



SHORT COMMUNICATION

Efficacy of anthelmintics against nematodes in naturally infected free range ducks

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Özet

Islam A, Anisuzzaman, Majumder S, Islam MA, Rabbi AKMA, Rahman MH. Doğal olarak enfekte ördeklerde antelmektiklerin etkinliği. **Eurasian J Vet Sci, 2012, 28, 4, 229-232**

Araştırmanın amacı dört antelmentiğin (piperazin sitrat, albendazol, fenbendazol, ivermektin) doğal enfekte ördeklerde etkinliğini belirlemektir. Farklı çiftliklerden elde edilen yirmi ördek temin edilerek dışkıları üç ayrı helmint açısından incelendi. Ördekler dört eşit gruba beş uygulama yapılacak şekilde ayrıldı. Dışkının her gramındaki yumurta oranı tedaviden önce ve sonraki 7, 14, 21 ve 30. günlerde hesaplandı. *Amidostomum* türü hariç bütün antelmektikler 14 güne kadar %100 etkinlik gösterdi. Fenbendazol 21. günde *Capillaria* türü %67 oranında etkiliyken diğerlerine %100 etkili olduğu belirlendi. Ivermektinin 21. güne kadar helmintlere %100 etkili olduğu belirlendi. Piperazin sitrat, fenbendazole ve ivermektin ile tedavi edilen ördeklerde *Capillaria* türlerinde karşı maksimum koruma sağlandığı belirlendi. Sonuç olarak piperazin sitrat ile ivermektinin albendazol ile fenbendazolden daha etkin olduğu ifade edilebilir.

Abstract

Islam A, Anisuzzaman, Majumder S, Islam MA, Rabbi AKMA, Rahman MH. Efficacy of anthelmintics against nematodes in naturally infected free range ducks. **Eurasian J Vet Sci, 2012, 28, 4, 229-232**

The objective of this study was to compare the efficacy of four anthelmintics (piperazine citrate, albendazole, fenbendazole, ivermectin) against nematodes of free range ducks. Twenty free-range ducks were selected from different farmer's house by fecal examination which was infected with three species of helminths. Ducks were divided into four treatment groups with five replications. Eggs per gram of faeces (epg) were calculated on pre-treatment and on day 7th, 14th, 21st and 30th post-treatment. All the anthelmintics showed 100% efficacy up to 14 days against all helminths except *Amidostomum sp.* Fenbendazole showed 100% efficacy against all nematodes except 67% against *Capillaria sp.* up to 21 days. Ivermectin showed 100% efficacy against all the helminths up to 21 days. Ducks treated with piperazine citrate, fenbendazole and ivermectin got the maximum protection against infection with *Capillaria sp.* In conclusion, it might be stated that piperazine citrate and ivermectin showed better efficacy than albendazole and fenbendazole.

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Bangladesh is a developing country where poultry trade is a mounting sector. The duck population in Bangladesh is 39.08 million (Anonym, 2007). It plays an important role in rural economy. Local ducks are distributed throughout the country, and smallholder farmers keep them under a subsistent level of management. Although geographical location, sub-tropical climatic condition of Bangladesh is suitable for duck habitation, and her water lodged and low-lying areas are also favorable for duck rearing, but this environment also favors the growth, multiplication, development, survival and spread of various parasites. A wealth of literatures show that almost all scavenging poultry including ducks are affected with one/more parasites (Farjana et al 2004, Anisuzzaman et al 2006, Rabbi et al 2006), which affect the growth and production performance of ducks (Anisuzzaman et al 2005). System of management, nutritional status, ecology of the parasites and their host-parasite relationship exert significant effect on the occurrence of the helminth infection in ducks.

Considering the adverse effects of these helminth parasites in ducks, present study was undertaken to investigate the therapeutic efficacy of some anthelmintics namely, piperazine, albendazole, fenbendazole, ivermectin against the natural infection with gastrointestinal nematodes in duck at Netrakona district in Bangladesh.

Table 1. Efficacy of anthelmintics at different days of trial.

Parasites	7 days				14 days				21 days				30 days			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
<i>Amidostomum</i> sp.	E	75%	83%	50%	E	50%	E	E	E	NE	E	E	75%	NE	67%	89%
<i>Capillaria</i> sp.	E	E	E	E	E	E	E	E	E	33%	67%	E	50%	33%	NE	80%
<i>Heterakis</i> sp.	E	E	E	E	E	E	E	E	E	67%	E	E	E	NE	E	E

E= 100% effective; NE= Not effective

To study the efficacy of some anthelmintics, treatment was given in naturally infected ducks. Twenty ducks were selected from different farmer's house by fecal examination which was infected with various species of nematodes. Before treatment eggs per gram of feces (epg) was calculated according to the method described by Thienpont et al (1979). The eggs were identified according to the keys and descriptions given by Soulsby (1982) and Thienpont et al (1979). Ducks were divided into four treatment groups as A (piperazine citrate, PO, 32 mg/kg), B (albendazole, PO, 100 mg/kg), C (fenbendazole, PO, 30 mg/kg) and D (ivermectin, SC, 0.3 mg/kg) each with five replications, and were marked with wing tag. Faecal samples collected from each duck were examined in same manner. Eggs per gram of faeces (epg) were calculated on day 7, 14, 21 and 30 post-treatment. Efficacy (E) of anthelmintics was calculated according to mentioned below.

$$\text{Efficacy} = \frac{[(\text{Mean EPG before treatment} - \text{Mean EPG after treatment}) / (\text{Mean EPG before treatment})] \times 100}{100}$$

A completely randomized design (CRD) with equal replications was employed to know the significant difference, if any, among the treatment group. The effects were compared with one another by least significant difference (LSD) test for identifying the best anthelmintic.

All the anthelmintics used were 100% effective up to 14 days against all helminths recovered except *Amidostomum* sp. (Table 1). With a course time the protecting potential of the drugs declined. We used piperazine citrate in group A, and it provided 100%, 75% and 50% protection, respectively, against *Heterakis* sp., *Amidostomum* sp. and *Capillaria* sp. up to 30 days. Piperazine citrate is widely used in poultry. In domestic geese, Katmov (1963) reported 100% efficacy of piperazine dithiocarbamate against *Amidostomum* sp. in naturally and artificially infected geese. Moderate efficacy of piperazine citrate against *Capillaria* sp. in turkey was detected by Kates et al (1969). Ziela (1999) observed that piperazine gave only 27.9% protection against *Heterakis gallinarum*, which is much lower than our findings. Disparity among the present and previous findings may due to the presence of anthelmintics resistant helminths, quality of the drug used for the study, and breed and environmental factors.

It was used albendazole in group B, which was 50% effective against *Amidostomum* sp. up to 14 days, and showed 33% efficacy against *Capillaria* sp. up to 21 days and 67% efficacy against *Heterakis* sp. up to 21 days. Albendazole is a broad spectrum anthelmintic with worldwide acceptability. Tucker et al (2007) reported 94% efficacy of albendazole against *Heterakis* sp., and 90-95% efficacy of albendazole against *Capillaria* sp. in broiler breeder birds of Arkansas, USA. Differences between the efficacy of this drug observed by our group and Tucker et al (2007) may mainly be due to the method of administration. Tucker et al (2007) used two divided doses whereas we used a single dose only. We treated ducks belonging to the Group C with fenbendazole. Fenbendazole showed 100% efficacy against all nematodes recovered except *Capillaria* sp.; against which the drug gave 67% protection up to 21 days. Ssenyonga (1982) reported more than 100% efficacy of fenbendazole against *Heterakis* sp. Kirsch (1984) observed around 100% efficacy

Table 2. Comparison of effects of anthelmintics for protecting the ducks from each of the parasitic infection.

Name of parasites	Relapsing time in day (mean±SE) of the various treatment			
	Piperazine	Albendazole	Fenbendazole	Ivermectin
<i>Amidostomum</i> sp.	30.0±0.00 ^a	17.2±3.89 ^b	25.4±4.60 ^a	30.0±0.00 ^a
<i>Capillaria</i> sp.	30.0±0.00 ^a	24.6±2.21 ^b	28.2±1.80 ^a	30.0±0.00 ^a
<i>Heterakis</i> sp.	30.0±0.00	28.2±1.80	30.0±0.00	30.0±0.00

^{a,b}: Different letters in the same line are statistically significant ($p < 0.05$)

of fenbendazole against natural *Capillaria obsignata* in 661 pheasants and 25 partridges in his study. Morishita and Schaul (2008) demonstrated that fenbendazole was effective against *Amidostomum* sp. in chickens. On the other hand, we used ivermectin in group D, which showed 100% efficacy against all the helminths recorded in this trial up to 21 days except *Heterakis* sp. In case of *Heterakis* sp., ivermectin provided 100% protection up to 30 days post treatment. Ivermectin is a modern drug, and is considered as a safe anthelmintic. Literatures regarding the efficacy of ivermectin are increasing tremendously. Through a well-designed trial Khayatnouri et al (2011) reported ~99% efficacy of ivermectin against *Heterakis* sp. Baker (2008) observed that ivermectin was effective against *Amidostomum* sp. in chickens. Ibarra-Velarde et al (2011) demonstrated that ivermectin, fenbendazole and albendazole were 94-100% effective against *Capillaria* sp. in naturally infected fighting cocks in Mexico.

Table 3. Comparison of overall effects of anthelmintics for protecting the ducks from parasitic infection.

Treatment group	Relapsing time
Piperazine	30.0±0.00 ^a
Albendazole	17.2±3.89 ^b
Fenbendazole	25.4±4.60 ^{ab}
Ivermectin	30.0±0.00 ^a

^{a,b}: Different letters in the same line are statistically significant ($p < 0.05$)

We found that the ducks of group A and D treated with piperazine citrate and ivermectin, respectively, were protected against *Amidostomum* sp., the most harmful nematode of ducks, up to a maximum duration of time (more than 30 days on an average). This finding was in agreement with Katmov (1963) and Baker (2008) who reported effectiveness of these drugs. The efficacy of albendazole was significantly ($P < 0.05$) lower than that of piperazine and ivermectin against *Amidostomum* sp. Ducks of group A (piperazine), C (fenbendazole) and D (ivermectin) got the maximum protection against infection with *Capillaria* sp. The efficacy of drugs of piperazine, fenbendazole and ivermectin was significantly ($p < 0.05$) higher than albendazole against *Capillaria* sp. Albendazole is very available and widely used. Therefore, it can be assumed that anthelmintics resistance may develop against this anthelmintic. Efficacy of fenbendazole was insignificantly ($p > 0.05$) lower than the drugs used in group piperazine and

ivermectin. On an average, the ducks of group A and D (treated with piperazine citrate and ivermectin, respectively) were free from the patent parasitic re-infection for about 30 days, whereas the ducks of group B and C (treated with albendazole and fenbendazole, respectively) were only free for ~17 and ~25 days, respectively (Table 3). Tanveer et al (2011) conducted a study in Pakistan against *Capillaria* sp. of pigeon using albendazole and fenbendazole and did not find 100% efficacy of these drugs.

In conclusion, piperazine citrate and ivermectin are the best anthelmintic to control the helminth infection in semiscavenging ducks, and these two drugs can be used at 30 days interval at the recommended dose.

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