

PREVALENCE OF ENDOPARASITES IN THE WILD BOARS IN THE MOUNTAINS OF POHRONSKÝ INOVEC

Imrich I., Mlyneková E., Mlynek J., Kanka T., Rolinec M., Bučko O.

University of Agriculture in Nitra, Faculty of Agrobiological and Food Resources, Slovakia

Abstract

The aim of this work was to evaluate the prevalence and intensity of the endoparasitic infection in the wild boars in the mountains of Pohronský Inovec. A wild boar (*Sus scrofa* L.) is a very adaptable animal, but its over preservation can often lead to the increased occurrence of the infectious and parasitic diseases. Wild boars are omnivores that live in groups, look for the wet and muddy places where good conditions can be found for development of various parasites. The young wild boars are particularly susceptible to many diseases. The experiment was carried out in the years 2014 and 2015. A total of 10 faecal samples were collected from the rectum and stored in the refrigerator. The laboratory diagnosis was performed within a day from the sample collection. The coprological examination was performed by the flotation method. The eggs of parasites were observed at the magnification of 40 x10. The prevalence of different types of parasites in the wild boars was as follows: *Metastrongylus* spp. 10 %, *Hyostrongylus rubidus* 10 %, *Trichuris suis* 40 %, *Physocephalus* spp 10 %, *Ascaris suum* 50 %, *Strongyloides ransomi* 10 % and *Eimeria* spp. 90 %. The intensity of infection was assessed on the basis of the number of parasite eggs in the samples. It can be stated that the intensity of infection was weak in most cases. Only in the case of *Eimeria* spp. there was determined the increased number of oocysts. The young individuals weighing up to 30 kg were the ones that were mostly infected.

Key Words: endoparasites, prevalence, wild boar

Wild boars often suffer from various parasites. This is caused by their social and group way of life (they live in herds) as well as by the fact that they like wet and muddy places, where there are good conditions for development of endoparasites. The boar piglets are most susceptible to many diseases, in which reductions of gains up to a high morbidity and mortality can occur (Hell, 1986). The level degree of wild boars invasion is affected by a variety of ecological factors such as geographical, geomorphological, climatic and trophic conditions of the habitat (Kiš et al., 2009). A relatively high prevalence of coccidia has been found in the black game, especially in the game preserve. In the free hunting grounds, the occurrence of coccidia in the wild boars is higher in the habitats of the floodplain forests (Chroust and Forejtek, 2010a). Mainly the wild boar piglets suffer from diseases (Páv, 1981). Metastrongylosis of the wild boars is also extended in the free hunting areas and has achieved a high prevalence. Although it occurs in all age groups, the most frequent and strongest invasions have been detected in young animals (Chroust, 2001). Various types of nematodes of the genus *Toxocara*, *Ascaris*, *Haemonchus*, *Trichostrongylus* and others parasitize in the intestines of the furred game. The symptoms of diseases are not so specific and depend on the invasion intensity (Červený et al., 2004). The most difficult disease progress has been observed in the

young boars, while the symptoms are not that striking in the older individuals and they overlap with the symptoms of other kinds of parasitosis (Chroust, 2001). Parasites may significantly contribute to total losses of the wild game in certain locations, especially in the winter and spring months. Not all kinds of parasitosis activate disease symptoms in the wild game. Some types of parasitosis do not show any symptoms of attacks from the outside, but there can occur, especially in the young and weaker wild boars, significant negative influence of the basic physiological processes (Chroust and Forejtek, 2010a). The proper hygiene of the feeding facilities, consistent selective shoot, continuous observations of animals in their natural environment, and also a direct examination of the killed animals including their internal organs are considered part of the preventive measures (Drmotá et al., 2007).

Material and Methods

The experiment was carried out in the years 2014 and 2015 in the mountain range of Pohronský Inovec. Pohronský Inovec falls into the region of the Slovak Upland. It is the volcanic origin massif composed of andesites and rhyolites. The mountain range has the character of a table-land with the upland as to the lower highlands. The area of Pohronský Inovec is drained by the rivers Hron and Žitava. The mountain

range is characteristic by the warm and moderate warm climate with the average annual temperature of 9 °C.

For the analysis, fresh faeces were directly removed from the rectum of the killed animals. Wild boar shooting was performed in the hunting season in accordance with the legislation in force. The removed samples of excrements were transported in the leak-proof containers and they were maintained refrigerated at 4 °C until the time of processing. Laboratory diagnosis was performed within one day of the samples remove.

The flotation method was used for the coprological examination regarding the presence of endoparasitic eggs. The named method is ranked among the concentration methods using the solutions with the higher specific weight than the actual eggs of endoparasites. The preparation procedure of the formulations was as follows: about 3 g of excrements were diluted with water (10 - 15 ml), stirred and poured through the sieve into a tube and centrifuged for 3 minutes at 2,500 rotations per min⁻¹, the liquid was then decanted and a few ml of the flotation solution were poured on to the sediment, mixed and centrifuged (3 minutes at 2,500 rotations per min⁻¹), the eggs were collected from the surface by parasitological loop and applied on the backing slide, which was covered with a cover glass (Letková et al., 1998). Preparation of the flotation solution: 72.5 g of MgSO₄ was dissolved in 100 ml of water; 142.5 g of Na₂S₂O₈ was dissolved in 100 ml of water. The prepared solutions were mixed in a ratio 3:3:1 parts of water. The given preparation was analyzed at a magnification of 40 x10.

Results and Discussion

During the reporting period, we analyzed 10 samples of excrements of the wild boars. We found the eggs of the following species of parasites in the excrements: *Metastrongylus spp.*, *Hyostrongylus rubidus*, *Trichuris suis*, *Physocephalus spp.*, *Ascaris suum*, *Strongyloides ransomi* and *Eimeria spp.* (Tab. 1).

Prevalence of *Metastrongylus spp.* parasitizing in lungs of the wild boars was at the level of 10 %. We have received one positive finding of the low infection intensity in a boar weighing approximately 10 kg. The findings were negative in the boars of a higher weight. According to Jurášek and Dubinský (1993), weanlings and runners aged 2 -5 months are most susceptible to infection. Kiš et al. (2009) have also reported that younger individuals are good hosts and invasion broadcasters. They are highly susceptible, have a low natural immunity against diseases, and since they usually stay in herds, they have a close contact with other individuals. In contrast to our results, Forejtek and Chroust (2010b) have reported prevalence of metastrongylus up to the level of 80 % in the wild boars.

Similarly, Ciberej et al. (2001) reported invasiveness in the wild boars within the range from 93.5 to 96 %. A high occurrence of metastrongylus was also observed in other countries, for example in the area of Northern Germany - 93.3 % (Spellmeyer 1996), in the province of Valencia in Spain, 85 % (De la Muela et al., 2001), in Croatia, by individual species from 57.6 to 75.8 % (Rajkovič - Janje et al., 2002). Kiš et al. (2009) found out that that the average invasion intensity value of the adult wild boars was during the vegetation season (summer months), almost double and in the juvenile wild boars almost three times of the values compared with the winter season. The reason for such a state could be especially good climate conditions for growth, development and reproduction of earthworms in the vegetation period (higher rainfall), which also enables a higher proportion of the feeding grounds of the wild boars. In winter, when the ground gets frozen and the wild boars don't have such opportunities to consume inter-hosts, the intensity invasion is therefore lower. This may explain the low occurrence of the by us discovered parasite, since most of the samples were collected in the autumn or winter months. The only positive finding was found in the sample, which was collected in the month of July.

The occurrence of *Hyostrongylus rubidus* in the examined samples was on the level of 10 %. The adult worms parasitize in the stomach. The only positive finding was recorded in the winter season in a boar weighing approximately 30 kg.

The *Trichuris suis* parasitizes in the colon and in the appendix of the wild boar. Through the excrements examination, we have found this parasite presence in the four samples, the prevalence was therefore on the level of 40 %. The findings were positive in the wild boars weighing from about 10 to 30 kg. The most frequent occurrence of this parasite was in the summer and autumn seasons (3 samples). Our findings are comparable with the results of Pěkný and Borkovcová (2003), who found the prevalence of this parasite on the level of 32 % in the samples of excrements taken from the free breeding. Chroust (2001) states that *Trichuris suis* occurs more in the game park than it is the case of the freely living wild animals. Popiołek et al. (2010) found out a higher prevalence of this parasite in the wild animals reared in captivity (16.5 %) in contrast to free living wild animals (9.8 %).

Physocephalus spp. parasitizes in the stomach wall. We have recorded one positive finding in the wild piglet weighing approx. 10 kg during the summer season, which corresponds to 10 % prevalence. The mentioned parasite did not occur in other samples. Popiołek et al. (2010) have reported 1, 6 % prevalence in the free nature and 3.7 % prevalence in captivity.

Ascaris suum parasitizes on the small intestine. Occurrence of this parasite was confirmed in 5 samples, which corresponds to 50 % prevalence. The moderate infection was present in case of the wild piglet weighing approximately 10 kg. The next four samples (individuals weighing 20-40 kg) showed only a kind of weak infection. In contrast to our findings, Páv (1981) states that the occurrence of ascarides in the wild boars was on the level of 5 %. Also, according to Kotrlá et al. (1984), the occurrence of ascarides is lower in the wild game in comparison to the field farming.

In one case there was discovered the presence of the parasite eggs *Strongyloides ransomi* in the sample of excrements. It was a minor infection of a wild piglet weighing 15 kg in the autumn season. According to Jurášek and Dubinský (1993), it is considered a parasite occurring in the small intestine of the young animals.

Oocysts of *Eimeria* spp. Have most frequently occurred in the samples of excrements. Strong infections have occurred most frequently in all the wild piglets regardless the season of the year. The source of infection were the adult individuals, while a few day old piglets and runners got sick until 8 weeks of life (Jurášek and Dubinský, 1993). There were no oocysts of coccidia in excrements of an adult wild boar of the weight 100 kg. The prevalence was stated on the level of 90 %. A lower prevalence of eimeria in Slovakia was found by Debnárová (2010), who indicated the value of 74.96 %.

We can state from the results of the coprological examination of the wild boars excrements that small wild piglets, in which a greater amount of different types of parasites was confirmed in comparison to adult individuals, are most sensible to the emergence of parasitic infections.

Table 1. Prevalence of Endoparasites and Invasion Intensity in the Observed Samples of Excrements

Characteristics				Species of endoparasites						
Sample number	Season	Sex	Weight	<i>Metastrongylus</i> spp.	<i>Hyoststrongylus rubidus</i>	<i>Trichostrongylus axei</i>	<i>Physocephalus sp.</i>	<i>Ascaris suum</i>	<i>Strongyloides ransomi</i>	<i>Eimeria</i> spp.
1	Spring	♂	30	0	0	0	0	0	0	xxx
2	Summer	♂	10	x	0	x	x	xx	0	xxx
3	Fall	♀	15	0	0	x	0	x	x	xx
4	Fall	♂	100	0	0	0	0	0	0	0
5	Fall	♂	30	0	0	x	0	0	0	xxx
6	Fall	♀	40	0	0	0	0	x	0	xx
7	Fall	♂	40	0	0	0	0	0	0	x
8	Winter	♂	30	0	x	xxx	0	x	0	xxx
9	Winter	♀	40	0	0	0	0	0	0	xxx
10	Winter	♂	20	0	0	0	0	x	0	xxx
Number of positive samples				1	1	4	1	5	1	9
Prevalence in %				10	10	40	10	50	10	90

Legend: 0 – the sample free of parasites, x – weak infection, xx – medium strong infection, xxx - severe infection.

Conclusion

The study results have confirmed that the way of life, as well as the feeding behaviour of the wild boars, create favorable conditions for invasion of various kinds of endoparasites. The greatest diversity of endoparasites was recorded in the youngest individuals. The invasion intensity contained in the samples of faeces was quite weak in most cases.

In majority of cases, there was a strong invasion intensity recorded at oocysts *Eimeria* spp. The obtained results further show that adult individuals tend to develop immunity against endoparasites and it is therefore recommended to primarily hunt weak and emaciated wild boars. It would be appropriate to continue our investigations in order to clarify the achieved results more widely, since endoparasites may have a great importance in the pathogenesis of many other diseases.

References

- CIBEREJ, J., KOVÁČ, G., LAZAR, P., et al. 2001. Starostlivosť o zver a choroby zveri. PaPRESS p.r.o. Bratislava, 204 s.
- ČERVENÝ, J., HELL, P., SLAMEČKA, J., et al. 2004. Encyklopédia poľovníctva. Ottovo nakladateľství: Praha, 591 s., ISBN 80-7181-902-6.
- DE LA MUELA, N., HERNÁNDEZ DE LUJÁN, P., FERRE, I., 2001: Helminths of wild boar in Spain. Journ. of Wildlife Diseases, 37(4), 840–843.
- DEBNÁROVÁ, M. 2010. Prevalencia a intenzita invázie endoparazitóz diviačej zveri v niektorých lokalitách SR. Diplomová práca, SPU:Nitra, 77 s.
- DRMOTA, J., KOLÁŘ, Z., ZBOŘIL, J. 2007. Srnčí zvěř v našich honitbách. 1. vyd. Praha: Grada Publishing, 256 s., ISBN 80-2472-366-2
- HELL P. 1986: Diviačia zver. Bratislava: Príroda, 419 s.
- CHROUST K., 2001: Parazitární choroby spárkaté zvěře. Myslivecké listy – Supplementum, No I., Brno, 52 s.
- CHROUST, K., FOREJTEK, P. 2010a. Parazitární choroby zvěře a jejich zdravotní význam. Myslivost, 2010(4), s 44.
- CHROUST, K., FOREJTEK, P. 2010b. Velké plicní hlístice u naší spárkaté zvěře. Myslivost, 2010(6), s. 32-34.
- JURÁŠEK, V., DUBINSKÝ, P. 1993. Veterinárná parazitológia. 1. vyd. Bratislava, Príroda, 382 s., ISBN 80-07-00603-6.
- KIŠ, O., CIBEREJ, J., LACIAK, V. 2009. Prevalencia a druhové zastúpenie pľúcnych červov rodu metastrongylus u diviačej zveri v poľovnej oblasti Gemer. Folia venatoria, 38-39, s. 93-103.
- KOTRLÁ, B., ČERNÝ, V., KOTRLÝ, A., et al. 1984. Parazitózy zvěře. 1. vyd. Academia: Praha, 192 s.
- LETKOVÁ, V., GOLDOVÁ, M., CSIYSMÁROVÁ, G. 1998. Handbook for the diagnosis of parasites - Part I. M&M vydavateľstvo: Prešov, 88 s, ISBN 80 -967727-2-4.
- PÁV, J. 1981. Choroby lovné zvěře. 1. vyd. Praha, Státní zemědělské nakladatelství, 262 s.
- PĚKNÝ, J., BORKOVCOVÁ, M. 2003. Endoparazites od wild boar in free nature and in game preserve in some regions of South Bohemia and South Moravia, Czech republic. Proceeding of the 12th Helminthological Days held at Dolní Věstonice, Czech republic, 2003 May 5-8.
- POPIOLEK, M., KNECHT, D., SZCZĘSNA, J., et al. 2010. Helminths of the wild boar (*sus scrofa* l.) in natural and breeding conditions. Bull Vet. Inst. Pulawy, 2010(54), ss.161 - 166.
- RAJKOVIČ – JANJE, R., BOSNIĆ, P., RIMAC, D., et al. 2002. Prevalence of helminths in wild boar from hunting grounds in eastern Croatia. Z. Jagdwisp., 48, s. 261–270.
- SPELLMEYER, O. 1996: Investigations on the helminth fauna of roe deer and wild boar in northern Germany. Tierärztl. Hochschule Hannover, 241 s.

Corresponding Address:

Ing. Ivan Imrich, PhD.
 University of Agriculture in Nitra,
 Faculty of Agrobiological and food resources
 Department of Veterinary Sciences
 Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic
E-mail: ivan.imrich@gmail.com

This work has been created with the support of VEGA 1/0818/16 and KEGA 006SPU-4/2014.