

## VBORNET Newsletter Year 2 Issue 1, October 2010

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### 1. VBORNET: SECOND YEAR

After a successful first year, VBORNET has now started its second year. As you may see from the graph shown below (Fig.1), more than 320 vector borne disease (VBD) experts have now downloaded our vector distribution tool with one peak of activity after our Annual General Meeting in Antwerp (June 2010) and another in October. In addition we have also disseminated a VBD-Public Health questionnaire to the ECDC national Public Health contact points to help us assess the state of VBD surveillance activities in Europe. Other major activities have included the publication of eight (8) Newsletters, of which three are special issues on mosquitoes, ticks and phlebotomines; and the publication of one risk assessment document on invasive mosquitoes and six (6) factsheets on each of *Aedes albopictus*, *Aedes japonicus*, *Aedes aegypti*, *Aedes koreicus*, *Aedes atropalpus* and *Aedes triseriatus*. All this information (and much more!) can be downloaded from our websites:

- <http://www.ecdc.europa.eu/en/activities/diseaseprogrammes/Pages/VBORNET.aspx>
- <http://edendatasite.com/> (click VBORNET tab)

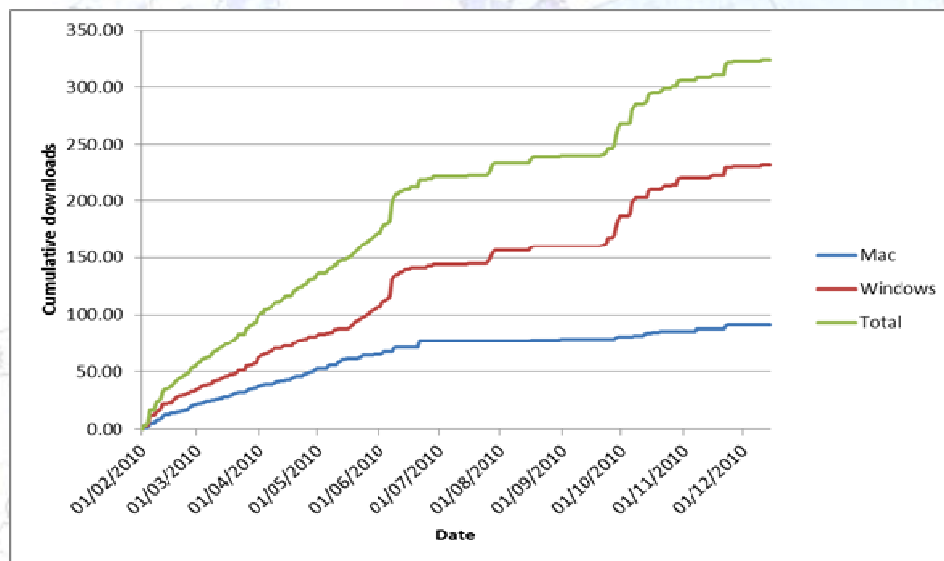


Figure 1 – Cumulative downloads from VBORNET website

#### Vector distribution maps

During the first year we focused on making the network known, developing tools and establishing a data validation procedure. For this second year our priority is to obtain and process more contributions to the shared vector data base and produce updated vector distribution and surveillance maps for the main arthropod vector species of public health importance in Europe.

By the end of the first year, maps for invasive mosquito species were available including: *Aedes albopictus*, *Aedes japonicus* and *Aedes aegypti*. For other vector species, data validation was still in progress. This has now been finalized and the current (October 2010) availability of distribution maps is given in Table 1. It is important to note that the procedure adopted by VBORNET is dynamic. Every three months<sup>1</sup> an update is uploaded for each species at four NUTS levels. For each map the legend

<sup>1</sup> Next update will be uploaded in January 2011

includes a 'No data' and 'Unknown' category. At any one time a VBORNET map shows the status of quality controlled information communicated to the network by confirmed experts. Experts are thus invited to examine the maps and communicate any information (including error reporting) they may have enabling us to further complete and improve the map quality. It is clear that the scarcity of available information increases with a finer spatial resolution (See Fig.2). It is also to be noted that there is often no records of confirmed absence – which is very necessary to complete the maps, so we ask contributors to provide this information if at all possible.



**Figure 2 – Currently available validated information on the presence of *Phlebotomus neglectus* respectively at NUTS 0, 1, 2 and 3. Note no information on observed absence is as yet available**

Vector species	Type	NUTS level			
		0	1	2	3
<i>Aedes albopictus</i>	Distribution	x	x	x	x
<i>Aedes japonicus</i>	Distribution	x	x	x	x
<i>Aedes aegypti</i>	Distribution	x	x	x	x
<i>Invasive Aedes species</i>	Surveillance	0	x	x	x
<i>Dermacentor reticulatus</i>	Distribution	x	x	x	x
<i>Hyalomma marginatum</i>	Distribution	x	x	x	x
<i>Ornithodoros sp.</i>	Distribution	x	x	x	x
<i>Rhipicephalus sanguineus</i>	Distribution	x	x	x	x
<i>Phlebotomus ariasi</i>	Distribution	x	x	0	0
<i>Phlebotomus neglectus</i>	Distribution	x	x	x	x
<i>Phlebotomus papatasi</i>	Distribution	x	x	x	x
<i>Phlebotomus perfiliewi</i>	Distribution	x	x	x	x
<i>Phlebotomus perniciosus</i>	Distribution	x	x	0	0
<i>Phlebotomus sergenti</i>	Distribution	x	x	x	x
<i>Phlebotomus similis</i>	Distribution	x	x	x	x
<i>Phlebotomus tobbi</i>	Distribution	x	x	x	x

**Table 1 – Current status of vector distribution maps**

In addition to the list of vectors mentioned above, VBORNET is now also inviting contributions on:  
 MOSQUITOES: *Anopheles plumbeus*, *Aedes vexans*, *Culex modestus*.  
 TICKS: *Ixodes ricinus*, *Ixodes persulcatus*.  
 PHLEBOTOMINES SAND FLIES: *Phlebotomus alexandri*, *Phlebotomus mascitii*.

Regarding ticks collaboration with EFSA has been established and the recently compiled EFSA tick data base is currently being merged with the VBORNET database.

We look forward to your contributions not only on vector presence, but also on confirmed absence!

#### THE VBORNET CONSORTIUM

## 2. SCIENTIFIC ADVANCES: VECTOR-BORNE DISEASES

### Ecological approaches to informing public-health policy and risk assessments on emerging vector-borne zoonoses

Jolyon Medlock, Lisa Jameson

Health Protection Agency, Medical Entomology & Zoonoses Ecology, Porton Down, United Kingdom.

Emerging Health Threats Journal, 2010, 3:e1. doi: 10.3134/ehj.10.001.

Pathogens associated with vector-borne zoonoses occur in enzootic cycles within nature. They are driven by a combination of vertebrate host and invertebrate vector population dynamics, which in turn

respond to changes in environmental stimuli. Human involvement in these cycles, and hence the occurrence of human disease, is often to act as incidental hosts. From a public health perspective our ability to better predict human outbreaks of these diseases and prepare intervention and mitigation strategies relies upon understanding the natural cycle of pathogen transmission. This requires consideration of for example, invertebrate and vertebrate ecology and biology, climatology, land use and habitat change. Collectively these can be referred to as medical entomology and medical ecology. This paper reviews the importance for inclusion of such disciplines when assessing the public health risk from vector-borne zoonoses and summarises the possible future challenges and driving forces for changes in vector status and vector-borne zoonoses emergence, with a particular focus on a UK and European context.

Link to the article: <http://www.eht-forum.org/ehit/journal/v3/pdf/ehitj10001a.pdf>

Key words: Zoonoses, Risk Assessment

#### **VBORNET comment: 2010-11-30**

Medlock and Jameson discuss in this paper how an ecological approach could and should inform public health policy and risk assessments on emerging vector-borne zoonoses, with focus on a UK and European context. They stress that with an ecological perspective, the risk assessment processes are in some occasions speeded up, complicated in others or guided to the weakest point in the transmission cycle and consequently to more efficient and effective intervention measures. Others authors have preceded them in discussing the complexity of these infections and role of multiple drivers for emergence, but have often stayed in using generic terms. By using appealing examples from their own work at the Medical Entomology and Zoonoses Ecology (MEZE) group, Health Protection Agency, non-medical entomologists will be able to appreciate the complexity and the future challenges of emerging vector borne zoonoses, and the necessity to take the ecology into account to prevent major errors, to avoid pitfalls or not to miss opportunities to lower disease burden or threats.

### **3. SCIENTIFIC ADVANCES: MOSQUITOES**

#### **West Nile virus in Europe: understanding the present to gauge the future**

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Eurosurveillance, March 2010,15(10):pii=19508, 4-10

The appearance of West Nile virus in New York in 1999 and the unprecedented panzootic that followed, have stimulated a major research effort in the western hemisphere and a new interest in the presence of this virus in the Old World. This review considers current understanding of the natural history of this pathogen, with particular regard to transmission in Europe.

Link to the article: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19508>

Key words: West Nile Fever

#### **VBORNET comment: 2010-25-11**

The author revisits West Nile transmission in Europe, under the light of the outbreak that recently experienced the New World (1999-2009), and making an interesting parallel with Saint Louis encephalitis virus transmission in the USA. Therefore, many references report to observations made in the USA, and some more recent events from Europe are not included (Italy 2008-2009: see Lelli R., Euro Surveill. 2010, 15(15): pii=19538), as are not the 2010' summer outbreaks. The author mainly emphasizes transmission between vertebrates, which contributed most probably to the maintenance of the transmission cycles and the speed of its dispersal through the Americas, but mosquito bites may still be considered a major transmission route and little comprehensive analysis is given on the diverse mosquito fauna contexts in Europe. In his conclusion, the author minimizes the impact of West Nile in Europe, based on little incidence on human and animal health. In 2010 viruses from lineage I and II have been isolated in several countries in Europe. Since the first identification of lineage II WN virus in birds in 2003-2004, it has also been reported in humans in Volgograd in 2007 and in Greece in 2010 (Bakonyi *et al.*, Emerg Infect Dis. 2006, 12(4): 618-23; Papa A., ProMED-mail 16 Aug 2010, archive no. 20100816.2843).

## 4. SCIENTIFIC ADVANCES: TICKS

### Distribution of Far-Eastern TBEV subtype strains in the former Soviet Union

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Journal of General Virology, 2010, 91: 2941-2946; doi:10.1099/vir.0.023879-0

European and Asian viruses within the tick-borne encephalitis *Flavivirus* complex are known to show temporal, spatial and phylogenetic relationships that imply a clinal pattern of evolution. However, the isolation of recognized Far-Eastern TBEV strains in the European region of the former Soviet Union (SU), i.e. thousands of kilometers west of the region in which they are considered endemic, appears to contradict this concept. Here, we present a parsimonious explanation for this apparent anomaly based on analysis of the dates and regions in which these non-endemic strains were isolated, together with their phylogenetic relationships and the records of re-distribution of animals under the All-Union Programme for acclimatisation of game animals within the former SU. Our evidence supports the concept that the anomalous distribution of Far-Eastern strains in Europe and Siberia arose primarily as the result of large-scale westward re-distribution of game animals for economic purposes.

Link to the article: <http://vir.sgmjournals.org/cgi/content/abstract/91/12/2941>

Key words: Tick-borne encephalitis

### VBORNET comment: 2010-12-07

This is an interesting study since many investigations have been conducted these last decades on European TBEV (EU-TBEV) transmitted by *Ixodes ricinus* but little information is available on other Eurasian strains like Far-Eastern TBEV (FE-TBEV) and Siberian TBEV (S-TBEV) transmitted by *Ixodes persulcatus*. In this paper, a nice effort is done to link molecular epidemiological data obtained by genotyping and localizing these virus strains and possible environmental factors explaining such observed patterns (natural animal migrations versus anthropogenic changes acting on vertebrate host location for ticks). The authors show that most FE-TBEV emergence events have been located in the western part of Europe, where S-TBEV is commonly endemic. Such emergence could be explained by the all-Union program of acclimatization and resettlement of game mammals and birds (reservoir hosts of FE-TBEV) from east to west, from the beginning of the 1930s until the middle of the 1990s. Although this explanation is the most likely there is no evidence of such phenomenon like the analysis of isolates from wild transferred animals. In addition, since the program finished in the 1990s, the existence of recent foci of FE-TBEV in the Sverdlovsk region remains unexplained. Far eastern TBE viruses have been also detected in Estonia, and their presence was not explained (see e.g. Golovljova et al., 2004. 74(4): 580-588; Golovljova et al., 2008. Int. J. Med. Microbiol., 298: 108-120). The article brings however some piece of evidence.

### Tick Surveillance in Great Britain

Jameson LJ, Medlock JM.

Medical Entomology & Zoonoses Ecology, Microbial Risk Assessment, Emergency Response Department, Health Protection Agency, Salisbury, Wiltshire, United Kingdom.

Vector-Borne and Zoonotic Diseases, 2010 Sep 17, ahead of print. doi:10.1089/vbz.2010.0079

The ability for public/veterinary health agencies to assess the risks posed by tick-borne pathogens is reliant on an understanding of the main tick vector species. Crucially, the status, distribution, and changing trends in tick distribution and abundance are implicit requirements of any risk assessment; however, this is contingent on the quality of tick distribution data. Since 2005 the Health Protection Agency has promoted an enhanced tick surveillance program. Through engagement with a variety of public and veterinary health agencies and practitioners (e.g., clinicians and veterinarians), wildlife groups (deer society, zoos, animal refuge centers, and academics), and amateur entomologists, >4000 ticks from 900 separate records across Great Britain have been submitted, representing 14 tick species (*Ixodes ricinus*, *Ixodes hexagonus*, *Ixodes acuminatus*, *Ixodes arboricola*, *Ixodes canisuga*, *Ixodes frontalis*, *Ixodes lividus*, *Ixodes trianguliceps*, *Ixodes ventralis*, *Carios vespertilionis*, *Dermacentor reticulatus*, *Haemaphysalis punctata*, *Hyalomma marginatum*, and *Amblyomma* species). The majority of ticks submitted were *I. ricinus* (81%), followed by *I. hexagonus* (10%) and *I. frontalis* (2.5%). Predominant host groups include companion animals (411 records), humans (198 records), wild birds (111 records), and large wild mammals (88 records), with records also from small/medium wild



mammals, livestock, the environment and domestic/aviary birds. The scheme has elucidated the detection of two non native tick species, the expansion of previously geographically restricted *D. reticulatus* and produced ground data on the spread of *I. ricinus* in southwest England. It has also provided a forum for submission of ticks from the concerned public and particularly those infected with Lyme borreliosis, thus raising awareness among public health agencies of the increased peri-urban tick problem in Britain. Our results demonstrate that it is possible to run a cost-effective nationwide surveillance program to successfully monitor endemic tick species, identify subtle changes in their distribution, and detect the arrival and presence of exotic species.

Link to the article: <http://www.liebertonline.com/doi/abs/10.1089/vbz.2010.0079>

Key words: Tick-borne diseases

#### VBORNET comment: 2010-12-07

This paper is a really nice analysis of results provided by a national tick surveillance program conducted from 2005 and 2009 in Great Britain by HPA. This study shows that useful information on tick distribution and ecology can be obtained from passive surveillance based on punctual records from public, veterinarians, clinicians, wildlife charities and academics from across Great Britain. This is a good example of how it may be possible to organize and encourage all these actors to report any single fact that may be included in a national database and then acquire an epidemiological significance. However, such type of sampling presents some biases (which the authors seem to be aware of) like host preferences or distribution changes since samples mainly come from individuals or professionals related to public health problems or pet issues. For example, the apparent extension or at least increase of abundance of *Ixodes ricinus* in the south-western part of the country is difficult to be interpreted since we do not know if the historical sampling effort was the same as the HPA recent one. The solution to resolve such issue of heterogeneous data and methods may be to develop distribution models based on presence data for both periods and see if the predicted suitable areas are different or not. Because one of the explanations proposed by the authors is the increase of the deer population in this region, likely vertebrate host density should be included in the models.

#### Pathogens and symbionts in ticks: a survey on tick species distribution and presence of tick-transmitted micro-organisms in Sardinia, Italy

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Journal of Medical Microbiology, 2010 Sep 30, ahead of print, doi:10.1099/jmm.0.021543-0

A total of 1485 adult ticks were collected from mammal hosts in Southeastern Sardinia, Italy, during the years 2007-2008. Ticks were identified and tested by PCR analysis for presence of *Rickettsia* spp. of the spotted fever group (SFG), *Ehrlichia canis*, *Anaplasma phagocytophilum*, *Coxiella burnetii*, *Bartonella* spp. and *Leishmania* spp.. Among all tick species examined (*Rhipicephalus sanguineus*, *Rhipicephalus turanicus*, *Rhipicephalus bursa*, *Rhipicephalus pusillus*, *Hyalomma marginatum marginatum*, *Haemaphysalis sulcata* and *Dermacentor marginatus*), only *H. marginatum marginatum* produced negative results. A total of 22 pools belonging to the three tick species *R. sanguineus* (0.9%), *R. turanicus* (4.5%), and *R. pusillus* (100%) were positive for *Rickettsia* spp., while a total of 5 pools belonging to *R. sanguineus* (0.09%), *H. sulcata* (16.7%), and *D. marginatus* (7.8%) were positive for *E. canis*. 5 pools of *R. turanicus* (1.8%) were positive for *A. phagocytophilum*. Positivity for *C. burnetii* was found in 7 pools belonging to three tick species: *R. sanguineus* (0.5%), *R. turanicus* (0.3%) and *H. sulcata* (4.4%). Finally, 4 pools belonging to *R. sanguineus* (0.09%), *R. turanicus* (0.7%), and *R. bursa* (1.1%) were positive for *Bartonella* spp.. *Leishmania* spp. DNA was not detected in any of the tick pools examined. Data presented here increase our knowledge on tick-borne diseases in Sardinia, and provide a useful contribution to understanding their epidemiology.

Link to the article: <http://jmm.sgmjournals.org/cgi/content/abstract/jmm.0.021543-0v1>

Key words: Tick-borne diseases, Rickettsial infection

#### VBORNET comment: 2010-12-07

In this paper, the authors present results produced by a two-year screening study on ticks from Sardinia for different tick-associated pathogens. They show that *Rhipicephalus sanguineus* is predominant and presents the most important diversity of pathogens, with its counterpart *Rhipicephalus turanicus*. They also confirm host preferences of ticks, as previously described. This descriptive work gives some useful data on tick presence and tick-associated pathogens in Sardinia. However, it seems ambiguous from the authors to announce a survey on tick distribution since only two zones of Sardinia have been examined and are treated together for the result interpretation. It is also astonishing that PCR for at least *Wolbachia* were not realized while the authors propose a survey of tick symbionts.

## 5. SCIENTIFIC ADVANCES: PHLEBOTOMINE SAND FLIES

### Leishmaniasis emergence in Europe

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Eurosurveillance, March 2010, 15(10):pii=19505, 29-39

Leishmaniasis emergence in Europe is reviewed, based on a search of literature up to and including 2009. Topics covered are the disease, its relevance, transmission and epidemiology, diagnostic methods, treatment, prevention, current geographical distribution, potential factors triggering changes in distribution, and risk prediction. Potential factors triggering distribution changes include vectorial competence, importation or dispersal of vectors and reservoir hosts, travel, and climatic/environmental change. The risk of introducing leishmaniasis into the European Union (EU) and its spread among Member States was assessed for the short (2-3 years) and long term (15-20 years). There is only a low risk of introducing exotic *Leishmania* species because of the absence of proven vectors and/or reservoir hosts. The main threat comes from the spread of the two parasites endemic in the EU, namely *Leishmania infantum*, which causes zoonotic visceral and cutaneous leishmaniasis in humans and the domestic dog (the reservoir host), and *L. tropica*, which causes anthroponotic cutaneous leishmaniasis. The natural vector of *L. tropica* occurs in southern Europe, but periodic disease outbreaks in Greece (and potentially elsewhere) should be easily contained by surveillance and prompt treatment, unless dogs or other synanthropic mammals prove to be reservoir hosts. The northward spread of *L. infantum* from the Mediterranean region will depend on whether climate and land cover permit the vectors to establish seasonal biting rates that match those of southern Europe. Increasing dog travel poses a significant risk of introducing *L. infantum* into northern Europe, and the threat posed by non-vectorial dog-to-dog transmission should be investigated.

Link to the article: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19505>

Key words: Leishmaniasis

### VBORNET comment: 2010-12-04

This review addresses the current situation of leishmaniasis in Europe on the basis of recently published documents (most of them during the last 10 years). According to WHO reports, the worldwide public health impact of leishmaniasis has been grossly underestimated for many years. In Europe only southern countries are affected, the high prevalence of asymptomatic human carriers of *L. infantum* suggesting that this parasite is a latent public health threat. This was demonstrated by the increase of co-infections with human immunodeficiency virus (HIV) and *Leishmania* that has been observed since the 1980s. Risks of emergence or re-emergence of leishmaniasis in Europe are considered under three scenarios: 1) the introduction of exotic *Leishmania* species into Europe via traveling of humans and domestic dogs, 2) the natural spread of visceral and cutaneous leishmaniasis caused by *L. infantum* and *L. tropica* from the Mediterranean region of Europe to neighbouring countries, 3) the re-emergence of disease in the Mediterranean region of Europe caused by an increase in the number of immunosuppressed people. Geographical distribution maps for Europe (updated to 2009) of human leishmaniasis due to *L. infantum* and *L. tropica* and also of the main vectors are given at country level. These maps are interesting, however their low precision needs to be taken into account, i.e. Germany appears in grey colour, suggesting colonization by *P. perniciosus*, whereas only a single observation has been reported so far from that country, moreover on a site having undergone dramatic environmental modifications suspected to have led to the extinction of that population. Updated maps will be edited at lower scale (admin nuts3 level) for these vectors within the VBORNET programme. Risk prediction models based on compartmental mathematical ( $R_0$ ) models have been developed within the EU-founded research programme EDEN and huge amount of data have been compiled and made accessible, also by LeishRisk, another international collaborative project, for the peer-reviewed literature on leishmaniasis epidemiology. However, it is stressed that public health and veterinary surveillance data are still fragmentary and in accordance to WHO recommendations, it is stated that more surveillance is necessary in Europe to assess an emergence of leishmaniasis. The author put the emphasis on the need of better coordination of existing surveillance, on notification of leishmaniasis, as they are notifiable in some countries (Greece, Italy, Portugal, Turkey, parts of Spain) and not in others (France), and on surveillance of dog travel. As for the vectors, data sharing on their current distribution is now in place (VBORNET programme) but monitoring of presence and abundance provides also key data for assessing and managing risk of transmission.

## 6. VECTOR BORNE DISEASE EVENTS



### **IMED 2011, The third International Meeting on Emerging Diseases and Surveillance 04-07 February 2011 – Hilton Am Stadtpark, Vienna, Austria**

The emergence of cholera in Haiti once again reminds us of the ferocity with which infectious diseases can strike and of the complex interactions of emerging infectious diseases with social conditions, human migration, and the ecosystem. These and other topics will be the subject of the upcoming IMED 2011 meeting. Once again, IMED will fully recognize the commonality of human and animal health in a true "one health" endeavor.

How can we better understand, predict, prepare, and prevent emerging disease outbreaks in man and animals? Join leaders in the field in Vienna for the third IMED.

Topics include: Wildlife and the drivers of disease emergence – New and emerging arenaviruses – Pandemic influenza: One flu, one health – Food and water borne pathogens – Innovations in disease surveillance – Emerging antibiotic resistance – Q fever outbreak in the Netherlands – Public communication of disease outbreaks – Vaccines and vaccine preventable disease outbreaks – Public communication, new media and emerging infectious diseases

The congress web site <http://imed.isid.org/>

Scientific program: <http://imed.isid.org/symposia.shtml>

Abstract submission: <https://esociety.netkey.at/isid/imed/abstractsubmission/> – Deadline December 1, 2010.

Online registration and hotel reservation: <https://esociety.netkey.at/sreg/imed/www/index.php>



### **International Symposium on Phlebotominae Sand Flies (ISOPS VII) 25-30 April 2011 – Pine Bay Hotel, Kuşadası, Turkey**

Kusadasi is one of the endemic sites of human and canine leishmaniasis (*L. infantum*) in western Turkey. It is 80 km from Izmir city centre and one of the most popular holiday resorts on west coast of Turkey. The town is close to the remains of many archeological and natural sites.

The programme is not yet available but main topics of the meeting will be : Collecting sand flies – Repositories for sand flies and sand fly colonies – Taxonomy and genetics – Ecology – Physiology and immunology – Sand fly Saliva and immune response to sand fly bites – *Leishmania*-sand fly interaction – Other pathogens in sand flies – Sand fly control as a part of integrated leishmaniasis control programs

Abstracts sent by participants can be published as supplement of Turkish Journal of Parasitology (This journal is covered by Index Medicus and other international databases – [www.tparazitolderg.org](http://www.tparazitolderg.org)).

Link to the website: <http://www.isops7.org>

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