

PREVALENCE AND CHEMOTHERAPY OF NEMATODES INFESTATION IN WILD AND DOMESTIC PIGEONS AND ITS EFFECTS ON VARIOUS BLOOD COMPONENTS

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ABSTRACT

Prevalence and chemotherapy of nematodes infestation and its effect on various blood parameters was studied in pigeons. One hundred wild and domestic pigeons each were subjected to Coprological examination for the presence of nematodes eggs. From these naturally infested pigeons, forty wild and forty domestic pigeons were selected and divided into eight groups W1, W2, W3, D1, D2, D3, CW and CD each comprising 10 pigeons. Pigeons of groups W1, W2, W3 were treated with ivermectin, oxfendazole and piperazine, respectively. Similarly the pigeons of groups D1, D2, and D3 were treated with the same drugs whereas the pigeons of groups CW and CD were kept as untreated control. The overall prevalence of nematodes infestation was 57% whereas it was 60% and 55% in wild and domestic pigeons, respectively. The efficacy of ivermectin, oxfendazole, and piperazine in domestic pigeons was 100%, 60%, and 80%, respectively whereas it was 50%, 100% and 80% for oxfendazole, ivermectin and piperazine in wild pigeons, respectively. Treatment and control groups showed highly significant difference ($p < 0.05$) in EPG, TLC, and haemoglobin estimation.

Key Words: Pigeons, Nematodes, Prevalence, Efficacy, Ivermectin, Oxfendazole, Piperazine

INTRODUCTION

Poultry industry is the most effective and economical source of animal protein in shortest possible time, but still it is unable to narrow down the animal protein supply and demand gap because of increasing future demands. Poultry producers are looking forward for some substitute of chicken meat, which in the future will come in the form of pigeon and quail meat to contribute towards the increase in gross domestic production (GDP) through livestock sector.

Pigeons fall into three groups i.e. poultry pigeons, carrier and racing pigeons, fancy and feral pigeons. Their distribution has made them readily accessible subjects for study. Pigeons probably originally the rock dove in Europe, have been partially domesticated and carried to all parts of the world. They have accustomed to live in close association with human beings and they are readily bred to produce a variety of plumage or to provide squabs for the table.

The gastro-intestinal tract of pigeons harbor a wide variety of helminthes, of which nematodes are the most deleterious parasites and are responsible for clinical and sub-clinical parasitism. During heavy infestation, these nematodes adversely affect the health of birds with loss in the body weight, retarded growth, unthriftiness, damage to the gut epithelium, fertility disturbances, emaciation and death especially in young birds (Urquhart, 1996).

Heavy losses have been attributed to gizzard nematode (*Amidostomum anseris*), which causes loss of appetite, dullness and emaciation in young birds. The

lining of the gizzard of a highly parasitized bird appears necrotic, loosened, leads to a rupture with ultimate formation of a sac or pouch. Extreme blood loss may contribute to the effects (Calnek *et al.* 1991). Similarly *Ascaridia galli*, a parasite of domesticated and wild birds which causes enteritis with diarrhea and unthriftiness with poor feed conversion (Blood and Studdert 1998).

Keeping in view the economic importance of the parasitic infestations in the development of profitable poultry industry, the present research was designed to study the prevalence of gastrointestinal nematodes in domestic & wild Pigeons, the effect of nematode infestation on various blood parameter and comparative efficacy of ivermectin, oxfendazole and piperazine against these nematodes.

MATERIALS AND METHODS

The present study was designed to work out the prevalence and chemotherapy of gastrointestinal nematodes in wild and domestic pigeons, its effect on various blood components and to evaluate the comparative efficacy of oxfendazole piperazine and ivermectin. For this purpose one hundred wild and one hundred domestic apparently healthy pigeons were purchased and kept under observation for 30 days. At 31st day they were subjected to Coprological examination. Out of naturally infected birds, 40 wild and 40 domestic pigeons were randomly selected and divided into 8 groups (D1, D2, D3, W1, W2, W3, CD and CW) each comprising 10 pigeons. The domestic pigeons group i.e. D1, D2 and D3 were treated with ivermectin (Ivomec 1%, MSD, Holland) @ 200µg/kg bw subcutaneously, oxfendazole (Oxafax, GalaxoWellcome)

@ 1ml/3kg bw PO and piperazine (Piprasym, Symans Laboratories) @ 2gm/litre of drinking water, respectively. The wild pigeons of groups W1, W2 and W3 were also treated with the same drugs.

Coprological Examination: The faecal samples were collected at day 0 (Pre-medication), and at day 10 and 21 (Post-medication) and were examined by direct smear method whereas egg per gram (EPG) was counted by modified McMaster technique (Soulsby, 1982).

Haematological Studies: The Blood samples were collected at day 0 (pre-medication) and at day 10 and 21 (post-medication) from the wing vein of the pigeons. The Blood Samples were examined for total leucocytes count (Benjamin, 1985) and hemoglobin concentration. Hemocytometer method as described by Coles (1986) was followed for the determination of TLC, whereas acid hematin method was used for haemoglobin estimation.

Drug efficacy: The percent efficacy of ivermectin, oxfendazole and piperazine was calculated by controlled test (Monskey and Harwood, 1941) on the basis of reduction in EPG.

RESULTS AND DISCUSSION

Prevalence: A total of 200 pigeons i.e. 100 wild and 100 domestic pigeons were selected for this study and their Coprological examination was performed for the presence of nematodes eggs. Sixty out of 100 wild pigeons were found positive for single or mixed infection of *Ascaridia columbae*, *Capillaria obsignata* and *Ascaridia galli*, whereas 55 out of 100 samples from domestic pigeons were found for single or mixed infection of above mentioned parasites. The overall prevalence of gastrointestinal parasites was 57%, whereas it was 60% and 55% for wild and domestic pigeons, respectively. These findings are supported by Buriro (1982) who reported the presence of *Ascaridia galli* in pigeons. Enz (1983) observed the presence of Ascarid in pigeons and overall prevalence of GIT parasites was reported to be 26.3%. Begum and Shaikh (1987) reported the prevalence of GIT parasite 86% with two species of nematodes i.e. *Ascaridia columbae* and *Capillaria obsignata* which is in agreement with the findings of present study. The difference in prevalence might be due to difference in geo-climatic conditions. Kaminjo *et al.* (1988) and Kulisic (1988) also reported the presence of *Ascaridia columbae* in pigeons which is congruent with the results of present study. The findings of the present study also correlates with the findings of Glass *et al.* (2002) who reported *Ascaridia columbae* (65%) in fledged white-winged dove. The findings of the present study also in

alignment with the findings of Magwisha *et al.* (2002) who reported 69% and 29% prevalence of *Ascaridia galli* in growers and adult chickens, respectively.

Efficacy of ivermectin, oxfendazole and piperazine: there was gradual decrease in EPG after medication (Table-1). The efficacy of ivermectin in both domestic and wild pigeons was 100% (Table 2). These results are in close agreement with Sharma *et al.* (1990) who found the efficacy of ivermectin to be 95% in pigeons. The findings of present study are also in complete agreement with those of Okaem (1988) who reported 100% efficacy of ivermectin in pigeons.

The efficacy of oxfendazole in domestic and wild pigeons was 60% and 70%, respectively (Table 2). Nurelhuda *et al.* (1989) reported 100% efficacy of oxfendazole against experimentally induced *Raillientina teragona* infection in pigeons, which do not correlate with the findings of present study. The difference may be due to the difference in species of parasite involved. Maqbool *et al.* (1998) reported the efficacy of oxfendazole to be 93% in chickens.

The average efficacy of piperazine was found to be 80% in both domestic and wild pigeons (Table 2). These findings are in close agreement with those of Pavlicek and Dykova (1976) who reported 83% efficacy of piperazine in white leghorn pigeons. Our findings are also in close alignment with those of Padmaja and Sathianesan (1993) who reported the efficacy of piperazine 85% in chickens. The findings of present study are in close alignment with the findings of Maqbool *et al.* (1998) who reported the efficacy of piperazine as 96% in chickens. The slight difference might be due species variation and different geoclimatic conditions prevailing at the time.

Total leucocytic Count: From the result of the present study it was observed, that the pigeons of groups W1, W2, W3, D1, D2, and D3 have significant difference ($p < 0.05$) in total leucocytic count with pigeons of groups CW and CD (Table 2). These results are in agreement with Kaushik and Sen (1978), who reported increased total leukocytic count in control groups and decreased total leucocytic count in treatment groups. Similar observation was reported by Krivutenko (1980) on Heterakis infection in turkeys and Sekhar and Sinha (1986), on *Ascaridia galli* infection in pullets.

Haemoglobin Estimation: The pigeons of groups W1, W2, W3, D1, D2, and D3 have significant difference ($P < 0.05$) in haemoglobin estimation with pigeons of groups CW and CD (Table 3). These results are in complete agreement with the studies of Rehman (1993) who reported decreased haemoglobin level in infected pigeons than the treatment group. Similar observations were recorded by Sekhar and Sinha (1986) in chickens for *Ascaridia galli*, Kaushik and Sen (1978) for nematodes ova and Krivutenko (1980) in turkey chick for Heterakis infection.

Conclusion: From the present study it may be concluded that nematodes like *Ascaridia columbae*, *Capillaria obsignata* and *Ascaridia galli* are common nematodes in wild and domestic pigeons and the ivermectin is a drug of choice for the treatment of nematodes infestation in domestic and wild pigeons which is 100% effective.

Table – 1. Efficacy of oxfendazole, ivermectin and piperazine in domestic and wild pigeons.

Type of Pigeons	Efficacy (%) of		
	Oxfendazole	Ivermectin	Piperazine
Domestic	60%	100%	80%
Wild	50%	100%	80%

Table – 2. Total leukocytic count (10³ /ul) in different treatment groups of domestic and wild pigeons at various days.

Day	Oxfendazole treated		Ivermectin treated		Piperazine treated		Total Control	
	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild pigeons
0	3900±10922396	52230±16524.19	62180±1246-95.84	55600±12713.59	50290±12460.02	53260±12568.8	42030±9335.98	40010±17930
10	4416±6739.13	39470±10969.55	408520±9567.39	37460±8750.5	34780±5183.90	37660±9279.03	48940±10607	17930±12533.71
21	29040±3921.50	28120±81185.35	23720±2750.30	24070±3559.9	27320±2520.49	28390±1752.10	62120±11505.43	64400±10439.77

Table – 3 Haemoglobin estimation (g/dl) in different treatment groups of domestic and wild pigeons at various days.

Day	Oxfendazole treated		Ivermectin treated		Piperazine treated		Total Control	
	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild Pigeons	Domestic Pigeons	Wild pigeons
0	6.6±0.719	7.24±1.10	6.7±1.260	7.2±0.952	7.6±1.255	7.36±1.111	8.69±1.452	8.69±1.452
10	7.71±0.721	8.38±1.109	8.72±0.855	8.78±1.02	9.13±0.69	9.35±0.738	8.50±1.170	7.56±1.307
21	9.78±0.239	9.54±0.97	10.8±0.26	10.88±0.436	10.59±0.420	10.7±0.249	8.0±1.1333	6.41±0.695

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