



SYMPOSIUM ON TICK AND TICK-BORNE DISEASES (ITTBD), WEIMAR, GERMANY, 28-30 MARCH 2019

The first ITTBD took place in 1991 in Potsdam in Germany and since then was organized every second year until 2013.

Now, it has been established again by the conference chairs Ard Nijhof, Olaf Kahl and Jochen Süß under the auspices of the German Society for Parasitology and was held in Weimar, Germany. More than 200 participants joined 40 lectures and over 100 posters.

In this report, some contributions are reflected. If interested in details, the reader can have a look into the program: www.ittbd-symposium.com.

The abbreviations below indicate the designation of the oral presentations and the posters in the abstract book.

Epidemiology of TBE

One of the primary topics was the epidemiology of TBE in Europe and Asia.

In some countries in Europe, a peak of reported TBE cases has been observed last year (e.g. Germany, Switzerland, Austria). Dobler (O5) showed that after a relatively cold spring in 2018 and a sudden increase of temperature in May made people spend more time outside, resulting in a drastic increase of TBE cases in June/July 2018 (weeks 19-27), indicating that short-term weather conditions can have a significant effect on acquiring TBE. While the incidence of TBE in Germany decreased in the northern regions of the Federal States of Bavaria and Baden-Wuerttemberg, an increase was observed in the northern parts of these states (O5). Interestingly, for the first time a county in the Federal State Lower Saxony has been declared as TBE risk area

by the Robert Koch-Institute in Berlin. The virus isolates in this region are genetically related to TBE virus from Poland isolated in 1971 (Boelke, TBP-16).

In the past (about 50 years ago), TBE cases had been observed in North-Eastern Germany in Mecklenburg-Western Pomerania (MWP), while nowadays, this region is regarded as non-risk area. More than 2600 ticks have been collected in this Federal State in 2018, but no TBE virus could be detected by RT-qPCR (but about 25% were positive for *Borrelia*) (Raileanu, LB-12). However, Frimmel (O7) could detect neutralizing TBE antibodies in sera from sheep in MWP.

A study to determine the clinical outcome, epidemiology and prevalence of tick-borne pathogens in Scandinavia and carried out from 2008 to 2015 indicate a low risk to acquire tick-transmitted diseases. Volunteers bitten by a tick were asked to detach the tick and to deliver it to one of more than 60 health care centers in Sweden, Finland and Norway, and to deliver a blood sample and to fill in a questionnaire. The risk of contracting a *Borrelia* infection after a tick bite with an infected tick is around 2%. About 25% of the ticks harbored *Borrelia* bacteria (50% *B. afzelii*), 5% of persons bitten by an infected spirochete showed symptoms and 2.1% developed Lyme Borreliosis (Lindgren, O33). About 0.23% of the ticks taken from persons contained TBE virus and 20% of persons bitten by a TBE virus infected tick developed symptoms. In the Italian province of Trento, the incidence rate for TBE has increased five-fold in the time period from 2012 to 2017 compared to 20 years before (1992-2011). Tagliapietra (O35) determined a



prevalence of 0.15% of TBE virus in ticks from this region (0.5% for adults and 0.1% for nymphs) which is in a similar range compared to Scandinavia (see O33).

A higher prevalence of TBE virus was found in Karelia (Russian Federation). Here, in the most infested area, the infection rate of *I. persulcatus* with TBE virus (Siberian subtype) was about 2.2% (Bugmyrin, TBP-4).

In the Republic of Tuva (Russian Federation), expeditions were carried out in various regions (forest-steppe, steppe zones and mountains) and more than 2700 ticks were collected and analyzed. *Dermacentor silvarum* disappeared after 1300 m above sea level, but *Ixodes persulcatus* was found up to 1538 m and *Dermacentor nuttalli* up to 2016 m. TBE virus could be isolated from all three tick species in 1000 to 1500 m altitude and there was no difference in infection rate among the various tick species. All strains were of Siberian subtype.

While TBE is a reportable disease in Poland since 1970, testing for microbiological confirmation of the disease is not available in all parts of the country. In the framework of a study to detect TBE cases, anti-TBEV testing was offered free of charge to patients with aseptic meningitis treated in one of 20 participating hospitals. During 5 months of the prospective study, 17 TBE cases were confirmed in 212 samples. Some cases had been diagnosed in regions that had previously been considered to be free of TBEV. The authors conclude that TBEV cases are underdiagnosed in Poland (Zajkowska, TBEV-15).

New methods

The precise identification of ticks is crucial to define their potential role as vectors and so far, this is done by morphological analyses and molecular methods. Boyer (O44), who declared to be absolutely not a tick expert while working in a clinical lab adapted the MALDI-TOF MS (by which he identifies more than 1500 bacteria per week)

to identify ticks. Four legs were cut from the ticks (to avoid possible cross-reaction by blood from a host) and were individually tested by MALDI-TOF MS and the intraspecies reproducibility and the interspecies specificity of the MS were evaluated. A total of 246 tick specimens were submitted to MALDI-TOF MS and blind tests with the created databank showed 98.5% of correct identification.

MALDI-TOF MS has also been used by Schulz (O53) to discriminate between three of the most common *Hyalomma* species (*H. truncatum*, *H. rufipes* and *H. dromedari*) in sub-Saharan Africa.

Alimentary TBE virus infection route

Two contributions were focusing on the alimentary route of TBE infection. Zajkowski (TBEV-14) presented data from Poland. Between 2000 and 2015, a total of 3662 TBE cases had been reported, of which 45% occurred in the northeastern region of Poland (Podlaskie Voivodeship). Various alimentary TBE epidemics have been reported in 1975, 1995 and 2014. In July 2017, four monks who were living in the same monastery and who were on a vegetarian diet had consumed raw goat milk (as source of protein) and acquired TBE (with a biphasic course). None of the patients had previously received TBE vaccinations.

Norway is a country with a low incidence of TBE (169 cases reported between 1997 and 2018) with most cases occurring in the south of the country. Using RT real-time PCR and pyrosequencing, TBEV RNA was identified in 5.4% of unpasteurized milk samples from 112 cows from 5 farms in Brønnøy, Finnøy, Mandal, Arendal and Skedsmo (Norway). Neutralizing anti-TBEV-antibodies were only found in animals from one farm at Arendal (southern Norway) with a prevalence of 88.2% (Paulsen, TBEV-10).



New tick species *Ixodes inopinatus*

The recently newly described tick species *Ixodes inopinatus*, which is closely related to *I. ricinus* has so far been reported from southern Germany, Austria and Romania outside of some Mediterranean countries. So far, the role of pathogen transmission of this tick species is unknown, Hauck (T&O-13) has collected nearly 4000 ticks in northern Germany (Hamburg and Hannover), of which 3.56% were identified as *I. inopinatus*. Among 137 *I. inopinatus* ticks analyzed for bacteria, 33.6% harbored *Borrelia* spp., 45.99% *Rickettsia* spp. and 2.92% *Anaplasma phagocytophilum*. *I. inopinatus* was also found by Knoll (TBP-13) in other regions of Lower Saxony, near Kassel and in Emsland close to the Dutch border.

Nonspecific Tick-Prophylaxis

In Russia, about 500,000 tick bites are reported and registered annually and a study by Natalia Shashina from the Scientific Research Institute of Disinfectology investigated the impact of acarologicals to reduce the number of ticks/ tick bites in the Irkutsk region. Treatment with cypermethrin-, alpha-cypermethrin-, cyfluthrin-, deltamethrin and fenthion-based insecticides was used in (sub-) urban green spaces especially in areas surrounding nursing homes, health centers and children's health facilities and is believed to have a 98% "efficiency" with no resistance observed. (Shashina, T&O-30).

Ticks around soccer grounds in Germany

Thirty-two football fields located in any of the 16 federal states were chosen with the consent of the owners to collect questing ticks by a standardized flagging approach. In total, 807 nymphs and adult ticks were collected around 29/32 football fields, with 88.5% *I. ricinus*, 7.9% *I. inopinatus* and 0.2% *I. frontalis*. The remaining 3 football fields were located in an urban environment (Kämmer, T&O-16).

Antivirals against TBE

Naturally occurring stilbenes are found in plants like wine, berries, vegetable or pines and anti-viral activity has been documented for some of them. Maskova et al. found inhibition of the cytopathic effect of the TBEV as well as reduced amounts of the TBEV in cell culture by using 3 substances designated resveratrol "RSV", derivatives of piceid acid "PIC" and viniferin "VIN". Furthermore, survival of mice was improved by these substances, and pretreatment with interferon- β resulted in additional significant survival (Maskova, TBEV-9).

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