

VBORNET Newsletter Year 2 Issue 5, June 2011

VBORNET USEFUL LINKS

Project description:

http://ecdc.europa.eu/en/activities/diseaseprogrammes/emerging_and_vector_borne_diseases/Pages/VBORNET.aspx

Registration, newsletters and Vector Questionnaire to be downloaded for reporting data:

www.vboret.net

VBORNET vector maps:

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

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1. SCIENTIFIC ADVANCES: MOSQUITOES

Climatic Factors Driving Invasion of the Tiger Mosquito (*Aedes albopictus*) into New Areas of Trentino, Northern Italy.

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BACKGROUND: The tiger mosquito (*Aedes albopictus*), vector of several emerging diseases, is expanding into more northerly latitudes as well as into higher altitudes in northern Italy. Changes in the pattern of distribution of the tiger mosquito may affect the potential spread of infectious diseases transmitted by this species in Europe. Therefore, predicting suitable areas of future establishment and spread is essential for planning early prevention and control strategies.

METHODOLOGY/PRINCIPAL FINDINGS: To identify the areas currently most suitable for the occurrence of the tiger mosquito in the Province of Trento, we combined field entomological observations with analyses of satellite temperature data (MODIS Land Surface Temperature: LST) and human population data. We determine threshold conditions for the survival of overwintering eggs and for adult survival using both January mean temperatures and annual mean temperatures. We show that the 0°C LST threshold for January mean temperatures and the 11°C threshold for annual mean temperatures provide the best predictors for identifying the areas that could potentially support populations of this mosquito. In fact, human population density and distance to human settlements appear to be less important variables affecting mosquito distribution in this area. Finally, we evaluated the future establishment and spread of this species in relation to predicted climate warming by considering the A2 scenario for 2050 statistically downscaled at regional level in which winter and annual temperatures increase by 1.5 and 1°C, respectively.

CONCLUSIONS/SIGNIFICANCE: MODIS satellite LST data are useful for accurately predicting potential areas of tiger mosquito distribution and for revealing the range limits of this species in mountainous areas, predictions which could be extended to an European scale. We show that the observed trend of increasing temperatures due to climate change could facilitate further invasion of *Ae. albopictus* into new areas.

Link to the article:

<http://www.plosone.org/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0014800&representation=PDF>

Key words: Mosquito-borne diseases, Climate Change

VBORNET comment: 2011-07-18

Roiz *et al.* made a very interesting study examining climatic factors driving the establishment and spread of *Aedes albopictus* in a mountainous region of Northern Italy. Its major strength is the use of recently collected field observations, whereas many similar studies are using data from Asian populations of this species, apart from the work published in 'Development of *Aedes albopictus* risk maps' (ECDC Technical Report, 2009, http://www.ecdc.europa.eu/en/publications/Publications/0905_TER_Development_of_Aedes_Alboipictus_Risk_Maps.pdf).

The latter study covered whole Europe whereas Roiz *et al.* propose a first study at regional level. Based on this example, similar studies should be done in other areas which will help to improve surveillance of introduction and establishment of this invasive mosquito species. Additionally it can guide preparedness for control and for early prevention of mosquito-borne disease transmission. For this last issue, abundance should be modelled as well. Finally, the study demonstrates the importance of collecting field entomological data, which is even more significant considering the possible adaptation of the mosquito to European climate and future climate changes.

2. SCIENTIFIC ADVANCES: TICKS

The hard-tick fauna of mainland Portugal (Acari: Ixodidae): an update on geographical distribution and known associations with hosts and pathogens.

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This work is an updated revision of the available information on Portuguese ixodid tick species. It includes data on tick biology, ecology, taxonomy and host/pathogen-associations. The current list of Portuguese ixodid ticks comprises twenty species: *Dermacentor marginatus* (Sulzer, 1776), *Dermacentor reticulatus* (Fabricius, 1794), *Haemaphysalis hispanica* Gil Collado, 1938, *Haemaphysalis inermis* Birula, 1895, *Haemaphysalis punctata* Canestrini & Fanzago, 1878, *Hyalomma lusitanicum* Koch, 1844, *Hyalomma marginatum* Koch, 1844, *Ixodes acuminatus* Neumann, 1901, *Ixodes bivari* Dias, 1990, *Ixodes canisuga* Johnston, 1849, *Ixodes frontalis* (Panzer, 1798), *Ixodes hexagonus* Leach, 1815, *Ixodes ricinus* (Linnaeus, 1758), *Ixodes simplex* Neumann, 1906, *Ixodes ventalloi* Gil Collado, 1936, *Ixodes vespertilionis* Koch, 1844, *Rhipicephalus (Boophilus) annulatus* (Say, 1821), *Rhipicephalus bursa* Canestrini & Fanzago, 1878, *Rhipicephalus pusillus* Gil Collado, 1938, and *Rhipicephalus sanguineus* (Latreille, 1806).

Link to the article: <http://www.springerlink.com/content/14k270w415417482/>

Key words: Tick-borne diseases

VBORNET comment: 2011-07-28

This work is a synthesis of all the historical reports of tick presence collected in Portugal and represented by administrative regions and smaller administrative divisions. Such data were also completed by tick sampling conducted in targeted areas during the last 15 years. More than 15,000 ticks were collected from humans, domestic and wild animals and from vegetation for morphological identification. This is an amazing and so useful work that totally answers to the ECDC call for tick expert knowledge and shows that past data may be of great importance as basis of knowledge. Such work is also useful to point out some potential changes of tick distribution (expansion or extinction) that should be further investigated in relation to associated pathogens.

Prevalence, distribution and risk associated with tick infestation of dogs in Great Britain.

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Current concerns over the potential impacts of climate change and the increased movement between countries of people and companion animals on the distribution of ectoparasites, highlight the need for accurate understanding of existing prevalence patterns. Without these future changes will not be detected. Here, the distribution and prevalence of tick infestations of domestic dogs in Great Britain were examined. A total of 173 veterinary practices were recruited to monitor tick attachment to dogs in their local areas between March and October 2009. Practices selected five dogs at random each week from those brought to the surgery and undertook a thorough, standardized examination for ticks. Each veterinary practice participated for 3 months before being replaced. Any ticks identified were collected and a sample sent to the investigators for identification, along with a clinical history of the dog. A total of 3534 dogs were examined; 810 dogs were found to be carrying at least one tick. *Ixodes ricinus* (Linnaeus) (Acari: Ixodidae) was identified in 72.1% of cases, *Ixodes hexagonus* Leach in 21.7% and *Ixodes canisuga* Johnston in 5.6% of cases. Five samples of *Dermacentor reticulatus* (Fabricius) (Acari: Ixodidae) were also found, adding to the growing evidence that an established population of *D. reticulatus* now exists in south-eastern England. Almost all the ticks found were adults. Overall, 19.2% of the veterinary practices reported no tick detections, 50% reported that $\geq 14.9\%$ of the dogs seen were infested and 14.6% reported that $>50\%$ of the dogs inspected carried ticks. The estimated incidence of tick attachment was 0.013 per day in March (lowest) and 0.096 per day in June (highest). A number of risk factors affected the likelihood of tick attachment on dogs. Gundog, terrier and pastoral breed groups were more likely to carry ticks, as were non-neutered dogs. Dogs with shorter hair were less likely to have ticks, and dogs were most likely to carry a tick in June. This study is of value because, unusually, it presents the results of a randomized sample of dogs and gives a prevalence which is higher than those previously recorded in Great Britain.

Link to the article:

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2915.2011.00954.x/pdf>

Key words: Tick-borne diseases

VBORNET comment: 2011-07-28

This study presents results from active surveillance conducted on dogs from March to October 2009 concerning their tick infestation. Thanks to a strict sampling protocol (especially the randomized sample of dogs), it was possible to assess a monthly tick attachment rate (=infestation incidence) and a tick infestation prevalence. Such data are usually rare even essential for designing any further field studies on tick ecology and tick-borne diseases. These results show that the tick infestation prevalence found in dogs from Great Britain is much higher than expected, suggesting an under-estimation of the tick burden for domestic animals and also humans. Useful information should have been also to distinct tick infestation for each tick species, which is commonly requested when studying a disease transmitted by specific tick species. However, this study provides important insights for Great Britain and is very complementary to recent work published by the Health Protection Agency of tick distribution during the 10 last years in UK.

3. SCIENTIFIC ADVANCES: PHLEBOTOMINE SAND FLIES

Phlebotomus (Transphlebotomus) mascittii Grassi, 1908, in Carinthia: first record of the occurrence of sandflies in Austria (Diptera: Psychodidae: Phlebotominae).

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During an entomology survey in July 2009 and July 2010, 4 males and 22 females of *Phlebotomus (Transphlebotomus) mascittii* were caught in southeastern Carinthia. These are the first documented records of the occurrence of Phlebotominae in Austria.

Link to the article: <http://www.springerlink.com/content/2153743jj8534201/>

Key words: Leishmaniasis

VBORNET comment: 2010-06-01

Phlebotomus mascittii was originally described from Rome (Italy) and subsequently found in several Mediterranean regions from Spain in the west to Turkey in the east. Moreover, it has been found north of the Alps in Switzerland, France, southern Germany, and Belgium. This study describes the first findings of *P. mascittii* in Carinthia, the southernmost region of Austria of which the fauna includes many Mediterranean elements. Whether the species is present since a long time as very low and hardly detectable populations or is extending its distribution area is unclear. *Phlebotomus mascittii* has never been proven to be a vector of leishmaniasis, but it is noteworthy that when it occurs in Leishmania infantum-endemic regions, it is often captured in small numbers in association with highly dense populations of the main local vector. To date, no data are available on the natural and/or experimental infection of females. Nevertheless, the affinity of *P. mascittii* to the subgenera *Adlerius* and *Larrousius*, which include all the potential vectors of Mediterranean leishmaniasis, suggests that the role of this species should no longer be overlooked, especially in areas where Leishmania infections have become the most frequently imported arthropod-borne disease in dogs. In this study, *P. mascittii* was caught in places situated close to human dwellings, suggesting it to become important for human leishmaniasis.

Infectivity to *Phlebotomus perniciosus* of dogs naturally parasitized with *Leishmania infantum* after different treatments.

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BACKGROUND: In Europe most dogs with clinical leishmaniasis are treated with leishmanicides, typically antimonials combined with allopurinol and good clinical recovery is observed in a high number of these dogs. Through xenodiagnosis, the capacity of a treated animal to infect the vector of the disease under treatment is assessed as a measure of the chemotherapeutic efficacy of the drug used. The objective of the present study was to evaluate through direct xenodiagnosis the infectivity to *Phlebotomus perniciosus* of dogs naturally parasitized with *Leishmania infantum* after treatment, and to follow the clinical and parasite course of disease. 32 dogs with clinical leishmaniasis were assigned to one of three treatment groups: meglumine antimoniate plus allopurinol (Group A), meglumine antimoniate (Group B) or allopurinol (Group C). During the study, the dogs were examined before treatment (Day 0) and bimonthly thereafter until Day 180 (six months post-treatment onset).

RESULTS: The three groups were scored over time according to the effects of treatment on clinical signs and clinical-pathological variables. Significant differences in clinical scores were observed between Group A and the other two groups, indicating the combined treatment was the most effective. After treatment, bone marrow cultures were positive for the parasite in 30.8% of dogs in some of the check ups (3 or 25% in Group A, 1 or 11.1% in Group B, and 4 or 80% in Group C). Our xenodiagnosis experiments revealed that 15.4% of treated dogs were still able to infect sand flies at some point after treatment (2 dogs or 16.6% in Group A, 2 or 22.2% in Group B, and none in Group C). Only 7.7% of the entire study population could infect sand flies as from the second month post-treatment onset.

CONCLUSION: The three treatment regimens tested significantly reduced the infectivity of dogs towards sand flies, thus diminishing the epidemiological risks of treated dogs both for human beings and other healthy dogs. Despite its low cure rate, the use of allopurinol after a course of leishmanicide treatment is proposed to keep dogs non-infectious during the disease transmission season (4-6 months in southern Europe).

Link to the article: <http://www.parasitesandvectors.com/content/pdf/1756-3305-4-52.pdf>

Key words: Leishmaniasis

VBORNET comment: 2010-06-01

The presence of clinically cured dogs that remain infective and serve as reservoir of the parasite is a major issue for the control of canine leishmaniosis (CanL). In this study, the authors assessed the efficacy of meglumine antimoniate combined with allopurinol on dogs through xenodiagnosis. In terms of public health, this study (1) confirms the need to treat sick dogs as they can infect sand flies and represent thus a serious epidemiological risk, and (2) validates the xenodiagnostic approach as a useful tool to measure the efficacy of new drugs or treatment regimens and epidemiological risks of CanL.

