



# **Ticks and tick-borne pathogens**

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# The role of EFSA

- To assess and communicate all risks associated with the food chain
- We work in response to a specific request for scientific advice
- The European Commission is the main requestor for scientific assessment

- The Animal Health and Animal Welfare (AHAW) Panel provides independent scientific advice on all aspects of animal diseases and animal welfare
- Its work is mainly focussed on food producing animals including aquaculture

# Why are we interested in vectors?

- **Transmission of animal diseases**

Ticks as vectors of African swine fever virus, louping ill virus ...

Midges transmitting Bluetongue, Epizootic hemorrhagic disease, African horse sickness...

- **Transmission of zoonoses**

Ticks transmitting Crimean–Congo hemorrhagic fever, Anaplasmoses, Rickettsioses...

Mosquitoes transmitting West Nile virus, Rift valley fever virus...

# Our previous work with vectors

- **Art. 36:** Preparatory work for scientific opinions, scientific and technical assistance, collection of data and identification of emerging risks.
  1. Scientific review on classical swine fever, African swine fever, and African horse sickness and evaluation of distribution of arthropod vectors and their potential of transmitting exotic or emerging vector-borne animal diseases and zoonoses (2007)
  2. Scientific review on Crimean-Congo haemorrhagic fever and Epizootic haemorrhagic disease (2009)

# Our previous work with midges

- **Scientific Opinions**

1. Scientific Opinion on Bluetongue vectors and vaccines (April 2007)
2. Report on epidemiological analysis of the 2006 bluetongue virus serotype 8 epidemic in North-western Europe (April 2007)
3. Self-mandate on Bluetongue origin and occurrence (April 2007)
4. Scientific opinion on Bluetongue (June 2008)
5. Risk of Bluetongue transmission in animal transit
6. Scientific opinion on Epizootic haemorrhagic disease (November 2009)

# Our previous work with ticks

- **Scientific Opinions**

1. Risk of tick introduction into UK, Republic of Ireland, and Malta as consequence of abandoning derogations on pet movement (March 2007)
2. Risk of introduction of ASF into the EU from eastern European countries, especially from the Caucasus. The role of ticks in the epidemiology of ASF (March 2010)
3. Geographic distribution of ticks and tick-borne diseases in EU and Mediterranean basin

# The current mandate on ticks

1. Geographic distribution of ticks with proven involvement in the transmission of animal diseases and zoonoses in EU, Middle East and Mediterranean basin
2. The role of tick vectors in the epidemiology of African swine fever and CCHF



# The current mandate on ticks

- Descriptive work rather than risk assessment in this mandate
- Based on a systematic literature review (last 10 years, general principles of the Cochrane method)
- We asked the WG experts to provide relevant papers from their private collections, regardless of the time frame

- **The systematic literature review:**
  - **Ticks:** *Argas, Ornithodoros, Dermacentor, Haemaphysalis, Hyalomma, Ixodes, Rhipicephalus, Boophilus*
  - **Pathogens:** *ASFV, Anaplasma, Ehrlichia, Babesia, CCHFV, Hepatozoon, Borrelia, Rickettsia, Theileria, TBEV, Louping ill virus, Francisella, Bartonella, Coxiella, AHSV*

- **The systematic literature review (cont.)**
  - **Geographic area:** European countries (including non EU countries and a buffer band of about 600 km in the European Russian Federation); Armenia, Georgia; Turkey, Israel, Palestine, Jordan, Syria, Lebanon, Egypt, Libya, Tunisia, Algeria, Morocco, and Western Sahara.

## **Databases** (Restricted to the last 10 years)

- ISI web of knowledge
- Pubmed

Up to March 11<sup>th</sup> 2010

## **What did we get?**

- About 2200 references that were screened for relevance

- **The first screening** was done by checking the **title and the abstract**:
  - Is the tick and / or tick-borne pathogen occurring in the area of concern?
  - Is there relevant information related to the geographic distribution / occurrence of this tick or tick-borne pathogen?

# The current mandate on ticks

References initially found	First screening		
	Relevant	Doubtful	Non relevant
2197	1222	309	666

## **The doubtful references:**

- The full text of the doubtful papers was read to judge their relevance

## **The relevant references**

- Retrieving the full article (missing articles)
- The issue of the language. Some of the articles found in Hungarian, Italian, French, Spanish, German, Bulgarian, and Dutch were considered

- **The second screening**
  - Only original works were considered (not reviews)
  - Expert evaluation of the method of tick identification
  - Expert consideration to the pathogen identification (serology, isolation, PCR)
  - Excluding importations that do not achieve the threshold to become established
  - Excluding case reports that refer the location to a reference hospital



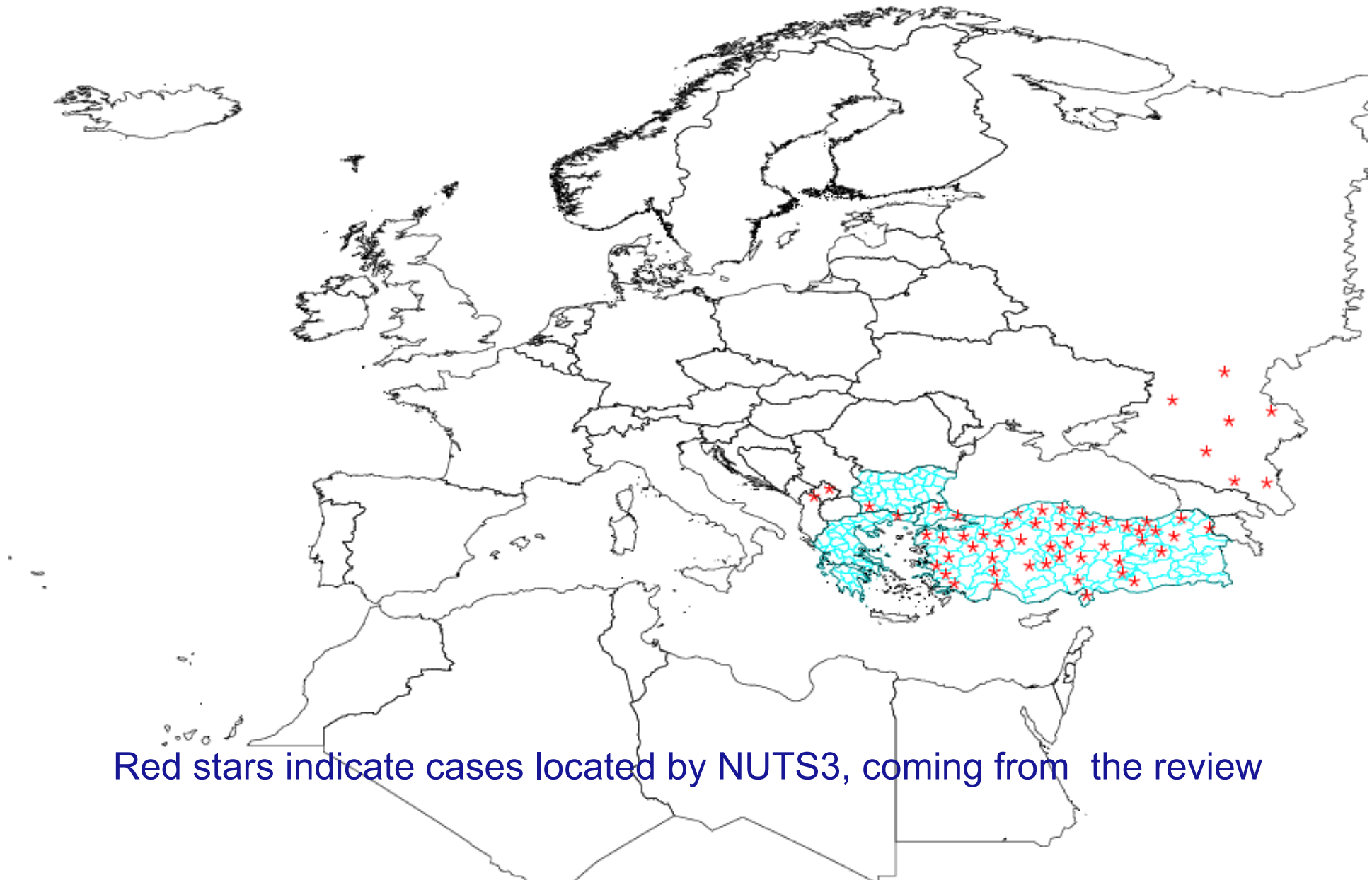
- **The data extraction:**
  - After the second screening, **620** scientific papers were considered appropriate for the data extraction
  - The data extracted was organized in different fields to generate a database from which the corresponding maps can be issued

- **The database fields (1/3):**
  - Tick genus and species (named as in the original paper)
  - Location: NUTS for EU countries. For other countries the name of the location provided in the original report, at equivalent level of precision. Coordinates if given in the article.
  - Molecular techniques to identify ticks: yes/no
  - Author and year (reference)

- **The database fields (2/3):**
  - The source of the tick specimen: free living (questing), livestock, pet, human, wildlife (taxonomic order of the host)
  - Pathogen genus and species (as it appears in the original work)
  - Location (pathogen): same level of precision as in the original work. NUTS for European countries. Geographical coordinates if provided.

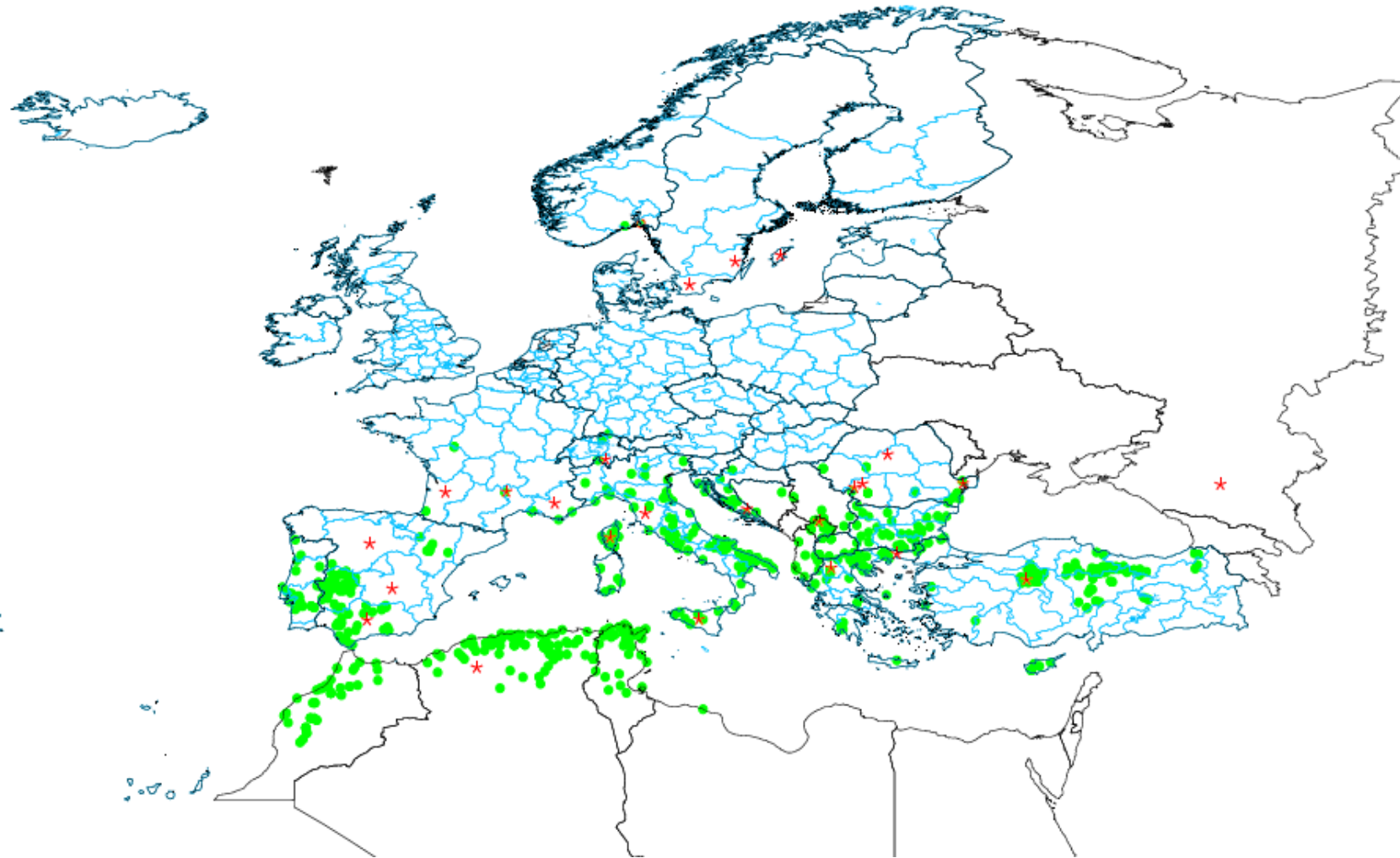
- **The database fields (3/3):**
  - Diagnostic method (pathogen): isolation, molecular, serology
  - Author and year (reference)
  - Source of the sample: livestock, pet, human, wildlife (taxonomic order of the host), tick.
  - Comments: observations related to the data of a particular entry.

# The maps: CCHFV



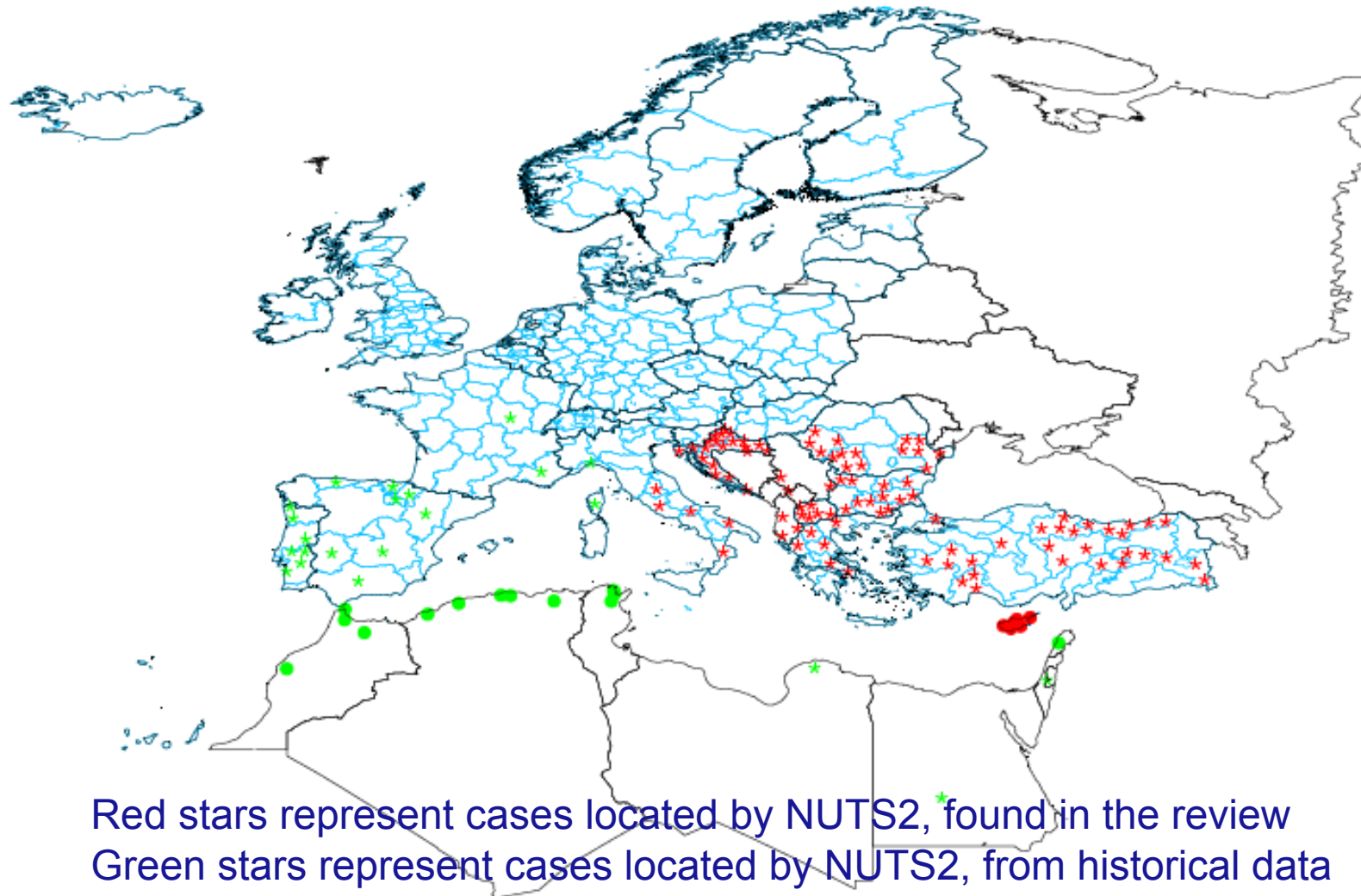
Red stars indicate cases located by NUTS3, coming from the review

# The maps: *Hyalomma marginatum*



Red stars represent cases located by NUTS2, found in the review  
Green dots correspond to case coordinates related to historical data

# The maps: *Rhipicephalus bursa*



Red stars represent cases located by NUTS2, found in the review  
Green stars represent cases located by NUTS2, from historical data  
Red dots correspond to case coordinates found in the review  
Green dots correspond to case coordinates related to historical data



# The current mandate on ticks

- The database (access format) will be attached to the scientific opinion once published in the EFSA website.
- It is important to keep the database updated. We may need to collaborate with ECDC (VBORNET)
- Reconsidering the users, the access, the fields, improvements, more vectors?  
how to be updated?



- **When will be the scientific opinions available?**
  - The scientific opinion on the role of ticks on the epidemiology of ASF and CCHF will be published by end of August 2010
  - The Scientific opinion on the geographic distribution of ticks and tick-borne diseases will be published at the end of September 2010

This is a team work. Thanks to:

## **Our Panel members**

- Mo Salman (Chair)
- Frank Koenen

## **Scientific Officers**

- Sofie Dhollander
- Milen Georgiev

## **Our WG experts**

- Agustín Estrada-Peña
- Robert Farkas
- Thomas Jaenson
- Maxime Madder
- Ilaria Pascucci





**THANK YOU FOR YOUR ATTENTION**  
**Comments?**