AG meeting of the VBORNET project, 1-4 June 2010, Antwerp

ORNITHODOROS TICKS AROUND THE MEDITERRANEAN BASIN

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Background

"Assessment of magnitude and importance of vector-borne diseases in Europe" including Tick-Borne Relapsing Fever (TBRF) transmitted by soft ticks of the *Ornithodoros* genus

- **A complete review of the disease**
- **Map of recorded TBRF human cases in (or close to) Europe**

  Published reports of autochthonous TBRF cases

  Only 31 records!!!!
- **Map of recorded *Ornithodoros* tick vector collections in (or close to) Europe**

  Quite exhaustive synthesis of tick collections in the Mediterranean basin : Morel PC, 1969. Ticks from Africa and the Mediterranean Basin. [French]. Published in 2003 by CIRAD, CDROM.

  Geographical location using the Fuzzy Gazeeter and Google Maps

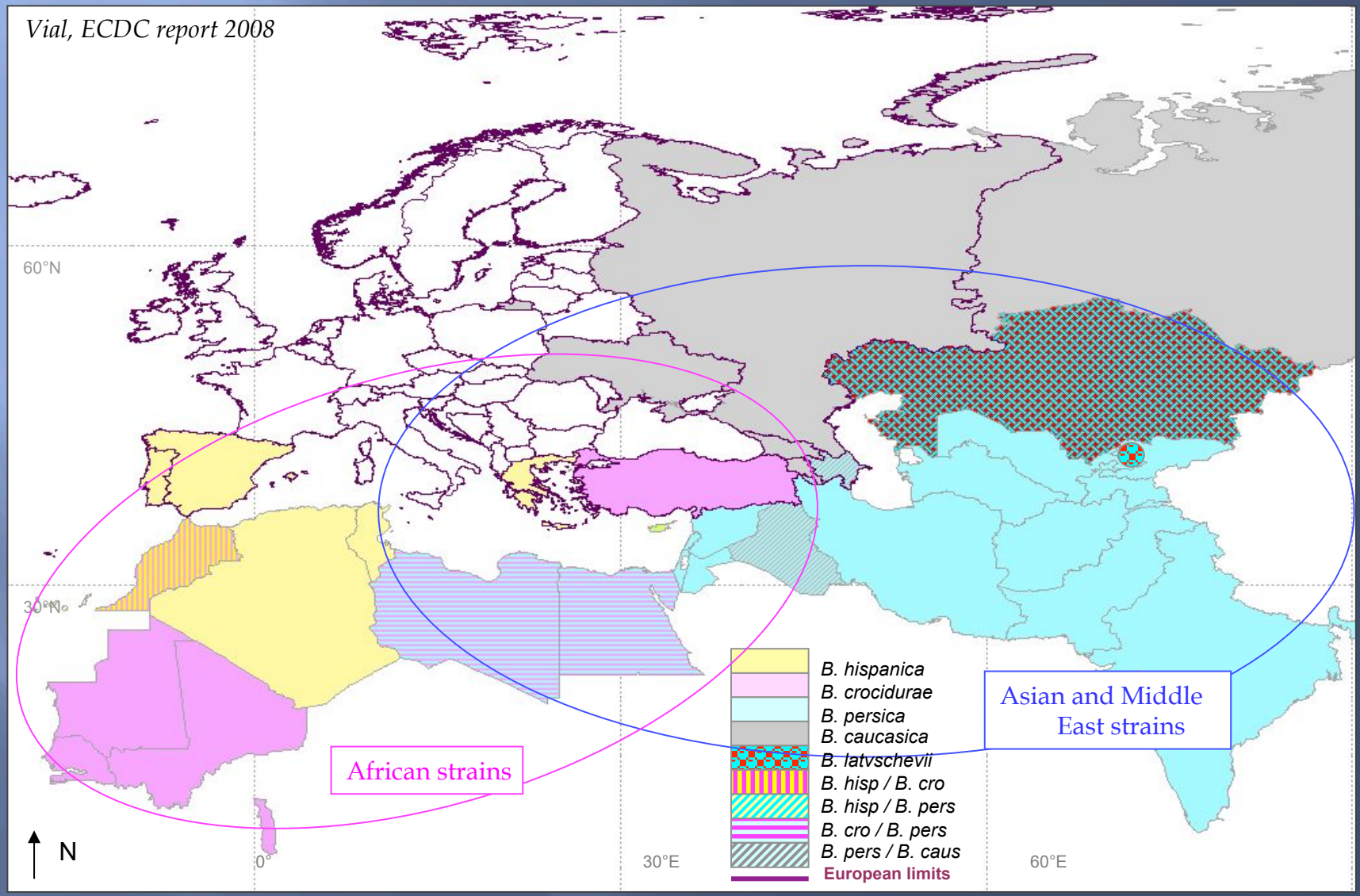
  466 located references of 576 reported from 1884 to 1984

  Main period of report: 1930s-1960s

Next

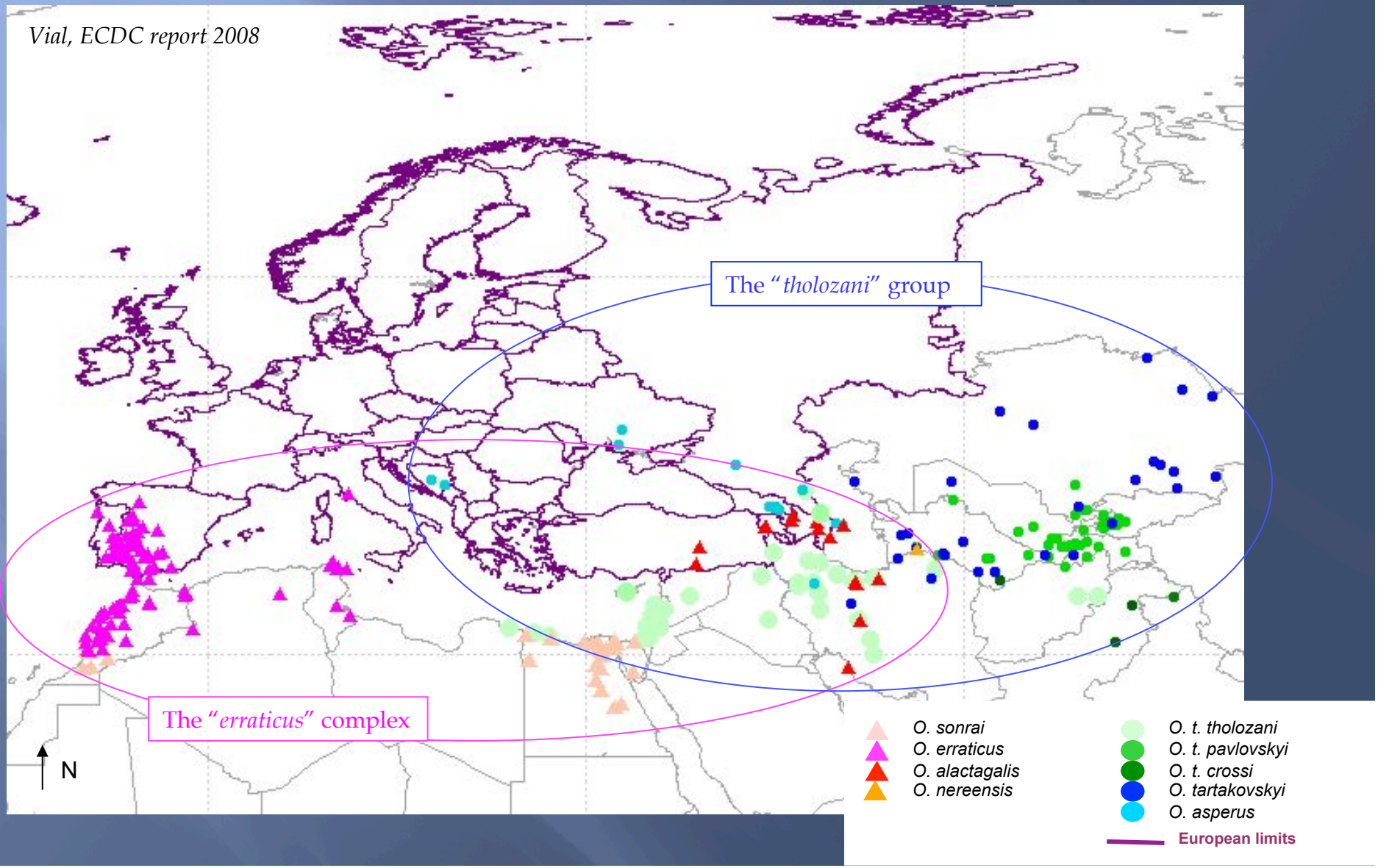
Retour

Map of recorded TBRF human cases



Retour

Map of recorded *Ornithodoros* tick vector collections in (or close to) Europe

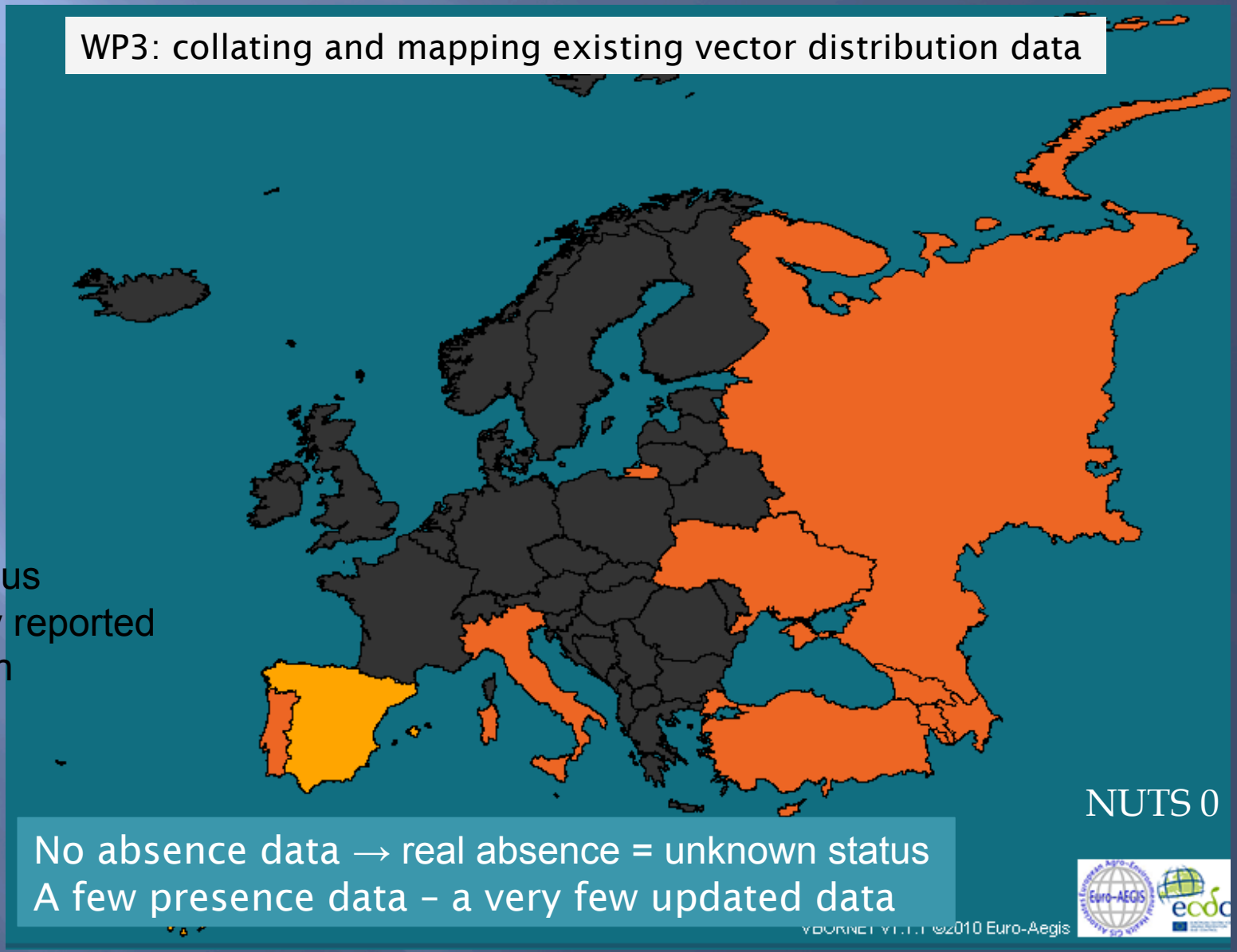


Current projet

Vborn Net

Vector questionnaire tool

WP3: collating and mapping existing vector distribution data



No absence data → real absence = unknown status
A few presence data – a very few updated data

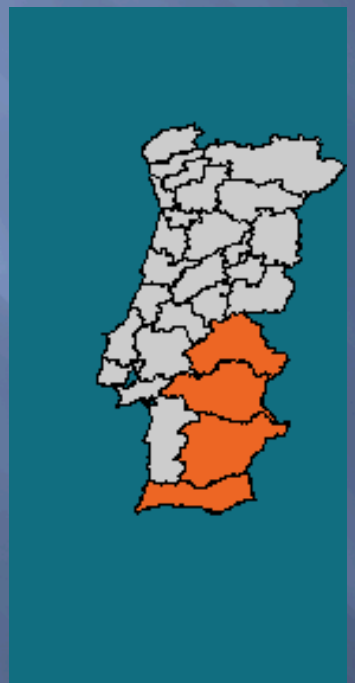
VbornNet

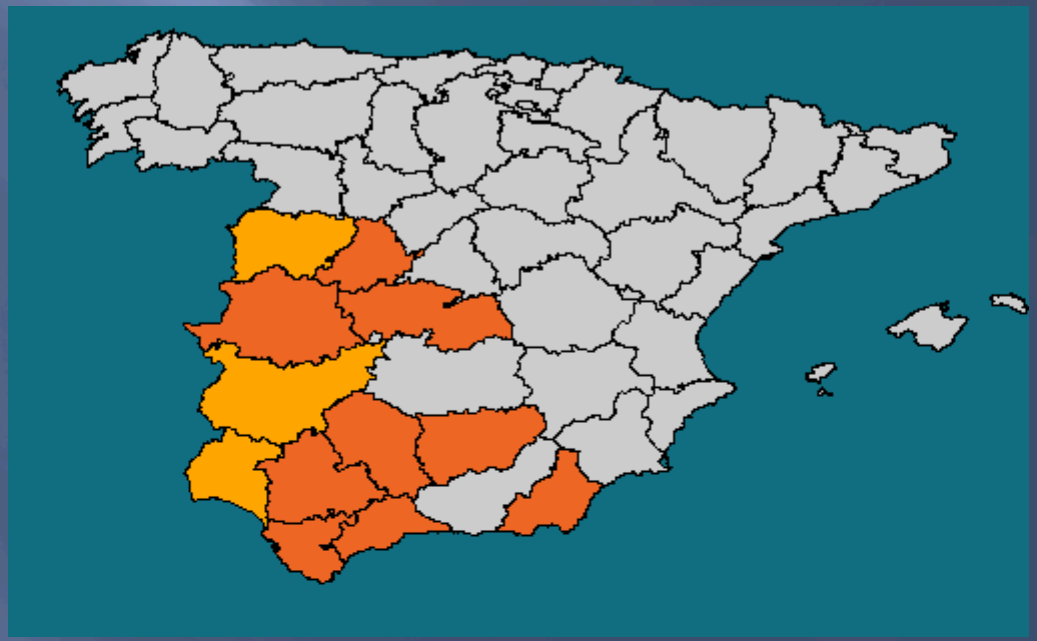
Vector questionnaire tool

Current projet

Our dataset allowed detailing the status at national level (NUTS 1,2,3)

In Portugal and Spain, *O. erraticus* is indigenous in the southern part of the boundary (important pig production area) and has been confirmed in the 1990s in some Spanish provinces. Conversely, the current status of Portugal is currently unknown.





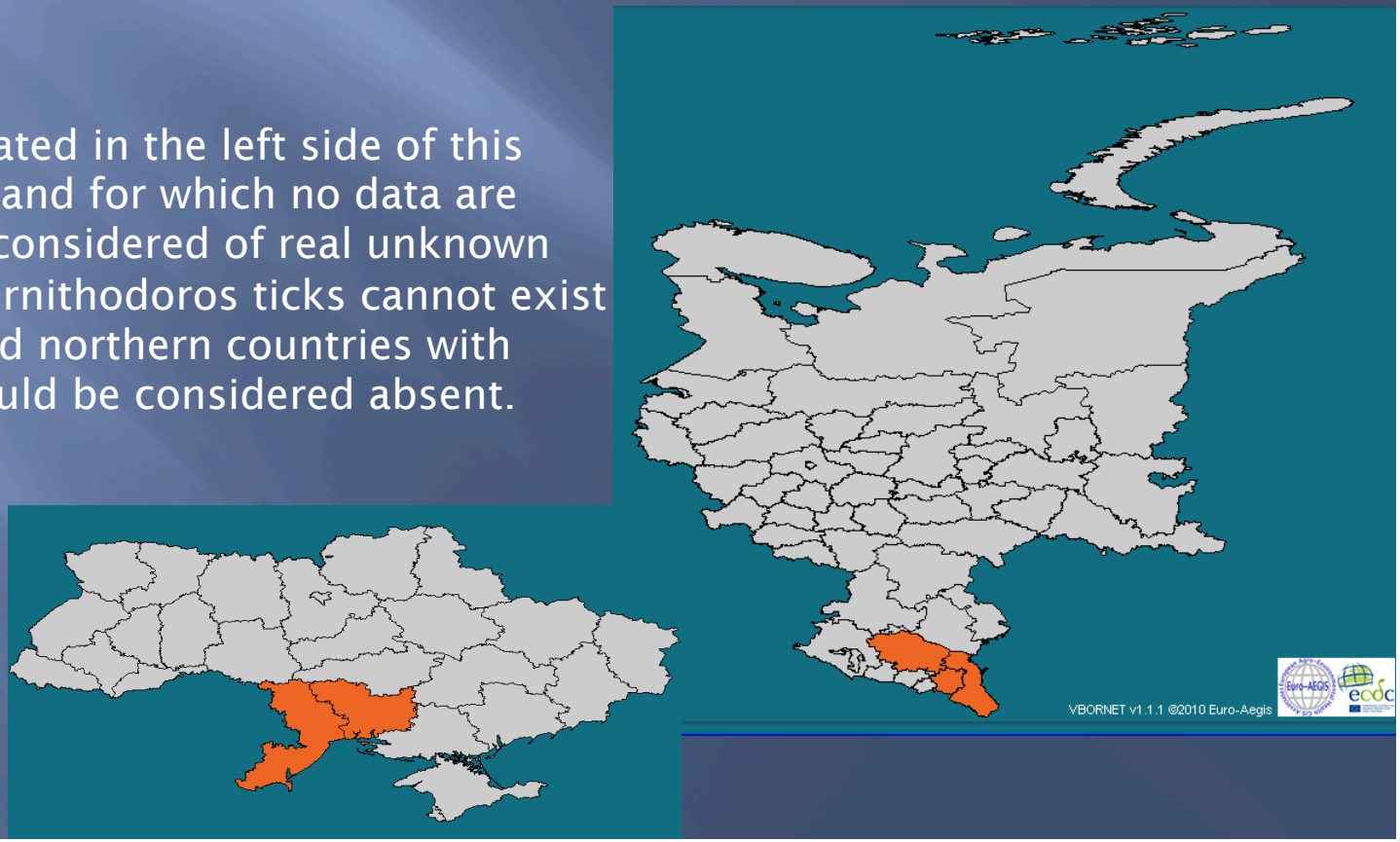
Vborn Net

Vector questionnaire tool

Current projet

In Russia and Ukraine, the infested areas are limited to the South and are connected to the other reported infested countries (Georgia, Armenia, Azerbaijan, Turkey and Cyprus). However, the precision level of the tool did not permit to detail the status of these later countries.

All the countries located in the left side of this global infested area and for which no data are available should be considered of real unknown status. Conversely Ornithodoros ticks cannot exist at higher latitude and northern countries with unknown status should be considered absent.



Vborn Net

Vector questionnaire tool

Current projet

In Italy, *O. erraticus* has been reported only once, in the single province of Grosseto. Recent studies conducted on the persistence of ASFV in Sardinia and on the risk for the rest of the country never mentioned the presence of the tick. We should be cautious with this record and it may be considered that there is not anymore *Ornithodoros* ticks in Italy.

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Vector questionnaire tool

Current projet

A useful tool :

• to classify the status of each country or administrative area, especially to differentiate historical records (indigenous) from recent ones (recently reported)

• to identify data gaps (absence data, non sampled countries, non sampled periods)

• to target surveillance on areas where the presence has been confirmed in the past but has not been recently verified (indigenous) and where the status is unknown

Vborn Net

Vector questionnaire tool

Current projet

However, some experts may question on:

• the impossibility to represent his/her expert knowledge, for example the case of northern coountries with unknown status and the case of Italy.

• the risk to partially report the entomological information since the African part of the Mediterranean basin and the eastern peripheral countries outside Europe are not represented whereas, for *Ornithodoros* ticks, the danger mainly comes from these areas.

• for some ticks like the *Ornithodoros* ticks, how to deal with the absence of absence and the few presence data

Updating and completing sampling

Modeling distribution

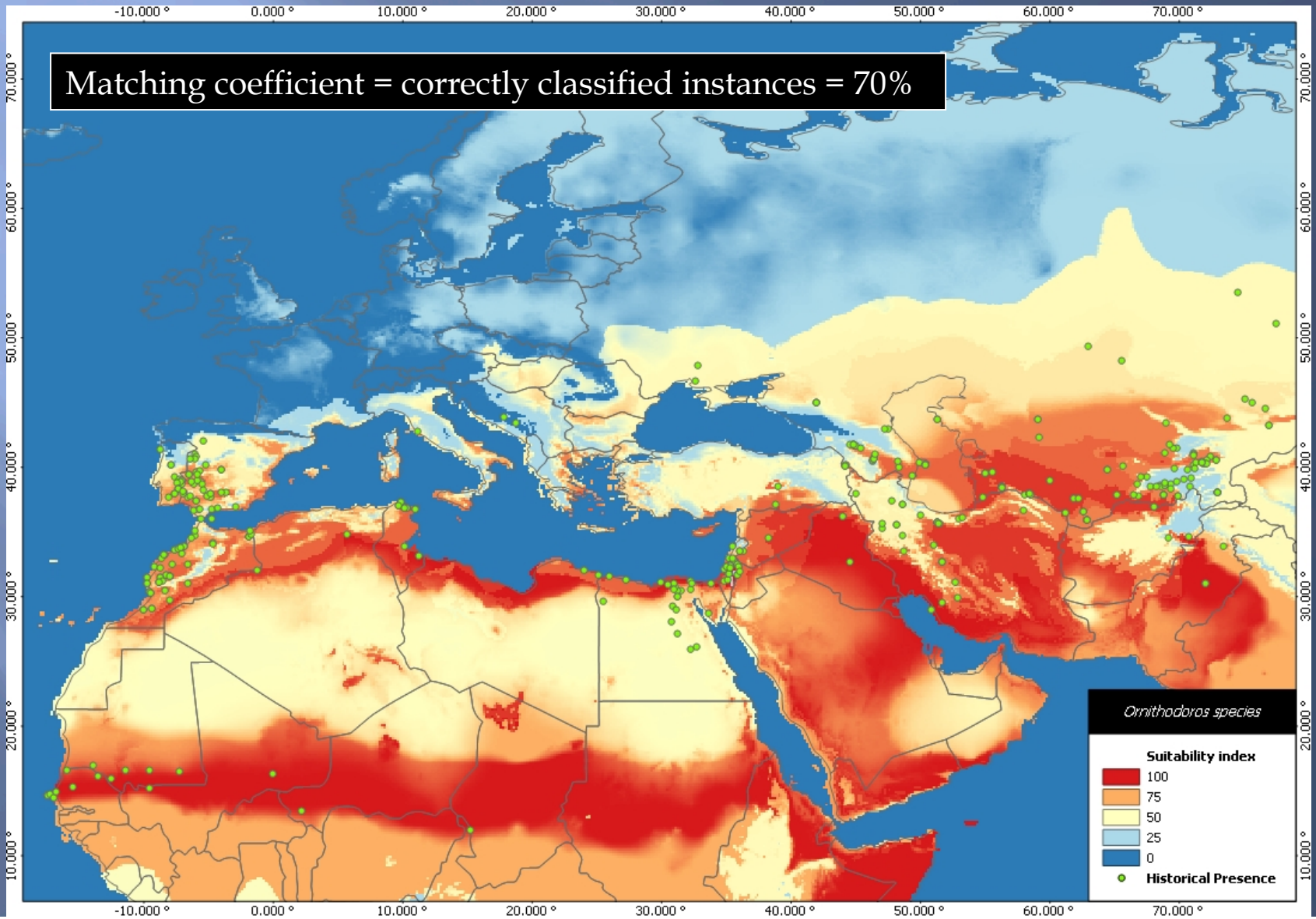
A preliminary model for *Ornithodoros* ticks in Europe

Collaborative work with Avia-GIS

Vial L, Ducheyne E. May Tick-Borne Relapsing Fever re-emerge in Europe? VI International Conference on Ticks and Tick-Borne Pathogens (TTP-6) 21-26 Sept 2008. Buenos Aires.

- Dealing with the absence of absence data and the lack of presence data for *Ornithodoros* ticks through the use of MCDA based on bibliography and expert knowledge on the ecology of these ticks (presence data only for validation);
- Considering the whole community of the *Ornithodoros* tick species transmitting TBRF as a single entity because of their close ecological features;
- Focusing on 4 climatic variables to determine their ecological niche:
  - Temperature signing the end of winter diapause and revival of activity/development
  - Number of months with a sufficient temperature allowing a complete development cycle per year
  - Precipitation levels for which the soil might be too wet or too dry for tick survival/development
  - Precipitation frequencies needed to maintain favorable humidity along the year inside the soil
- Dealing with the peculiar endophilic status of *Ornithodoros* ticks to recalculate threshold values for external climatic variables of the model, depending on the internal constraints on these ticks in their microhabitat

A preliminary model for *Ornithodoros* ticks in Europe



A preliminary model for *Ornithodoros* ticks in Europe