VBORNET

"European Network for Arthropod Vector Surveillance for Human Public Health"

AGM 2012, Riga

WP3: Vector surveillance and distribution maps

Period 4

Francis Schaffner

WP3 – Vector surveillance and distribution data

- Main objective: *"To maintain and update existing **databases for vector distribution and surveillance**, and create new databases for arthropod vector surveillance based on available data"*

- Executing agency: ITM, Antwerp, Belgium
- Officer in charge: Marc Coosemans ITM, WP3 coordinator

- Vector focal points:
- Francis SCHAFFNER, Avia-GIS (Zoersel, BE), Mosquito validation
- Laurence VIAL, CIRAD (Montpellier, FR), Tick validation
- Bulent ALTEN, Hacettepe Univ. (Ankara, TR), Phlebotomine validation

WP3 – Main outputs Period 4

- Maintenance of existing surveillance and distribution maps
- Gap analysis in collaboration with WP1.5
- Distribution of malaria vectors in countries at risk of malaria transmission

- www.vbornet.eu
- http://ecdc.europa.eu/en/activities/diseaseprogrammes/emerging_and_vector_borne_diseases/Pages/VBORNET_maps.aspx

WP3.1 – Maintenance of existing surveillance and distribution maps

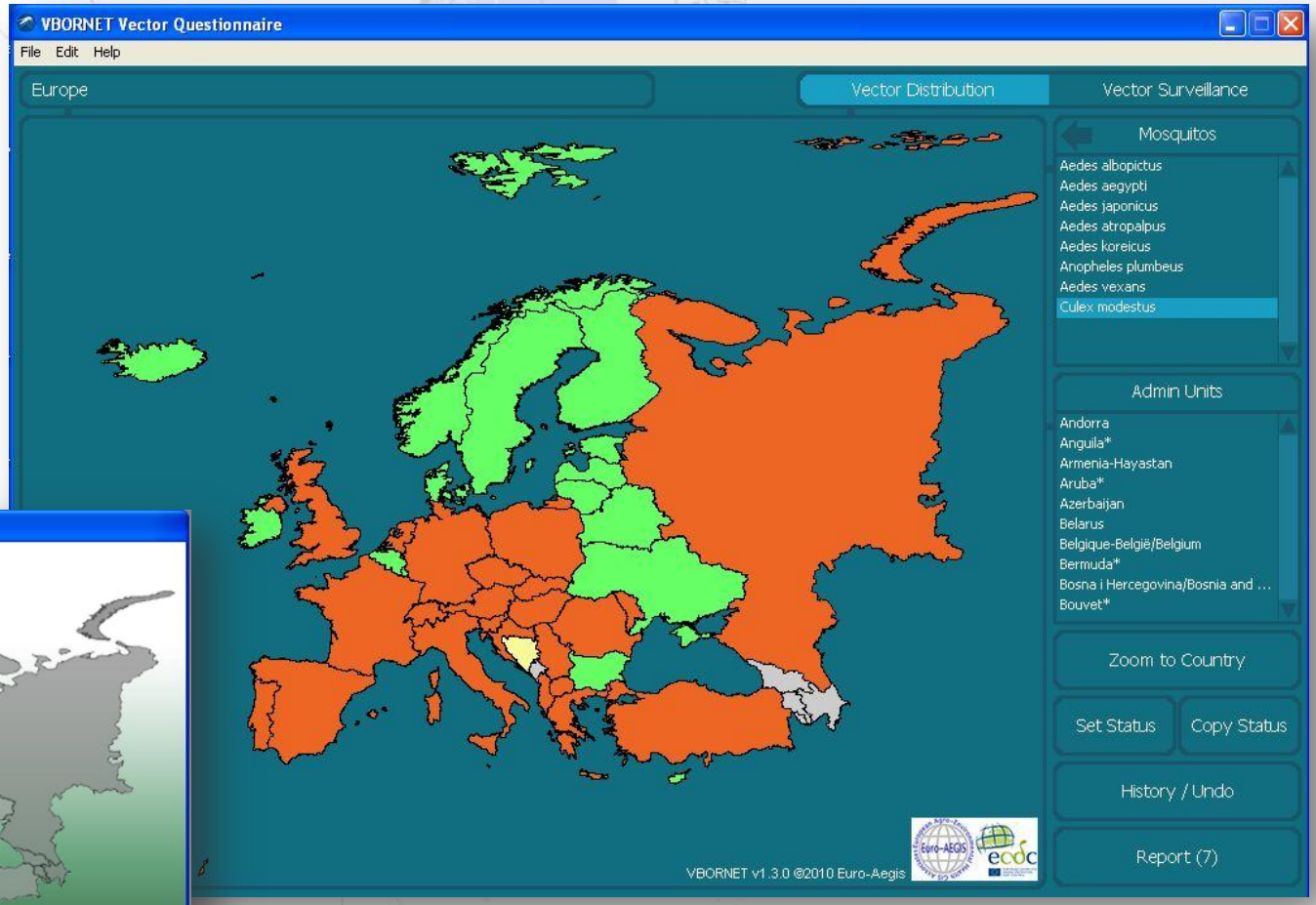
- Update of maps (mosquitoes, ticks and phlebotomines) developed in previous years
- Production of new maps on a three monthly basis: April 2012, July 2012, October 2012, January 2013
- For each map: gap analysis (collaboration with WP1.5) where needed areas of confirmed absence will be identified based on expert advice
- Model outputs generated under WP1.5 to fill identified gaps, to be assessed and integrated in the database

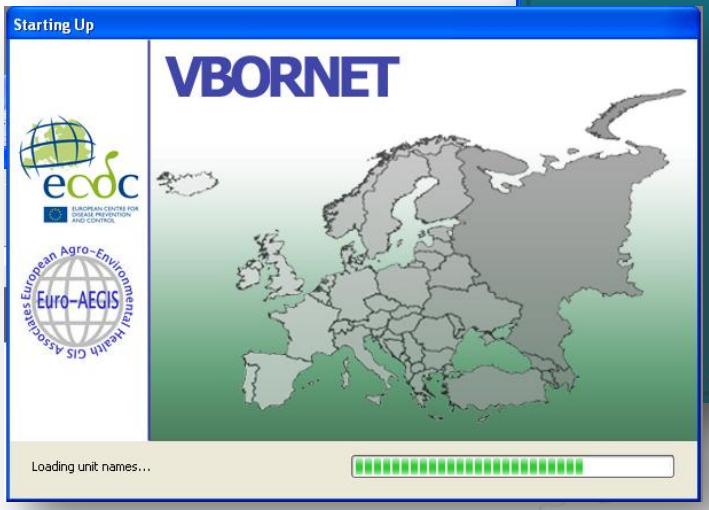
WP3.2 – Malaria vectors

- Distribution data on malaria vectors collected and mapped with focus on countries at risk for local malaria transmission
- Species selected with ECDC, including at least: *Anopheles labranchiae*, *An. sacharovi*, *An. atroparvus*, and *An. plumbeus*
- All newly designed databases created in close coordination with ECDC to ensure consistency with other ECDC mapping tools for public health purposes

Data collection and processing

- Direct reports from experts via Vector Questionnaire





Data collection and processing

- Direct reports from experts via Vector Questionnaire

- Role of experts:
- ✓ Enter reports
  - ✓ Surveillance
  - ✓ Vector distribution (field data)
  - ✓ Expert identification
  - ✓ Data publication

- Role of focal point:
- ✓ Validate expert's reports
- ✓ Attribute a status to each unit, based on:
  - Expert's reports
  - Up-scaling of reports
  - Absence of reports

Data collection and processing

- Direct reports from experts via Vector Questionnaire

  →Very soon: new online tool

- Reports from focal point based on:
  - Information from experts (e.g. excel sheets with geographical coordinates or NUTS)
  - 'Historical' and 'recent' data: published scientific papers, books, thesis, administrative or scientific project reports, museum material and their references, validated checklists, validated data banks, congress presentations, personal communications, etc.

- Validation process
  - Step 1: Validation of the data source and the distribution status
  - Step 2: Validation of the species identification
  - Step 3: Validation of the location
  - Special cases: Validation of multiple reports

Validation process

- Step 1: Validation of the data source and the distribution status
  - Data source (for ticks only):
    - Acceptable (1): Data reported from human, mammal, amphibian and reptilian hosts.
    - Not acceptable (0): Data reported from birds and bird nests
  - Distribution status: As VBORNET maps show distribution of established vectors, interception (in means of transportation) and sporadic observation related to transportation and without establishment are not validated as presence data.
    - Acceptable (1): Data reporting presence and establishment (reproduction of the vector on one site and several observations made over at least one year, or reproduction of the vector on several sites)
    - Not acceptable (0): Data reporting observations in means of transport
    - Not acceptable (0): Data reporting observations on one site of introduction without evidence of reproduction on site and establishment

Validation process

- Step 2: Validation of the species identification
  - Validation of the expert: Is this expert fully trustable or not? If not, removal of all his/her reports or those that seem aberrant
  - Validation of the identification method: Are some methods more reliable than others? Checking of the report and the used methods.
    - Not acceptable (0): Only a report of presence, except:
      - (a) If the expert is a well-known and/or trustable scientist,
      - (b) If the VBORNET focal point personally knows the location and considers the report as highly probable.
    - Acceptable (1): A report of presence + use of a referenced identification key
    - Acceptable (2): A report of presence + use of identification key + expert validation
    - Acceptable (3): A report of presence + use of identification key + molecular identification
  - For ticks, a marking from 0 to 3 is adopted for possible use to rank data (so far saved in focal point's database and not included in VBORNET database and not shown on VBORNET maps)

Validation process

- Step 3: Validation of the location
  - If geographic coordinates (with reference system) are given: possible to locate in VBORNET subunits (NUTS)
  - If only location is indicated: ask the expert to locate the report in NUTS
  - If only location is indicated and if not possible to ask specifications: use of Google or Gazetteer maps to identify the different possibilities of locations and types of locations (also the case for published data)

1. One possible location:
   - Acceptable (4): A point (locality…)
   - Acceptable (3): A seat of an administrative area, if restricted to one NUTS
   - Not acceptable (0): An extended area connected to several NUTS (large administrative area, mountain, river…)
2. Several possible locations:
   - Acceptable (2): One point and extended areas, referring to the point
   - Acceptable (1): One seat of an administrative zone and extended areas, referring to the seat
   - Not acceptable (0): Several points
   - Not acceptable (0): Several extended areas

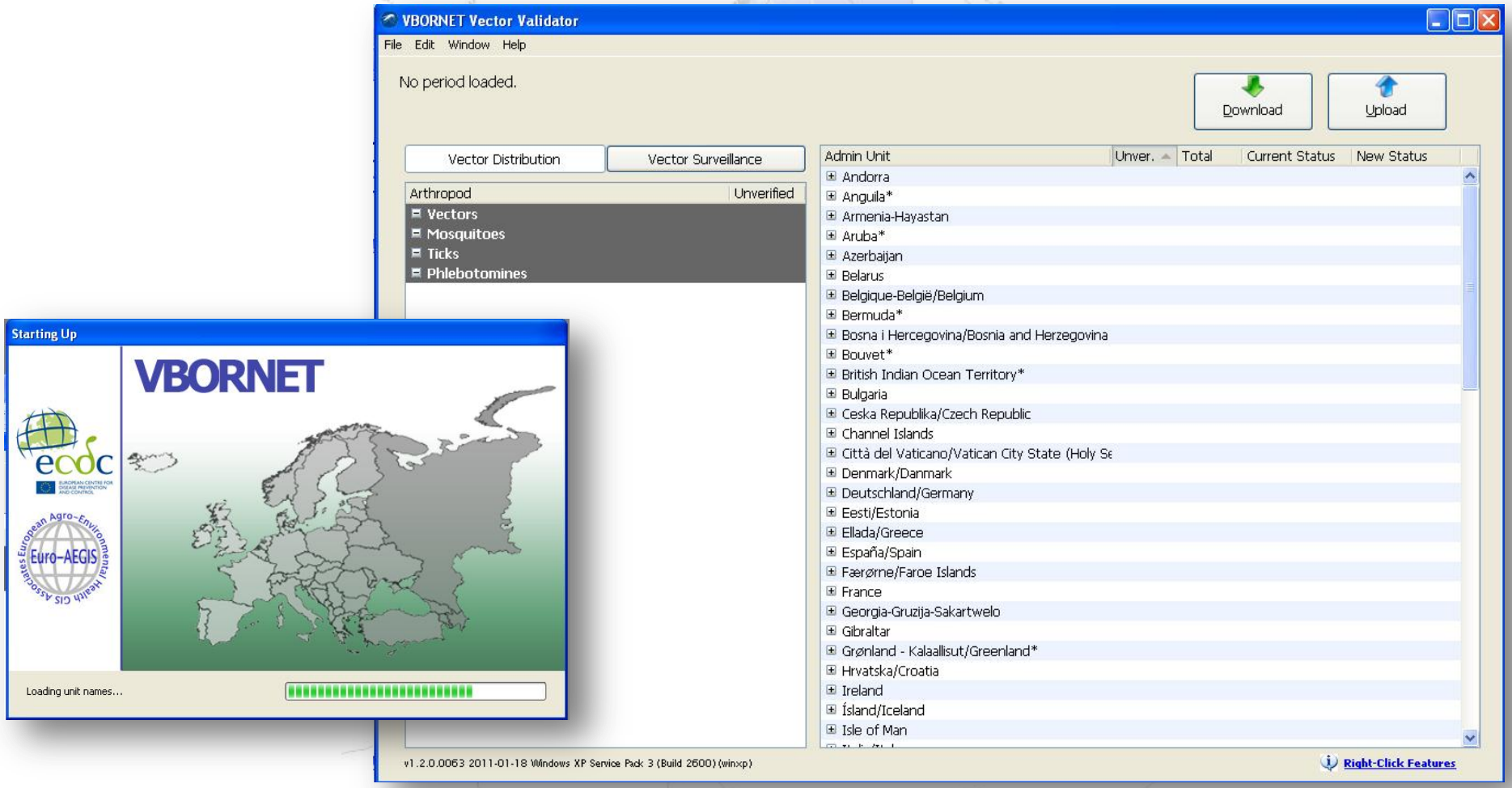
  - For ticks, a marking from 0 to 4 will be adopted for possible use to rank data

Validation process

- Special cases: Validation of multiple reports
  - Several data can be reported for the same species and unit (NUTS), for the same period of report
    - If congruent: all data are validated by the procedure described above and the matching status is attributed
    - If contradictory: all data are submitted to the validation procedure as described above and status is attributed according to the most recent data (of the field observation) that is validated
  - Several data can be reported over different periods of report for the species and unit (NUTS) that have already a status
    - If congruent: the newly reported data is validated and the matching status is attributed
    - If contradictory: the newly reported data is submitted to the validation procedure and the status is attributed according to most recent validated data

Validation process

- Validation tool: VBORNET Vector Validator



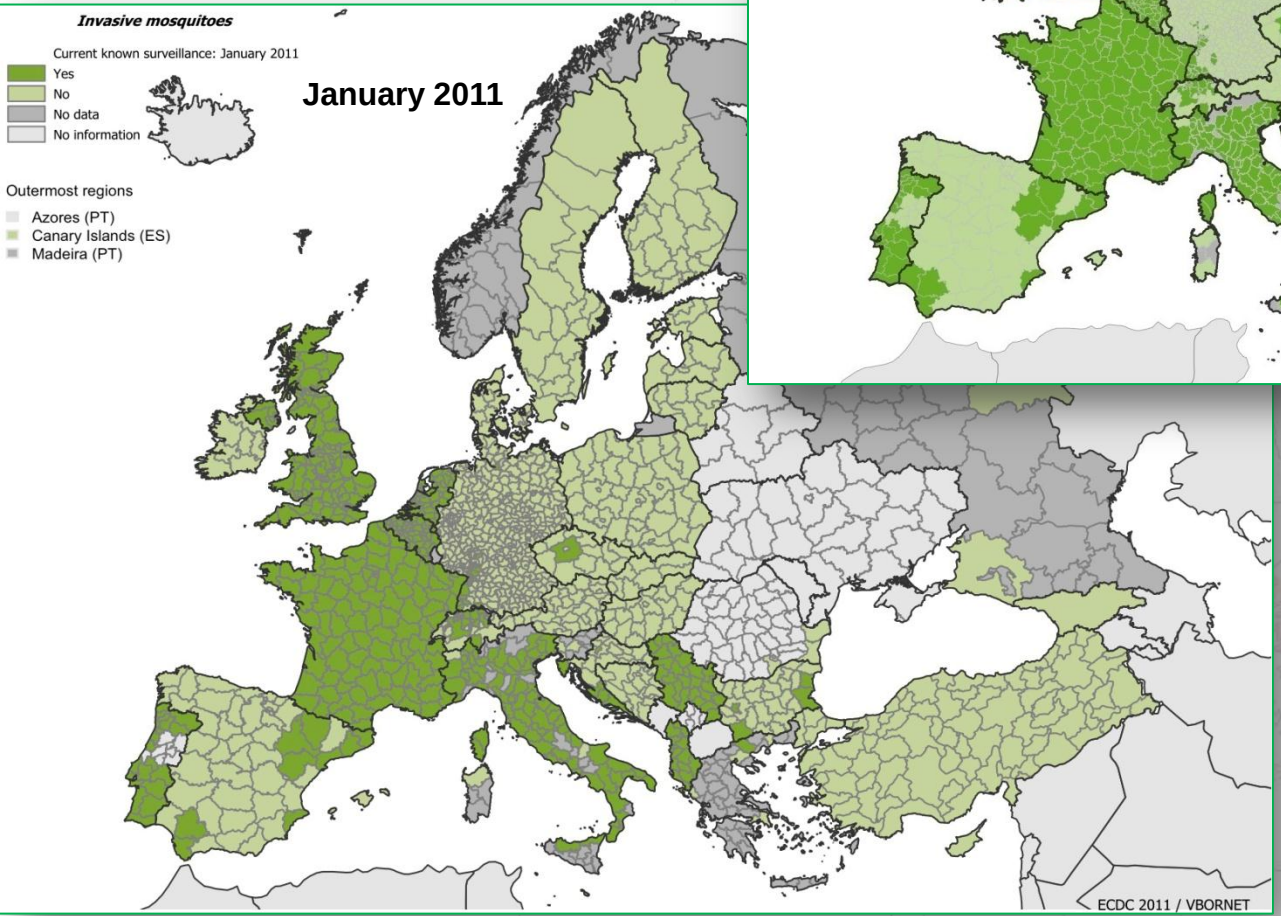
Mosquitoes

Coordination and data validation: Francis SCHAFFNER

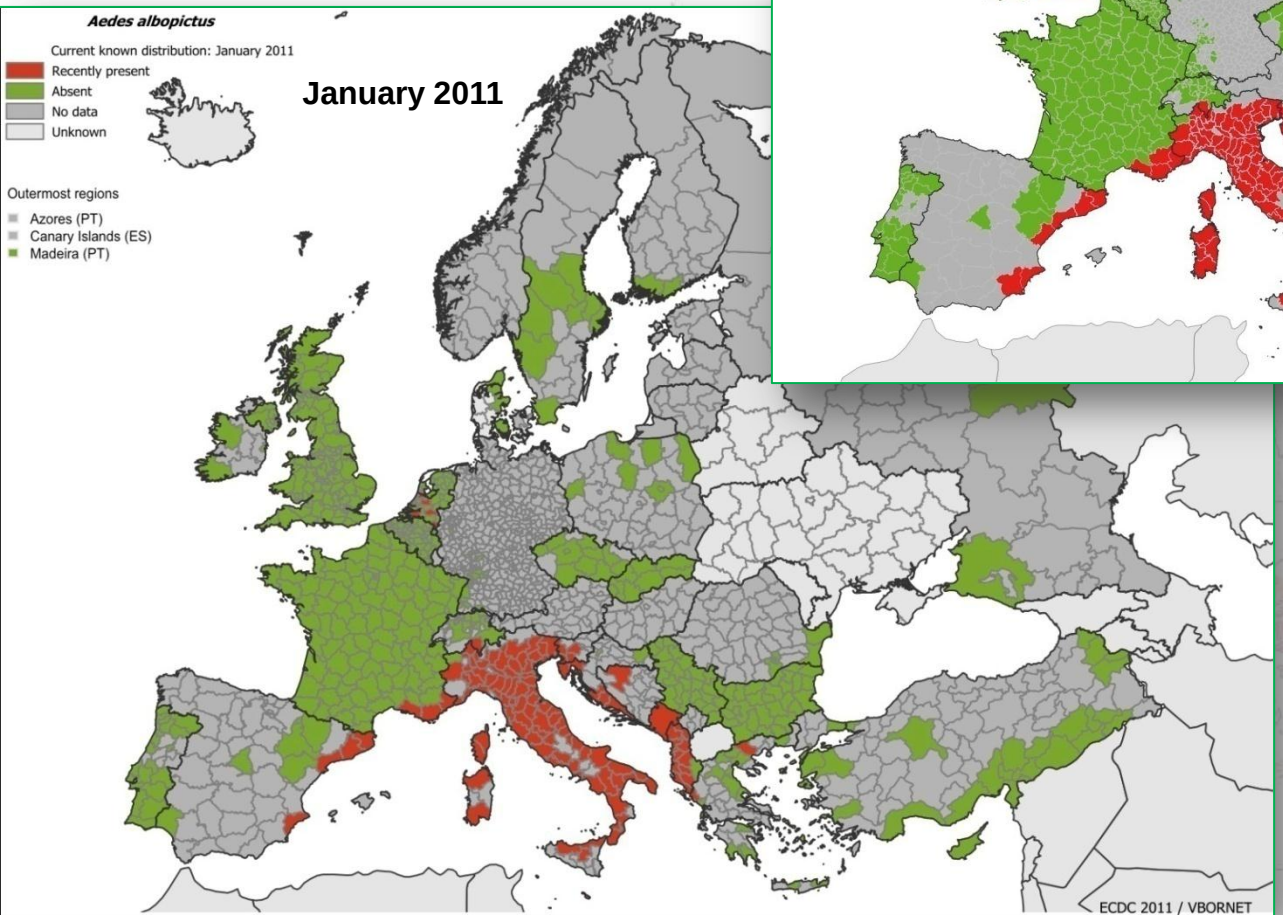
Mosquitoes

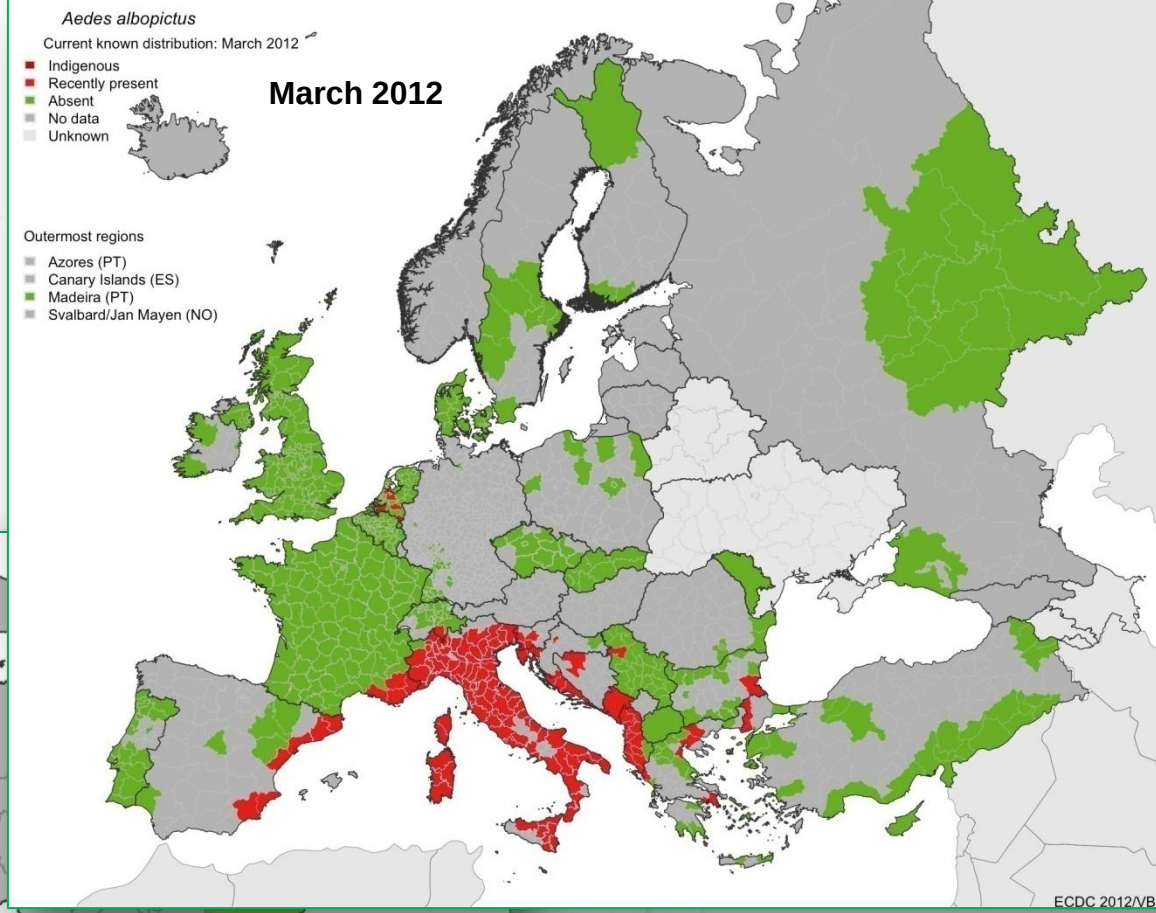
- Period 1: Invasive species
  - Distribution maps: *Aedes aegypti, Ae. albopictus, Ae. japonicus, Ae. koreicus, Ae. atropalpus*
  - Surveillance map: all invasive species
- Periods 2 & 3: Other main known vectors
  - *Aedes vexans, Anopheles plumbeus, Culex modestus*
- Period 4: Main malaria vectors
  - *Anopheles labranchiae*, *An. sacharovi*, *An. atroparvus* (*An. plumbeus* already included)

Current surveillance Europe

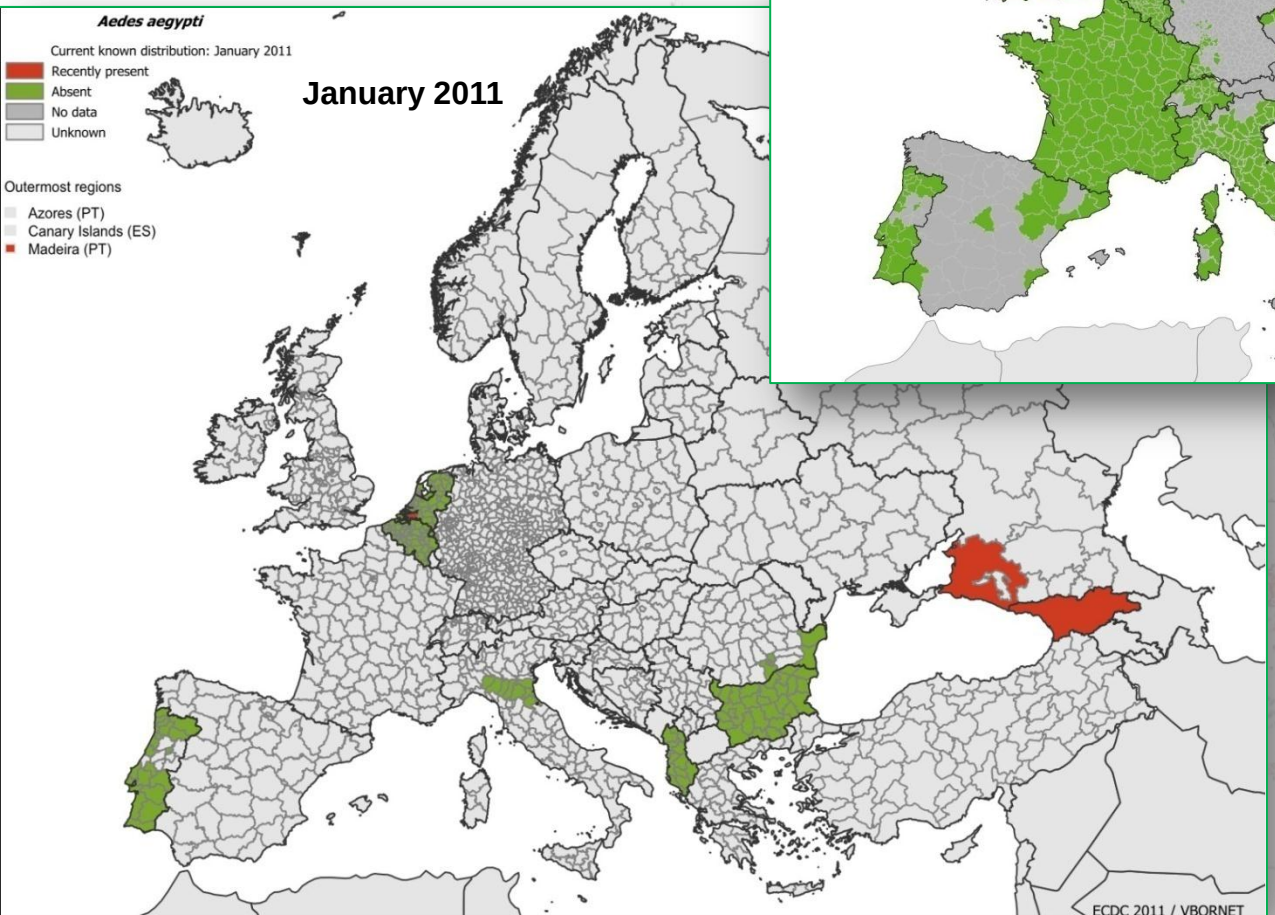


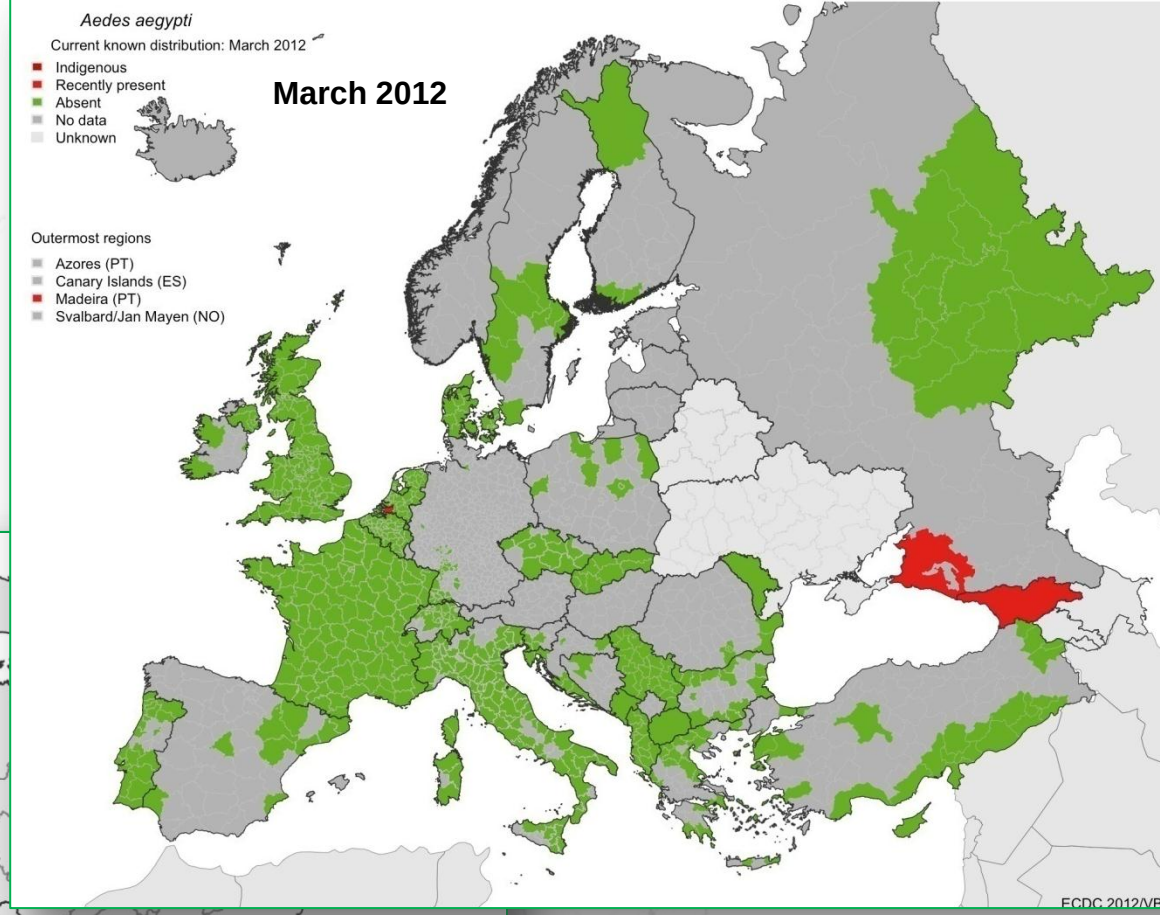
Ae.albopictus distribution



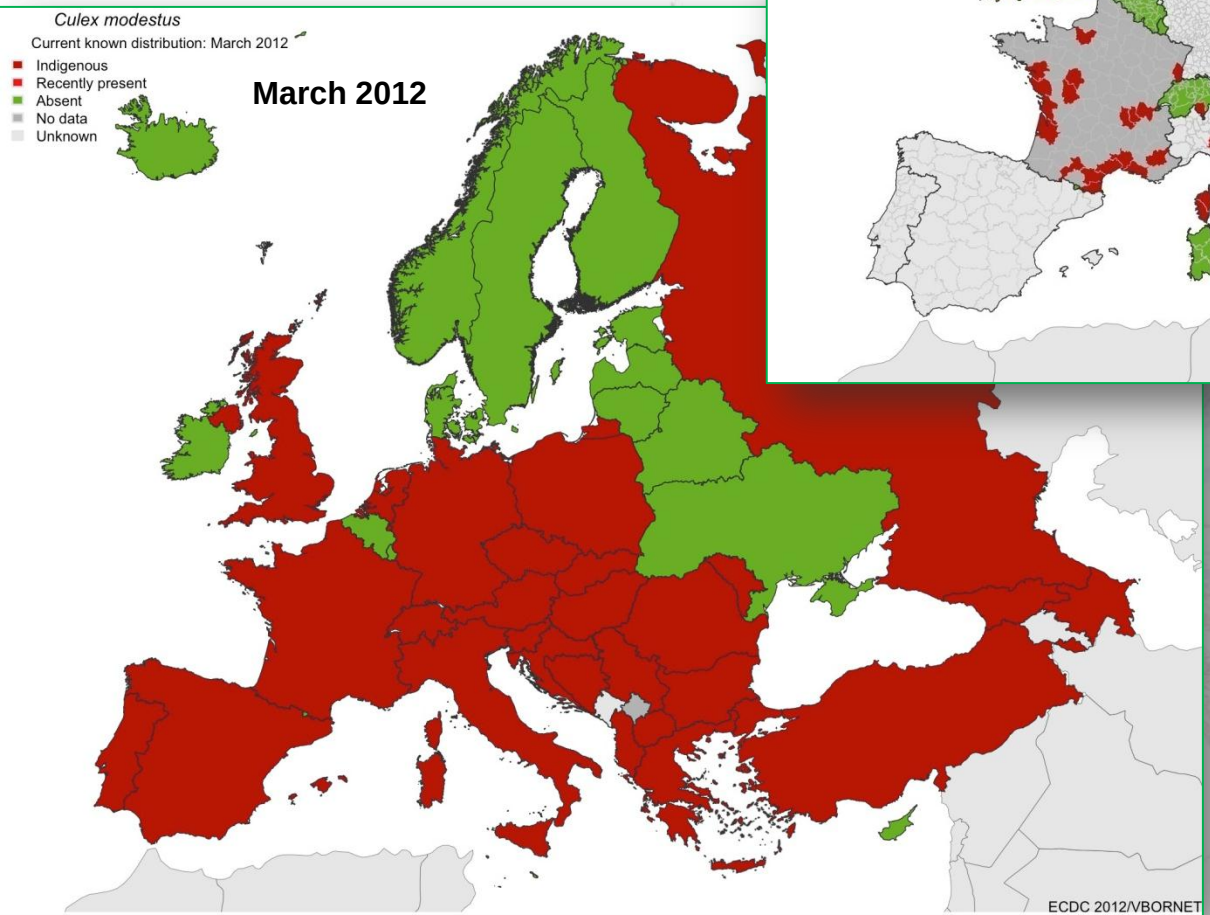


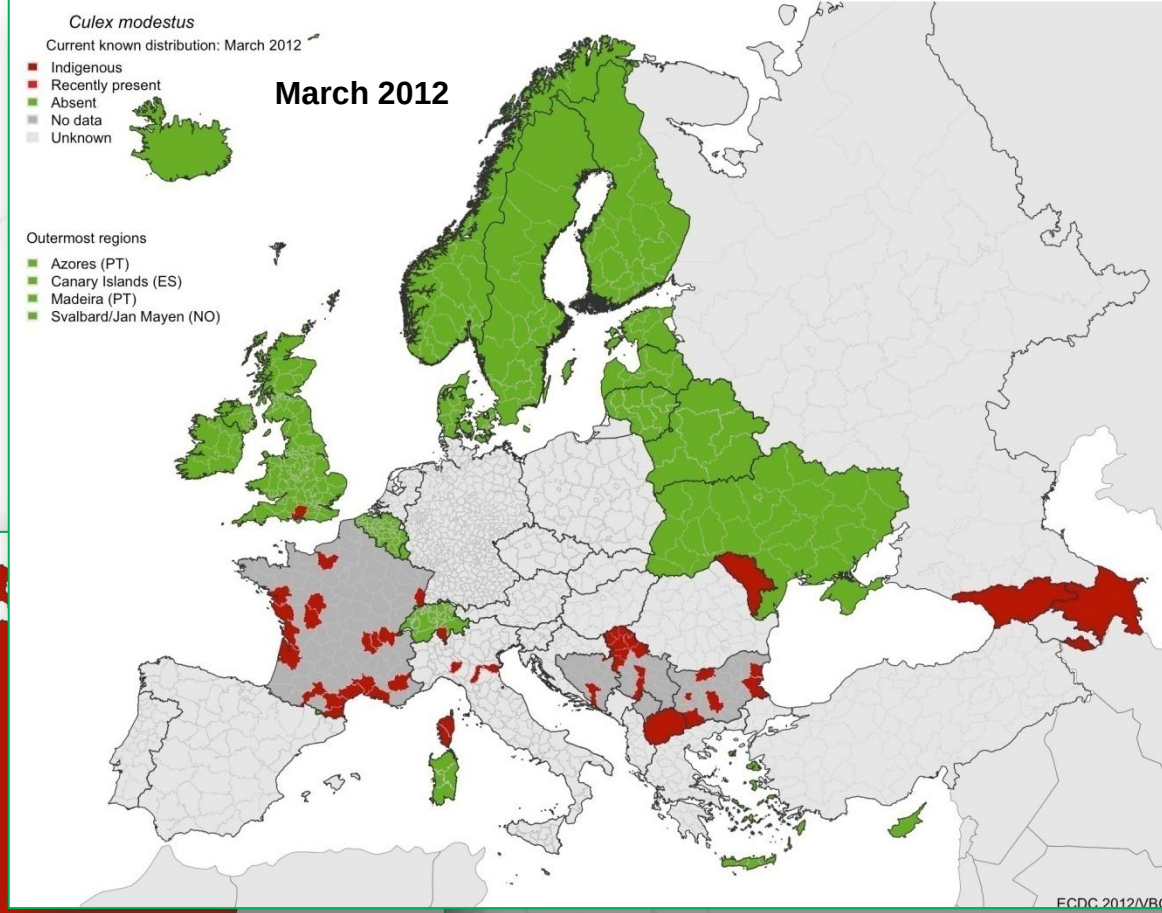
Ae. aegypti distribution





Cx. modestus distribution





Mosquitoes – Perspectives

- Updating maps for invasive species
- Other vectors: NUTS 3 data from litterature and experts
- *Anopheles* species: compile data from litterature and experts
- Specific cases: finding experts from Armenia, Azerbaijan, Belarus, and Ukraine

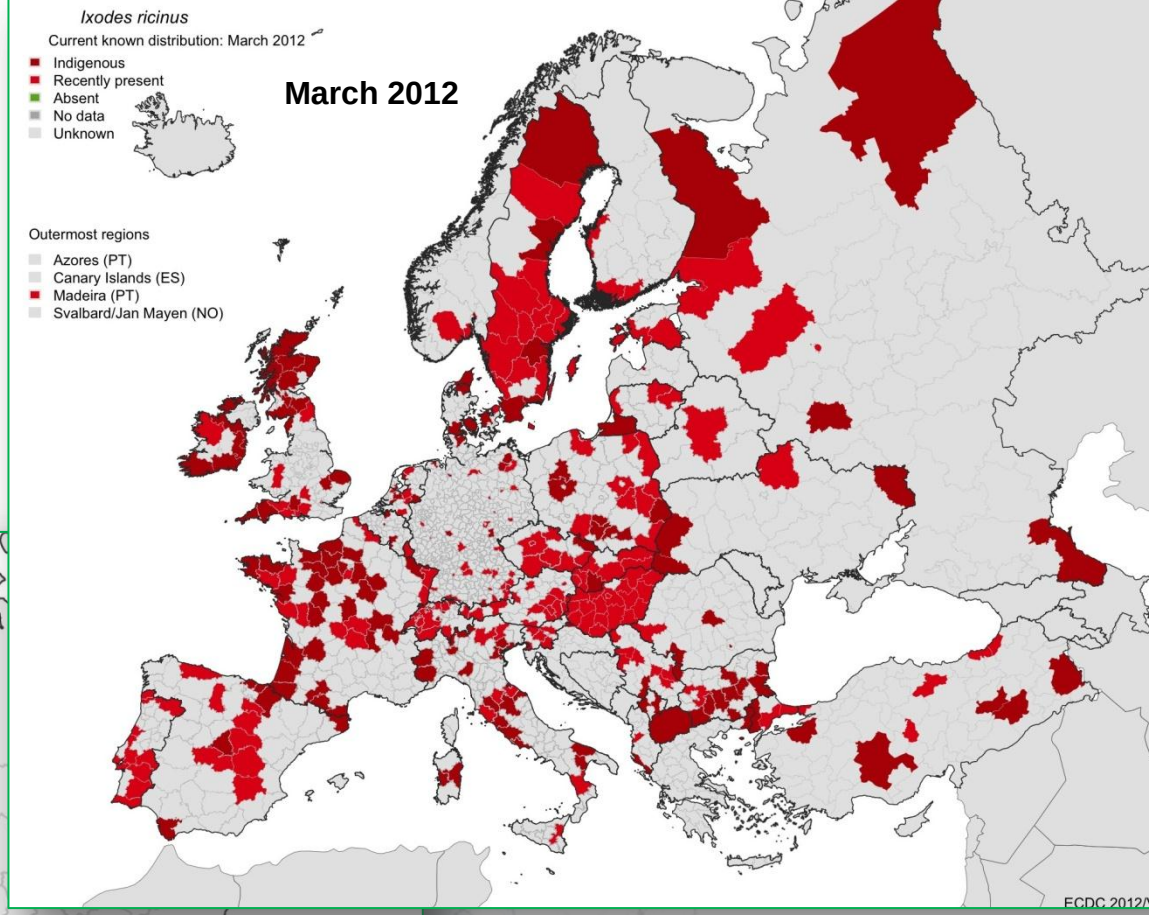
Ticks

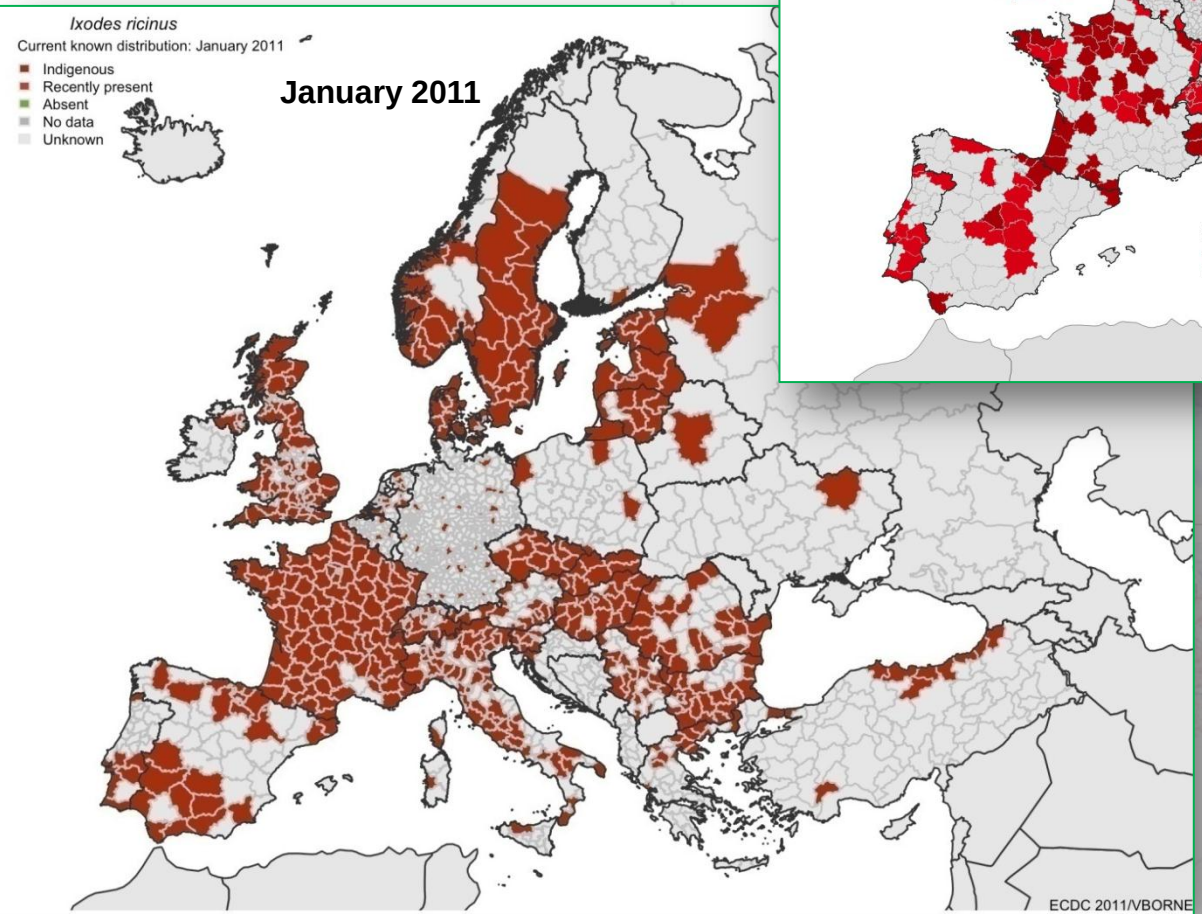
Coordination and data validation: Laurence VIAL

Ticks

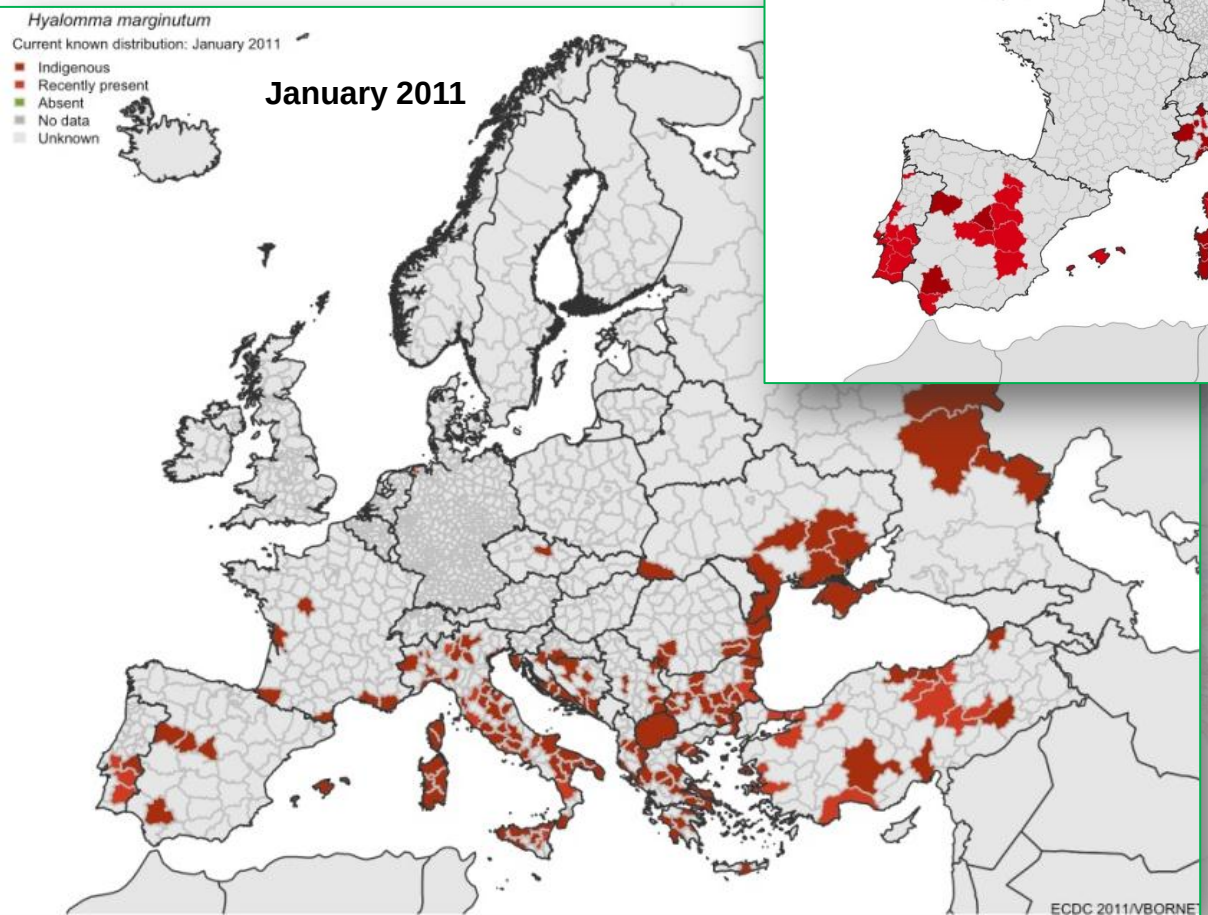
- *Dermacentor reticulatus*, *Hyalomma m. marginatum, Ixodes ricinus, I persulcatus, Ornithodos spp., and Rhipicephalus sanguineus*
- Sources:
  - Historical database (Morel 1969)
  - EDEN data
  - ATP Emergence
  - EFSA data base

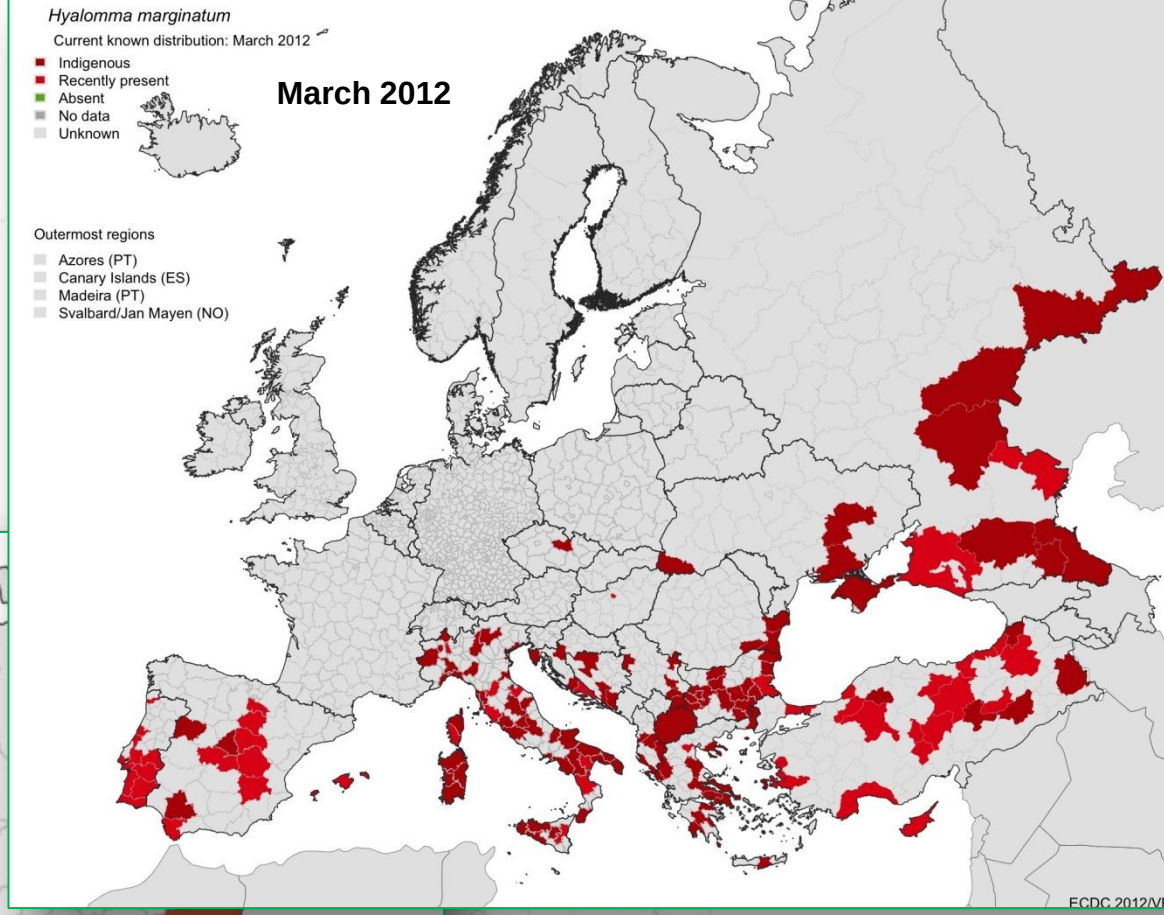
Ixodes ricinus (from **EFSA** sources)





Hyalomma m. marginatum





Ticks – Perspectives

- Further data integration and validation
- Focus on limits of distribution areas
- Confirmation/validation request from tick experts
- Identify gaps and ambiguities
- Modelling approach for filling gaps: Defining suitable habitat envelope (distribution limits for each tick species using presence models)

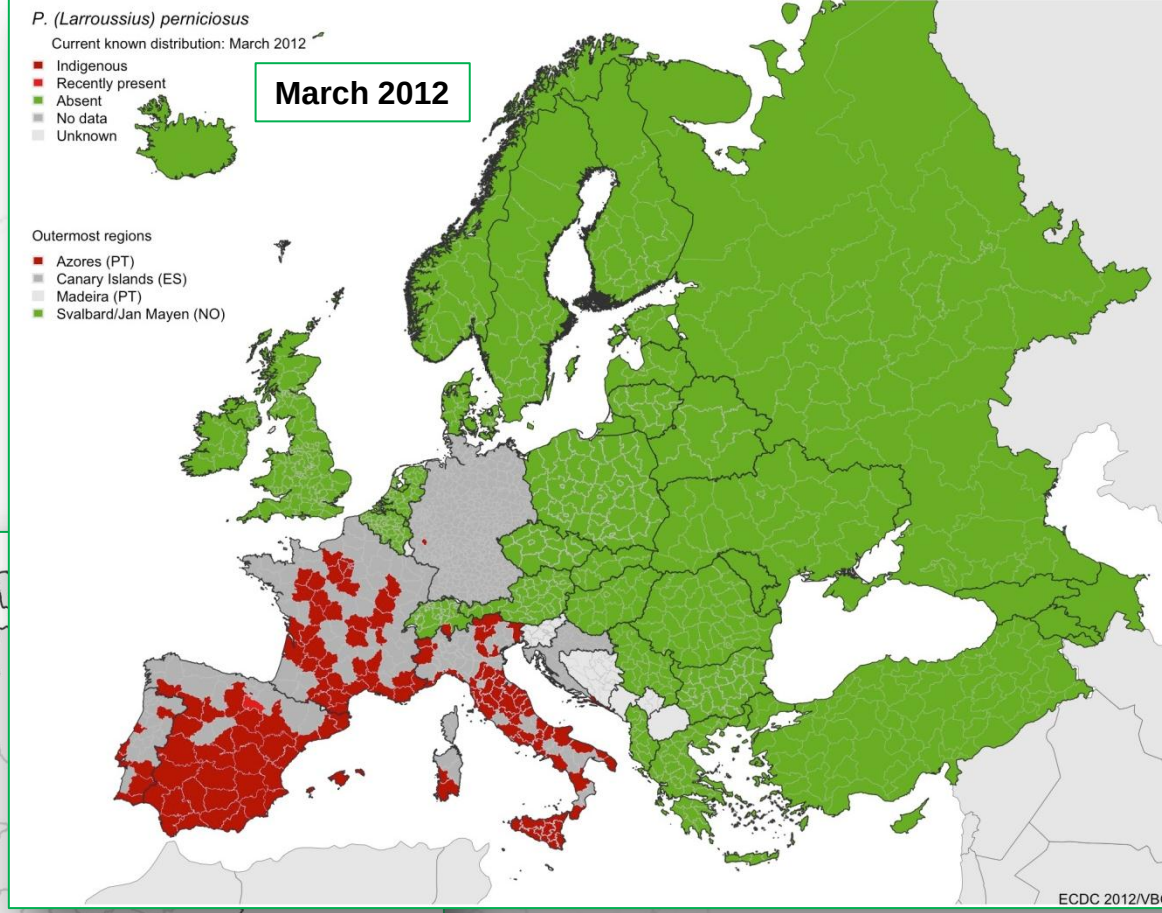
Phlebotominae sand flies

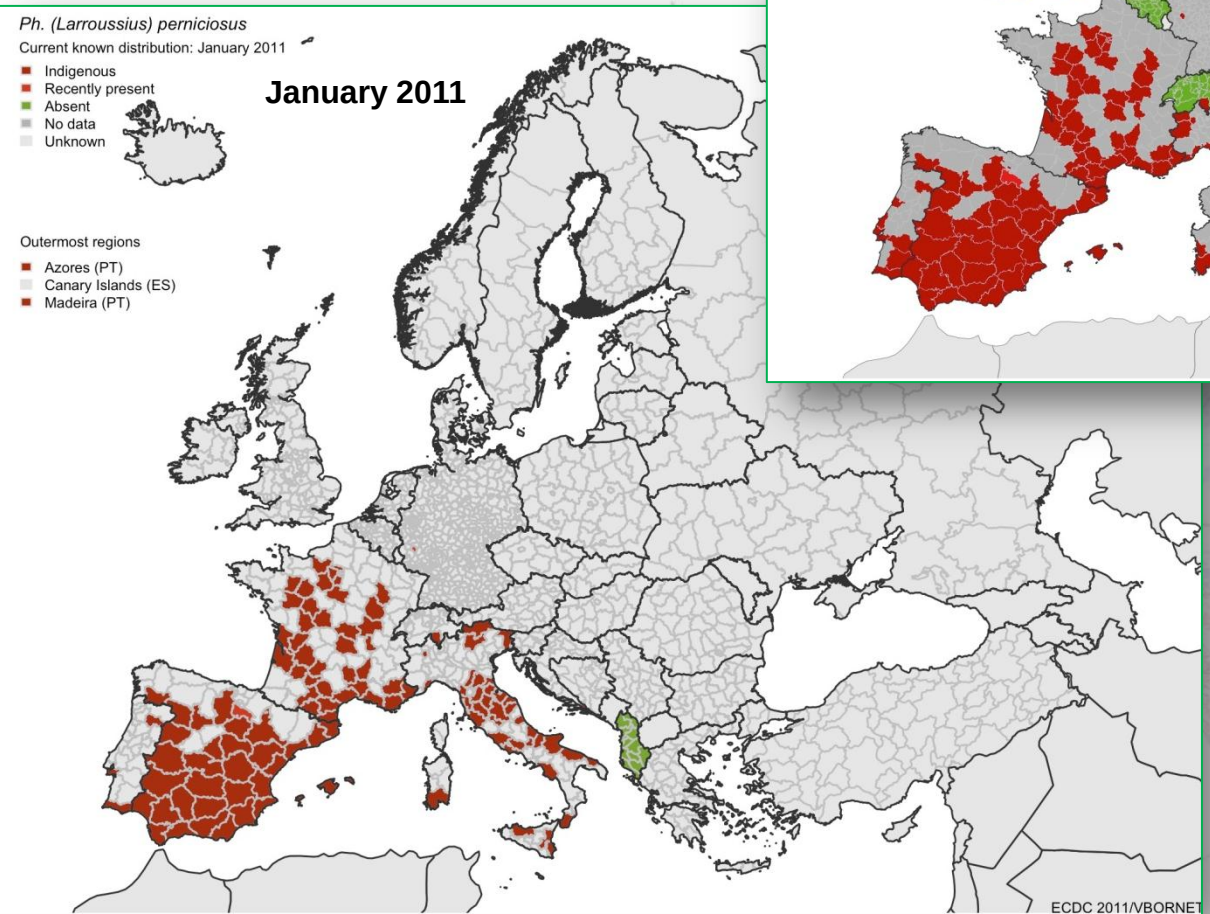
Coordination and data validation: Bulent ALTEN

Phlebotominae

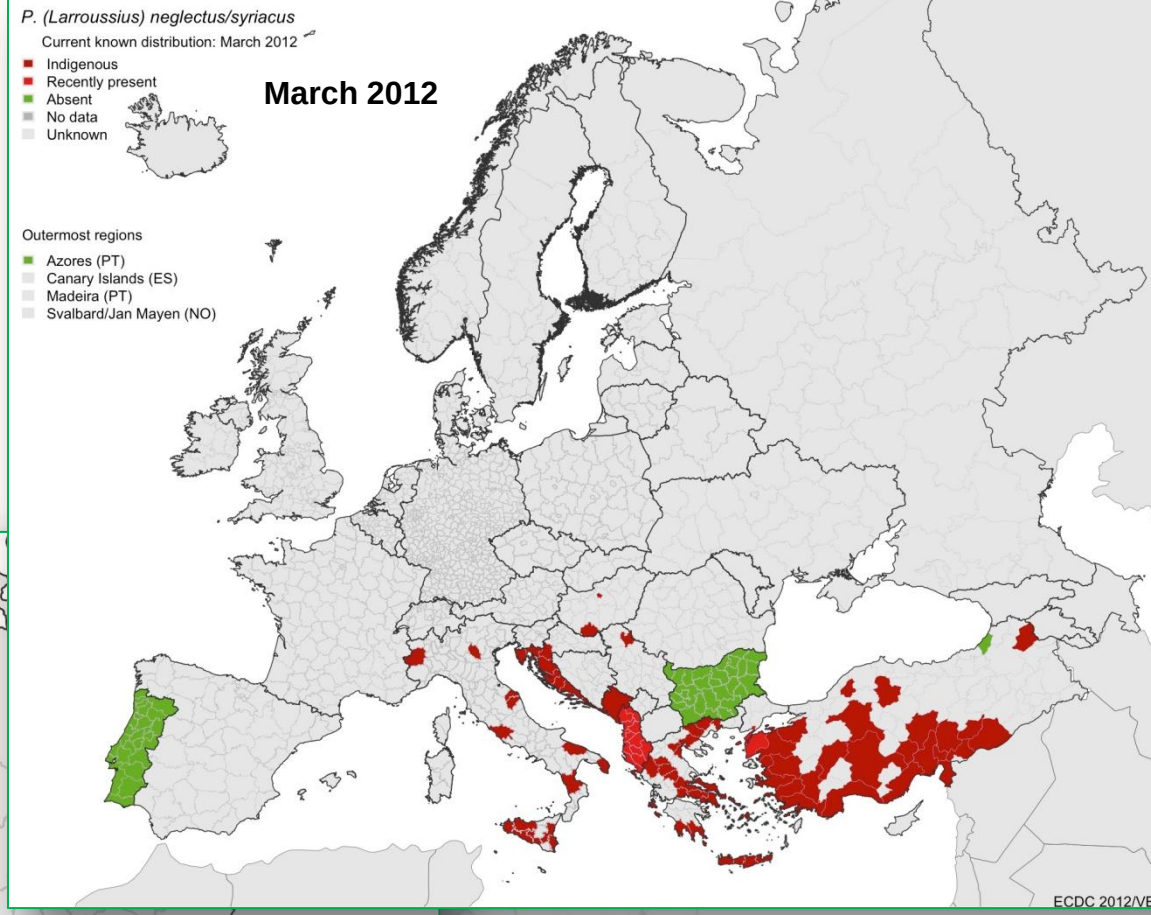
- *Phlebotomus ariasi, P. neglectus/syriacus, P. papatasi, P. perifiliewi, P. perniciosus, P. sergenti, P. similis, P. tobbi*
- New maps: *P. alexandri, P. mascitii*
- Sources:
  - Historical dadabases
  - Publications
  - EDEN and EDENext

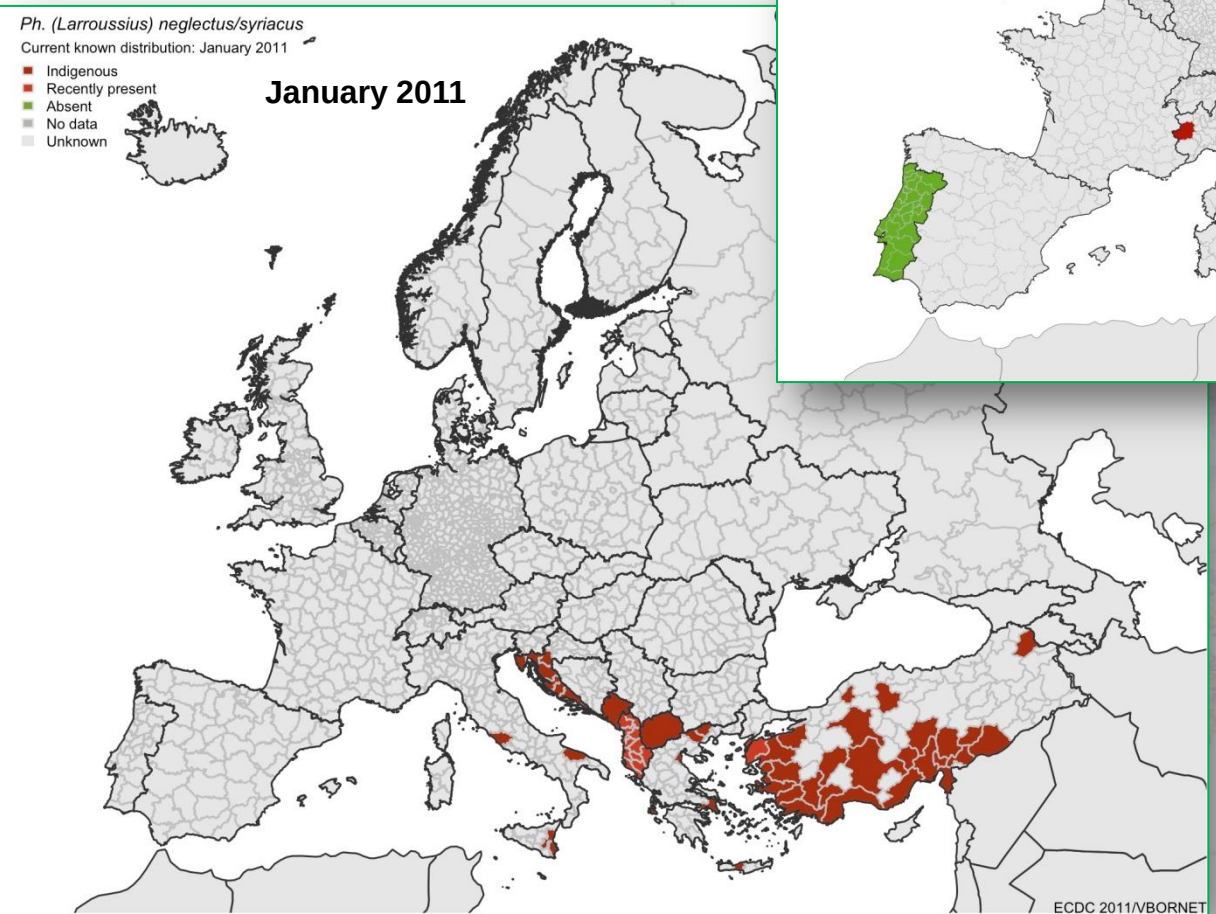
Phlebotomus perniciosus



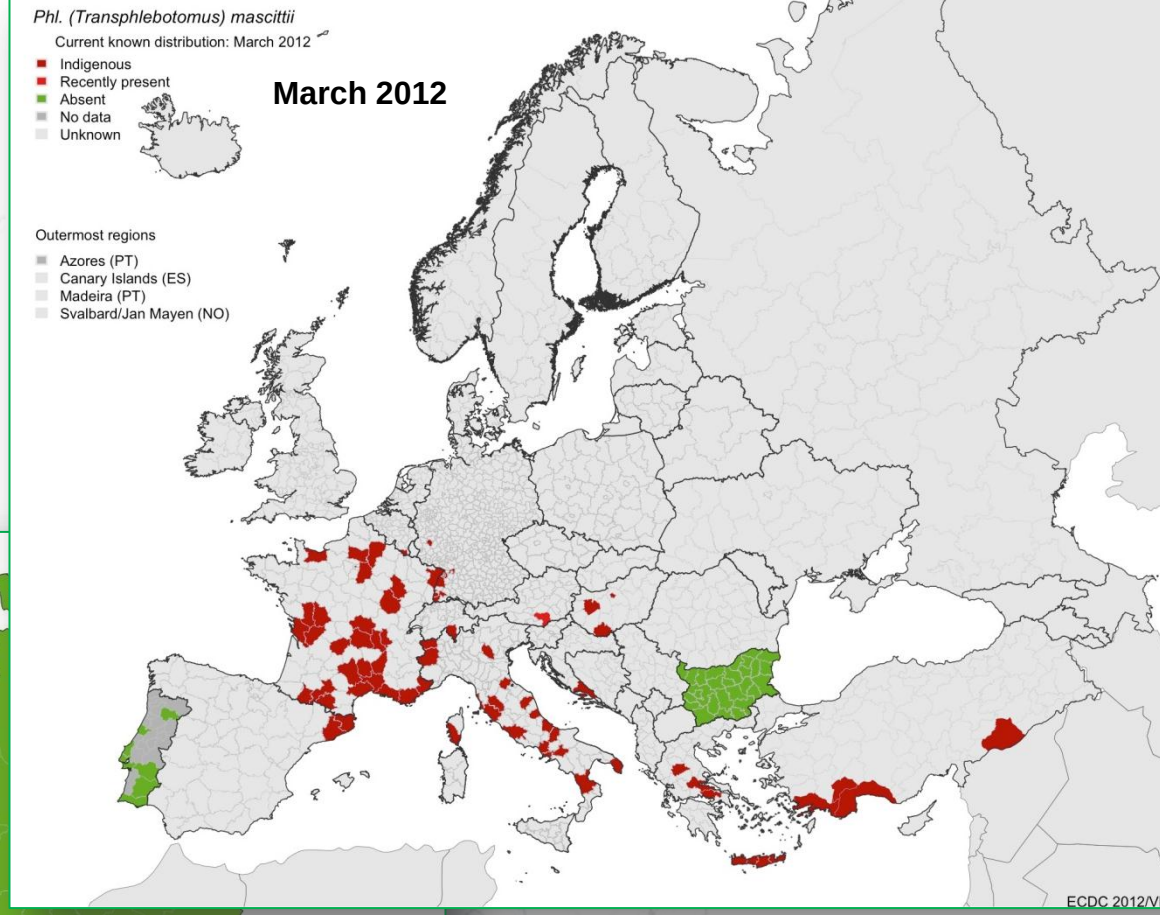


Phlebotomus neglectus

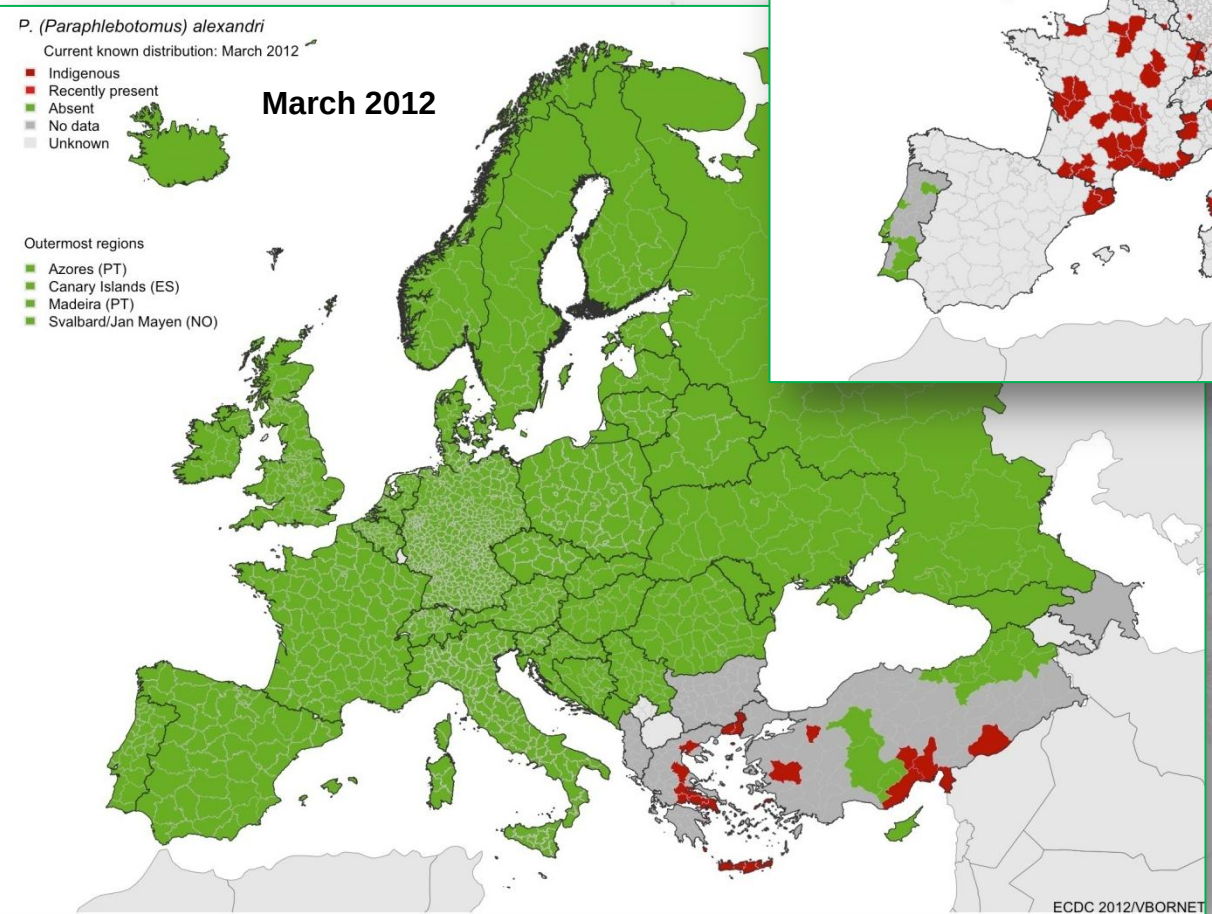




Phlebotomus mascittii



Phlebotomus alexandri



Phlebotominae – Perspectives

- Further data integration and validation
- Focus on limits of distribution areas
- Confirmation/validation request from tick experts
- Identify gaps and ambiguities
- Modelling approach for filling gaps: Defining suitable habitat envelope (distribution limits for each tick species using presence models)

Overall perspectives

- Get more contributions from local experts
  - → Now online tool
  - → Data can be entered by consortium if needed/wanted
- Identify national databases
- Links with national and international projects
- Filling gaps with new data or modelling