West Nile Fever on the Balkan Peninsula

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Vector borne diseases

- Many vector-borne diseases are considered as emerging infectious diseases in the European Union
- Many vector-borne diseases are zoonotic diseases, i.e. diseases that can be transmitted directly or indirectly between animals and humans

Vector borne diseases

- ***Biological vectors***, such as mosquitoes and ticks may carry pathogens that can multiply within their bodies and be delivered to new hosts, usually by biting.
- ***Mechanical vectors,*** such as mosquitoes, flies can pick up infectious agents and transmit them through physical contact (flying syringe!)

Vector borne diseases

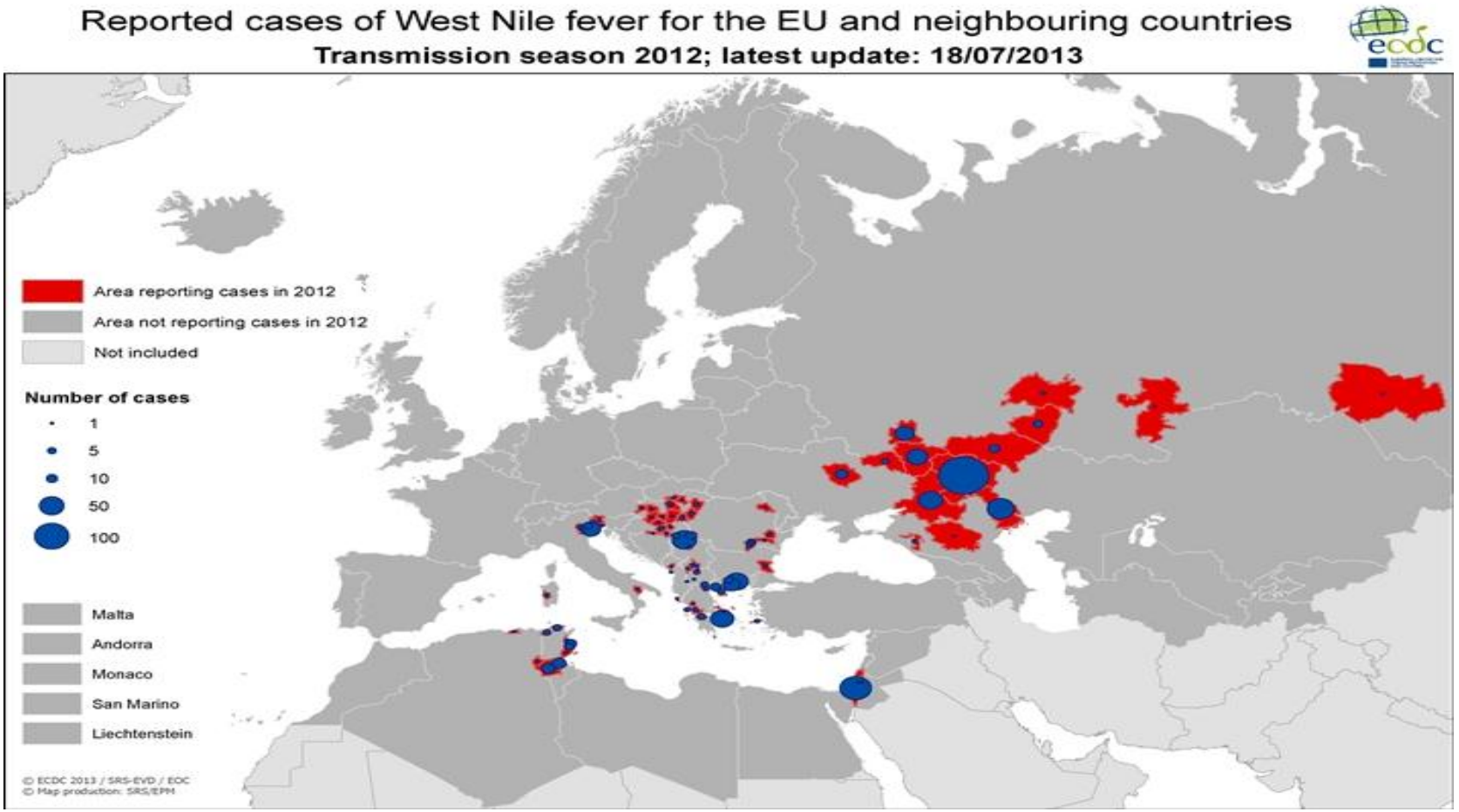
Some vectors are able to move to considerable distances. This may affect the transmission ranges of vector-borne zoonotic diseases. Vectors can be introduced to new geographic areas for example by:

- *travel of humans and international trade;*
- *animal movement, for instance of livestock;*
- *migratory birds;*
- *changing agricultural practices;*
- *or the wind.*

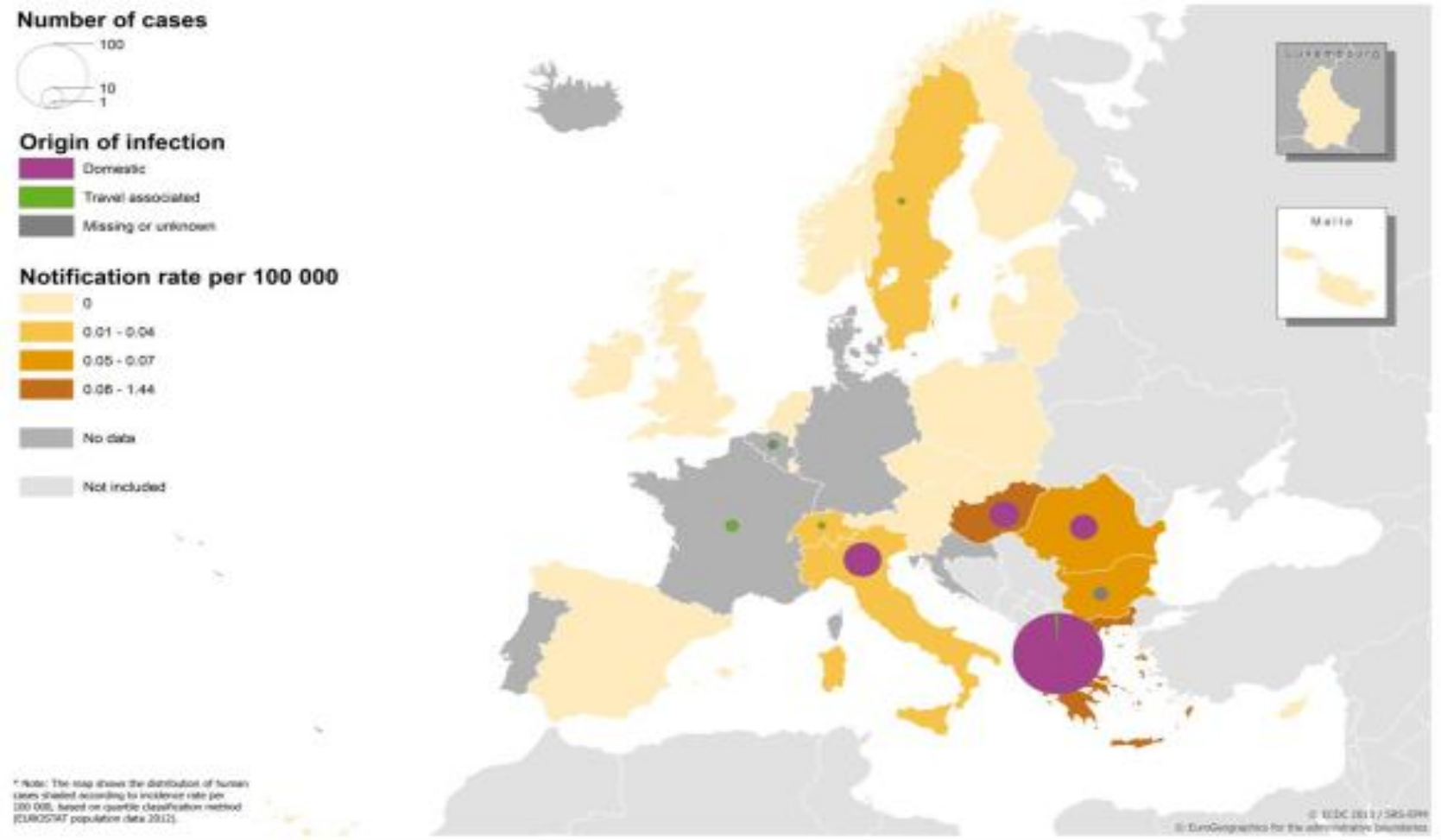
WND importance and concern

- West Nile virus (WNV) transmission has been confirmed in the last four years in Europe and in the Mediterranean Basin. ***An increasing concern towards West Nile disease (WND) has been observed due to the high number of human and animal cases reported in these areas confirming the importance of this zoonosis.***

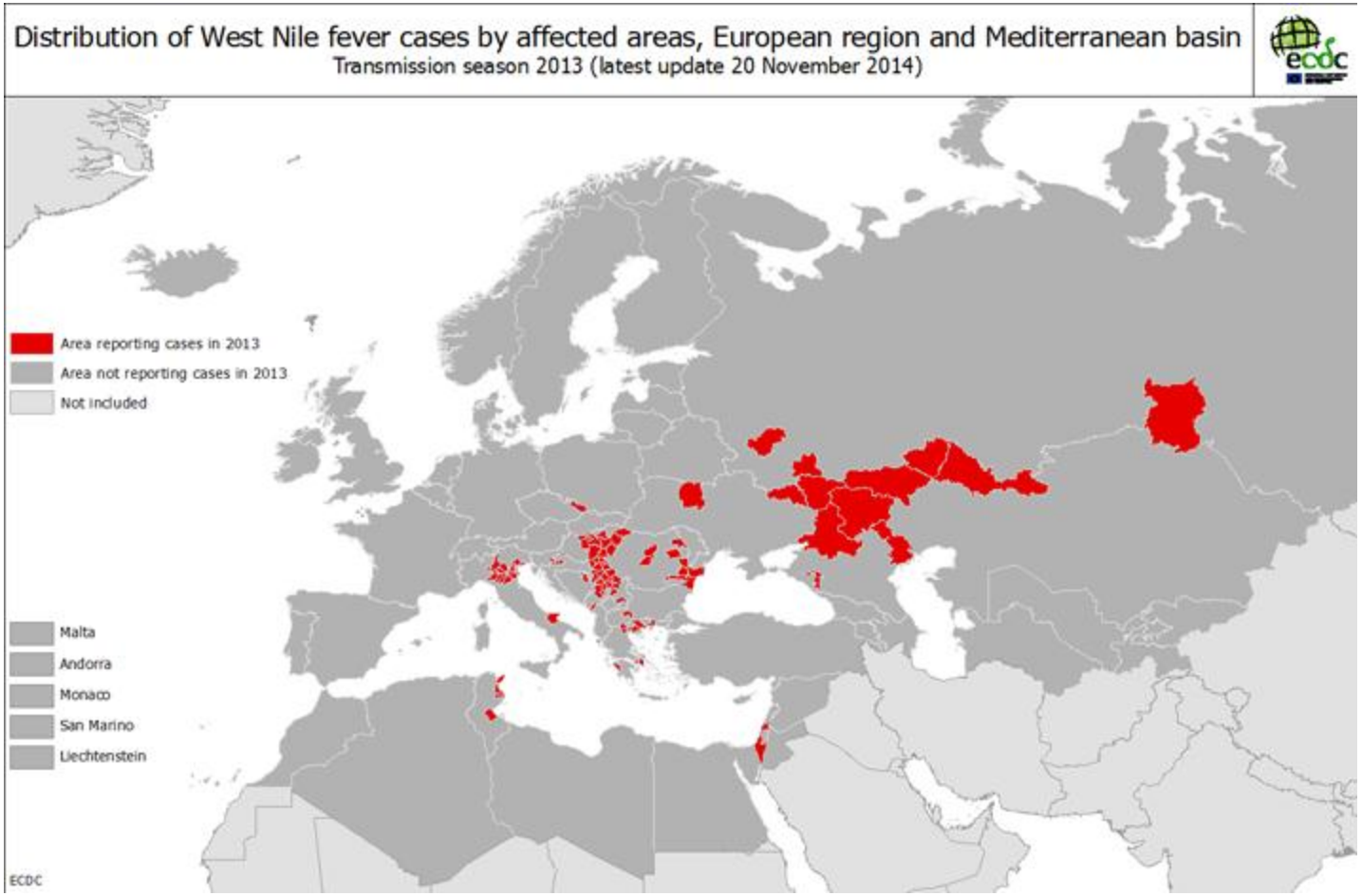
WND transmission season 2012



West Nile fever reported humans cases 2012 at EU



WND transmission season 2013



WND on the Balkans

- ***Greece*** - from the beginning of 2013 until 30/10/2013, 86 laboratory diagnosed cases of WNV infection have been reported (including 8 deaths), of which 51 presented with neuro-invasive disease (encephalitis and/or meningitis and/or acute flaccid paralysis) and 35 cases with mild symptoms (febrile syndrome)

WND on the Balkans

- Other Balkan countries have reported WNV cases - few sporadic cases were reported in FYRM, Kosovo, Montenegro and Bulgaria in the last three years.
- ***Serbia*** WNV was firstly identified in 2012, when 69 cases of disease were notified, and a new outbreak is occurring in 2013, with 238 cases identified up to the end of September.

WND on the Balkans

- ***Croatia*** reported 5 cases in humans and 12 cases in equines without apparent clinical signs from July to August 2012. Both equine and human cases occurred in the eastern part of Croatia. In 2013, 16 human cases, of which one was confirmed, in Medimurska, Zagreb, and Zagrebacka areas were identified.

WND on the Balkans

- ***Kosovo and Montenegro*** in 2012 reported, 6 and 1 human cases respectively. In 2013 in ***Montenegro*** four additional human cases were notified. In 2011 ***FYROM*** reported 4 confirmed human cases in Skopje, occurring from August the 25th to October the 6th, and additional 10 confirmed cases in horses and 36 in birds. In 2012, six further human cases were reported in ***FYROM***. In 2013 a human case was identified in July .

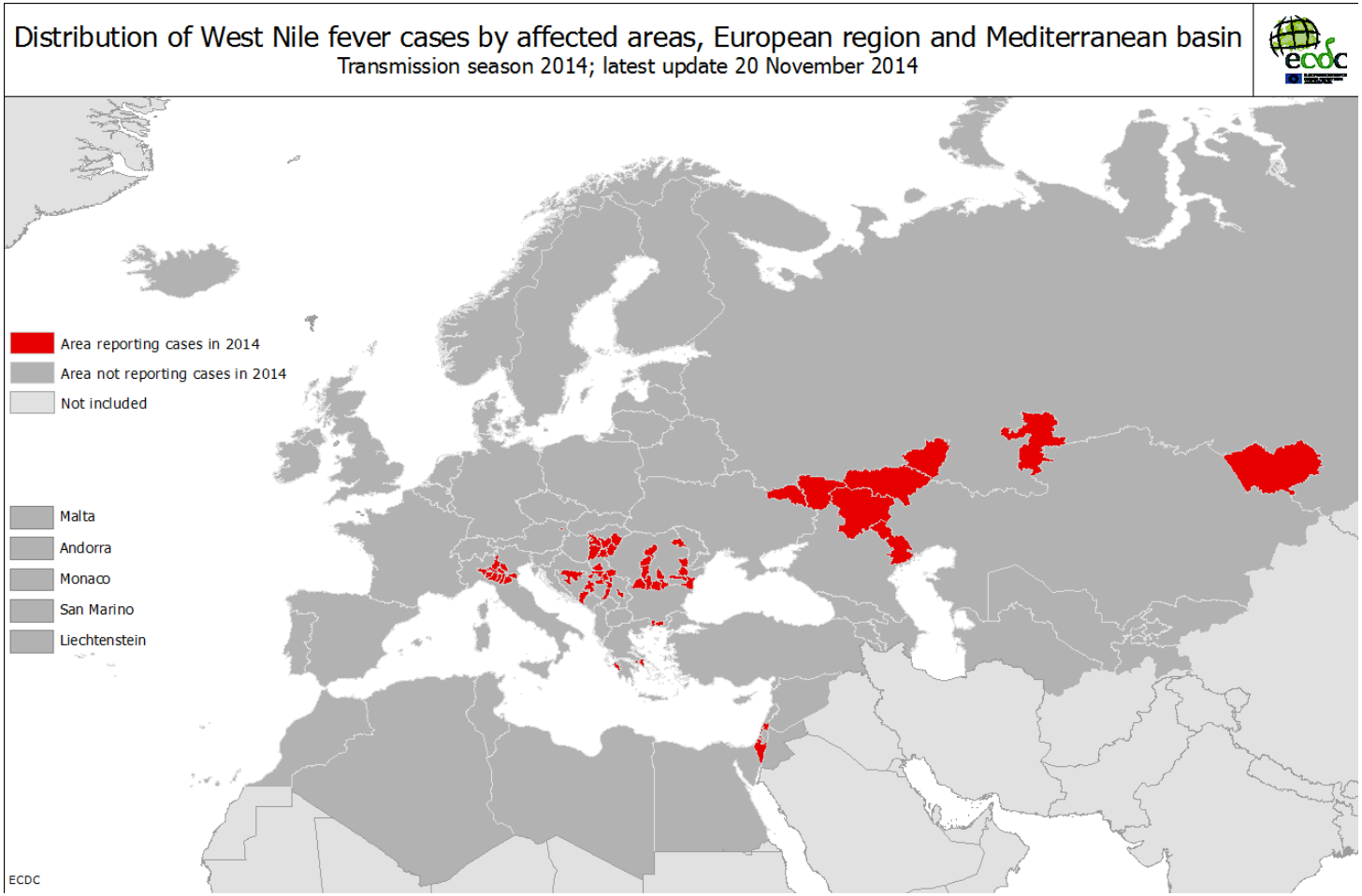
WND on the Balkans

- For the first time, WNV human cases were reported in ***Bosnia-Herzegovina*** in 2012. In 2013, 3 human cases were confirmed in Modrica and Tuzlansko-Podrinjski cantons . Between late August and early September 2013 WNV infection has been detected in 2 crows (Corvus cornix).

WND on the Balkans

- ***Turkey*** In 2010, confirmed laboratory 12 cases in humans in 15 provinces, located in western Turkey. In 2011, three further laboratory-confirmed cases were detected in the same part of the country. The first isolation of WNV lineage 1 was reported in 2011 in 2 horses in Eskisehir province and in a man in Ankara province

74 human cases of West Nile fever have been reported in the EU and 136 cases have been reported in neighbouring countries during transmission season 2014

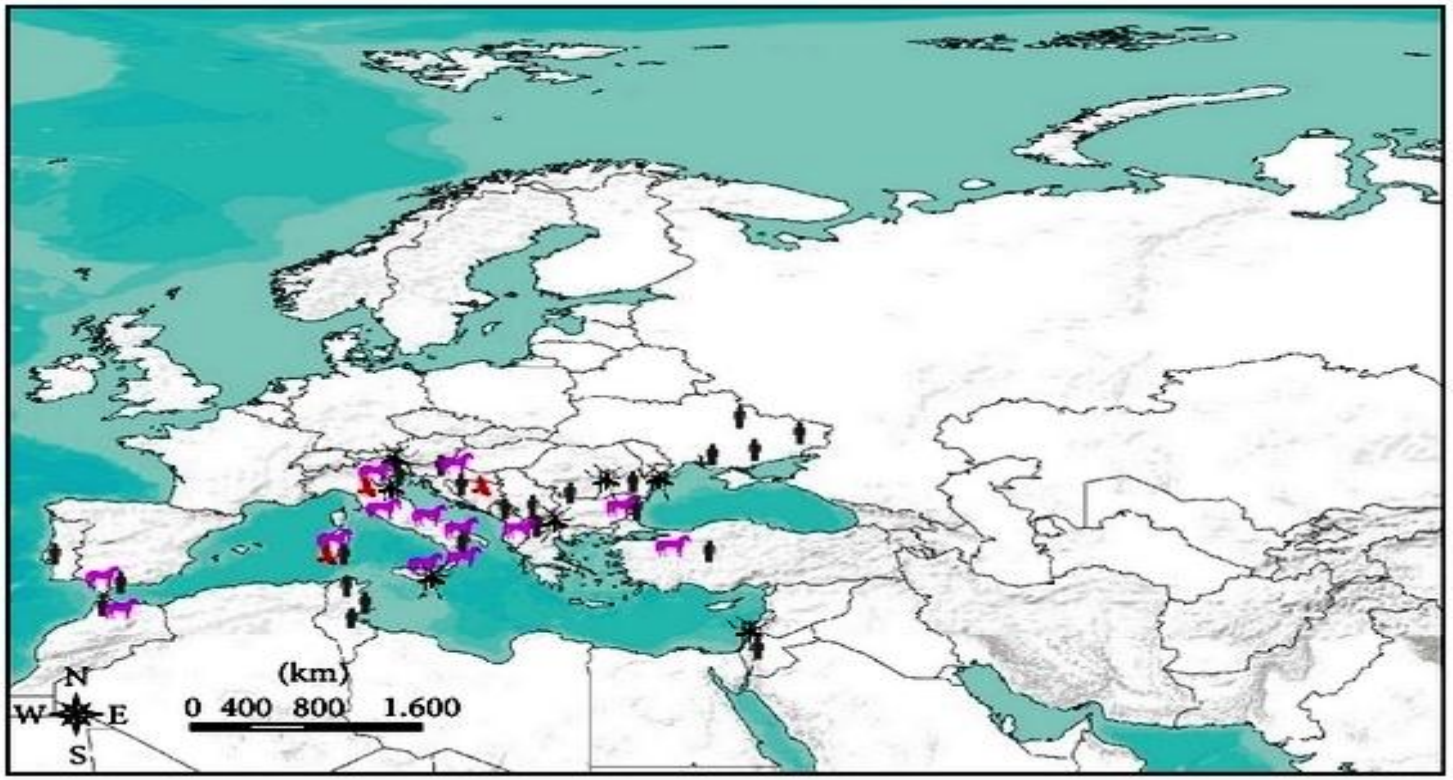


WND in equines in Europe 2013

Molecular epidemiology

Studies of molecular epidemiology show a co-circulation of ***WNV lineage 1 and lineage 2*** in several European countries. In particular, WNV lineage 2 appears now to be established in South-eastern Europe and in the Balkans. This suggests that WNV is continuously reintroduced in this geographical area. Specifically, ***the two lineages of WNV are dispersed throughout Europe after arriving through bird migration, following the western and the eastern routes.*** The latter route is likely to be involved in the emergence and reemergence of ***WNV infection in South-eastern Europe, where this viral infection represent an important public health challenge*** (*J Microbiol Infect Dis 2014; Special Issue 1: S10-S)*

WNDV strain occurrence in Europe



Lineage 1

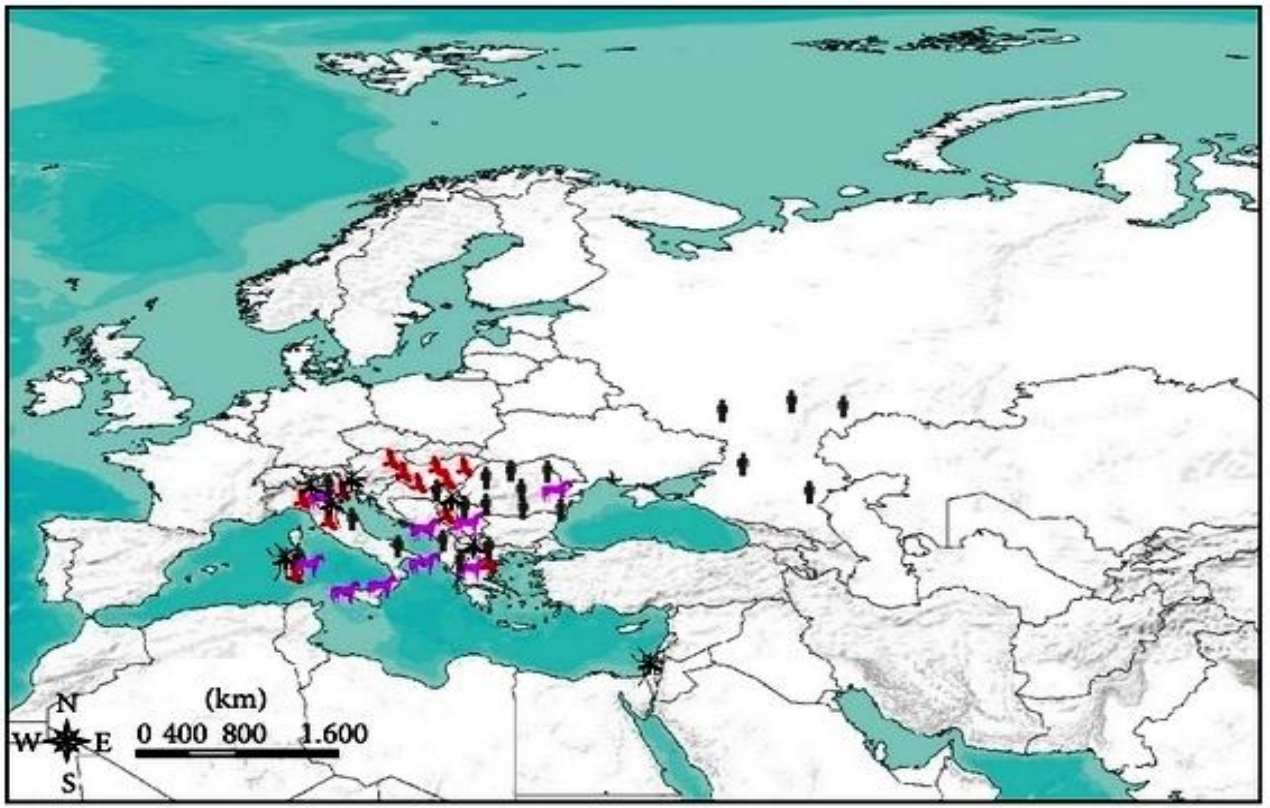
Birds

Equidae

Humans

Mosquitoes pools

Lineage 2 strain WND virus in Europe



Lineage 2

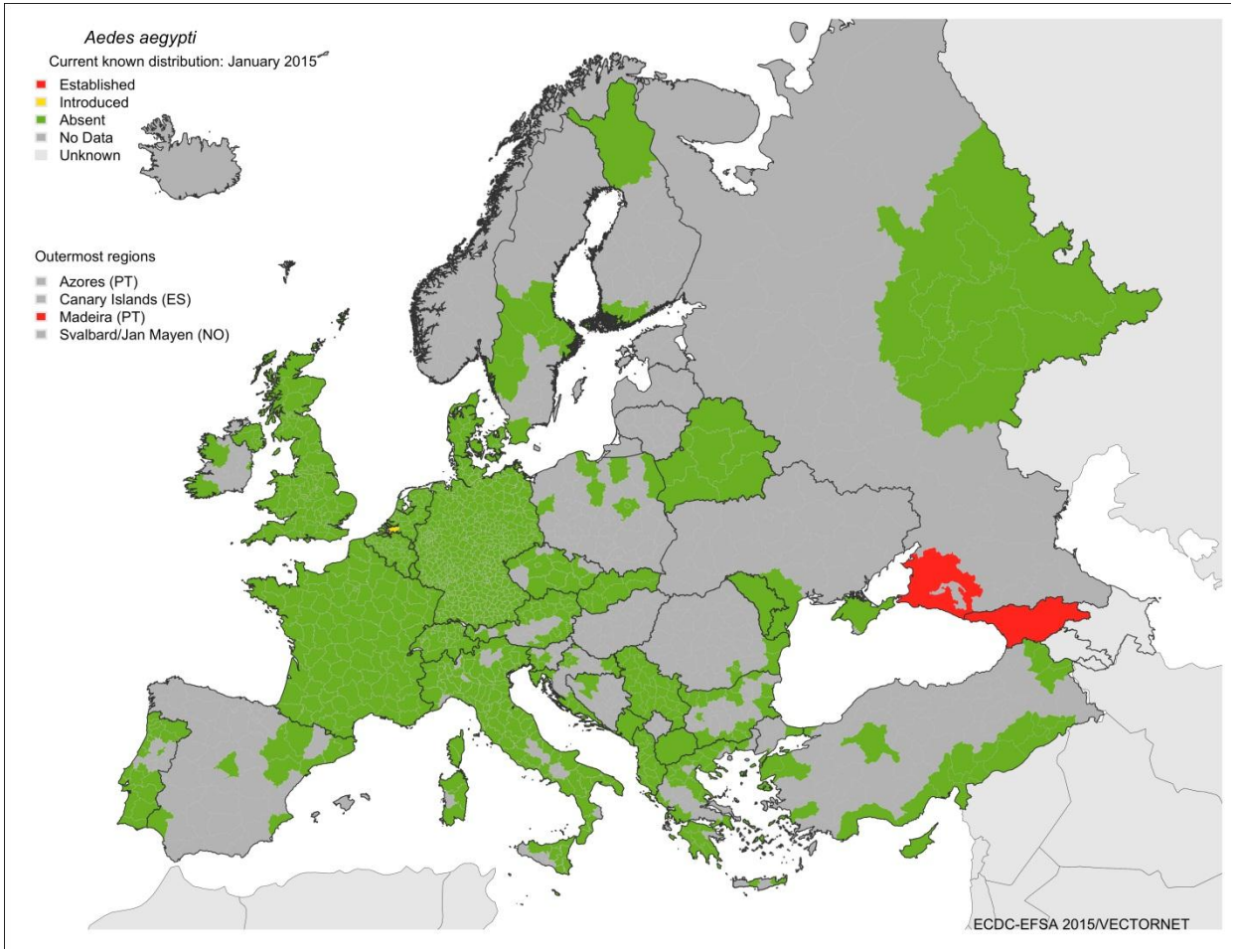
Birds

Equidae

Humans

Mosquitoes pools

Aedes aegypti map distribution in Europe



Conclusions:

- ***WNV appears to be expanding its geographical range in Europe and in the rest of the world, causing increasing numbers of outbreaks associated with human morbidity and mortality***. Multiple de novo introduction of unrelated WNV strains has been demonstrated in Europe, raising concerns about the potential emergence of the disease. Given this continuing unpredictability and the rapid development of epidemics, ***timely surveillance for WNV infection is needed on an EU-wide scale. This includes veterinary and entomological surveillance, as well as molecular surveillance of emerging strains.***

Conclusions:

- Confirming the epidemiological role played by migratory birds, **the infection endemisation in some European territories including Balkan Peninsula** today is a reality supported by the constant reoccurrence of the same strains across years in the same geographical areas.
- **lineage 2 strain** across European and Mediterranean countries in regions **where lineage 1** strain is still circulating ***creating favourable conditions for genetic reassortments and emergence of new strains.***

Conclusions:

- The detection of WNV infections in humans or in the same areas during two and more consecutive years may indicate the establishment of a ***local endemic transmission cycle with virus overwintering***

Conclusions:

- The constant WNV occurrence in the Balkan Peninsula region ***lighted to endemic cycles and local persistence of the infection*** or the contribution of overwintering mosquitoes or other infection overwintering mechanisms involving some predator bird species, as these belonging to ***Corvidae or Falconidae***.

Thank you for the attention !