



**HAL**  
open science

## Risk of further EHDV introduction in Europe

Amandine Bibard, Davide Martinetti, Albert Picado, Karine Chalvet-Monfray, Thibaud Porphyre

► **To cite this version:**

Amandine Bibard, Davide Martinetti, Albert Picado, Karine Chalvet-Monfray, Thibaud Porphyre. Risk of further EHDV introduction in Europe. 17. International Symposium on Veterinary Epidemiology and Economics, Nov 2024, Sydney, Australia. . hal-04746012v2

**HAL Id: hal-04746012**

**<https://hal.inrae.fr/hal-04746012v2>**

Submitted on 5 Nov 2024

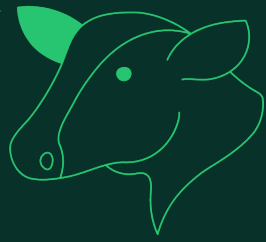
**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License

# RISK OF FURTHER EHDV INTRODUCTION IN EUROPE



**A. Bibard<sup>1</sup>, D. Martinetti<sup>2</sup>, A. Picado<sup>1</sup>, K. Chalvet-Monfray<sup>3</sup>, T. Porphyre<sup>4</sup>**

<sup>1</sup> Boehringer Ingelheim Animal Health, France

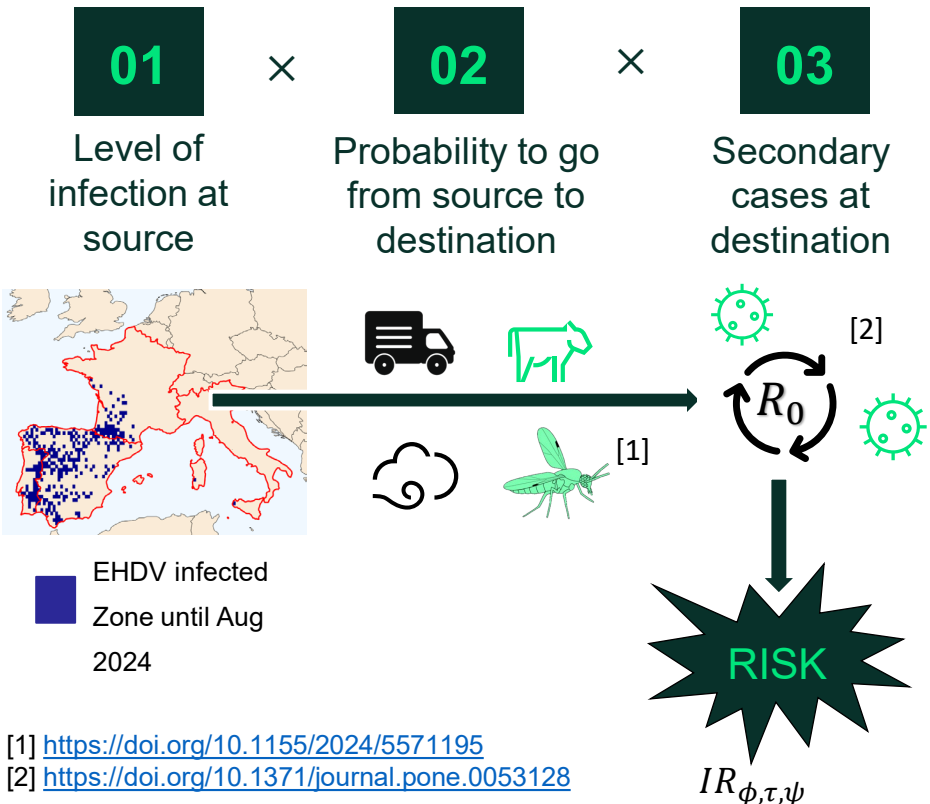
<sup>2</sup> UR 0546 Biostatistiques et processus SPatiaux, INRAE

<sup>3</sup> UMR 0346 EPIdémiologie des maladies Animales et zoonotiques, INRAE, VetAgro Sup, France

<sup>4</sup> Laboratoire de Biométrie et Biologie Evolutive, Université Lyon 1, CNRS, VetAgro Sup, France

**Epizootic Hemorrhagic Disease Virus (EHDV)** is a growing threat in Europe for the livestock industry. New incursions are triggered by **wind dispersal** of the *Culicoides* vectors and **trade movements** of live animals.

## How to estimate the Risk of EHDV introduction? A dual-pathway model in 3 steps



[1] <https://doi.org/10.1155/2024/5571195>

[2] <https://doi.org/10.1371/journal.pone.0053128>

# RISK OF FURTHER EHDV INTRODUCTION IN EUROPE

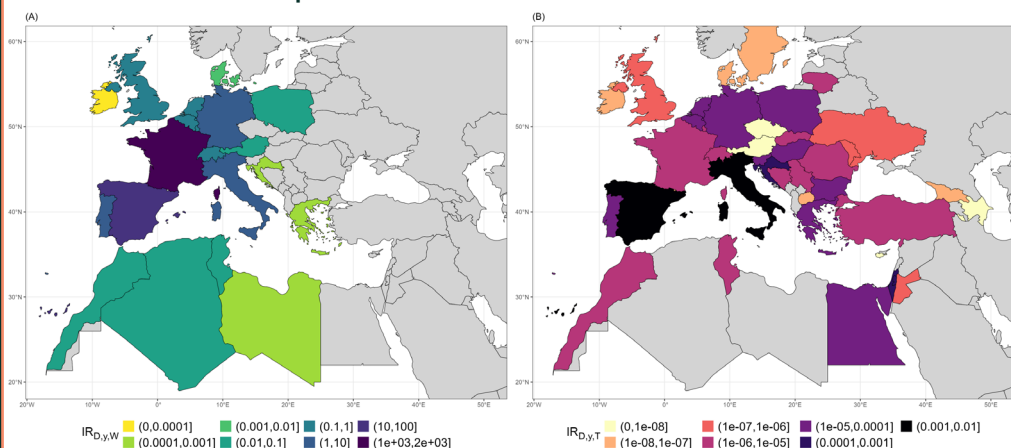


Where ? When ?

## Spatial Distribution of Yearly Risk of EHDV introduction by country

Wind Dispersal

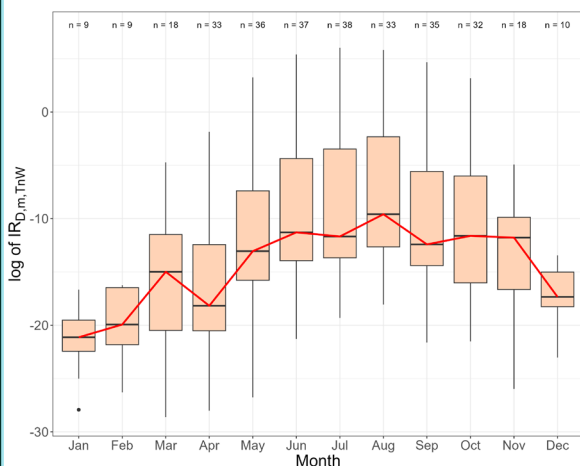
Trade



- Risk by wind > Risk by trade
- High-risk destinations by the wind = France, Spain & neighbouring countries
- Low or very low risk level by the trade but extended risk zone
- High-risk destinations by trade = Spain, Italy

## Temporal variation of Risk

Cumulative risk per country over the 2 pathways of introduction (in log)



- Period at-risk from June to November
- Animal movements contribute to sustain a baseline level of risk during the colder months, notably in March.

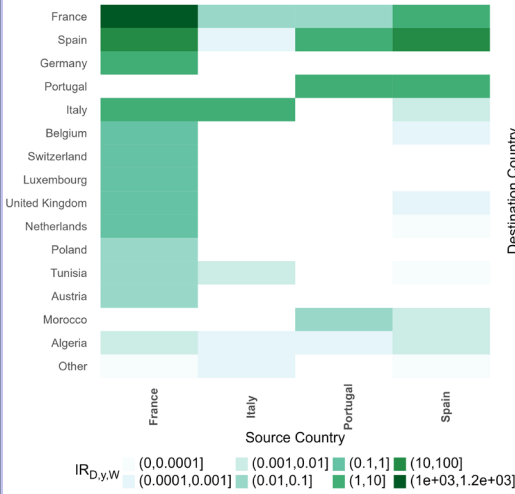
# RISK OF FURTHER EHDV INTRODUCTION IN EUROPE



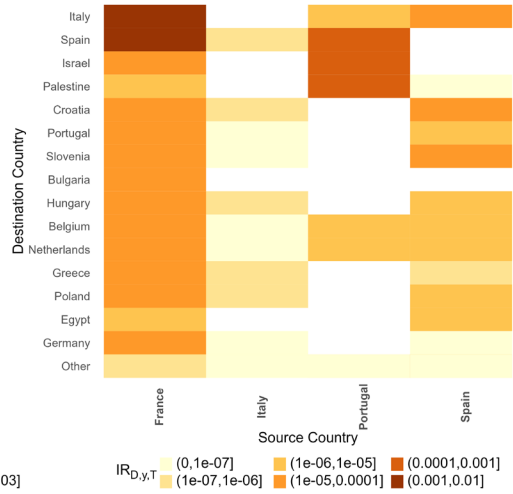
*By which pathway?*

## HeatMap of Risk : source and destination combinations

(A) Wind Dispersal



(B) Trade



- Portugal contributes to risk outside EU (Israel/Palestine) by trade
- Italy: low contributor due to limited initial source zone

## Conclusions

- Risk of EHDV introduction: broad risk area in EU but highly variable risk levels
- Wind: primary risk pathway to nearby countries (France & Spain)
- Trade: Low risk overall, basal risk in distant countries/cool periods
- France: Key risk source for both pathways



Boehringer  
Ingelheim



VetAgro Sup

INRAE



LBBE



ISVEE17

11-15 November 2024 • Sydney, Australia  
International Convention Centre Sydney

17th International Symposium on Veterinary Epidemiology and Economics 2024  
Veterinary epidemiology and economics down under in legs and bounds

Financé par



GOUVERNEMENT  
Liberté  
Égalité  
Fraternité



Financé par  
l'Union européenne  
NextGenerationEU