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BENZIMIDAZOL RESISTANCE IN NEMATODE PARASITES IN DOMESTICATED ANIMALS IN NORTH-WEST PART POLAND

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ABSTRACT

The anthelmintics resistance of nematodes in sheep, cattle, horses and sows was investigated on 4 farms in North-West part Poland. The farms were visited thrice – before and twice 7 and 14 days after treatment. During the first visit, groups of 10 animals were formed. All animals were weighted before treatment and from each animal faecal samples were individually taken. One group in each farm remained untreated as a control. Benzimidazol – fenbendazol was administered in following doses: sheep, pigs – 5 mg/kg of body weight and

cattle and horses – 7.5 mg/kg of body weight. The drug resistance was ascertained by the faecal egg count depression test (FECDT).
Based on the FECDT, benzimidazol resistance in gastro-intestinal nematodes was demonstrated in all farms. In sheep the efficacy of treatment ranged from 36.5 to 25.9 per cents, in cattle from 23.3 to 16.2 per cents, in sows against Oesophagostomum sp. from 47.0 to28.5 per cents and in horses from 62.3 to 25.0 per cents respectively 7 and 14 days after treatment.

Key words: Parasites, animal, benzimidazol, resistance, Pomerania

INTRODUCTION

Anthelmintic resistance is one of the most important problem confronting the successful control of nematode parasites of grazing animals. Most often benzimidazol resistance in nematodes has been found in sheep, goats, and horses. Resistance has been detected in pig parasites, too. It is reasonable to sume that the resistance will increase, if there is no change in traditional methods of parasites control. Although progress is being made in non chemotherapeutic method of control, these are unlikely to provide any practical alternatives in the short-term future.

Nematode parasites are of major economic importance in domesticated animals throughout the world. Intensive use of anthelmintics will select for those individual nematodes that can survive the treatment; these being nematodes that are genetically and physiologically resistant to the anthelmintic treatment. These resistant individuals will reproduce. After some time, the anthelmintic may be relatively ineffective for the significant suppression of worm burdens and animal production may be impaired. In the most severe circumstances, parasitic diseases may not be checked by use of the anthelmintic.

The aim of these studies was to get information about the benzimidazol resistance of nematode parasites in domesticated animals in the Pomerania region.

MATERIALS AND METHODS

The benzimidazol resistance of nematodes in sheep, cattle, horses and pigs were investigated in 4 farms of North-West part Poland. On all farms a questionnaire was filled in wich relevant data for the survey, such as anthelmintic usage during the last years, grasing management in sheep, horses and cattle, way of pigs feeding etc. The farm were visiting thrice – before and twice 7 and 14 days after treatment. During the first visit, groups of 10 animals were formed.

From each animal faecal samples were individually taken. One group in each farm remained untreated as a control. The infection rate was established on the basis of coprological examination by using the McMaster method. The drug resistance was ascertained by the faecal egg-count depression test (FECDT). Fenbendazol (Panacur) was administered in following doses: sheep, pigs – 5 mg/kg of body weight, cattle and horses – 7.5 mg/kg of body weight.

RESULTS

Benzimidazol resistance were found in all farms, where the studies has been relised. The results are presented in the tables 1–5. In he horse farm Bielin anthelmintic treatment with fenbendazol (Panacur) against small strongyles (mainly against Cyathostomatidae) was

ineffective. Seven days after treatment the drug was in 62.4 per cent and after 14 days in 24.7 per cent effective (tab. 2)

Table 1. Benzimidazole resistance of Oesopfgostomum sp. in pigs

Number of pigs	Infection rate (EPG)			
	Before treatment	7 days after treatment	14 days after treatment	Control animal
1.	450	200	250	550
2.	600	250	400	350
3.	300	100	150	450
4.	800	350	550	600
5.	400	150	250	800
6.	750	350	300	700
7.	950	500	700	450
8.	250	150	150	550
9.	650	500	650	650
10.	800	600	850	750
x	595	315	425	585
SD	236.23	173.29	247.49	143.5

Table 2. Benzimidazole resistance of small strongyles in a horse farm

Number of horses	Infection rate (EPG)			
	Before treatment	7 days after treatment	14 days after treatment	Control animal
1.	910	400	750	1000
2.	1720	550	1600	1610
3.	1250	310	750	1350
4.	2800	900	1900	1800
5.	600	200	550	1600
6.	1100	500	950	600
7.	3150	1310	1850	1200
8.	950	350	800	1950
9.	1310	650	1150	1640
10.	750	300	600	900
x	1454	547	1090	1365
SD	864.19	336.26	512.51	432.62

The efficiency of fenbendazol against gastro-intestinal nematodes in sheep is presented in tab. 3. The efficiency of the drug ranged from 34,0 to 25.9 per cent respectively 7 and 14 days after treatment. It is worthy of note the very high effectivity of Levamisol (99.0 per cent) against gastro-intestinal nematodes in sheep.

Table 3. Benzimidazole resistance in gastro-intestinal nematodes in sheeps

Number of sheeps	Infection rate (EPG)			
	Before treatment	7 days after treatment	14 days after treatment	Control animal
	550	200	200	300

2.	500	650	650	850
3.	2200	1400	1400	1100
4.	100	50	50	450
5.	650	400	400	250
6.	1400	950	950	1000
7.	1100	850	850	1150
8.	1250	650	650	750
9.	1150	600	600	1200
10.	550	250	250	1450
x	945	600	600	850
SD	601.13	402.08	402.08	406.89

The data on fenbendazol resistance in cattle are given in tab. 3. After 7 days the drug was effective in 23.3 per cent and after 14 days in 16.3 per cent. As in sheep Levamizol was high effective against gastro-intestinal nematodes infection, too (tab. 4).

Table 4. Benzimidazole resistance in gastro-intestinal nematodes in cows

Number of cows	Infection rate (EPG)			
	Before treatment	7 days after treatment	14 days after treatment	Control animal
1.	200	150	150	100
2.	350	300	300	400
3.	150	100	100	200
4.	250	200	250	250
5.	250	150	200	400
6.	150	100	100	50
7.	300	250	300	200
8.	50	50	50	150
9.	250	200	200	200
10.	200	150	150	100
x	215	165	180	205
SD	85.15	74.72	85.63	118.91

Pigs were infected in 97.8 per cent mainly with Oesophagostomum sp. (in 93.0 per cent), the next with Ascaris suum (in 50.2 per cent) and with Trichocephalus suis (in 18.8 per cent). Seven days after treatment the efficiency of fenbendazol was in 50 per cent and 14 days after treatment in 37.5 per cent (tab. 1)

The summary of fenbendazol resistance of gastro-intestinal nematodes in domesticated animals of Pomerania Region is presented in tab. 5.

Table 5. Mean values of benzimidazol efficacy in domesticated animals.

Animals	Efficacy (per cent) – days after treatment	
	7	14
Horses	62.3	25.0
Sheep	36.5	25.9
Cattle	23.3	16.2
Pigs	47.0	28.5

DISCUSSION

Anthelmintic resistance in nematodes can be a problem in sheep, goats, horses, cattle and pigs. The most widespread resistance problems occur to benzimidazol anthelmintics in nematodes of sheep, goats and horses. Reports of this type of resistance have emanated from Australia. Africa, Europe North and South America; wherever animals are regularly treated with anthelmintics and investigation have been made. Beveridge et al. (1990), Eady et al. (1998), Rolfe (1993) and Waller et al.(1986) found a high level of benzimidazole resistance in gastro-intestinal nematodes in sheep in Australia. In Europe an increasing incidence of anthelmintic resistance in sheep were reported in Great Britain (Coles 1997, Hunt et al. 1992), in France (Guerin 1996) and in Denmark (Maingi et al. 1997). In USA benzimidazole resistance of gastro-intestinal nematodes in sheep were found in North Carolina (Uhlinger et al. 1992) and in eastern region (Lyons et al. 1992).

Benzimidazole resistance in cyathostomes in horses has been reported in USA (Lyons et al. 1997; Woods et al. 1998), Australia (Kelly et al. 1981) and in following European countries: Germany (Bauer et al. 1986); Netherlands (Borgsteede et al. 1997; Boerseman et al. 1991; Fisher et al.1992); Slovakia (Varady et al. 1997) and Norway (Ihler 1993).

Benzimidazole resistance in gastro-intestinal nematodes has been reported in cattle in Australia and New Zealand (Eagleson and Bowie 1986; Jackson et al. 1987), in Argentina (Suares 1997) and in Netherlands (Borgsteede et al. 1992). Recently, Borgsteede et al. (1997) in Netherlands, Requejo-Fernandez et al. (1997), in Spain and Dangolla et al. (1997) in Denmark found a high level of benzimidazole resistance in gastro-intestinal nematodes in goats.

Reports of benzimidazole resistance in Oesophagostomum in pigs have emanated from Germany (Bauer et al. 1993; Gewert 1996) and from Denmark (Dangoll et al. 1997).

Till now we have only fragmentary information about anthelmintic resistance in nematodes in North-West Part Poland. Balicka- Ramisz and Ramisz (1997) have presented communication on fenbendazole resistance in nematodes of sheep and Ramisz and Betlejewska (1993) have found fenbendazole resistance cyathostomes in horses. Our studies were realized in farms where fenbendazol has been used for a longer period. The studies inform us, that in Poland the benzimidazol resistance in nematodes of domesticated animals could be an important practical problem. Benzimidazol preparations are used in large scale for parasites control in Poland. It seems necessary to examined the efficiency of treatment when benzimidazol have been used.

CONCLUSIONS

1. Anthelmintic resistance is one of the most important problem confronting the successful control of gastro-intestinal nematodes of farm animals;
2. It seems necessary to examined the efficiency of treatment when benzimidazol preparations have been used.

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