PREVALENCE OF *EIMERIA* PROTOZOA IN COWS IMPORTED TO POLAND FROM THE CZECH REPUBLIC, FRANCE, AND GERMANY. A PRELIMINARY STUDY

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Abstract

Coproscopic examination, using the Willis-Schlafl flotation method, was performed in 122 cows imported to Poland from the Czech Republic, 28 from France, and 27 from Germany. The mean prevalence of infection with *Eimeria* protozoa in cows imported to Poland was 20.90%. Infections were found in 51.85% of animals imported form Germany, 28.57% from France, and 12.30% from the Czech Republic. Five species of coccidia (*E. bovis*, *E. auburnensis*, *E. ellipsoidalis*, *E. subspherica*, and *E. zurnii*) were isolated from the faeces of cows imported from the Czech Republic, four species (*E. bovis*, *E. auburnensis*, *E. ellipsoidalis*, and *E. zurnii*) from French cows, and seven species (*E. bovis*, *E. auburnensis*, *E. ellipsoidalis*, *E. canadensis*, *E. cylindrica*, *E. alabamensis*, and *E. zurnii*) from German cows. The analysed animals were found to have mixed (mostly two- and three- species) coccidial infections. When importing cattle to Poland, special attention should be given to *Eimeria* protozoa because of the high prevalence of infection with species such as *E. zurnii* and *E. bovis*, which are responsible for the incidence of clinical coccidiosis in the geoclimatic conditions of Poland.

Key words: cows, *Eimeria* sp., Czech Republic, France, Germany.

Breeders import cattle to improve the genetic potential of their own animals. This takes place not only in Poland but also in other European Union countries (Germany, France, the Czech Republic, Slovakia, Great Britain). Poland most often imports cows and in-calf heifers from Germany, the Czech Republic, and the Netherlands, with sporadic imports from France. In the last few years, about 5,000 heifers were imported yearly to Poland mainly from Holland, Germany, and France, and now these animals and their offspring represent approximately 10% of active population of Black and White breed cows in Poland (19).

Imported animals can introduce new species of parasites, as reported by Pavlasek et al. (10) and Pilarczyk et al. (13-15).

Even the best-managed cattle are exposed to contact with invasive forms of parasites. Parasites in imported animals negatively affect their health but also their acclimation and adaptive capacity. Because parasitic diseases in general follow a subclinical course, very often they escape the notice of both breeders and veterinarians. Coccidia have a special place among the many parasite species found in cattle because of their widespread distribution regardless of the climatic conditions. Protozoon of the genus *Eimeria* cause severe losses due to a reduced body condition, productivity and resistance of animals (4, 8, 16, 17, 21). Coccidiosis is a chronic parasitic disease of different animal species. The infection is caused primarily by *Eimeria* sp. protozoa, which live mainly in the epithelium of the small intestine. The most pathogenic species are *E. bovis*, *E. zurnii*, *E. ellipsoidalis*, and *E. auburnensis* (12, 20). In cattle, coccidiosis most often takes a subclinical form. In Poland, it is not obligatory to test imported cattle for endoparasites such as coccidia, cryptosporidia, gastrointestinal nematodes, and liver fluke. Special consideration must be given to coccidial fauna in imported cattle due to the risk of introducing new species to Poland.

The aim of the study was to determine the prevalence of infection and the species composition of...
Eimeria protozoa in cows imported to Poland from the Czech Republic, France and Germany.

**Material and Methods**

Analysis was made of faecal samples brought to the Department of Animal Reproduction Biotechnology and Environmental Hygiene by breeders in the years 2006-2008. The animals were quarantined on arrival in Poland. Coproscopic examinations were performed in 177 cows (122 Simmental and Montbeliarde from eastern part of the Czech Republic – the Pardubice Region, 28 Charolais and Limousin from Limousin Region in Central France, and 27 Holstein-Friesian from Mecklenburg, Germany) imported to Poland. All animals came from commercial farms (herd size - above 100 cows).

Faeces samples were obtained from individual cattle. The infection with Eimeria sp. was evaluated based on coproscopic examination using Willis and Schläf flotation technique (22). Species composition of coccidia was determined according to the key of Pellerdy (11). Oocysts were cultured additionally in a moist chamber at 24-26°C. A 2.5% water solution of potassium dichromate (K2Cr2O7) was used as an antimoulding agent.

**Results**

The mean prevalence of infection with Eimeria protozoa in the cows imported to Poland was 20.90%. The highest level of infection was found in cattle originating from Germany (51.85%) and the lowest in animals imported from the Czech Republic (12.30%) (Fig. 1).

Five coccidia species were isolated from the faecal samples of animals imported from the Czech Republic: E. bovis, E. auburnensis, E. ellipsoidalis, E. subspherica, and E. zürnii. E. bovis was the dominant species. In animals imported from France, four coccidian species were isolated: E. bovis, E. auburnensis, E. ellipsoidalis, and E. zürnii, with E. auburnensis being the dominant species. Seven species of coccidia (E. bovis, E. auburnensis, E. ellipsoidalis, E. canadensis, E. cylindrica, E. alabamensis, and E. zürnii) were found among animals imported from Germany and E. bovis was the dominant species (Fig. 2).

Coproscopic examinations showed that the animals had mixed coccidial infections. In most cases, the coccidia-infected animals had two- and three-species (Fig. 3). No cases of clinical coccidiosis were found in the animals investigated.

**Discussion**

The presented data are the results of preliminary study conducted on a relatively small group of animals. This study indicates that the mean prevalence of infection with Eimeria protozoa in the cows imported to Poland from the Czech Republic, France, and Germany was twice as high as in cows imported from the Netherlands (14), but similar to the results obtained for cows from a large-herd farm (23.4%) in West Pomerania (18). We found the level of infection to be lower in cows from small farms (from 5.5% to 12.0%). In another study by the same authors (13) with cattle imported to Poland from the Netherlands, the prevalence of infection with coccidia (17.92%) was similar to the present findings.

![Fig. 1. Mean prevalence of infection with Eimeria protozoa in cows imported to Poland.](image-url)
It is worth noting that the prevalence of infection with coccidia among the cows imported to Poland from Germany (51.85%) constituted more than half of the value obtained by (10), who studied heifers imported to the Czech Republic (92.8%). A high level of coccidia infection in Germany was reported by Samson-Himmelstjerna et al. (21), who found clinical coccidiosis cases in calves from North-Western Germany. Equally high levels of cattle infected with coccidia (above 70%) were found by Klockiewicz et al. (7) in twelve regions of South Poland. In the Netherlands, Eimeria protozoa were found in 16% of cows and 46% of calves (3). Cicek et al. (2) and Ozkan and Tuzer (9) showed Eimeria infections to range from 15.65% to 68% in cows from Turkey.

Species composition of coccidia depends mainly on local environmental and breeding conditions. To date, 19 Eimeria species that parasitised cattle have been described around the world. Twelve coccidia species are found in Europe: E. alabamensis, E. auburnensis, E. bovis, E. brasiliensis, E. bukidnonensis, E. canadensis, E. cylindrica, E. ellipsoidalis, E. pellita, E. subspherica, E. wyomingensis, and E. zurii (5). Nine coccidia species have been reported in Poland. None of the Eimeria protozoa found in cattle imported from the Czech Republic, France, and Germany was new to the Polish coccidial fauna. However, we found species such as E. zurii, E. bovis, E. auburnensis, and E. ellipsoidalis, which are responsible for the incidence of clinical coccidiosis under the geoclimatic conditions of
Poland (7). In Polish geoclimatic conditions, clinical coccidiosis is mainly caused by *E. zurnii* and *E. bovis*. It is worth noting that in cattle imported from Germany a high level of infection with *E. bovis* (40.74%) was found, which, in addition to *E. zurnii*, is considered the most pathogenic species for cattle. These protozoan species were also identified in cattle imported from the Netherlands by Pilarczyk et al. (14), who observed that *E. zurnii* was more than three times as frequent in cows imported from the Netherlands (5.33%) as in Polish cows (1.67%). In the presented study, a high prevalence of infection with this species in cows imported from France (14.25%) was also demonstrated. Likewise, Ernst et al. (6) reported that *Eimeria bovis* was the most frequent species detected in calves (72.5%) and cows (10.2%) from North Georgia, USA. Similar findings were described by (10) for cows and heifers imported from Germany and Denmark, where coccidial fauna was dominated by *E. bovis* and *E. zurnii* oocysts. These two species of coccidia were also reported by Bejsovec et al. (1) to be most frequent in cows from the Czech Republic (*Eimeria bovis* 55.6%, *E. zurnii* 47.0%).

In a study conducted in West Pomeranian farms by Pilarczyk et al. (17), six coccidia species were isolated from cows: *E. bovis*, *E. auburnensis*, *E. zurnii*, *E. ellipsoidalis*, *E. subspherica*, and *E. cylindrica*. In most cases, the coccidia-infected animals had single- (70.1%) and two-species infections (22.9%). The same authors also found three- (6.4%) and four-species infections (0.6%). Single-species infections were the most prevalent (29%) in cattle from Turkey (9). We obtained different results in the present study, in which two- and three-species infections were most often found in cows imported from the Czech Republic, France, and Germany.

When importing cattle to Poland, a special attention should be given to *Eimeria* protozoa because of the high prevalence of infection with species such as *E. zurnii* and *E. bovis*, which are responsible for the incidence of clinical coccidiosis under the geoclimatic conditions of Poland. Studies indicated that all detected species of *Eimeria* protozoa in imported cows were found earlier in Poland.

**References**