

Prevalence and Pathology of *Amoebotaenia sphenoides* in free ranging chicken of Kashmir Valley.

S Salam, A Khan, M Mir

Citation

S Salam, A Khan, M Mir. *Prevalence and Pathology of Amoebotaenia sphenoides in free ranging chicken of Kashmir Valley.* The Internet Journal of Parasitic Diseases. 2008 Volume 4 Number 1.

Abstract

In the present study, a survey was carried out for a period of two years from Jan 2005 to Dec 2006 on the prevalence and pathology associated with the cestode *Amoebotaenia sphenoides* in a sample size of 478 birds collected from different localities of Kashmir valley, India. The overall prevalence rate of the cestode was found to be 6.69% (32/478) and annual occurrence rates of 6.8% (16/233) and 6.5% (16/245) were respectively reported for the 1st and 2nd years of study. Histopathological sections revealed the scolices burrowing deep into the mucosa and at the site of infection, the disintegration of epithelium and glands and infiltration of mononuclear cell was prominent.

INTRODUCTION

Amoebotaenia sphenoides occurs in the domestic fowl and is cosmopolitan in distribution. It is a small tapeworm 2 to 3.5mm in length and about 1mm in width, roughly triangular in shape and possesses about 20 segments. The development of the cestode involves earthworms as intermediate hosts. Mature tapeworms are found in fowls about 4 weeks after the ingestion of infected earthworms. Although this parasite is not responsible for any clinical entity but enteritis and wasting have been ascribed to it when heavy infections are present. Therefore the importance of the cestode in decreasing the productivity can not be undermined. The present study was aimed to have a correct idea about the economic loss produced by a cestode. Therefore, an attempt has been made in this study to find out the prevalence trends of the cestode and the extent of damage produced in the intestine by natural infection of this small cestode.

MATERIALS AND METHODS

In the present study free ranging chicken were purchased from villagers and the local market from different localities covering almost whole of the Kashmir valley. Post mortem examinations were performed as described by Fowler (1990). After decapitation, the trachea was examined directly and the entire gastrointestinal tract including the esophagus was collected from each bird. The gastrointestinal tract was opened in a longitudinal section and the contents were carefully washed through a test sieve. The mucosa was scraped in order to collect the cestodes embedded in the

mucosal layer. Finally, the contents were also examined under the microscope for locating any larvae or egg invisible to naked eye. All cestodes were counted before being fixed. Permanent slides of the scolices were prepared to identify the cestodes taking help from the work of Yamagutti and Soulsby (1982). The intestines showing gross abnormalities were fixed in 2.5% glutaraldehyde for Scanning Electron Microscopic studies and for histological studies the infected intestinal tissues were fixed and preserved in 10% formalin, processed through conventional technique (Behmer et al., 1976) for paraffin embedding and then sectioned at 4-5 microns in thickness. The sections were then stained with Haematoxyline and Eosin.

RESULTS

The monthwise prevalence of *Amoebotaenia sphenoides* recorded for a period of two years from Jan 2005 to Dec 2006 is presented in Figure 1 and the season wise variations in the parasitic loads of *Amoebotaenia sphenoides* on the domestic fowl of Kashmir valley are presented in the Figure 2. *Amoebotaenia sphenoides* was found to show relatively lower prevalence rates as compared to other cestodes of the domestic fowl showing an overall prevalence rate of 6.69% (32/478) and annual occurrence rates of 6.8% (16/233) and 6.5% (16/245) respectively for the 1st and 2nd years of study. Figure 1 clearly indicates that the number of birds infected with the cestode were more in July and September months of the study when temperature and rainfall were comparatively higher. While looking on the Figure 2, it is

clear that the load of the cestode was maximum in the autumn seasons of the both the years of the study.

Figure 1

Fig. 1: Month wise prevalence of .

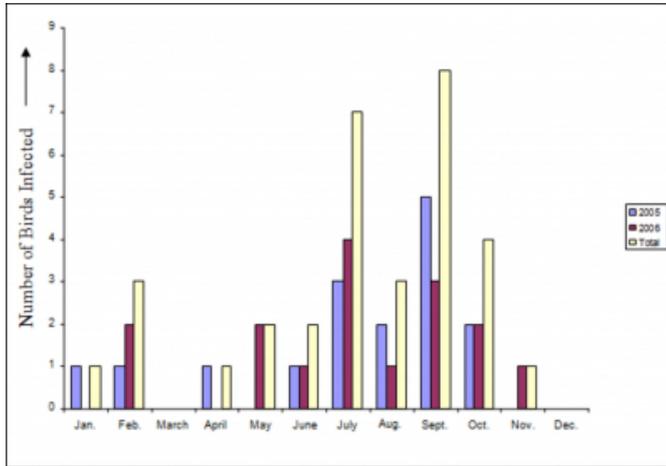
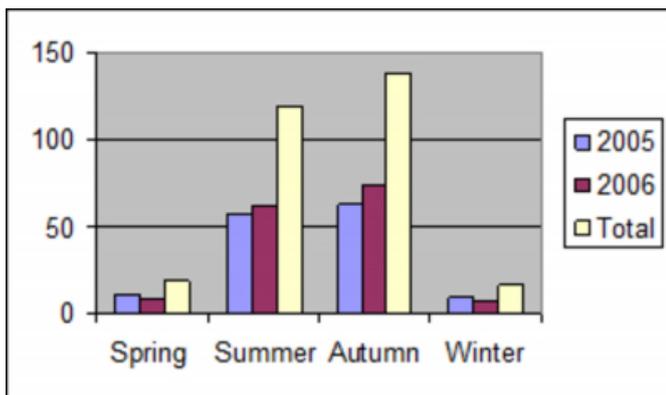


Figure 2

Figure 2. Season wise variations in parasitic loads of



In the fowl intestines infected with *Amoebotaenia sphenoides*, SEM revealed that the parasite was firmly attached and deeply embedded into the mucosa of duodenum (Plate 1). Also, a few parasites were found free into the lumen of lower jejunum. Histopathological sections revealed the scolices burrowing deep into the mucosa, villi appeared to be atrophied with rounding of tips and at the site of infection, the epithelium and glands were disintegrated (Plate 2). The inflammatory reaction was characterized by mononuclear cell infiltration which was more severe at the site of infection (Plate 3). The pathological changes were more severe in mixed infections (Plate 4).

Figure 3

Plate 1: Scanning electron micrograph of penetrating the duodenum of domestic fowl. 120X



Figure 4

Plate 2: Photomicrograph of intestine of the domestic fowl revealing A penetrating the mucosa. Degeneration and disintegration of the mucosa epithelium and glands are evident. (H&E 10X.)

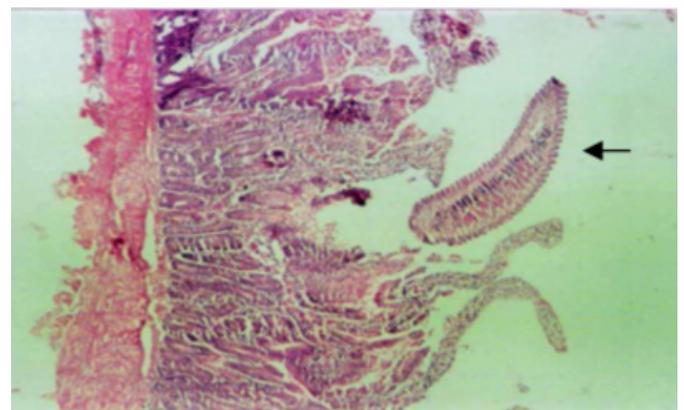


Figure 5

Plate 3: Photomicrograph of intestine of free ranging domestic fowl infected with revealing degeneration and disintegration of mucosa & mononuclear cell infiltration (H&E 40X).

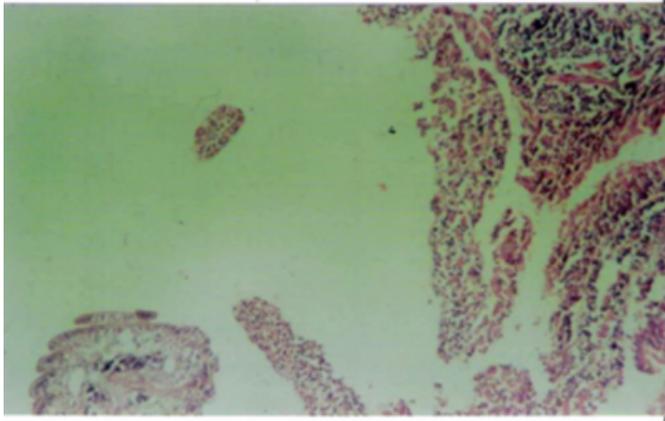
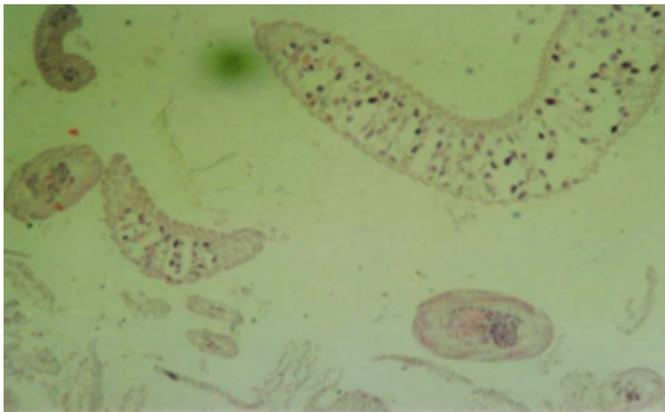


Figure 6

Plate 4: Photomicrograph of section of intestine from domestic fowl showing presence of , & in the lumen (H&E 10X).



DISCUSSION

The present investigation on the prevalence of the cestode *Amoebotaenia sphenoides* clearly revealed that the prevalence as well as the parasitic load of the cestode was more in the early autumn when temperature and rainfall are optimum. The results of the present study in domestic fowl are in line with the observations of Pandit et al. (1991) who while working on the prevalence of helminth parasites in desi fowls of Kashmir got almost similar percentage prevalence of the helminths. Our observations are also clearly in line with the observations of Fotedar and Khateeb (1986) who also recorded the highest incidence of helminth infection in the domestic fowl of Kashmir valley in the month of September and lowest in the months of December and January and a decrease in the incidence and mean worm

burden with decreasing temperature and rainfall. The reason behind the heavy infection during the warm and wet months may be high mean temperature and high relative humidity which lowers the resistance of birds and favours heavy infection (Hawkins, 1945) and lower rate of infection during winter season might be attributed to low temperature which also may help in arrested development of parasites in host and environment (Ogunsui and Eyskey, 1989). The increased availability of intermediate hosts in the rainy seasons for the completion of life cycles of parasites may also be one important factor responsible for high rate of infection during summer months. Coinciding with our study are the observations of Hassouni & Belghyti (2006) in Morocco, Permin et al. (1999) in Denmark, Ashenafi & Eshetu (2004) in Ethiopia and Nithiuthai., et al. (2003) in Bangkok. Minor differences in the results of the present study could be explained on the basis of seasonal, managerial, climatic variations and also due to variation in parasitic population of different localities where birds were exposed.

Histological studies of the infected tissues revealed atrophy of villi with broadened surface and increased vascularity. The epithelium and glands at the site of infection were disintegrated and degenerated. The inflammatory reaction was characterized by predominant infiltration of heterophils and lymphocytes and proliferation of connective tissues suggestive of mild form of enteritis. Infiltration of heterophils and lymphocytes probably acted as first and second line of defense (Runnels et al., 1976). Also a few lymphocytes and eosinophils were seen in the lamina propria. The presence of lymphocytes is indicative of immunogenic response to the body and eosinophils are supposed to be active in eliminating toxin material (Vaughn, 1953). Infiltration of mononuclear cells, eosinophils in the intestinal tissue was also recorded in the later stage of infection (Gray, 1975). The pathological changes observed with *Amoebotaenia sphenoides* infection in fowl is in agreement with earlier reports (Nath and Pande, 1963; Jha et al., 1981; Bhowmik et al., 1983). The parasites have been frequently reported free in the lumen and also attached to the lining. The mucosal damage has been attributed to dragging of epithelial tissue by the parasite sucker. Besides these various other reports also indicate that the tapeworm infection causes leucocytosis, heterophilia (Matta, 1980) and eosinophilia (Yakimoff and Rastegaieff, 1929; Asdrubali and Mughetti, 1969).

References

r-0. Asdrubali, G. and Mughetti, L., 1969. Sul Comotamentobi cosdetti leucocitiglobulari in aleune

parasitosis intestinally del poll. Atti. Soc. ital. Sci. Vet. 22: 601-606.

- r-1. Ashenafi, H & Eshetu, Y., 2004. Study on gastrointestinal helminthes of local chickens in Central Ethiopia. *Revue Med. Vet.*, 155(10): 504-507.
- r-2. Bhowmik, M.K. & Sinha, P.K., 1983. Studies on the pathology of taeniasis in domestic fowl. *Indian Vet. J.*, 60: 6-8.
- r-3. Bhowmik, M.K., Sinha, P.K. & Chkraborty, A.K., 1982. Studies on the pathobiology of chicks experimentally infected with *Raillietina cesticillus* (cestode). *Indian J. Poultry Sci.*, 17: 207-213.
- r-4. Biester, H. E. & Schwarte, L.H., 1965. *Diseases of Poultry*, Iowa State College Press, Ames Iowa, pp. 1382.
- r-5. Fotedar, D.N. & Khateeb, N.G., 1986. Occurrence and seasonal variation of helminth parasites of domestic fowl in Kashmir. *Indian Journal of Helminthology.*, 38(1): 49-54.
- r-6. Gray, J.S., 1976. The cellular response of the fowl small intestine to primary and secondary infections of the cestode *Raillietina cesticillus* (Molin). *Parasitology.*, 73: 189-204
- r-7. Hassouni, T. & Belghyti, D., 2006. Distribution of gastrointestinal helminths in chicken farms in the Gharb region – Morocco. *Parasitol. Res.*, 99: 181-183.
- r-8. Hawkins, P.A., 1945. Cited by Rajkhowa and Hazarika (2001). *Indian Vet. J.*, 78: 449-451.
- r-9. Jha, A.N., Sahai, B.N., et al., 1981. On the histopathology and histochemistry of the intestine in common poultry cestodiasis, with a note on the incidence of parasites in Patna (Bihar). *Indian J. Anim. Sci.*, 51(6): 655-660.
- r-10. Matta, S.C., 1980. Studies on *Ascaridia galli* infection of chick with special reference to its histopathology. *Veterinary Research Journal.*, 3: 23-25.

- r-11. Nath, D. & Pande, B.P., 1963. A histological study of the lesions in tapeworm infestations in domestic fowl. *The Indian Journal of Veterinary Science and Animal Husbandry.*, 33:1-7.
- r-12. Nithiuthai, S., Chungpivat, S. & Sukumavasi., 2003. The study of gastro-intestinal helminthes in native chicken and the efficacy of Mebendazole against the helminth parasites. *Thai J. Vet. Med.*, 33(3): 65-72.
- r-13. Ogunsui, R.A. and Eyskey, M., 1989. Cited by Rajkhowa and Hazarika (2001). *Indian Vet. J.*, 78: 449-451.
- r-14. Pandit, B. A., Mir, A. S., Bandy, M.A.A & Shahardar, R.A., 1991. Prevalence of helminth parasites in Indigenous fowls of Kashmir Valley. *Poultry Adviser Vol. XXIV Issue X.*
- r-15. Permin, A., 1997. Helminths and helminthosis in poultry with special emphasis on *Ascaridia galli* in chickens. Ph.D thesis. The Royal Veterinary and Agriculture University Copenhagen, Denmark.
- r-16. Permin, A., Bisgaard, M., Frandsen, F., Frandsen., Pearman, M., Kold & Nansen. P., 1999. Prevalence of gastrointestinal helminthes in different poultry production systems. *British Poultry Science.*, 40: 439-443.
- r-17. Runnels, R. A., Monlux, H.S and Monlux, A.W., 1976. *Principles of Veterinary Pathology*. Scientific Book Agency, Calcutta, Edn. 7, pp 248.
- r-18. Soulsby, E.J.L., 1982. *Helminths, Arthropods and Protozoa of Domesticated animals*. 7th Edition. 809pp. Bailliere Tindall, London, UK.
- r-19. Vaughn, J., 1953. The function of eosinophilic leucocyte. *Blood.*, 8: 1-4.
- r-20. Yakimoff, W. L. and Rastegaieff, E. F., 1929. Surla question des variations cytologiques du song des poules. *Bull. Soc. de. Path. Exot.* 22: 766-768.

Author Information

Sheikh Tanveer Salam

Post Graduate Department of Zoology, University of Kashmir, Srinagar190006. India

A.R. Khan

Post Graduate Department of Zoology, University of Kashmir, Srinagar190006. India

M.S. Mir

Post Graduate Department of Zoology, University of Kashmir, Srinagar190006. India