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Short communication

Bovine tuberculosis outbreak in farmed American bison (*Bison bison*) in Poland

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Abstract

Poland has been an officially bovine tuberculosis (bTB) free country for the last seven years. The problem currently observed is the increasing number of new cases of bTB in wild species, kept in a farmed herd and free-living herd: European bison (*Bison bonasus*), wild boar (*Sus scrofa*), wolves (*Canis lupus*) and red deer (*Cervus elaphus*). This article presents the case of *Mycobacterium caprae* transmission to an American bison (*Bison bison*) herd kept on a private farm in Eastern Poland.

Key words: *Mycobacterium caprae*, bovine tuberculosis, bison (*Bison bison*), epidemiology

Introduction

Bovine tuberculosis (bTB) is identified mainly in cattle, but in Poland it is also present in wild species (Krajewska et al. 2015, Welz et al. 2005). So far, bTB has been reported in a European bison free-living herd (*Bison bonasus*), wild boar (*Sus scrofa*), badger (*Meles meles*), wolves (*Canis lupus*) and red-deer (*Cervus elaphus*) from Southern Poland (Brewczyński and Welz 2011, Krajewska et al. 2014). The source of the infection is most commonly an affected animal. The disease can be transmitted by the respiratory or alimentary tract.

American Bison (*Bison bison*) Breeding Farm is privately owned, located in Eastern Poland. American bison (20 heifers and 2 bulls) were imported from the largest farm in Europe “Bison d’Ardenne” in Belgium in December 2000. The first animals created a founding herd. On the basis of this stock, subsequent generations of animals born on this farm exceeded the number of 80 individuals. Newborn females are mainly used to replace culled cows and a greater number of males are slaughtered (Kornaś et al. 2014). The herd is constantly growing. With the growth in the number of animals in the herd, some of them, especially males, are slaughtered for economic reasons and their

Table 1. Identification of isolates *Mycobacterium caprae* from bison.

Sex and age of the animal	Clinical material	Identification		
		GenoType MTBC	Spoligotype	MIRU-VNTR
American bison female, ca 5 years old	lymph node, lung, spleen, liver	<i>M. caprae</i>	SB1912	34465155841 ² 432
American bison female, ca 12 years old	lymph nodes, lung	<i>M. caprae</i>	SB1912	34465155841 ³ 432
American bison female, ca 15 years old	lymph nodes, lung, liver	<i>M. caprae</i>	SB1912	34465155841 ³ 432

meat is served in the restaurant located on the property. Products made from bison meat can also be bought in the shop at the ranch.

In 2013, during a routine post mortem examination in the slaughterhouse, the official veterinarian observed granuloma lesions in one individual (female, ca 5 years old). After the skin tuberculin test, conducted in this herd in 2014, the decision to eliminate 2 females (ca 12 years old; ca 15 years old) was taken because of positive results in the intradermal tuberculin test.

Materials and Methods

The microbiological examination segments of organs were collected (left lung, liver, spleen, chest lymphatic nodes) from 3 American bison. The tissue material was handled in accordance with the procedure of the Chief Veterinary Officer in order to obtain the precipitate for the culture on Stonebrink media. For identification of *Mycobacterium tuberculosis* complex strains, GenoType MTBC[®] (Hain Lifesciences, Germany) was used. All strains of mycobacteria were genotyped by spoligotyping and MIRU-VNTR methods.

Results and Discussion

In all 3 cases *Mycobacterium caprae* strains were isolated and they showed identical spoligo pattern SB1912, registered in the international spoligotype nomenclature by www.Mbovis.org (Smith and Upton 2012). In MIRU-VNTR, 2 strains showed the same genetic patterns and one strain differed at most in 1 out of the 15 loci analyzed (Table 1). MIRU-VNTR results indicate the transmission of bTB to the bison herd.

The bison spoligotype name was submitted and registered in www.Mbovis.org databases by Niemann in 2010 and the strains were isolated from 3 human

patients in Germany (Kubica et al. 2003). According to the classification of World Health Organization (WHO), bovine tuberculosis is rated as direct zoonosis, in which a direct transmission of the infectious factor from an infected vertebrate (an animal) to a sensitive vertebrate occurs, i.e. a human being, without the participation of an indirect host. Due to the direction of the infectious factor transmission, bovine tuberculosis can be considered as every kind of zoonoses. Anthrozoosis occurs when the disease is transmitted from an animal to a human, but there are also cases of zooanthroponoses, where a human is a source of disease for animal. Companion and farm animals can get infected with tuberculosis from their owners (Shrikrishna et al. 2009, Krajewska et al. 2012). It is worth emphasizing that mycobacteria under favorable conditions can survive many years: in river waters – up to 5 months, in the soil – 1-2 months, in feces and excrements – over a year.

In Germany, bison breeding is very popular; the animals are bred in 17 herds. Up to 100 buffalos are killed per year on each farm. Bison meat is sold mainly for catering and wholesale businesses. It is difficult to find connections between the occurrences of human tuberculosis caused by *M. caprae* in Germany with bison bTB in Poland. The Polish owner of the animals does not want to collaborate, hence it is difficult to establish the common source of the bTB infection.

Bovine tuberculosis in wildlife in Poland was also found in free-living animals living in the neighboring province located about 200 km away. However, comparing the patterns of molecular methods allowed to exclude the common source of the transmission (Krajewska et al. 2015).

BTB was confirmed in American bison in Yellowstone, Wood Buffalo and Riding Mountain National Parks (Himsworth et al. 2010, Shury et al. 2015). At this moment, the Polish herd is considered to be free of that zoonosis. The next interdermal tuberculin skin test in this herd will be performed in 3 years. It should be emphasized that monitoring tuberculosis in wild

animals is very important so that Poland could receive the status of an officially bTB free country.

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