

Tick burden on European roe deer as indicator of TBE endemic foci in areas with low TBE incidence in Saxony, Germany

Nina Król¹, Lidia Chitimia-Dobler², Gerhard Dobler², Yauhen Karliuk¹, Stefan Birka³, Martin Pfeffer¹

¹ Institute of Animal Hygiene and Veterinary Public Health, University of Leipzig, Leipzig, Germany; ² National Consulting Institution for TBE, Bundeswehr Institute of Microbiology, Munich, Germany; ³ Institute of Food Hygiene, Faculty of Veterinary Medicine, University of Leipzig, Leipzig, Germany

The south of Germany is recognized as tick-borne encephalitis (TBE) risk area (according to the definition of the Robert-Koch-Institute), however the north of the country is almost free of human TBE cases. Saxony is of the importance in the surveillance of TBE as it is a part of the transition zone between TBE-risk areas and areas with only sporadic cases. According to results of our previous serological research on the presence of TBE antibodies in game animals from Saxony, roe deer (*Capreolus capreolus*) were chosen for current study as they showed higher seroprevalence rates compared to wild boar (*Sus scrofa*) from the same district. Therefore, in order to find the missing link between risk and non-risk TBE areas, the aims of this study were to examine at least 100 roe deer coats from different counties in Saxony for the presence of ticks and to test attached ticks for TBE virus via RT-PCR (reverse transcription polymerase chain reaction).

Due to cooperation with the Hunting Association (August 2017 – January 2019), roe deer coats were provided by hunters from 5 regions in Saxony: Leipziger Land, Vogtland, Sächsische Schweiz-Osterzgebirge, Nordsachsen and Landkreis Leipzig Borna. After the delivery, the coats were frozen at -80°C . Subsequently, coats were defrosted at 4°C , examined from both sides – inside and outside. Attached and de-attached (from fur and bags) ticks were collected and identified under the microscope. Afterwards, ticks were sent to Bundeswehr Institute of Microbiology in Munich for RNA extraction and RT-PCR detection of TBE virus.

In total, 134 roe deer were provided by hunters and checked for tick infestation. Ticks ($n = 1279$) were found on 48 of coats. Predominant species was *Ixodes ricinus* (99.76%; $n = 1276$). Three remaining individuals were identified as *Ixodes* spp. (0.16%, 1 female and 1 nymph) and *Dermacentor reticulatus* (0.08%, 1 male). The average infestation was 26.7 (SD = 69.5), with the maximal rate of 439 ticks (recorded in May). The dominant life stage of ticks parasitizing roe deer were females ($n = 536$; 42%), followed by nymphs ($n = 397$; $n = 31.1\%$), males ($n = 175$; 13.7%) and larvae ($n = 168$; 13.2%). Majority of collected *I. ricinus* ticks were de-attached ($n = 616$; 48.3%). Most of the coats originated in Nordsachsen ($n = 50$; 37.3%), however the majority of ticks ($n = 653$; 51.2%) were collected from roe deer caught in Sächsische Schweiz-Osterzgebirge ($n = 28$). TBE virus was detected only in one out of 1279 tested ticks. Infected female was infesting roe deer from Altenberg in Sächsische Schweiz-Osterzgebirge which became TBE risk in 2019.