PREVALENCE OF INTESTINAL PARASITES OF POLISH KONIK HORSES – COMPARISON BETWEEN DOMESTIC HORSES AND IMPORTED FROM THE NETHERLANDS

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Abstract

The aim of the study was to determine the prevalence of infection with gastrointestinal parasites in Polish Konik horses from Poland and those imported from the Netherlands. The prevalence and rate of infection was determined based on coproscopic examination using Willis-Schlaf and Mc-Master methods. Faecal samples were tested for the presence of Cryptosporidium sp. using a modified Ziehl-Neelsen staining method. Mean prevalence of infection with gastrointestinal parasites in Polish Koniks imported from the Netherlands and those from Poland was 100%. Imported horses were found to harbour nematodes of the family Strongylidae (89.47%) and Cyathostominae (94.74%) as well as Parascaris equorum (5.26%) roundworms. Domestic Polish Koniks were found to harbour Strongylidae (100%) and Cyathostominae (100%) nematodes as well as Cryptosporidium sp. protozoa (2.27%). Domestic horses were more infected with Cyathostominae (865 EPG) and Strongylidae (731 EPG) than horses imported from the Netherlands (739 and 600 EPG, respectively). The study demonstrated that Polish Koniks from Poland and those imported from the Netherlands should be monitored parasitologically because endoparasites may create a major epizootiological problem when these animals are kept in an organic production system.

Key words: Polish Konik horses, intestinal parasites, prevalence of infection.

The breeding of Polish Konik horses has a relatively short history of about 80 years. Characteristically, it has been carried out using two different systems from the very beginning. Most Polish Koniks have been maintained under stable and pasture management, and another group has been formed by horses raised in the wild in reserves, with minimum human intervention, under close to natural conditions (15).

The origin of Polish Koniks is not completely understood, but there is a consensus that they originate from the Tarpan (Equus caballus gmelini Ant.) (20, 31).

In Poland, Polish Koniks are raised in the reserve system in several centres, mainly in national parks such as Białowieża, Roztocze, and Biebrza National Parks. However, these centres are small in area. The largest centre in terms of animal population and area is the reserve in the Polish Academy of Sciences Research Station in Popielno, by the Śniardwy Lake in the Mazury Lake District (about 1,628 ha). The second largest sanctuary (700 ha) is found in the Kliniska Forest Division (nine animals, since September 2009). From 1986, breeding has been conducted in the Lasy Janowskie Landscape Park near Janów Lubelski. In 1990, Popielno horses were used as a basis for a private farm in Zielony Ostrów by the Oswin Lake (14, 19), situated in the Seven Islands Reserve, to protect the breeding area of waterfowl and marshbirds (15).

Breeding in the wild is gaining increasing interest not only in Poland but primarily abroad, where Polish Konik horses are considered essential to maintaining the biodiversity of different environments, mainly the steppe and meadow ones. This situation occurs in the Netherlands (Oostvandersplassen Nature Park), Belgium, France, and Germany (12, 16).

Parasitoses are one of the most common diseases of the horse (21, 36, 38). They cause digestive upsets that can lead to emaciation, debility, and even death. Because parasitic diseases most often follow a subclinical course, they very often escape the attention
of both breeders and veterinarians. Imported animals can introduce new parasites, which has been observed by many authors (27, 28).

In Poland, it is not mandatory to examine imported horses for the presence of intestinal nematodes, in particular strongyles (Strongylidae, Cyathostominae) and Cryptosporidium sp. protozoa. Even well-managed horses are vulnerable to invasive forms of these parasites. Like other horse breeds, Polish Koniks are invaded by many types of helminths (33). In adult animals Romaniuk et al. (34) observed mainly infections of cyathostome species. These authors suggest that in foals roundworms usually appear first, followed by the infection of strongyles. Tapeworms were found in 1-2 years old horses. In primitive Polish horses, Slivinska et al. (38) observed 27 species of nematodes from four families (Strongylidae, Oxyuridae, Ascaridae, Habronematidae), one cestode species (Anoplocephala perfoliata), and one species of botfly larvae (Gasterophilus intestinalis).

Cryptosporidium sp. has been long known to veterinary medicine as a factor in gastrointestinal diseases. This protozoan is a member of the phylum Apicomplexa, which causes a disease known as cryptosporidiosis in humans and in many species of animals (4, 35, 36). Young animals are particularly vulnerable to Cryptosporidium sp. infections (1, 35, 36).

The aim of the study was to determine the prevalence and rate of infection with gastrointestinal parasites in Polish Konik horses from Poland and those imported from the Netherlands.

Material and Methods

Coproscopic examination was performed in 19 Polish Koniks imported from the Netherlands and in 44 domestic Polish Koniks living in meadows lying above the flood plain of the Czarnocin area next to the Szczecin Lagoon (over 600 ha). In this area, the Odra Delta Nature Park was created in coordination with the Dutch Ministry of Agriculture, Nature Management and Fisheries, and the Society for Preservation of Nature Monuments in the Netherlands (Vereniging Natuurmonumenten).

The first herd was brought in March 2008 from the nature reserve in Delfgauw near Rotterdam. From that time, the herd has been kept in a fenced area of about 50 ha, without any contact with the private herd. The Dutch herd includes two stallions (5 and 6 years old), 11 mares (one yearling, two 5 years old, the other 2 and 3 years old) and six colts (one yearling, the other 2 and 3 years old). The Dutch herd has never been subjected to anthelmintic treatment. Coproscopic examination was performed after the horses were imported.

The second, private herd had 50 horses of different ages. During winter, the animals remained on wintering ground (a fenced area of about 70 ha), where they were supplemented with hay from local meadows. Outside the winter period, the herd was kept since September 2002 in a free-roaming system in an area of 600 ha of uncultivated land, meadows, and pastures.

Faecal samples were obtained from individual horses. The prevalence and rate of infection was determined based on coproscopic examination using Willis-Schlaf (qualitative method) and Mc-Master (quantitative method) methods (42). Only positive faecal samples were tested using quantitative method. The results obtained were used to calculate mean prevalence of infection (%) and eggs per g of faeces (EPG). The proportion of small and large strongyles in the horse parasite fauna was determined based on differentiation of the invasive larvae of these nematodes (13).

Faecal samples were tested for the presence of Cryptosporidium sp. using a modified Ziehl-Neelsen staining method.

Results and Discussion

Mean prevalence of infection with gastrointestinal parasites in Polish Koniks imported from the Netherlands and those from Poland was 100% (Table 1).

Polish Koniks imported from the Netherlands were found to harbour nematodes of the family Strongylidae and Cyathostominae as well as Parascaris equorum roundworms. Domestic Polish Koniks were found to harbour Strongylidae and Cyathostominae nematodes as well as Cryptosporidium sp. protozoa (Table 2). Because neither herd was subjected to anthelmintic treatment, it was impossible to determine species composition of the strongyles. Gawor (10) reported that species composition of strongyles can only be determined at postmortem examination of horses. A simpler practical method for in vivo determination of adult strongyles is to obtain parasites from horse faeces after deworming.

In Polish Koniks imported from the Netherlands, the prevalence of infection was 94.74% for small strongyles (Cyathostominae) and 89.47% for large strongyles (Strongylinae). However, nematodes from both of these families were found in all domestic horses (Table 2).

Our results revealed that strongyles were prevalent in both domestic and imported Polish Koniks. The mean prevalence of strongyle infection among Polish Konik horses from the analysed herds was high. Similar findings were reported by other authors for horses in Poland (11, 32, 34) and abroad (3, 7, 8, 22, 23, 25, 40).

In a study by Kornaś et al. (17), the prevalence of infection with strongyles in horses ranged from 84.4% to 95%. Likewise, Romaniuk (35) found nematode eggs in 100% of 2-year-old mares and stallions and in 83.3% of foals. Kornaś et al. (18) showed that pastured horses were twice as infected with strongyles as those kept indoors.
Table 1
Mean prevalence and rate of parasitic infection among Polish Konik horses

<table>
<thead>
<tr>
<th></th>
<th>Mean prevalence of infection (%)</th>
<th>Mean number of eggs per g of faeces (EPG)</th>
<th>Range (EPG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported herd</td>
<td>100</td>
<td>1.410</td>
<td>550-2.600</td>
</tr>
<tr>
<td>Domestic herd</td>
<td>100</td>
<td>1.595</td>
<td>550-3.000</td>
</tr>
</tbody>
</table>

Table 2
Mean prevalence (%) and intensity of infection with gastrointestinal nematodes in Polish Konik horses

<table>
<thead>
<tr>
<th></th>
<th>Prevalence and intensity of infection</th>
<th>Imported herd</th>
<th>Domestic herd</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean prevalence</td>
<td>Mean EPG</td>
<td>Range EPG</td>
</tr>
<tr>
<td>Parascaris equorum</td>
<td>5.26</td>
<td>16</td>
<td>0-100</td>
</tr>
<tr>
<td>Cyathostominae</td>
<td>94.74</td>
<td>739</td>
<td>0-1.500</td>
</tr>
<tr>
<td>Strongylinae</td>
<td>89.47</td>
<td>600</td>
<td>0-1.100</td>
</tr>
<tr>
<td>Cryptosporidium sp.</td>
<td>0</td>
<td>--</td>
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</tr>
</tbody>
</table>

EPG – number of eggs per g of faeces

The prevalence of infection with *Parascaris equorum* (horse roundworm) was very low (5.26%) in imported horses and nil in domestic horses (Table 2). The horse roundworm is fairly common in foals aged up to 6 months but is sometimes diagnosed in older horses.

Free-roaming Polish Koniks are not dewormed. Although these horses harbour internal parasites, mainly strongyles, they show no signs of disease. Romaniuk and Jaworski (34) demonstrated that no visible response of these animals indicates that they have innate resistance to strongyle and roundworm infections.

*Cryptosporidium* sp. was found in none of the Polish Koniks imported from the Netherlands and in 2.27% of domestic Polish Koniks. The prevalence was comparable to that found in Germany and some regions of the USA (Texas and Colorado), where it ranged from 0.33% to 3% (2, 5, 9), but was lower in comparison to that reported by Canadian and other US authors (Louisiana, Colorado, and Texas), where it was in the 17%-100% range (6, 26, 39, 41). Majewska et al. (24) found the prevalence of *Cryptosporidium* sp. infection among horses from the Wielkopolska region is 9.4%. Studies conducted in West Pomerania showed that the prevalence of infection in foals was 11.54% (30). *Cryptosporidium* sp., observed in horses from different regions of the world, is always accompanied by diarrhoea and deaths of foals (6, 41).

In our study, domestic horses were more infected with *Cyathostominae* (865 EPG) and *Strongylinae* (731 EPG) than horses imported from the Netherlands (739 and 600 EPG, respectively) (Table 2). In a study by Romaniuk et al. (32), the rate of strongyle infection was higher in forest Polish Koniks than in those reared on the fields and meadows. Likewise, Sasimowski et al. (37) found that strongyle infections were much more prevalent in primitive breeds of preserve Polish Koniks in comparison to stabled Polish Koniks.

The present study demonstrated that Polish Koniks from Poland and those imported from the Netherlands should be periodically monitored to determine the risk from parasites, because endoparasites may create a major epizootiological problem when these animals are kept in an organic production system.

**References**


