



ASCARIDIASIS IN NATIVE CHICKENS AT SADAR UPAZILA IN DINAJPUR DISTRICT

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ABSTRACT

The study was carried out in the Department of Pathology and Parasitology, Hajee Mohammad Danesh Science and Technology University during the period from July, to December, 2012, to determine the ascaridiasis in chicken of different villages at Sadar Upazila in Dinajpur district, and the comparative efficacy of piperazine citrate and fenbendazole against ascaridiasis in indigenous poultry. Attempts were also made to study the effects of piperazine citrate and fenbendazole on some clinical parameters in chicken. Average infection rate was found 84.22%. The rate of infection was studied in various age groups i.e. 60 to 90(97.93%) days, 91 to 150 (91.76%) days and 150 to 210 (53.79%) days of age group. A total 507 of chickens were examined for the presence of Ascarid parasites by faecal examination. Out of 507 chickens, 45 chickens having ascarid positive were randomly divided into 3 equal groups (group A, B and C), each group consisting of 15 chickens. The chickens of group B and C were treated with recommended (1g mixed in 0.35 kg feed) dose of Pipervet® and recommended (0.6 gm mixed in 1.5 kg feed) dose of Panacure® orally respectively. The chickens of group A were kept for control (untreated). On the basis of fecal egg count, the efficacy of Pipervet® was 80% after 14 days of treatment whereas Panacure® was 100% effective after 14 days of treatment against ascaridiasis in chickens. After treatment, both group of treated and also control groups of chickens were kept for 28 days and clinical parameters were investigated at 7 days interval ('0' day, 7th day, 14th day, 21st day and 28th day of treatment). Post mortem worm count revealed that Panacure® was considerable effective against the larval stage and adult worm. But Pipervet® is considering more suitable one anthelmintic for the treatment of ascaridiasis in indigenous poultry due to cost effective and available for rural people. This study is preliminary one considering small population of chicken. So further study must be carried out to explore the possible therapeutic use of Pipervet® against ascaridiasis as well as improvement of housing in chickens of rural area.

Key words: Ascariasis, Native chicken, Prevalence,

INTRODUCTION

Poultry is a promising sector in Bangladesh which is increasing day by day. Poultry production is hindered by many problems among which various diseases namely bacterial, viral and parasitic infections are the most important (Ojok 1993). In fact poultry of Bangladesh are parasitized by various parasites. Among the parasites next to the coccidian, *Ascaridia galli* infection in chicken is considered to be of great importance and the rate of infection in Bangladesh varies from just over 30% to nearly 80%. The rate of infection is higher in male than female and in young than adults (Mondal and Qadir 1991). It is an intestinal worm and chickens under three months of age are mostly susceptible. Both in rural and farm conditions ascarids infection is important in Bangladesh (Haq 1986). *Ascaridia galli* causes extensive economic losses in different ways such as loss of weight gain, meat production, egg production and death of birds. Immature *Ascaridia galli* penetrate into the duodenal mucosa and causes severe haemorrhagic

enteritis. The laying hens become unthrifty, marked emaciation, gradually weak and egg production is decreased. In heavy infections intestinal obstruction and perforation may occur leading to peritonitis and death of the chicken (Soulsby 1982). *Ascaridia galli* is a common parasite of poultry and has been reported in chicken, turkey, guinea fowl, pigeons, duck, and goose (Ruff and Norton 1997). It has been reported as a common parasite of pigeons and doves. The life cycle is simple and direct, and infection is acquired by ingestion of infective eggs with contaminated feed and water, hatch in either the proventriculus or the duodenum of the susceptible host. The prepatent period is about five to six weeks (Abdullahi *et al.* 2010; Oniye *et al.* 2000; Audu *et al.* 2004 and Gadzama *et al.* 2005).

A good spectrum of effective anthelmintics is available in the market. Albendazole, fenbendazole, ivermectin, livamisole, piperazine etc are the widely used anthelmintics. Among them

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piperazine citrate is widely used for the treatment of ascariasis in chickens. Peoples of Bangladesh who rear indigenous poultry by scavenging system are mainly farmers. They live under poverty line. They have no ability to buy modern medicine because of high price of the drug and their poor economic condition. As a result their livestock and poultry die from disease. In Bangladesh a number of manufacturing companies have introduced several drugs in the market for treatment and chemoprophylaxis of chicken ascariasis. Some of these drugs have been subjected to clinical evaluation elsewhere, but not in this region under our situation. Although, there has been no data on the economic losses caused by *Ascaridia galli* in the rural chicken of Dinajpur district. It has been assumed that losses in terms of morbidity and mortality would be very high in comparison to other countries of the world. Considering the above facts the present study was undertaken to study the prevalence of ascariasis in relation to age, sex and to evaluate the efficacy of Piperazine citrate and fenbendazole on ascariasis in indigenous chickens.

MATERIALS AND METHODS

Coprological examination: A total of 507 native chickens were examined ranging from 2 to 7 months of age from different villages at Sadar Upazila in Dinajpur district. Fecal samples were collected directly from the cloaca of chickens in polythene bags in early morning and preserved in 10% formalin. Samples were sent to the laboratory examined by direct smear method and Stoll's ova counting technique.

Study of drug efficacy

Collection of chickens: We collected 60 chickens (2-3 months, above 3-5 months and above 5-7 months) from different local market of Sadar Upazila of Dinajpur District and screened by coprological examination. Among them, 45 chickens were infected. Infected chickens were selected for efficacy study. The chickens were allowed to take rest for 7 days for adaptation. The experiment was carried out in Upazila Livestock Hospital, Sadar, Dinajpur. The age and body weight of all selected chickens ranged from 60 to 210 days and 300 to 500 gm, respectively. The chickens were supplied with normal diet and water.

Selection and collection of drugs/chemicals: Piperazine citrate (Piper-Vet®, Square Pharmaceuticals Ltd. Bangladesh) and Fenbendazole (Panacure®, Hoechst Germany Ltd.) were selected and purchased from local market for the evaluation of the comparative efficacy against ascariasis in chickens.

Experimental design: All the selected 45 chickens were randomly divided into 3 groups (A, B and C)

for assessing the efficacy of piperazine citrate and fenbendazole against ascariasis in chickens.

Group A: Control. **Group B:** Piperazine treated group. The drug was administered orally with @ 1g mixed in 0.35 kg feed for 2 days in the morning. **Group C:** Fenbendazole treated group. This was administered orally @ 0.6 gm mixed in 1.5 kg feed for 3 days in the morning. All the chickens of treated and control groups were closely observed for 35 days after treatment.

Data analysis: Statistical analyses were carried out by using Statistical Package for Social Sciences (SPSS) using F test and chi-square test (for the detection of significance level of different parameters).

RESULTS AND DISCUSSION

A total of 507 chickens from different villages at Sadar Upazila in Dinajpur district were examined to study (a) the Ascarid nematodes infection. In addition two patent drugs namely Piper-Vet® and Panacure® were given orally to study (b) the comparative efficacy of these drugs against ascariasis by observing the effect of these two drugs.

Ascariasis in chicken: In this research work chicken from 60 days (2 month) to 210 days (7 months) of age of different villages of Sadar Upazila of Dinajpur district were examined and overall rate of infection of ascariasis was found 84.22%. Out of 507 chickens, 369 were hens and 138 were cocks. Among the female and male birds, 299 (80.21%) and 122 (88.40%) were found infected with Ascarid nematodes, respectively (Table-1). The rate of infection was found highest in village Mohabolipur (93.06%) and lowest in Noyonpur (75%). The rate of infections were 97.93% in 60 to 90 days (2 to 3 months) of age, 91.76% in 91 to 150 days (above 3 to 5 months) of age and 53.79% in 151 to 210 days (above 5 to 7 months) of age of chickens (Table-2). In our country, more or less similar prevalence of gastrointestinal nematodiasis in chickens have been reported earlier by Sarker *et al.* (2009) who found that highest prevalence of ascariasis was in Daganbhuiyan upazilla (90.47%) and lowest was in Parshuram upazila (81.57%) under Feni district. Rabbi *et al.* (2006) recorded the prevalence of *R. tetragona* (100%) was the highest followed by that of *A. galli* (87.50%) and *H. gallinarum* (80%) in backyard poultry. Haq (1986) recorded *A. galli* as 45%, *H. gallinae* 80%, *Capillaria annulata* 10%, and *C. columbae* 15%. The highest rate of infection was found in 60 to 90 days (2 to 3 months) of age group fowls. Similar findings have been reported by Sarker *et al.* (2009). Our findings also conform with that other scientists conducting research in abroad (Nnadi and George, 2010; Mukaratirwa and Khumalo, 2010; Matur *et al.*, 2010; KÖSE *et al.*,

Table 1. Ascariidiasis in chickens from different villages at Sadar Upazila in Dinajpur district

Villages	No. of examined	No. of infected (%)
(1) Subra	56	43(76.78%)
(2) Gobindogonj	56	48(85.71%)
(3) Kornai	56	44(78.57%)
(4) Mohabolipur	101	94(93.06%)
(5) Gosaiपुर	61	55(90.16%)
(6) Sadhipur	86	71(82.55%)
(7) Noyonpur	96	72(75%)
Total	507	427(84.22%)

Table 2. Effect of age on the prevalence of *A. galli*

Category	No. of examined	No. of infected (%)
Category-1: 60-90 days	193	189(97.93%)
Category-2: 91-150 days	182	167(91.76%)
Category-3: 151-210days	132	71(53.79%)
Total	507	427(84.22%)

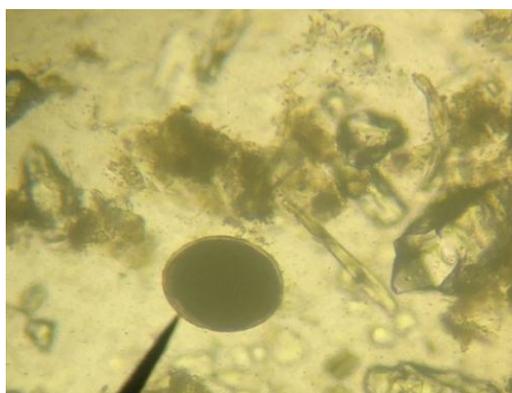


Figure 1. Egg of *Ascaridia* sp.



Figure 2. Pathological changes in the intestine



Figure 3. Adult *Ascaridia galli*

On comparing the efficacy of Pipervet® and Panacure® on the basis of reduction of fecal egg count of *Ascaridia spp*, Panacure® was found to be best drug and was 100% effective within 14 days of oral administration. On the other hand, the efficacy of piperazine citrate was slow and less effectiveness against the larval stage of *A. galli*. The present study supported with the report of (Horton-Smith and Long 1956 and Kulkarni 1979). Even then, use of piperazine salt against chicken ascarids have been recommended for laying hens by Brewer and Edgar 1975; because this drug has no side effects on the growth and/or egg production at therapeutic levels. When the market value of Pipervet® and Panacure® are compared, Pipervet® is found to be more economic and the feasibility of using Panacure® at farmer's level seem to be somewhat limited.

Treatment significantly increased body weight gain: Mean body weight of each group of chickens prior to treatment and after treatment on 7th, 14th, 21st and 28th days was calculated in gram and percentage of live weight gain/loss in gram was shown in table-4. The oral administration of recommended doses of Pipervet® (1g mixed in 0.35 kg feed) and Panacure® (0.6 gm mixed in 1.5 kg feed) were given to chicken of group B and C respectively and group A was kept untreated and control. The anthelmintics significantly($p < 0.05$) increased the percentage of mean body weight of chicken of groups B and C as 4.17% and 4.74% respectively on 28th day after treatment. But percentage of body weight gain of the control group was very negligible as 0.88% on 28th day. In chicken of group B and C, body weight gain might be due to proper absorption and metabolism of feed nutrients. Because at that time the chicken of group B and C were free from parasites. But in the chicken of group A, body weight was not increased significantly because they were suffering from parasitic infection. Parasites interfere with absorption of feed nutrients. As a result, the body weight of chicken of group A was decreased

Table 3. Effect on fecal egg count

Group of chicken	Drug and dose	Pre-treatment	After drug administration(post-treatment)			
		0 day	7 th day	14 th day	21 st day	28 th day
A	Control	230±3.94	210±2.25	190±2.01	150±1.63	110±0.69
B	Pipervet® @ 1g mixed in 0.35 kg feed orally	225±3.88	120±1.81	25±0.91	0	0
C	Panacure® @ 0.6 gm mixed in 1.5 kg feed orally	215±3.58	20±0.84	0	0	0

Values given above represent the mean ± SE, n=5

Table 4. Effects of on body weight gain in chicken

Group of chickens	Drug, dose and route	Pre-treatment	After drug administration (Post-treatment)				Mean weight gain (%)
		0day	7 th day	14 th day	21 st day	28 th day	
A	Control (untreated)	406.5	402.2	409.6	407.5	410.1	0.9
		± 3.7	± 3.9	± 3.6	± 3.6	± 3.5	
B	Pipervet® @ 1g mixed in 0.35 kg feed orally	419.1	422.1	425.2	429.9	436.6*	4.2
		± 3.9	± 4.6	± 2.3	± 1.6	± 2.1	
C	Panacure® @ 0.6 gm mixed in 1.5 kg feed orally	434.3	436.3	442.2	443.5*	450.6*	4.7
		± 5.3	± 5.9	± 5.2	± 5.6	± 5.3	

Values given above represent the mean ± SE, n=5 *significantly increased (p<0.05)

Table 5. Effects of Pipervet® and Panacure® on number of parasites in chickens

Group of chicken	Drug and dose	Pre-treatment	Post-treatment	
		0 day	14 th day	28 th day
A	Control	11	14	15
		± 1.41	± 1.42	± 1.91
B	Pipervet® @ 1g mixed in 0.35 kg feed orally	8	0	0
C	Panacure® @ 0.6 gm mixed in 1.5 kg feed orally	± 1.64	0	0
		3	± 1.32	

Values given above represent the mean ± SE, n=3

gradually. The present findings conform to the observation of Hoque *et al.* (2006); Khalid *et al.* (2005) and Islam *et al.* (2005).

Postmortem examination

Two patent drugs Pipervet® and Panacure® were given orally in chickens of groups B and C respectively and observed for 28 days. Before treatment three chickens from each group were also slaughtered to count the number of parasites (Ascarids) and to see if there were any pathological changes present. After treatment three chickens from each group were slaughtered to count number of parasites (Ascarids) and to study if there were

any pathological changes present on 14th day of treatment. That was also done on 28th day of treatment. There was no significant pathological change in any internal organs of the chicken of the treated groups. Table 5 shows the effect of Pipervet® and Panacure® on number of parasites in chickens. Moreover in the Panacure® group, the total numbers of recovered worm were very less compared with that of Pipervet® group. It was also noted that the worm recovered from Panacure® group were immature, whereas those recovered from Pipervet® group were adult. From this comparative assessment of the number of worm and their maturity, it may be stated that Panacure® was superior to Pipervet® in the treatment of A.

galli infection in chicken. Reduction of parasite count was found on 14th and 28th day in the group of chicken of B and C. Number of parasites was found to be '0' on 14th day in both group B and group C. On the other hand, numbers of parasites were increased day by day in control group A. This findings support with the observation made by Gaulty *et al.* (2005).

CONCLUSION

Our results suggest that Pipervet® is considering more suitable one anthelmintic for the treatment of ascariasis in indigenous poultry to rural people.

REFERENCES

- Abdullahi SU, Abdu P A, Ibrahim MA, George JBD, Sa'idu I, Adekeye JO and Kazeem HM. 2010. "Incidence of Diseases of Poultry Caused by Non-Viral Infection Agents in Zaria, Nigeria". The Pacific Journal of Science and Technology. 11(2): 515-520
- Audu PA, Oniye SJ and Okechukwu PU. 2004. "Helminth Parasites of Domesticated Pigeons {*Columba livia domestica*} in Zaria". Nigerian Journal of Pest, Diseases and Vector Management, 5: 356-360.
- Begum S, Mostofa M, Alam A K M R, Hossain M F, Barman V G, Ali A A M and Mian R. (2010). Comparative efficacy of leaves extract of neem and bishkatali with patent drugs piperazine and levamisole against ascariasis of indigenous chicken. International Journal of BioResearch . 1 (5): 17-20.
- Brewer R N and Edgar S A. 1975. Control of the large round worm in broiler. Practicing Nutritionist. 9: 18-20.
- Eshetu Y, Mulualem E, Ibrahim H, Berhanu A and Abera K. 2001. Study of gastro-intestinal helminths of scavenging chickens in four rural districts of Amhara region, Ethiopia. Revue Scientifique Et Technique-Office International Des Epizooties. 20 (3): 791-796.
- Gadzama IMK, Olawuyi NA, Audu PA and Tanko D. 2005. "Haemoparasites and Intestinal Helminths of the Laughing Dove (*Streptopelia senegalensis*) in Zaria, Nigeria". Journal of Tropical Biosciences. 5(1):133-135.
- Hafiz A and Bhattacharyya H K. 2009. Comparative efficacy of piperazine and ivermectin against ascariasis in chickens. Indian Journal of Animal Research. 43 (3): 213-214.
- Haq MS. 1986. Studies on helminthes infections of chicken under rural condition of Bangladesh. Bangladesh Veterinary Journal. 20 (2-4): 55-60.
- Hoque M E, Mostofa M, Awal M A, Choudhury M E, Hossain MA and Alam MA. 2006. Comparative efficacy of piperazine citrate, levamisole and pineapple leaves extract against naturally infected ascariasis in indigenous chickens. Bangladesh Journal of Veterinary Medicine. 4 (1): 27-29.
- Horton-Smith C and Long PL. 1956. The anthelmintic effect of three piperazine derivatives on *Ascaridia galli*. Poultry Science. 35: 606-611.
- Islam SA, Rahman MM, Hossain MA, Chowdhury MGA and Mostafa M. 2005. Comparative efficacy of some modern anthelmintics and pineapple leaves with their effects on certain blood parameters and body weight gain in calves infected with ascarid parasites. Bangladesh Journal of Veterinary Medicine. 3 (1): 33-37.
- Khalid SMA, Amin MR, Mostofa M, Choudhury M E and Uddin B. 2005. Effects of indigenous medicinal plants (neem and pineapple) against gastrointestinal nematodiasis in sheep. International Journal of Pharmacology. 1 (2): 185-189.
- Kulkarni D. 1979. A controlled laboratory trial on the anthelmintic efficacy of 'Loxon-2' and Coopane against *A. galli* in experimentally infected chicks. Poultry Guide. 14: 51-54.
- Matur BM, Dawam NN and Malann YD. 2010. Gastrointestinal Helminth Parasites of Local and Exotic Chickens Slaughtered in Gwagwalada, Abuja (FCT), Nigeria. New York Science Journal. 3 (5): 96-99.
- Mondal MMH and Qadir ANMA. 1991. Some epidemiological aspects of ascarids infection in chicken under the existing situation of Bangladesh Agricultural University Poultry Farm. Bangladesh Agricultural University Research Progress 5: 332-336.
- Mukaratirwa S and Khumalo MP. 2010. Prevalence of helminth parasites in free-range chickens from selected rural communities in KwaZulu-Natal province of South Africa. Journal of the South African Veterinary Association. 81(2): 97-101.
- Mustafa Köse, Feride Kircali Sevimli , Esmâ Küpeli Kozan and Hatice Sert Çiçek. 2009. Prevalence of Gastrointestinal Helminths in Chickens in Afyonkarahisar

- District, Turkey. Kafkas Univ Vet Fak Derg. 15 (3): 411-416.
- Nnadi PA and George SO. 2010. A cross-sectional survey on parasites of chickens in selected Villages in the subhumid zones of south-eastern Nigeria. *Journal of Parasitology Research*. 3: 2-5.
- Ojok L. 1993. Diseases as important factor affecting increased poultry production in Uganda. *Der Tropenland Wirt Zeitschrift fur die landwirtschaft in din Tropen and Subtropen*. 94 : 37-44.
- Oniye SJ, Audu PA, Adebote DA, Kwaghe BB, Ajanusi OJ and Nfor MB. 2000. "Survey of Helminth Parasites of Laughing Dove, *Streptopelia segalensis* in Zaria, Nigeria". *African Journal of Natural Sciences*, 4:65-66.
- Permin A, Bisgaard M, Frandsen F, Pearman M, Kold J and Nansen P. 1999. Prevalence of gastrointestinal helminths in different poultry production systems. *Br Poult Sci*. 40 (4): 439-443.
- Phiri, IK., Phiri AM, Ziela M, Chota A, Masuku M and Monrad, J. 2007. Prevalence and distribution of gastrointestinal helminths and their effects on weight gain in free-range chickens in Central Zambia. *Trop Anim Health Prod*. 39 (4):309-315.
- Pinckney RD, Coomansingh C, Bhaiyat MI, Chikweto A, Sharma R and Macpherson CNL. 2008. Prevalence of gastrointestinal parasites in Grenada, West Indies. *West Indian Veterinay Journal*. 8 (1): 23-26.
- Poulsen J, Permin A, Hindsbo O, Yelifari L, Nansen P and Bloch P. 2000. Prevalence and distribution of gastro-intestinal helminths and haemoparasites in young scavenging chickens in upper eastern region of Ghana, West Africa. *Preventive Veterinary Medicine*. 45 (3-4): 237-245.
- Rabbi AKMA, Islam A, Majumder S, Anisuzzaman and Rahman MH. 2006. Gastrointestinal helminths infection in different types of poultry. *Bangladesh Journal of Veterinary Medicine*. 4 (1): 13-18.
- Ruff MD and Norton RA. 1997. "Nematodes and Acanthocephalans". In: Calnek, B.W., Barnes, U.J., Beard, C.W., McDougald, L.R., and Saif, Y.M. *Diseases of Poultry*, 10th ed. Iowa State University Press: Ames, IA. Pp: 815-850.
- Sarker RR, Mostofa M, Awal MA, Islam MS and Mian R. 2009. Comparative efficacy of the selected indigenous medicinal plants with a patent drug levamisole against ascariasis in village poultry. *Bangladesh Journal of Veterinary Medicine*. 7 (2): 320 - 324.
- Sarker RR, Mostofa M, Awal MA, Islam MS and Mamun SA. 2009. Prevalence of ascariasis in village poultry at five upazilas under feni District. *Bangladesh Journal of Veterinary Medicine*. 7 (1): 293 - 295.
- Soulsby E.J.L. 1982. *Helminths, Arthropods and protozoa of Domesticated Animals*. 7th edn. ELBS, Bailliere, Tendam, pp. 167-169.