

## Short notes

# Occurrence of tapeworms *Moniezia benedeni* (Moniez, 1879) in European bison *Bison bonasus* L. in Białowieża Primeval Forest

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**ABSTRACT.** Tapeworms *Moniezia benedeni* are cosmopolitan parasites of wild and domestic ruminants. The aim of this study was to examine the prevalence of those tapeworms in European bison in Białowieża Primeval Forest. Parasitological necropsy of small intestine of 26 bison, aged from 3 months to 26 years was performed in years 2007–2011. Tapeworms *M. benedeni* were isolated from 11 examined animals and the prevalence of infection was estimated on 42.3%. Intensity of infection was ranging from 2 to 25 tapeworms and the mean intensity was estimated on 5.8 specimens. Prevalence in the group of calves reached 50% and in adult bison – 33.3%. Intensity of infection in calves was estimated on 2 to 5 tapeworms while in adult animals it was ranging from 1 to 2 parasites. High prevalence of tapeworms *M. benedeni* in European bison might result from poor condition or weak immunity of eliminated animals.

**Keywords:** cestodes, *Moniezia benedeni*, European bison, Białowieża Primeval Forest

## Introduction

Bison moniezirosis is caused by a cosmopolitan species of tapeworm *Moniezia benedeni*. The parasite infects mostly young animals up to 6 months old. The length of the parasite ranges from one to four m, and width from 15 to 25 mm. The body of the tapeworm consist in unarmed scolex with suckers and numerous proglottids with two sets of reproductive organs [1] (Fig. 1). Ruminants are definitive hosts of the tapeworm while soil mites from the superfamily Oribatoidea are considered intermediate hosts. Eggs of *M. benedeni* are passed out in the feces of ruminant and eaten by soil mites. The eggs hatch and the oncospheres penetrate into the haemocoel of mite and after 90–100 days develops into the invasive stage – cysticercoid. Cervids eat infected mites while grazing. Cysticercoids locates in the small intestine and develop into the mature tapeworms within 5–6 weeks [1,2].



Figure 1. Tapeworm *Moniezia benedeni* (phot. Anna M. Pyziel)

Numerous tapeworms in the small intestine can be the cause of closure of intestinal lumen, impediment of gastrointestinal flow, impairment of peristalsis and hence damage of intestinal mucosa

and catarrhal inflammation. Products of tapeworms metabolites are toxic for deer.

Animals infected with single tapeworms do not show clinical signs of the disease; however massive infection can be the cause of loss of appetite, and diarrhea alternated with constipation as well as anemia, and even death. In older animals, monieziosis performs chronically with poorly expressed clinical symptoms [1,3].

## Materials and Methods

Parasitological necropsy of 26 European bison aged from 3 months to 26 years, eliminated in Białowieża Primeval Forest in years 2007–2011, was performed. Small intestine was isolated during the necropsy, cut along and rinsed with water. Content of intestines was sedimented and examined macroscopically and under the stereoscopic microscope. The scolices, strobiles and other fragments of tapeworms were collected and preserved in 70% alcohol and then identified to the species level on the basis of morphometrical features.

## Results and Discussion

Tapeworms *Moniezia benedeni* were found in small intestine of 11 examined bison so the prevalence of infection reached 42.3%. Prevalence of monieziosis in the group of calves was higher and reached 50% in comparison with 33.3% of infected adult bison. The intensity of infection was ranging from 1 to 25 tapeworms and mean intensity was estimated on 5.8 specimens. Adult animals were infected only with 1 or 2 tapeworms. Intensity of infection in calves mostly ranged from 2 to 5 parasites; however in one, 8-months-old calf, reached 25 tapeworms (Table 1). The animal was emaciated with strong flatulence and intestines plugged with parasites.

Adult tapeworms were 150 to 232 cm long and 11 to 15 mm wide. The total length of all isolated tapeworms and their fragments was over 29 metres.

The intestinal wall was very thin, with numerous ecchymoses. Cholangitis was observed in the liver of infected animal, probably due to intoxication. Described infection of *M. benedeni* in bison calf was the most intensive ever reported.

First infection of European bison with tapeworms from the genus *Moniezia* was described by Wróblewski in the beginning of 20th century. Most of young necropsied animals were infected with 1 or 2 tapeworms. Monieziosis was diagnosed as a cause of death of two European bison, infected with 6 and 7 tapeworms, with extensive inflammation in the intestines [4]. In the middle of 20th century, Drózdź isolated *M. benedeni* from 3 bison in Pszczyna and found eggs of the tapeworm in the feces of 16.1% of examined animals [5]. In the winter season 2007/2008 tapeworms from the genus *Moniezia* were found in 41% of examined European bison in the Białowieża Primeval Forest. Necropsy of infected animals revealed catarrhal enteritis and haemorrhage in the small intestine wall [6]. In 2012, eggs of *Moniezia* sp. were found in 3.3% of bison fecal samples in the breeding reserve of Białowiecki National Park [7]. Studies concerning dynamics of excretion of *Moniezia* eggs in a yearly cycle in the Białowieża Primeval Forest revealed the highest prevalence of the tapeworm in the winter season, reaching in January almost 21% [8]. Prevalence of *Moniezia* sp. in European bison in the belorussian part of the Białowieża Primeval Forest in 1986–2001 was ranging from 3.1% in adult animals to even 17.8% in calves [9]. Tapeworms *M. benedeni* were also isolated during the necropsy of bison in the zoological garden in Prague [10]. During recent studies in Poland, eggs of *Moniezia* sp. were detected in the faeces of 3 to 9.5%, 3.2% and 5 to 7% of examined bison in Bieszczady Mountains, Borecka Forest and Knyszyńska Forest, respectively [11,12].

High prevalence of tapeworms *M. benedeni* in the current research, probably resulted from the poor condition of adult bison and late born calves, chosen for the elimination and examined in the present studies.

Table 1. Infection of European bison with the tapeworms *Moniezia benedeni* in the Białowieża Primeval Forest

European bison	No. examined	No. infected	Prevalence %	Intensity range	Mean intensity
Calves 4–8 months	14	7	50	1–25	5.8
Adults 1.5–26 years	12	4	33.3	1–2	1.5
All animals	26	11	42.3	1–25	4.2

Although parasitological necropsy of European bison is performed rarely, it is necessary to determine the species of tapeworms and exact pathological changes in the course of monieziosis.

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