The importance of the Eurasian wild boar (*Sus scrofa*) as a reservoir of tuberculosis for free-living animals including European bison

Blanka Orłowska¹, Monika Krajewska-Wędzina², Anna Didkowska¹, Krzysztof Anusz¹

¹ Department of Food Hygiene and Public Health Protection, Faculty of Veterinary Medicine, Warsaw University of Life Sciences, Warsaw, Poland
² Department of Microbiology, National Veterinary Research Institute, Puławy, Poland

Abstract: Cases of TB were recorded in European bison in the Bieszczady Mountains in 1997 – 2013. An alarming phenomenon, however, is a TB case in a wild boar from the Bieszczady. Transmission of TB between infected wild boars and European bison is potentially possible. The article is aimed at presenting the problem of the occurrence of TB in wild boar and the potential danger posed to European bison by this situation. The role of wild boar in TB transmission is not always clear (maintenance, spillover or dead-end host), and depends on various environmental conditions (e.g. population density, occurrence of tuberculosis in other species in the area, feeding, climate). The majority of cases of TB in Europe in wild boars have been reported in Mediterranean Iberia (Spain and Portugal).

Keywords: wild boar, European bison, the Bieszczady Mountains, tuberculosis transmission

Introduction

Tuberculosis (TB) is caused by an infection with various species of the *Mycobacterium tuberculosis* complex – MTBC (e.g. *M.caprae*, *M.bovis*). Both animals and humans are susceptible to MTBC infection. Inter- and intraspecies transmission is possible and multi-host system is typical for TB infections. In the Bieszczady Mountains in 1997-2013 cases of TB were recorded in European bison (Krajewska *et al*. 2015, 2017). An alarming phenomenon, however, is a TB case in a wild boar from the Bieszczady. (Krajewska *et al*. 2014). The strain (*M.caprae*) isolated from this wild boar had the same spoligotype and MIRU pattern as strains isolated previously from European bison from the herd of Górny San (the Bieszczady Mountains), which had been eliminated because of the TB. TB in wild boars in this area has not been recorded previously (Witkowski *et al*. 2017). Transmission of TB between infected wild boars and European bison is potentially possible. The article is aimed at presenting the problem of the occurrence of TB in wild boar and the potential danger posed to European bison by this situation.
The importance of the Eurasian wild boar

Tuberculosis and the wild boar

Tuberculosis in wild boar is found in many European countries. The role of wild boar in TB transmission is not clear and is different in various regions. This species might be a spillover or dead-end host but also a true reservoir under certain conditions. The most cases of TB in Europe in wild boars have been reported in Mediterranean Iberia (Spain and Portugal). In this region, wild boar is a MTBC maintenance host. For example, in Doñana National Park in south-western Spain, MTBC infection prevalence in wild boars was 52%, and similarly high TB prevalence was recorded in other regions of Mediterranean Spain and Portugal (Gortazar et al. 2008, Vieira-Pinto et al. 2011, Gortazar et al. 2012). It is probably related to the Mediterranean habitats with dry summers, which causes animals to gather at a few remaining water and feeding sources (Gortazar et al. 2012). Moreover, in Mediterranean Spain, contrary to Atlantic, TB prevalence in cattle and wild boar population density are higher (Muñoz-Mendoza et al. 2013). All this may contribute to intra- and interspecies TB transmission.

The role of wild boar in TB transmission is less important in Iberian Atlantic Spain, France, Italy, England and throughout most of Europe (Gortazar et al. 2012, Muñoz-Mendoza et al. 2013). In Iberian Atlantic Spain, Muñoz-Mendoza et al. (2013) found a low MTBC prevalence (2.6%) and a higher proportion of atypical mycobacteria (MAC) infection (4.5%). Only 16.7% of MTBC infected wild boars displayed generalized TB lesions. In France, wild boar is considered as TB spillover host and most TB cases in this species are found in areas where TB is also diagnosed in cattle (Payne et al. 2016). The majority of the MTBC strains isolated from animals came from cattle (88%) and only 9% from wild animals (wild boar, badgers, red deer) (Hauer et al. 2015).

Hardstaff et al. (2014) found that in Europe the most common TB host system is cattle-deer-wild boar. Similarly, Muñoz-Mendoza et al. (2013) revealed molecular (spoligotyping and MIRU pattern) epidemiological links between wild boar and other animals (cattle, goat, sheep, badger and red fox).

In TB affected wild boar, lesions are frequently seen in head lymph nodes (LNs), particularly the mandibular or the retropharyngeal LNs (Martín-Hernando et al. 2007; Zanella et al. 2016), however, different organs may be affected. Generalized and severe infections are often seen in juveniles (Gortázar et al. 2008; Santos et al. 2009). Extensive TB lesions in many organs (e.g. lungs) may be the cause of mycobacteria excretion to the environment.

Conclusion

The role of wild boar in interspecies TB transmission may by different in various ecosystems. More research on the prevalence of TB among wild animal populations
in the Bieszczady Mountains is needed to determine the exact role the wild boar may play in the transmission of this disease (maintenance, spillover or dead-end host).

References


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Znaczenie dzika jako rezerwuaru gruźlicy dla zwierząt wolno żyjących z uwzględnieniem żubra