



HAL
open science

Risk assessment of BTV-3 incursion from Sardinia by wind dispersal of *Culicoides* midges

Amandine Bibard, Davide Martinetti, Giraud Aymeric, Albert Picado de Puig, Karine Chalvet-Monfray, Thibaud Porphyre

► To cite this version:

Amandine Bibard, Davide Martinetti, Giraud Aymeric, Albert Picado de Puig, Karine Chalvet-Monfray, et al.. Risk assessment of BTV-3 incursion from Sardinia by wind dispersal of *Culicoides* midges. Using Epidemiological Studies in Health Risk Assessments: Relevance, Reliability and Causality, Nov 2023, Berlin, Germany. . hal-04299359

HAL Id: hal-04299359

<https://hal.inrae.fr/hal-04299359>

Submitted on 22 Nov 2023

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.

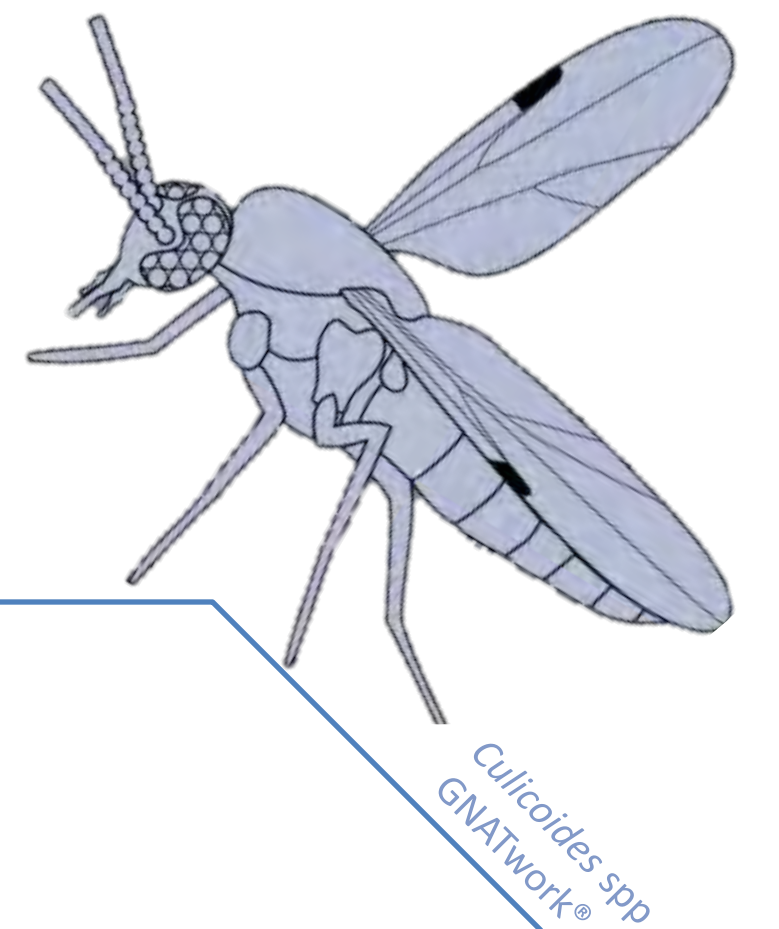
L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Risk assessment of BTV-3 incursion from Sardinia by wind dispersal of *Culicoides* midges

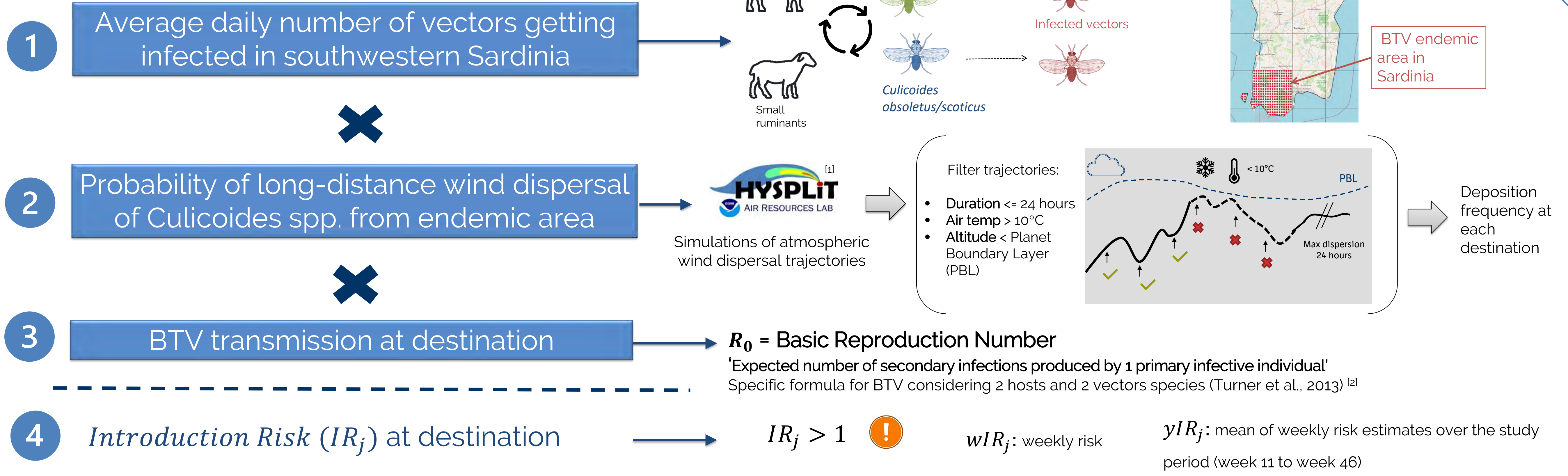


Amandine Bibard – Boehringer Ingelheim, Global Innovation, Lyon, France
amandine.bibard@boehringer-ingelheim.com

- **Bluetongue virus (BTV)** is a major veterinary public health concern. The **BTV serotype 3 (BTV-3)** first appeared in 2018 on the island of Sardinia (Italy), at the doorstep of mainland Europe.
- **Long-distance wind dispersal** of flying vectors is a known pathway of BTV introduction.
- *What is the risk of BTV incursion into mainland Europe from Sardinia ?*



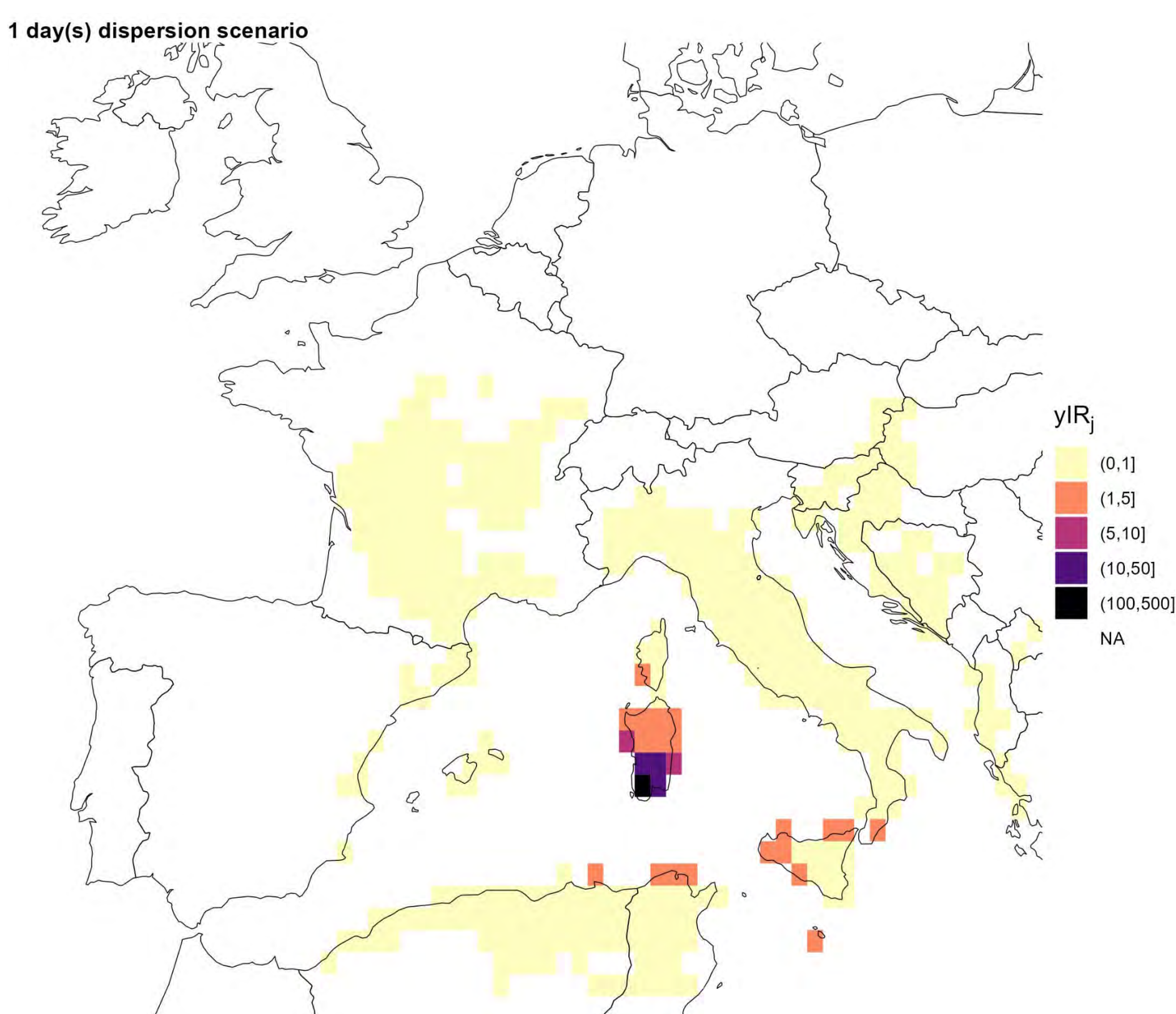
Risk Assessment Model Framework



Results

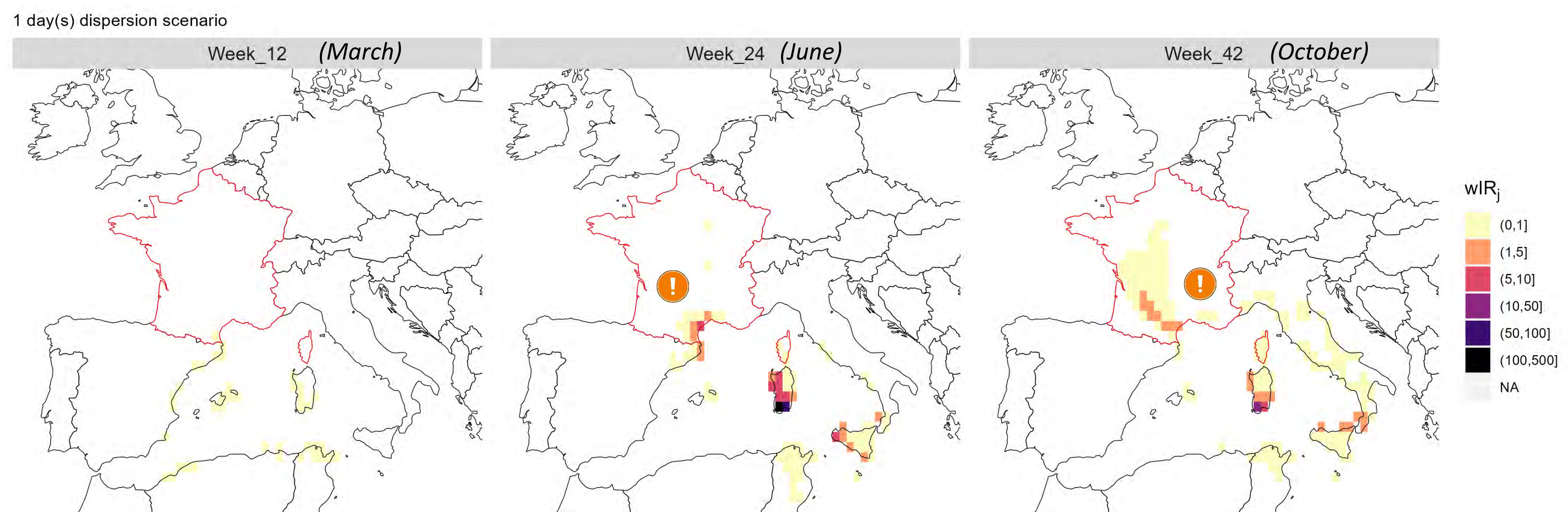
At-risk destinations of BTV incursion

Mean risk over study period (W11 to W46)



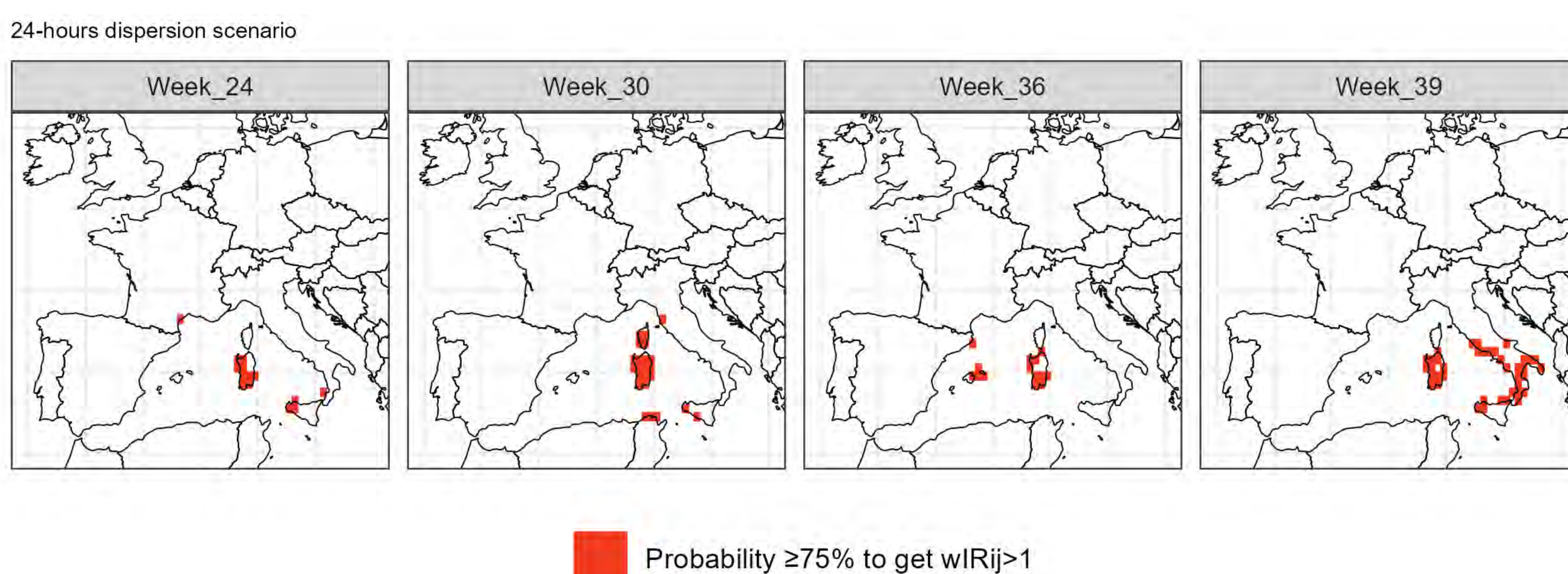
- Mean introduction risk >1 mostly limited to Sicily, southeastern point of Italy and Corsica (1-day dispersion scenario)
- **Continental France**: mean yearly risk <1, but sporadic weekly risk >1 in spring (June) and autumn (Oct) along mediterranean coast and southwestern region

Weekly risk estimates – 3 maps to illustrate temporal variations in France



Uncertainty in risk estimates

Areas with at least 75% probability to get a weekly risk >1



- High-risk destinations mostly limited to the southern Mediterranean Basin
- But high spatio-temporal variations of weekly risk estimates
- Risk for continental France and Balearic Islands increases as duration of atmospheric simulation increases (2 and 3 days)
- Better knowledge about flight conditions of midges and *Obsoletus*-specific parameters for BTV-3 transmission could improve the model robustness

Next step: extend the model to include other introduction pathways

References DOI: ^[1] 10.1175/bams-d-14-00110.1; ^[2] 0.1371/ journal.pone.0053128

Bibard, Amandine¹; Martinetti, Davide²; Giraud, Aymeric²; Picado De Puig, Albert¹; Chalvet-Monfray, Karine³; Porphyre, Thibaud⁴

¹Boehringer Ingelheim Animal Health France, Global Innovation, Transboundary and Emerging Diseases, Site de Lyon Porte des Alpes, Saint Priest, France

²INRAE UMR 0546 Biostatistiques et Processus Spatiaux, Avignon, France

³Université Clermont Auvergne, INRAE, VetAgro Sup, UMR EPIA, Saint-Genès-Champagnelle, France

⁴Université de Lyon, Université Lyon 1, CNRS, VetAgro Sup, Laboratoire de Biométrie et Biologie Evolutive, Villeurbanne, France

