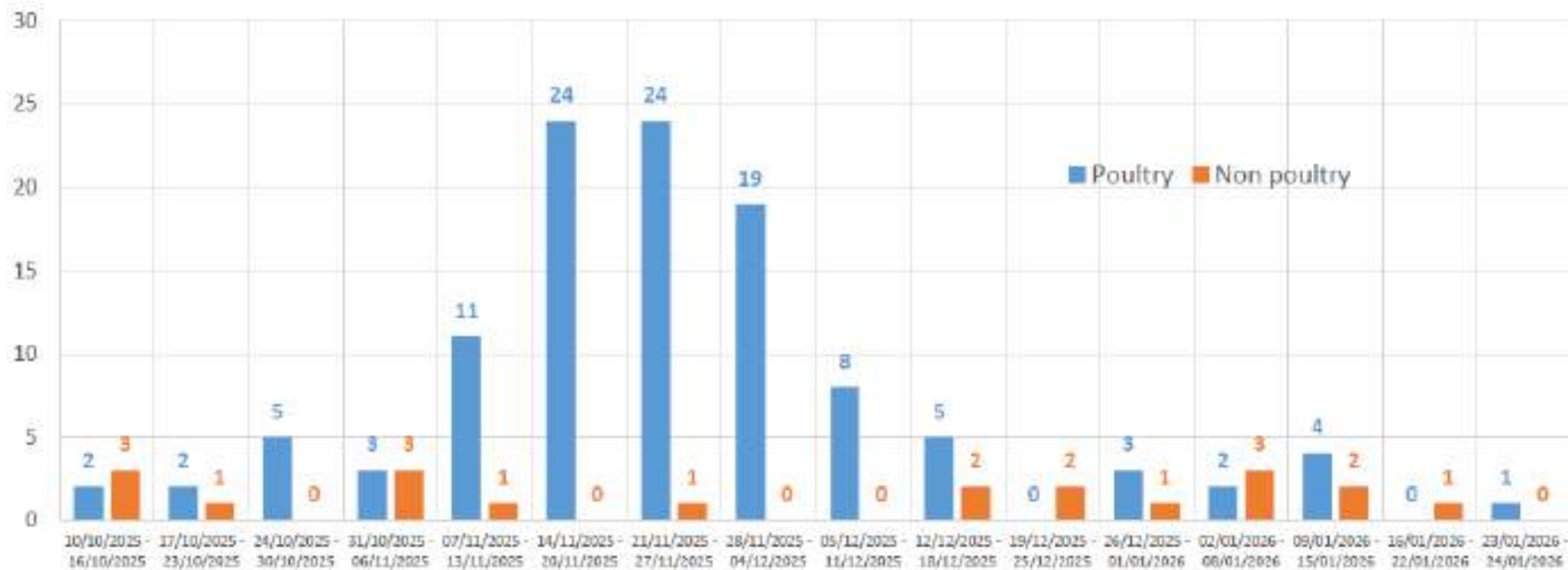
II) HPAI CRISIS 2025-2026





EVOLUTION OF OUTBREAKS IN POULTRY

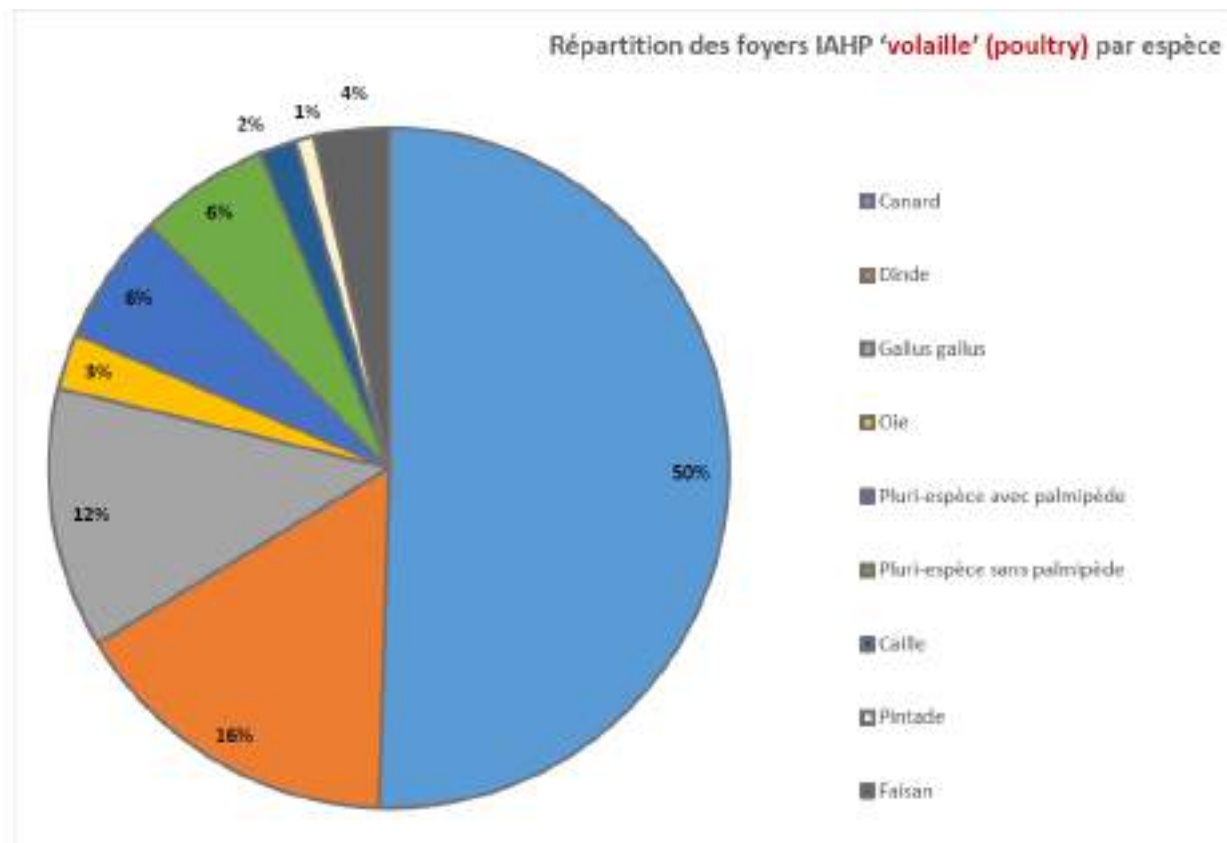
- Between October 2025 and January 2026
 - **114 HPAI outbreaks in farms**
 - *23 HPAI outbreaks in backyard flocks*





DISTRIBUTION OF OUTBREAKS BY SPECIES

II) HPAI Crisis 2025-2026



- Half of the outbreaks concern ducks
- Followed by turkeys, laying hens, and chickens



HPAI: CLINICAL SIGNS

- Warning signs → **drops in feed and water consumption**
- Then → **depression and neurological disorders**
- Differences between ducks species ?
 - *Same clinical signs*
 - *Morbidity and mortality higher in Muscovy ducks*
- **Always clinical signs?**
 - *In 90% in Muscovy duck cases*
 - *In 50% in mule duck cases*
- **How to diagnose without clinical signs?**
 - *HPAI vaccination surveillance*
 - *Control before duck movement*

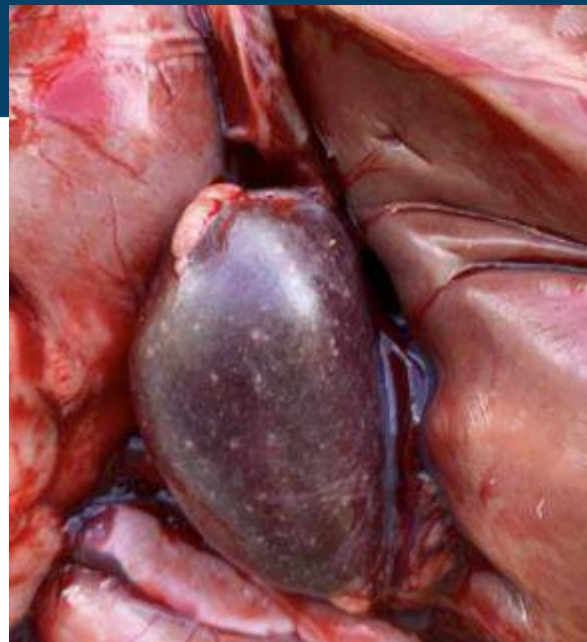




HPAI: MACROSCOPIC LESIONS

- Lung congestion
- Septicemic form
- Meningeal hyperemia

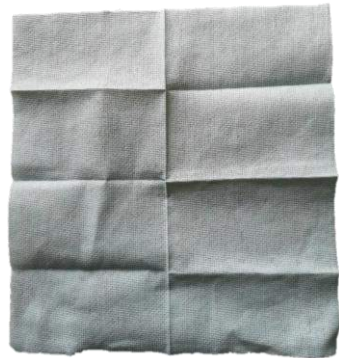
- Absence of lesions in the absence of clinical signs





MOLECULAR DIAGNOSIS

- Samples



- Caution with potential inhibitors in dust

Essential use of BSA + exogenous positive control



Optimizing environmental viral surveillance: bovine serum albumin increases RT-qPCR sensitivity for high pathogenicity avian influenza H5Nx virus detection from dust samples

Pierre Bessière¹, Brandon Hayes¹, Fabien Flaire^{1,2}, Laetitia Lèbre¹, Timothée Vergne¹, Matthieu Pinson², Guillaume Croville¹, Jean-Luc Guérin¹

¹ IHAP, Université de Toulouse, INRAE, ENVT, Toulouse, France

² THESEO France, LarXess Biosecurity, LarXess Group, Laval, France

³ Labovet, Châlons, France

- 3 PCRs

M gene

H5/H7

Clade 2.3.4.4b

- Results within the day

- Then sending samples to NRL

Confirmation of HP character by determination of the amino acid sequence of the H5 cleavage site

Complete genome sequencing



QUANTITATIVE SEROLOGY

- | ELISA kit | FLUH5SDUCK | FLUNPS |
|--|---|--|
| Method | Indirect ELISA | Indirect ELISA |
| Species | Ducks (Pekin, Mule, and Muscovy) | Chickens (broilers, breeders, layers), turkeys, ducks, and geese |
| Sensitizing antigen | Purified recombinant H5 protein | Recombinant nucleoprotein (NP) |
| Conjugate | Anti-duck Ig-HRP conjugate (10X concentrated) | Anti-chicken IgG-HRP (10X concentrated) |
| Quantification of antibodies produced by ... | Vaccination and wild infection | Wild infection |



CASE STUDY EXAMPLE: BACKGROUND

- January 13, 2026
- 15,000 mule ducks distributed over 5 barns of 100 days old
- HPAI vaccination at 1, 28, 56 days
- Farm in a regulated zone
 - *departure to force-feeding room prohibited*
 - *Control before movement requested*
- Decision to send to slaughter on 01/15, so release samples taken on 01/13
- 60 per building performed for M gene PCR in private lab
- **No clinical signs**
No mortality
Water and feed consumption OK
- 100/100 swabs **positive** for **M gene PCR**
- H5/H7 PCR performed: 100% **positive for H5 PCR**



CASE STUDY EXAMPLE: PCR RESULTS

II) HPAI Crisis 2025-2026

- **01/15: official suspicion triggered**
- 60 swabs sent to an approved public laboratory
- 3 PCRs launched simultaneously
- **100% positive M gene, H5, and clade 2.3.4.4b**
- Suspicion confirmed on 01/15 evening
- **Euthanasia started on 01/16**

# Paramètre	Désignation	Date de fin d'analyse
(C) INFLUM (*)	Génome du virus Influenza aviaire de type A (gène M) par RT-PCR Méthode interne - Kit d'extraction: ADIAMAG (Bio-X Diagnostics) et kit d'amplification: ADIAVET AIV Real Time (Bio-X Diagnostics) - Technique: PTSA2ANA601.	15/01/2026
(C) INFLUTH5 (*)	Génome du virus de l'Influenza aviaire de type A (sous-type H5) par RT-PCR. Méthode interne - Kit d'extraction: ADIAMAG (Bio-X Diagnostics) et kit d'amplification: ADIAVET AIV H5 H7 Real Time (Bio-X Diagnostics) - Technique: PTSA2ANA601.	15/01/2026
(C) INFLUTH7 (*)	Génome du virus de l'Influenza aviaire de type A (sous-type H7) par RT-PCR. Méthode interne - Kit d'extraction: ADIAMAG (Bio-X Diagnostics) et kit d'amplification: ADIAVET AIV H5 H7 Real Time (Bio-X Diagnostics) - Technique: PTSA2ANA601.	15/01/2026
(C) INFLUCLA5 (*)	Génome du virus de l'Influenza aviaire de sous-type H5 hautement pathogène appartenant au clade 2.3.4.4b de la lignée A/goose/Guangdong/1/1996 par RT-PCR Techniques: PTSA2ANA601 et Méthode ANSES: rRT-PCR H5HP_VIR1005.	15/01/2026

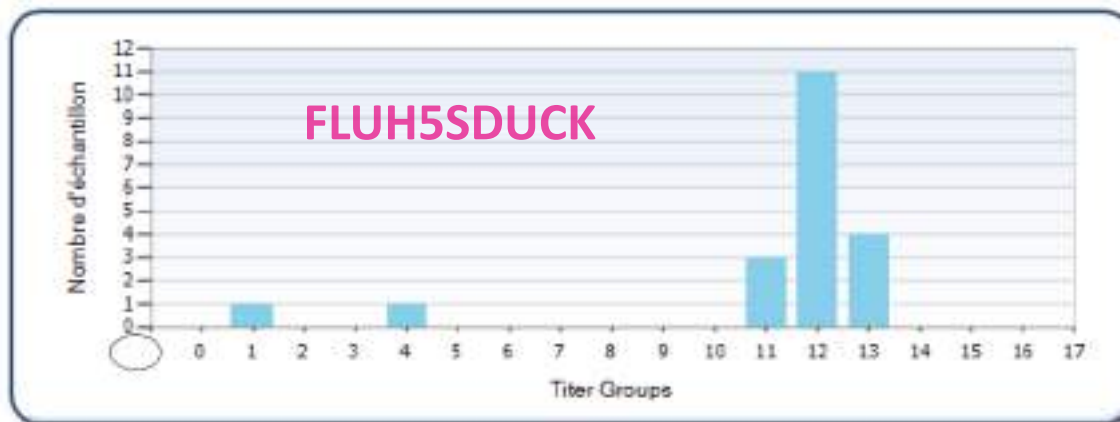
N° Echantillon	Référence	Résultats			
		INFLUM	INFLUTH5	INFLUTH7	INFLUCLA5
L.2026.1160-1-1	ET 1	DETECTE	DETECTE	Non détecté	DETECTE
L.2026.1160-1-2	ET 2	DETECTE	DETECTE	Non détecté	DETECTE
L.2026.1160-1-3	ET 3	DETECTE	DETECTE	Non détecté	DETECTE
L.2026.1160-1-4	ET 4	DETECTE	DETECTE	Non détecté	DETECTE

Mean Ct value	32,3	29,2	/	33
Maximal Ct value	36,5	35,6	/	37
Minimal Ct value	27,8	24,5	/	29,5

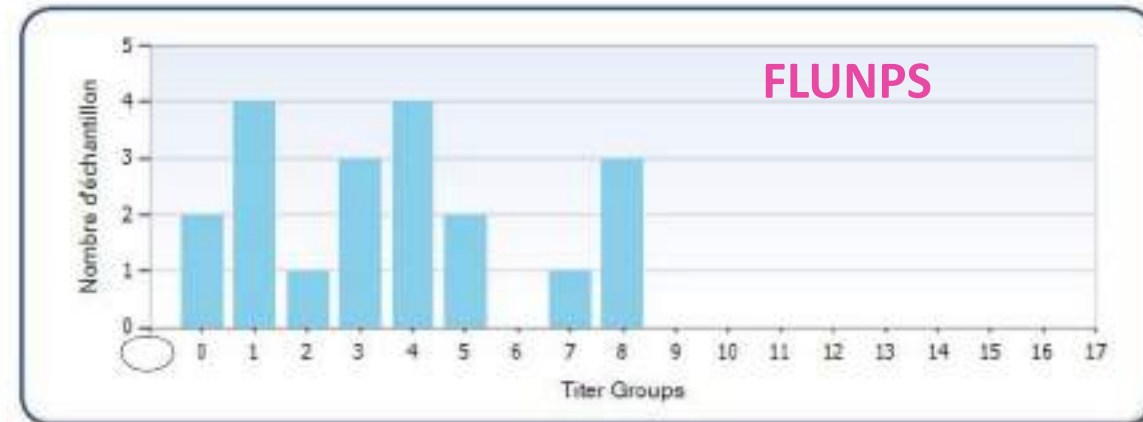


CASE STUDY EXAMPLE: SEROLOGY

- 20 blood samples taken during suspicion visit to study serological response



AMean value: 23,889.00
%CV value: 31.00
Min. value: 1,272.00
Max. value: 29,556.00



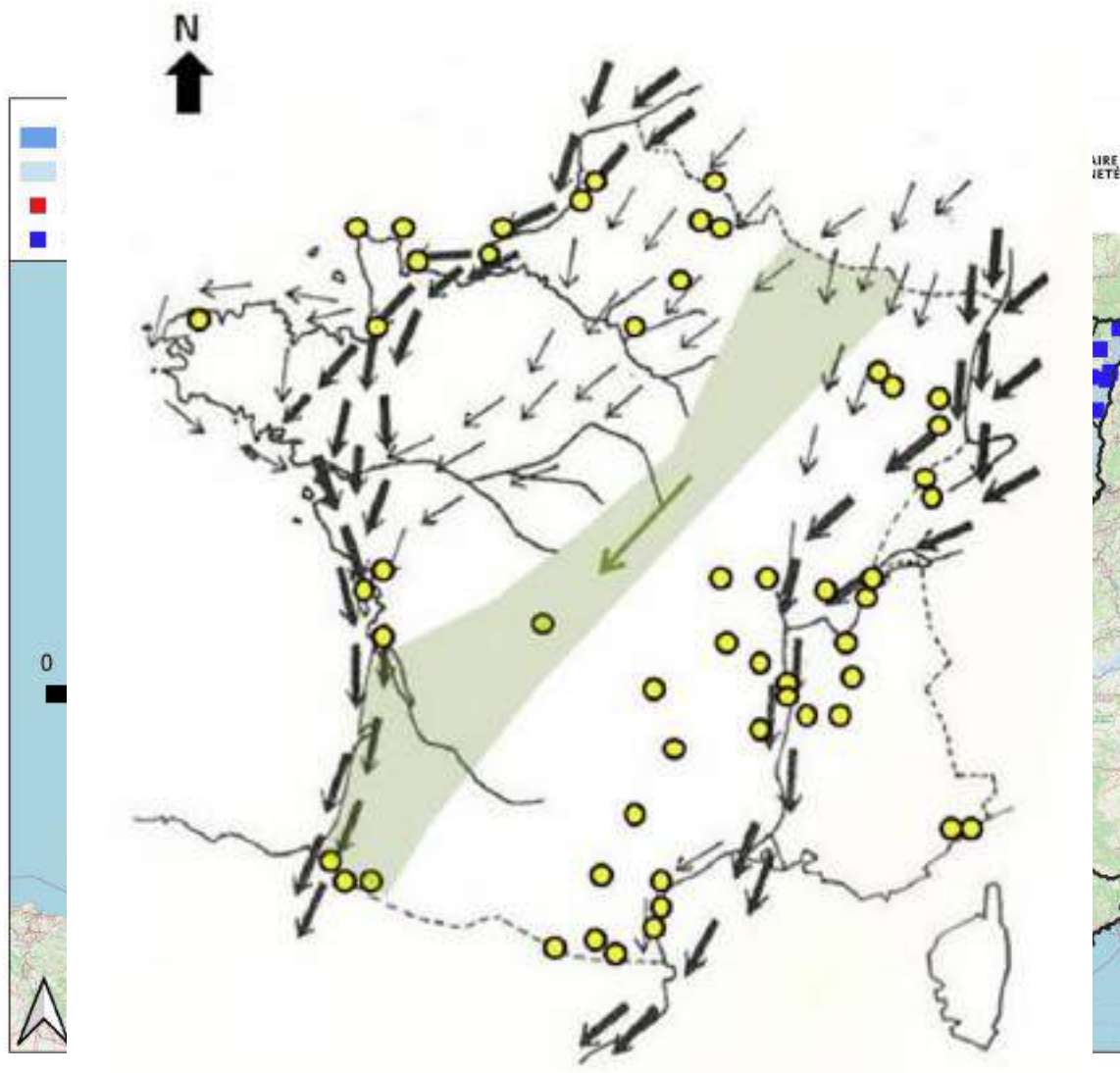
AMean value: 4,984.00
%CV value: 86.00
Min. value: 28.00
Max. value: 12,910.00

- Anti-H5 antibodies very high** because there were 3 doses of H5 vaccines before, so rapid and strong rise in antibodies post-contamination, possible in less than 5 days
- Anti-NP antibodies heterogeneous and rather low**, ongoing seroconversion situating contamination (roughly) between 7 and 10 days before samples on 01/15



HPAI IN WILD BIRDS

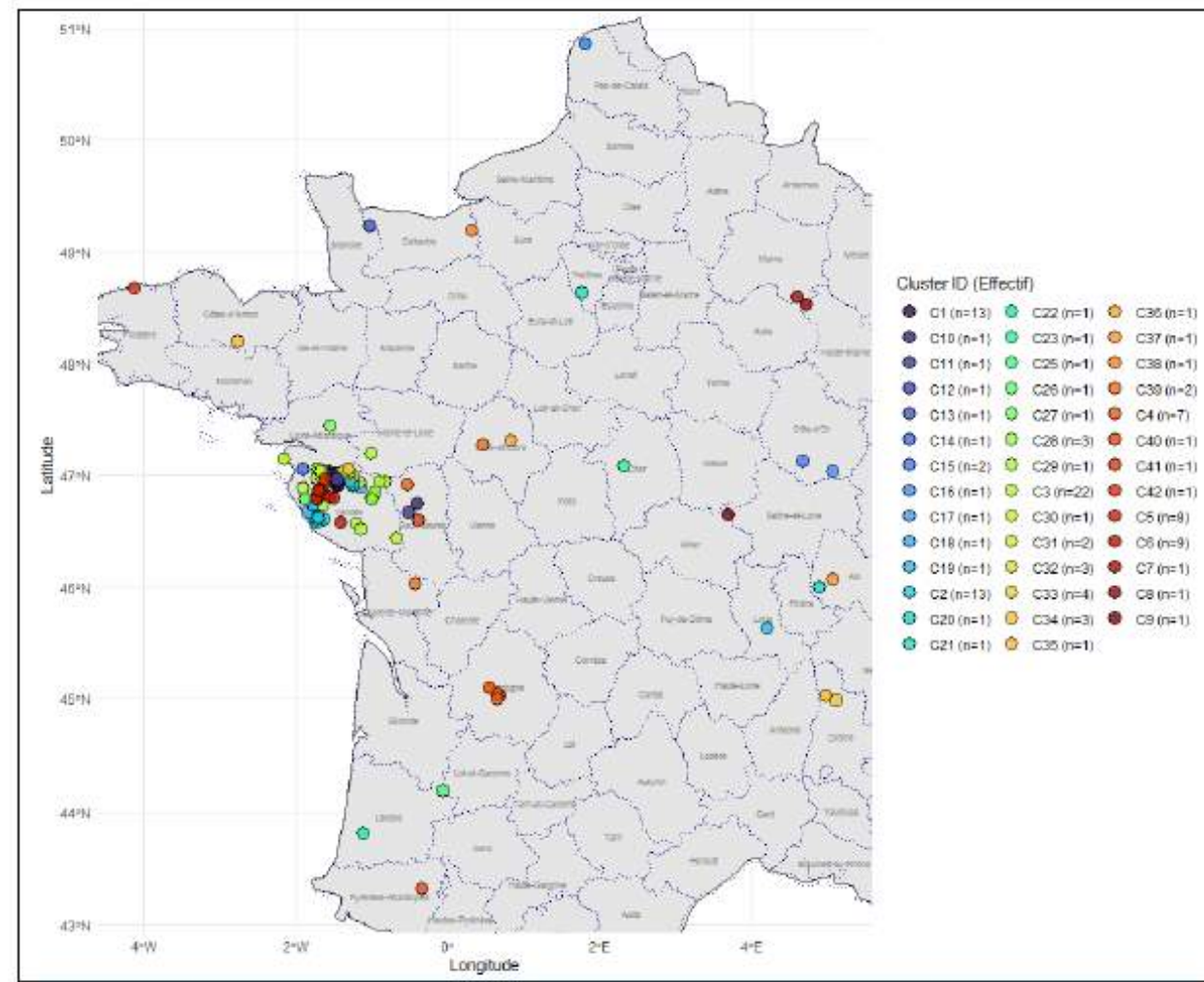
- Wild bird cases 08/01/25 to 02/10/26 = **291**
Same period 1 year before = **25**
- 2 species particularly affected
 - **Ducks**
 - **Cranes**
- The map of cases overlaps with migration corridors
- Similar observation at European scale
 - 2024-2025: **793** wild bird cases
 - 2025-2026: **4,921** wild bird cases





SEQUENCING OF DETECTED VIRUSES

- **100 virus sequenced** by ANSES
- Almost exclusively **FR20** genotype
- **42 different clusters**
- High proportion of contaminations by wild birds Versus inter-farm transmission
- **Contrast to the 2022 crisis**
 - *Vast majority of cases = inter-farm transmission*

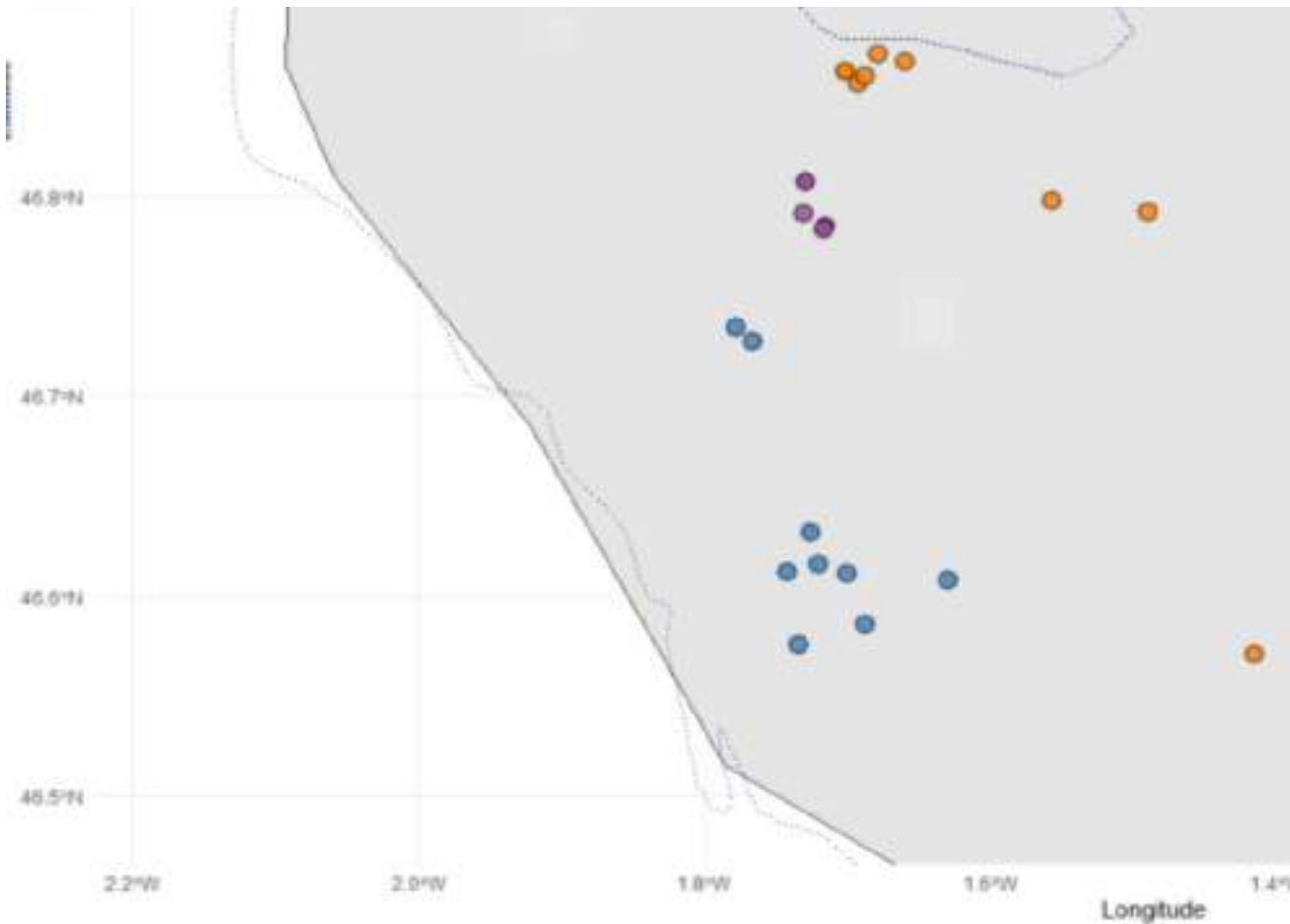


15/01/2026



TRANSMISSION BETWEEN FARMS FOR OUR CUSTOMERS

II) HPAI Crisis 2025-2026



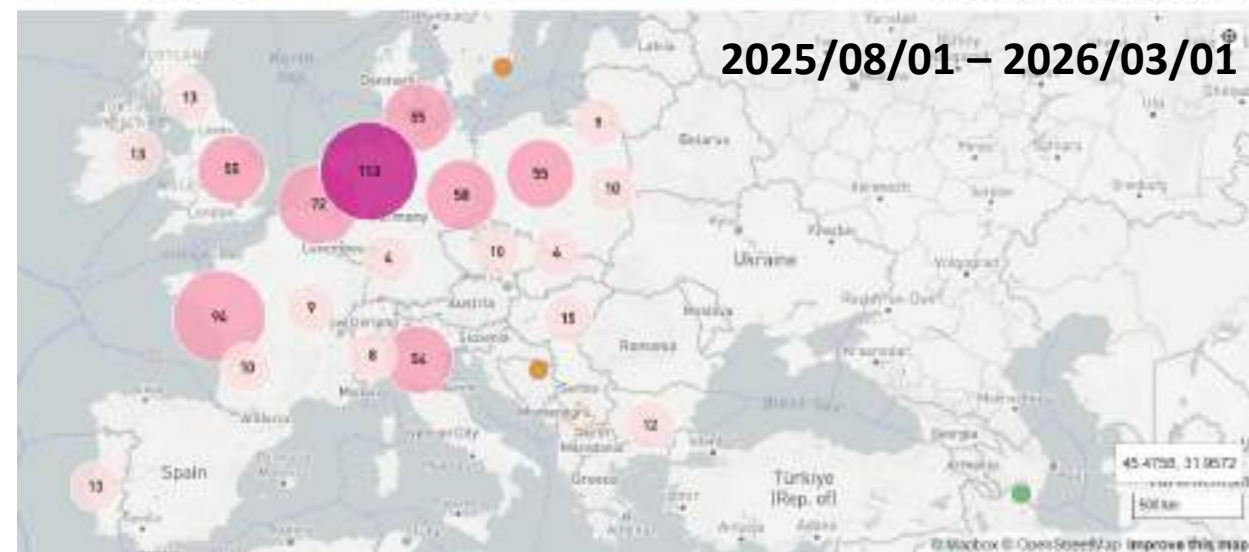
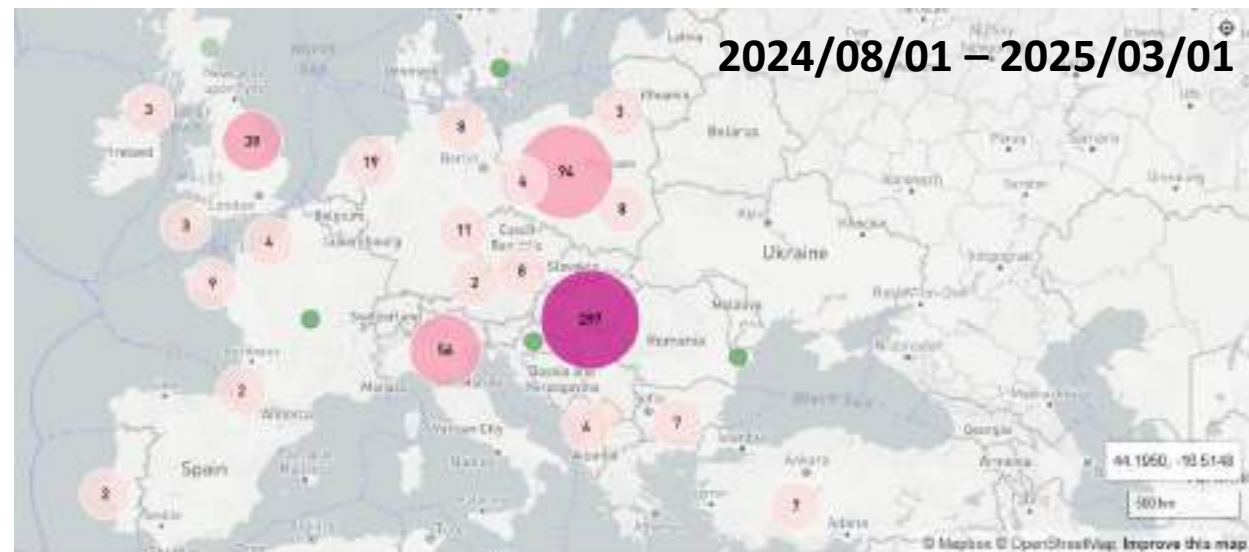
- 3 local clusters in our clientele (without the other cases)
 - *Blue = Cluster 2 in 9 farms*
 - *Purple = Cluster 4 in 5 farms*
 - *Orange = Cluster 5 in 9 farms*
- First case in each situation : duck flock
- **Ducks remain a dangerous species**
- Vaccination plan need to be improved to avoid transmission between farms



WHAT ABOUT OTHER DUCK-PRODUCING COUNTRIES?

- **HPAI outbreaks in Europe**
- **Hungary**
 - *Very affected in 2024-2025*
 - *Just a few cases this winter*
 - *No vaccination*

<https://wahis.woah.org/>





III) FOCUS ON 3 DISEASES OF INTEREST



Mule ducks

- Derzsy disease
- Pneumovirosis?

Muscovy ducks

- *Parvovirosis*
- Reovirosis
- Circovirosis?
- Pneumovirosis?



PARVOVIRUS IN DUCKS

- Diseases caused by infection with *Dependoparvovirus anseriform 1*, family *Parvoviridae*
 - *Very resistant virus*
 - *Great genetic stability*
- The species includes **2 viruses**
- **GPV** in mule ducks = Derzsy disease
 - *Short beaks and dwarfism*
 - *Situation controlled with just a few cases per year*
- **MDPV** in Muscovy ducks = Duck Parvovirosis

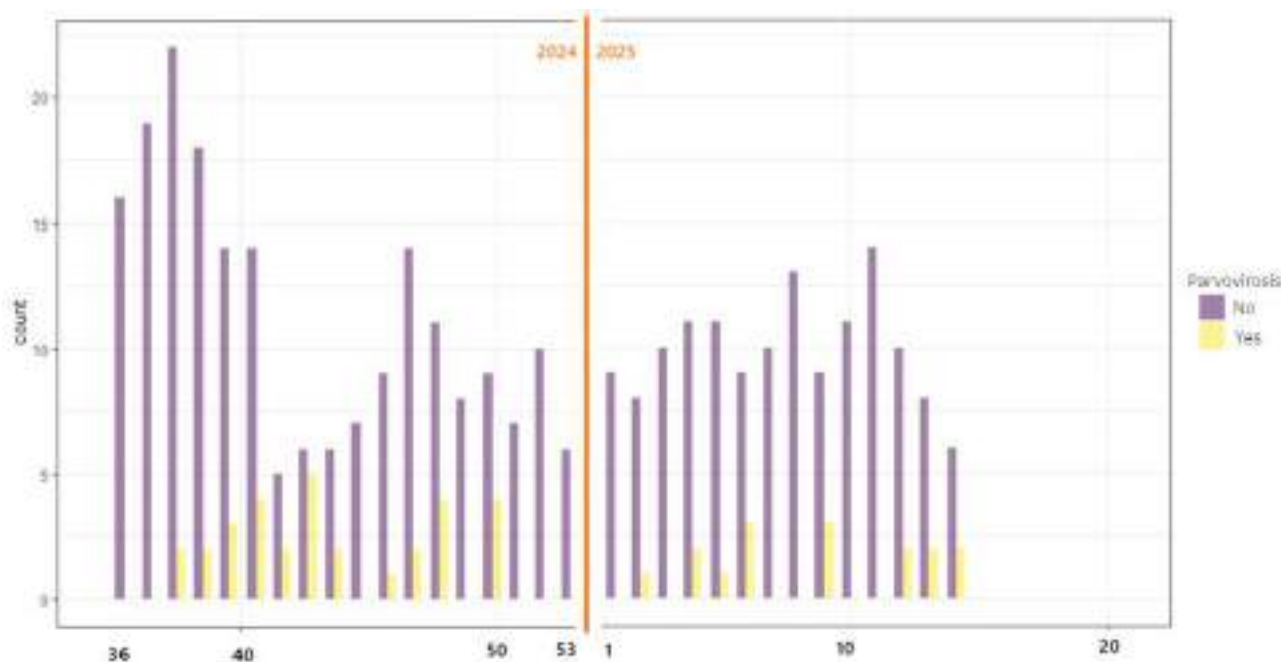




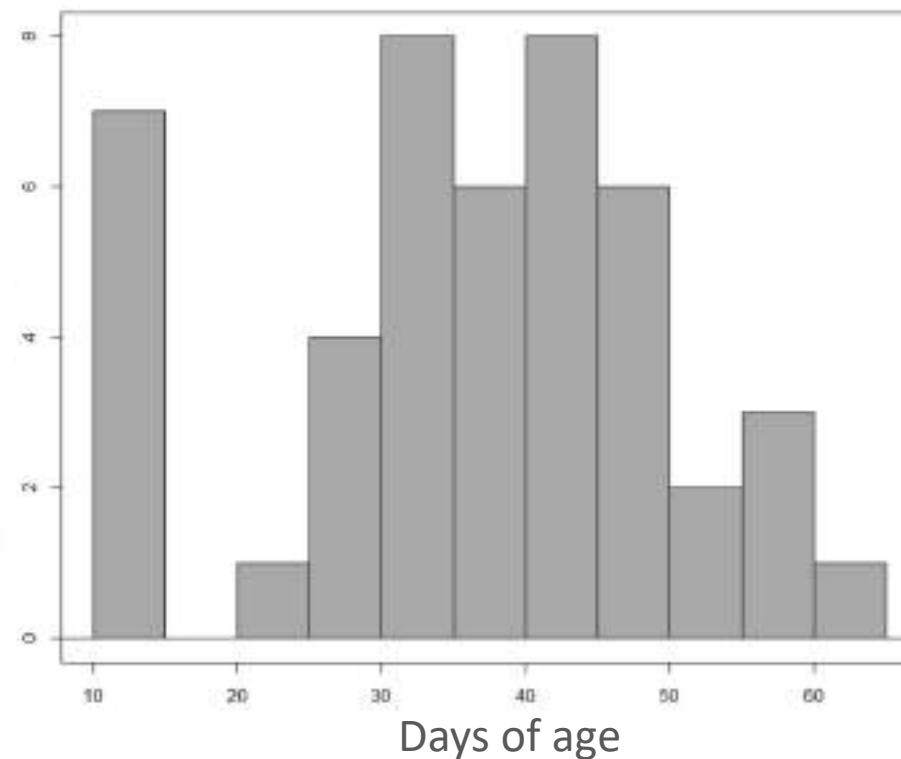
PARVOVIROSIS IN MUSCOVY DUCKS

- Normally, between 0 and 10 cases per year
- **Epidemic** between September 2024 and April 2025
- **47 clinical cases out of 387 flocks** in our clientele

➔ **12% affected flocks**



Age at onset of clinical signs





PARVOVIROSIS - CLINICAL SIGNS

III) Focus on 3 diseases of interest





PARVOVIROSIS - CLINICAL SIGNS

III) Focus on 3 diseases of interest





PARVOVIROSIS - CLINICAL SIGNS

III) Focus on 3 diseases of interest

- Growth delay
- Mortality from malnutrition
- Morbidity and severity of lesions very variable, depends on
 - *Age of infection*
 - *Presence of other secondary diseases*
 - *Comfort measures implemented*





PARVOVIROSIS - MACROSCOPIC LESIONS

- **Pinched feathers**
- No other lesions or nothing specific





PARVOVIROSIS - DIAGNOSIS

- **GPV/MDPV PCR**

- Spleen
- Cloacal swab

- **Histology**

- *Myopathy of skeletal muscle*
- *Hepatitis, myocarditis, sciatic neuritis, and polioencephalomyelitis*
- *Atrophy of lymphoid organs (bursa of Fabricius, spleen, and thymus)*

PCR en temps réel - MDPV - GPV (DERZSY)

	GPV	CT #	MDPV	CT #
2025.42794-1-1 Rate	Non détecté	—	Détecté	20.28



Actions

- Restore **complete vaccination protocol**
 - *Some farms (overexposed among positives) had abandoned hatchery vaccination to do only the 2-3 week one*
- **Vaccination audit**
- Reinforcement of **cleaning and disinfection**
 - *Particular attention to **slatted floors**, to be washed on both sides, and **slurry pits***

Evolution

- Decrease in cases in 2nd semester 2025
- Decrease in placements from November 2025 due to HPAI regulations
- **No miracle solution but consolidation of fundamentals**



Mule ducks

- Escherichia coli
- Lysinibacillus sphaericus
- Riemerella anatipestifer
- Pasteurella multocida
- Streptococcus pluranimalium

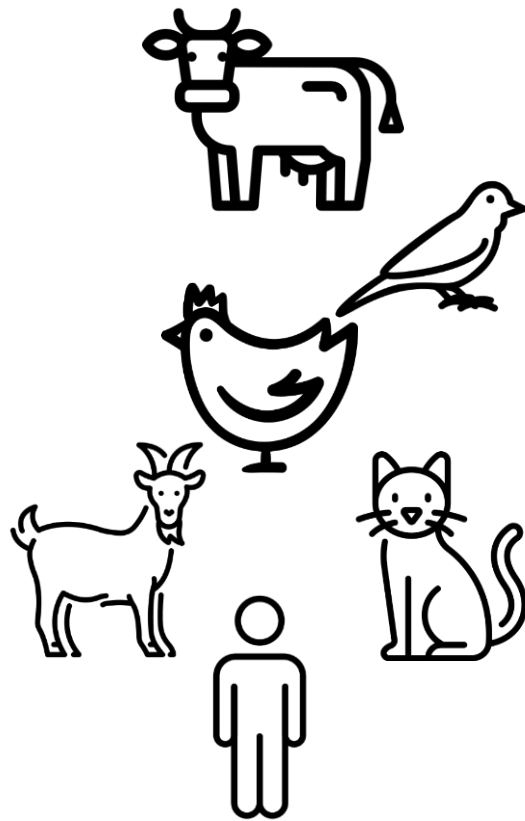
Muscovy ducks

- Escherichia coli
- **Streptococcus**
 - *Gallolyticus*
 - ***Pluranimalium***
- Riemerella anatipestifer
- Pasteurella multocida
- Erysipelothrix rhusiopathiae
- Yersinia pseudotuberculosis
- Lysinibacillus Sphaericus



S. PLURANIMALIUM - HOST SPECTRUM

III) Focus on 3 diseases of interest

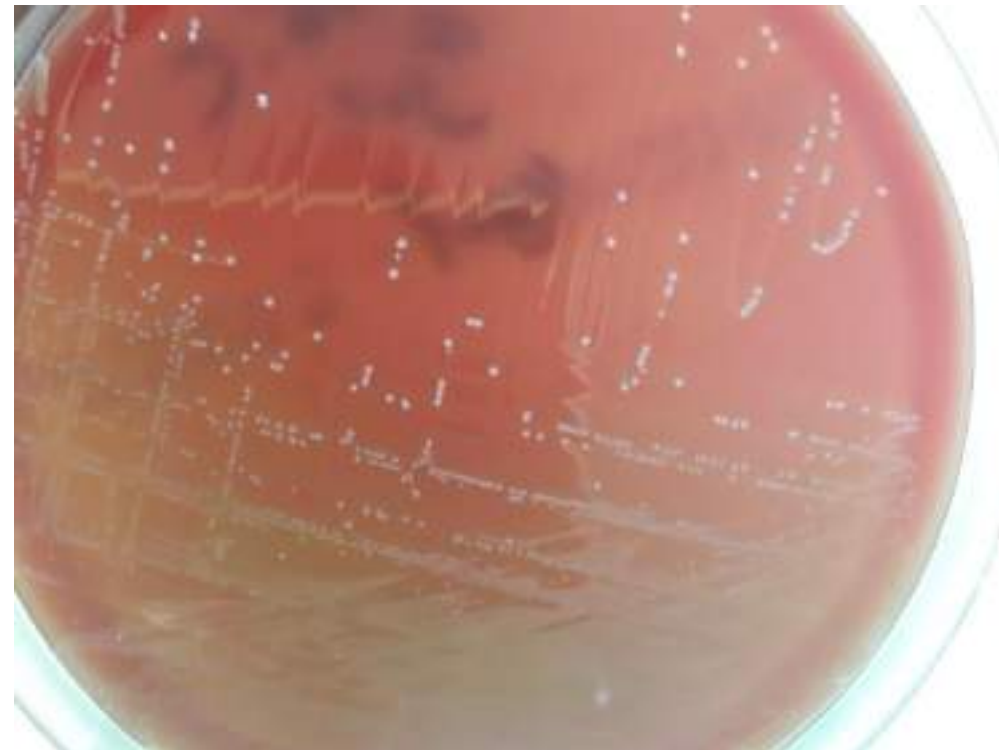


- First description in 1999
- **Diversity of hosts and locations**
 - *Mastitis, tonsillitis, genital tract infection, brain abscesses*
 - *Respiratory tract infection*
 - *Septicemia and endocarditis*
 - *Tonsillitis*
 - *Subdural empyema, endocarditis, brain abscesses, and septicemia*

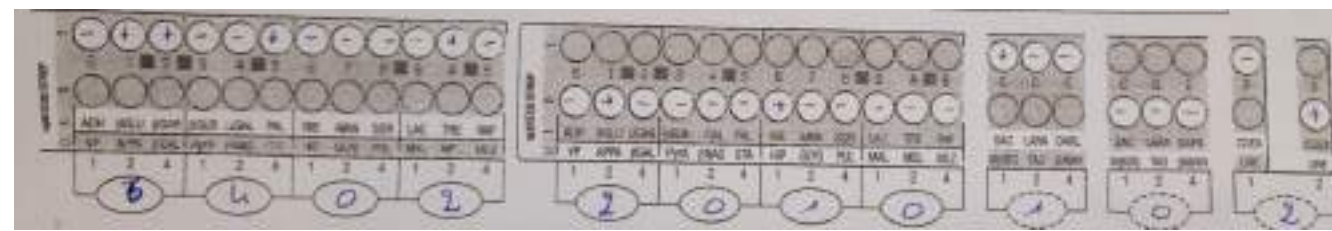


S. PLURANIMALIUM - BACTERIOLOGY

- Greenish hemolysis zone on blood agar
- Good growth on ANC agar
- Gram-positive cocci in chains, pairs, or groups
- Identification impossible by "Rapid ID32 STREP" galleries
 - *Covers several biochemical profiles, unacceptable response*
- **MALDI-TOF technique required**
 - *Identification of Streptococcus pluranimalium with high confidence*



III) Focus on 3 diseases of interest





- **Sporadic cases since 2018**
 - *Between 0 and 5 cases per year*
 - *Sporadic, never epidemic, no recurrence*
- Majority of cases **between 6 and 8 weeks**
- Low excess mortality, heterogeneity, no specific clinical signs



S. PLURANIMALIUM: LESIONS IN MULE DUCKS

- **Heart**
 - *Necrotic spots and severe endocarditis*
- **Spleen**
 - *Splenomegaly and necrotic spots*

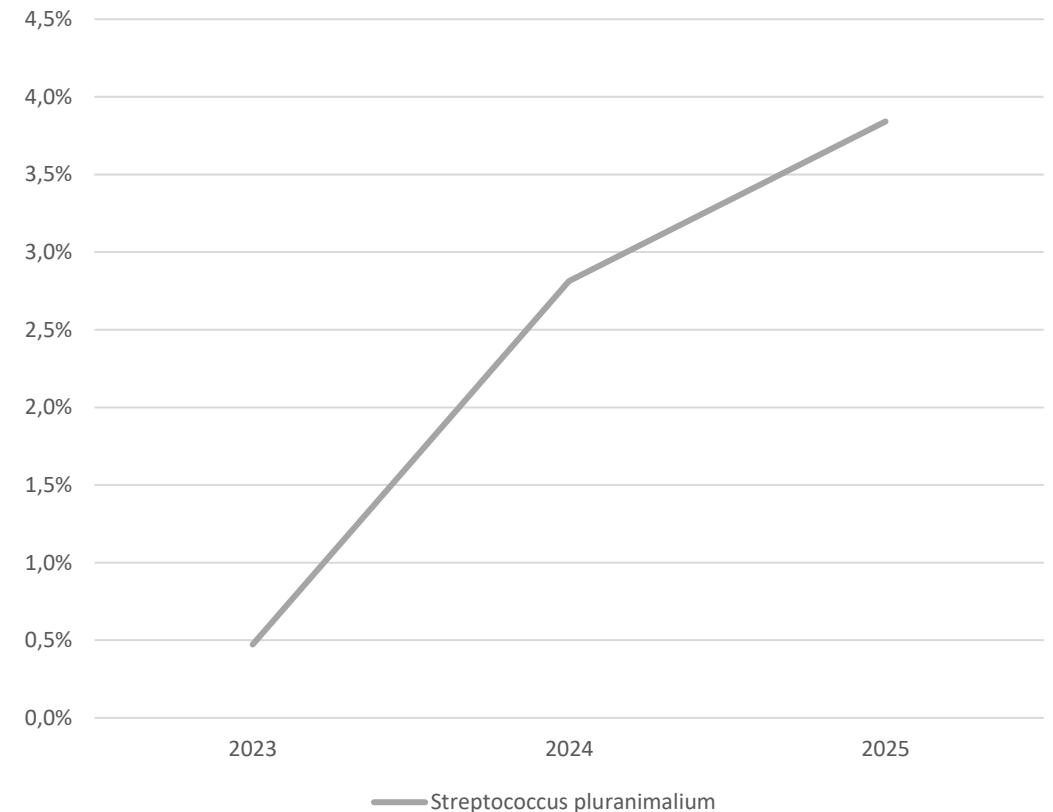




S. PLURANIMALIUM: SITUATION IN MUSCOVY DUCKS

- **First isolations in 2023** and increasing number of cases since
- **2026:** Bacteriology performed on 62 duck flocks
 - ➔ 191 bacteria isolated
 - 102 *E. coli*
 - **33 *S. pluranimalium***
 - 13 *R. anatipestifer*
 - Syndrome more similar to *Streptococcus gallolyticus* infection (= "sudden death syndrome in young ducklings")
 - **2-5 weeks-old**
 - **Sudden mortality**

Proportion of *S. pluranimalium* relative to total bacteria isolated per year





S. PLURANIMALIUM - LESIONS IN MUSCOVY DUCKS

- Based on 2023-2025 necropsy data
 - **Splenomegaly** with necrotic foci
 - **Hyperemia** of other tissues
- New in 2026 → cases of **endocarditis**



- **Sharp increase** in cases of S. pluranimalium in Muscovy ducks
- Difficult identification → **Risk of under-diagnosis**



Mule ducks

- Coccidiosis
- Aspergillosis
- Candidiasis
- **Ricketts**
- Dyschondroplasia

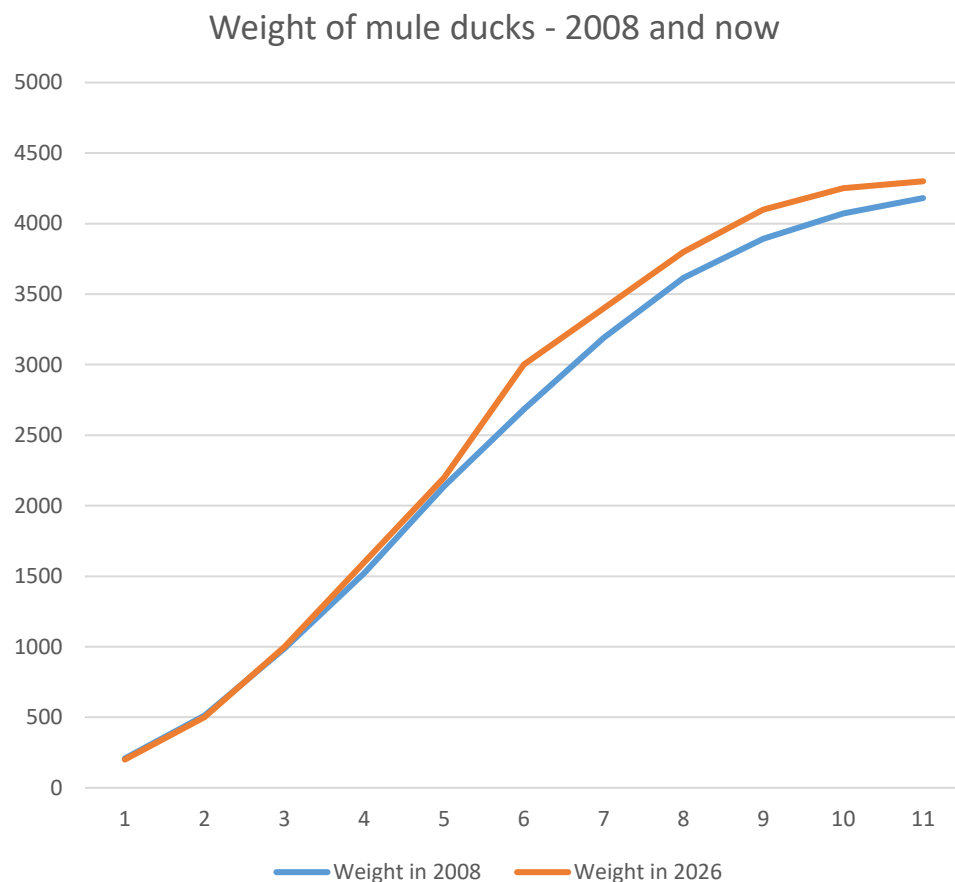
Muscovy ducks

- Feather pecking
- Aspergillosis
- Caseous tracheitis



GROWTH CURVES

III) Focus on 3 diseases of interest



- Strong growth in the first weeks of age
 - *1 kg at 3 weeks-old*
- In 20 years:
 - *Improved weight after 5 weeks of age*
 - *Similar growth during the first 3 weeks*
- However, **increased observations of locomotors disorders in young age**
 - → *Rickets*



RICKETS – CLINICAL SIGNS

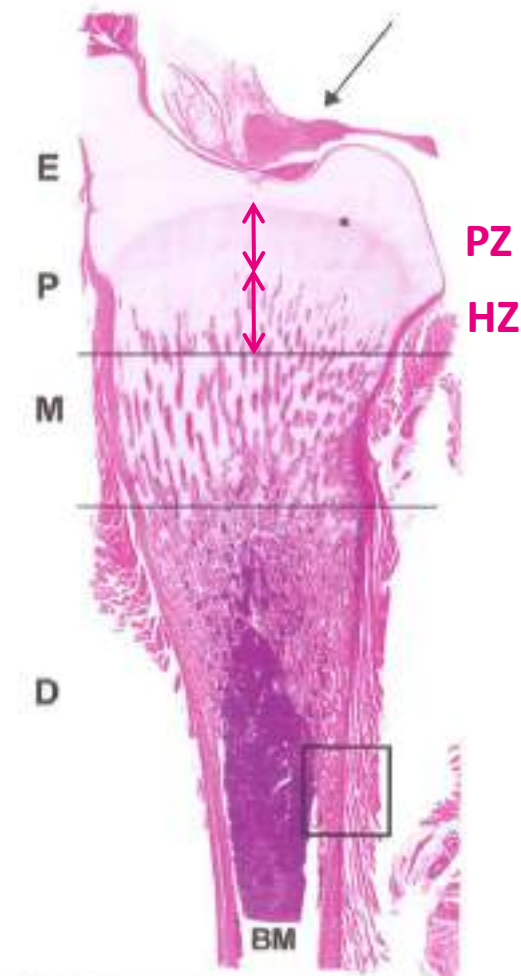
- Mule duck flock
 - *10 days-old*
 - *15000 birds*
- **Locomotor disorders**
 - *Since 3 days*
- **Increased mortality rate**
 - *Days 0 – 9: under 2 dead birds per day*
 - *Day 10: 10 dead birds*





RICKETS – LESIONS


- Macroscopic lesions
 - **Soft bones**
 - *Distended ureters with urates*
- Histology ?
 - *Gold standard to characterise rickets according to **thickness of proliferation (PZ)** and **hypertrophy (HZ)** of tibial growth plates*
 - **Delay incompatible with implementation of supplementations**

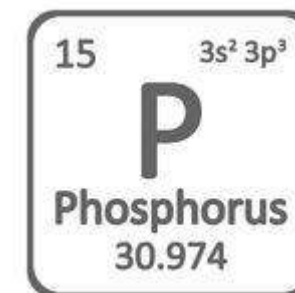
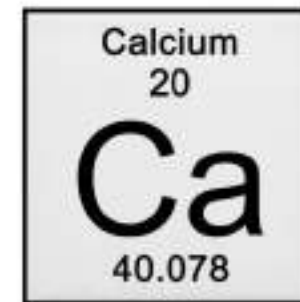


31. Proximal tibiotarsus. Normal. 2-week-old turkey. Shown are the epiphysis (E), physis (P), metaphysis (M), diaphysis (D), and cortex (BM) and see Figure 3.8 for high magnification. The arrow identifies tendon and the * is on the junction of the epiphysis and physis. BM, Bone marrow.

Credit: Avian Histopathology, 4th edition



- **Faster diagnostic test**
-  Absence of reference values
- **Samples collected on 5 affected ducks and 5 healthy ducks**
- Blood collected in heparinized tubes
- Plasma collection and analysis on a liquid chemistry analyzer
- Dosage of **calcium, phosphorus, total proteins**

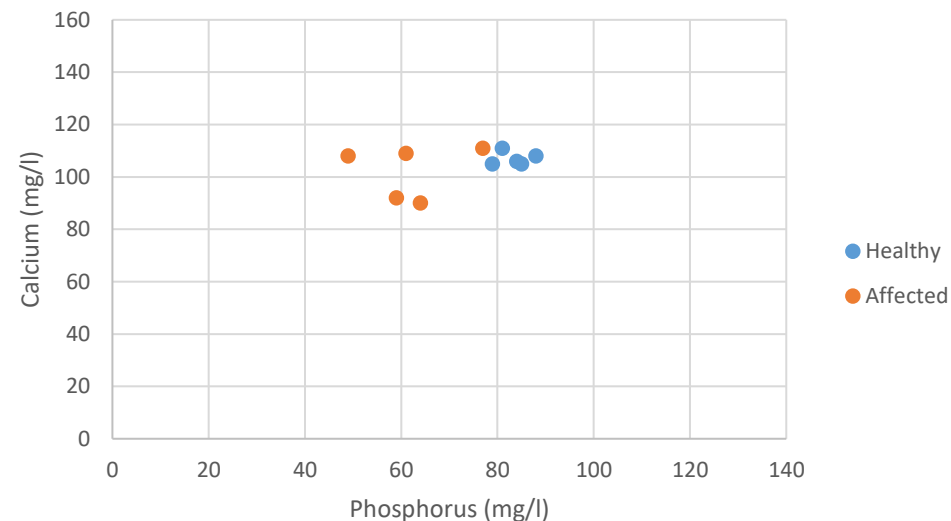




RICKETS - BLOOD BIOCHEMISTRY

- Calcium OK but lower Phosphorus in affected ducklings → **Increased Ca/P**
 - *Phosphorus supplementation*
 - *Clinical recovery in a few days*
- Biochemistry data in other cases
 - *Heterogeneous results*
 - *Most common case = Phosphorus deficiency*
- Prevention
 - *Growth limitation at start up*
 - *Mineral supplementations*

	Healthy ducklings	Affected ducklings
Mean Ca (mg/L)	107	102
Mean P (mg/L)	83	62
Ca/P ratio	1,28	1,68
Total protein (g/L)	39	41





ONE LAST RECENT ISSUE: MYCOTOXINS

- **High mycotoxin levels** in corn harvested late 2024
 - *Notably trichothecenes*
- **Ducks** in force-feeding phase, fed only with corn
 - *More affected* than other poultry
- **Ulcerative lesions** in esophagus +++
 - Macroscopically well visible
- Histology reports
 - *Multifocal and acute ulcerative ingluvitis without mycotic features*





THANK YOU FOR YOUR ATTENTION



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