

Ph.D. Theses

Studies on eimerians (Apicomplexa: Eimeriidae) of wild ruminants

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In total, 1591 faecal samples from free-roaming and captive European bison and deers were examined in the years 2008–2011 in order to estimate the species involved in wild ruminants eimeriasis in Poland. Oocyst count per gram of faeces (OPG) was determined in all cases with the use of McMaster quantitative method alongside the modified Willis direct flotation method. Sporulation of oocysts was done under controlled conditions in the environment with the addition of 2.5% potassium dichromate solution at the temperature of 23°C. *Eimeria bovis* oocysts from cattle were compared with *E. bovis*-like oocysts from the European bison by analysis of a multiplex PCR of the 18S rRNA gene. Moreover, scraps of large intestine of 10 culled bison were histopathologically examined to determine the sexual stages of potentially pathogenic species. Oocysts of the eleven species of *Eimeria* were found in the faeces of the European bison (*E. alabamensis*, *E. auburnensis*, *E. bovis*, *E. brasiliensis*, *E. bukidnonensis*, *E. canadensis*, *E. cylindrica*, *E. ellipsoidalis*, *E. pellita*, *E. subspherica*, *E. zuernii*). The overall prevalence of *Eimeria* spp. reached 33.5% and the OPG varied from 50 to 6550. The most prevalent species was *Eimeria bovis* (29.7%), while *E. brasiliensis* was the rarest one (0.5%). The results of the morphological, developmental and molecular analysis of *E. bovis* oocysts collected from the cattle and the bison indicate that the same species can occur in both the hosts. The mature gamonts of eimerians were diagnosed only in the intestinal cells of the bison that were shedding coccidian oocyst in their faeces. Six species were involved in the red deer eimeriasis (*E. asymmetrica*, *E. austriaca*, *E. elaphi*, *E. robusta*, *E. sordida*, *E. virginianus*), even though the white-tail deer is a typical host for one of the species (*E. virginianus*). The prevalence of *Eimeria* spp. invasion in the red deer was 22.6% and the OPG varied from 50 to 7950. *E. austriaca* was the most prevalent species (14.8%), and *E. elaphi* was the rarest one (0.8%). Four eimerian species typical for the red deer were diagnosed in the fallow deer (*E. asymmetrica*, *E. austriaca*, *E. robusta*, *E. sordida*). The prevalence of *Eimeria* spp. reached 6.2%, and OPG was 50–1200. *E. austriaca* was the most common species (3.5%), while both the *E. robusta* and *E. sordida* were the rarest ones (1.2%, respectively). Eight eimerian morphotypes were found in the faeces of the roe deer (*E. capreoli*, *E. catubrina*, *E. panda*, *E. patavina*, *E. ponderosa*, *E. rotunda*, *E. superba*, *Eimeria* sp. Boch and Lucke, 1961). The prevalence of invasion was 30.3%, and the OPG varied from 50 to 9000. The most frequently diagnosed species was *E. capreoli* (21.3%), while *E. rotunda* was the rarest morphotype. Moose was a host for two species of *Eimeria* (*E. alces*, *E. catubrina*), though the roe deer

is a typical host for one of them (*E. catubrina*). The prevalence of *Eimeria* spp. invasion in moose reached 1.6%, and the OPG was from 50 to 100. Both the species were found only in a single individual of a host (0.8%). The number of species involved, as well as the prevalence of eimerian invasion, were higher in the group of captive bison, red deer, and roe deer in comparison with the group of free-roaming animals. Moreover, the diversity of eimerian species, as well as the prevalence of invasion and the value of OPG, were remarkably higher in the bison calves than in mature bison. The prevalence and the OPGs of oocysts shed by the free-roaming European bison, the captive red deer and fallow deer showed a monthly variation. In the group of bison the highest prevalence and OPG were observed in spring, whereas in the group of captive red deer and fallow deer the highest value of the both parameters were recorded in the winter period. No cases of clinical coccidiosis occurred during the studies.

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