



Histopathological studies on intestine of *Columba livia* Gmellin, 1789 infected with cestode parasites

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Abstract

In the present study an attempt has been made to visualize the histopathological changes that are caused to the intestine of avian host *Columba livia*, Gmellin, 1789 due to infestation of cestode parasite *Cotugnia aurangabadensis* (Shinde, 1969) and *Paruterina* sp. Histopathological studies have been made to assess the extent of damage caused by the parasites. It includes destruction and extrusion of intestinal villi, inflammatory fibrosis due to cysts. The scolex of *Cotugnia aurangabadensis* is non-penetrative type while *Paruterina* sp. is penetrative type. It was found that the extent of damage is proportional to the penetration of scolex. Cysts were found encircled with connective tissue sheath deep in the submucosa.

Keywords: *Cotugnia aurangabadensis*, Crypts of Lieberkhun, Histopathology

Introduction

In Cyclophyllidea, many genera like *Dipylidium canium*, *Cotugnia bhaleraoi*, *Raillietina R. tetragona* and *Echinococcus granulossus* are studied for histopathology and host-parasite relationships. Some scolexes of these genera were penetrative type and others were non-penetrative type (Shinde and Mitra, 1980). In penetrative type attachment is very intimate and Crypts of Lieberkhun are invaded while in non-penetrative type it superficially attached to mucosal epithelium of intestinal villi. Important contributions in this direction were made by Tuli *et al.*, 1992; Mitra and Shinde, 1981; Lakshma Reddy *et al.*, 2006; Banarjee *et al.*, 2007.

In the present study an attempt has been made to visualize the histopathological changes that are caused to the intestine of avian host *Columba livia*, Gmellin, 1789 due to infestation of cestode parasite *Cotugnia aurangabadensis* (Shinde, 1969) and *Paruterina* sp.

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Materials and Method

Intestines of host bird *Columba livia* were examined and observed to see the degree of infection. The worms which were attached to the intestine were kept intact and small pieces of intestine were fixed in Bouin's fixative and then it was washed thoroughly. These were then dehydrated through ascending alcohol grades, cleared in xylene and embedded in paraffin wax (M.P. 52°-54°C). The transverse and longitudinal sections were cut on rotary microtome and eosin was used as counter stain.

Results and Discussion

The result of the study is given in Fig. 1- Fig. 6. The changes that occur in the intestine of host are due to mechanical damage and may be due to the release of toxins by the parasites. Intestine is one of the important parts of the alimentary canal concerned with several functions like chemical digestion and absorption of nutrients. The histopathology caused extensive damage to various layers of intestine right from epithelium of mucosa to the muscularis mucosae. The infected intestine of *Columba livia* by *Cotugnia aurangabadensis* showed scolex attached to the intestinal villi through large rostellum (Fig. 2).

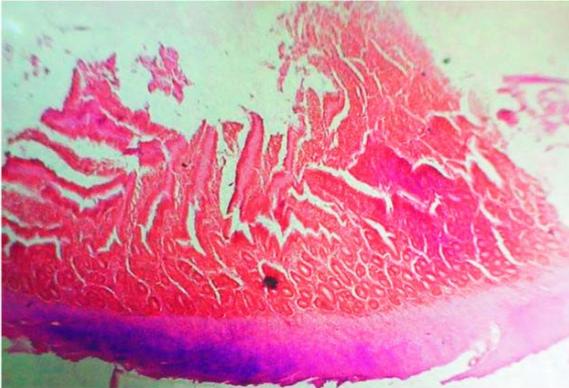


Fig. 1: Non-infected intestine of *Columba livia*



Fig. 2: Scolex of *Cotugnia aurangabadensis* attached to intestinal villi

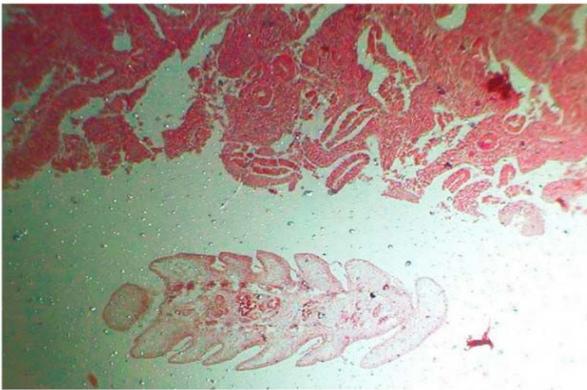


Fig. 3: Mature proglottids of *Cotugnia aurangabadensis* in lumen of intestine

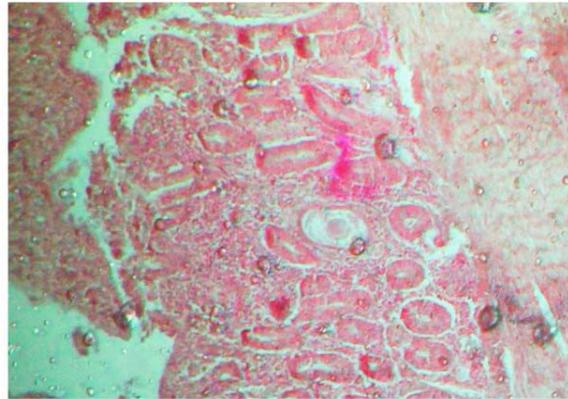


Fig. 4: Cyst of *C. aurangabadensis* in submucosa layer

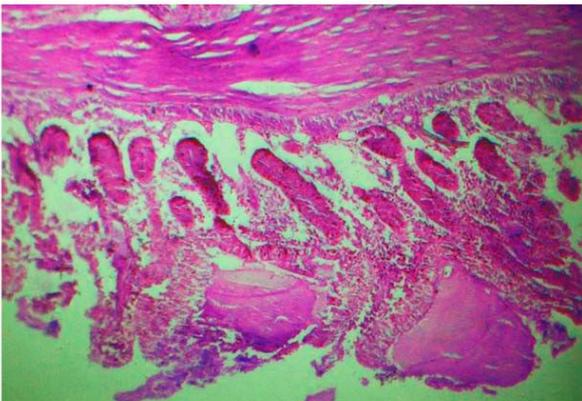


Fig.5: Scolex of *Paruterina shindei* approaching to the crypts of Lieberkhun

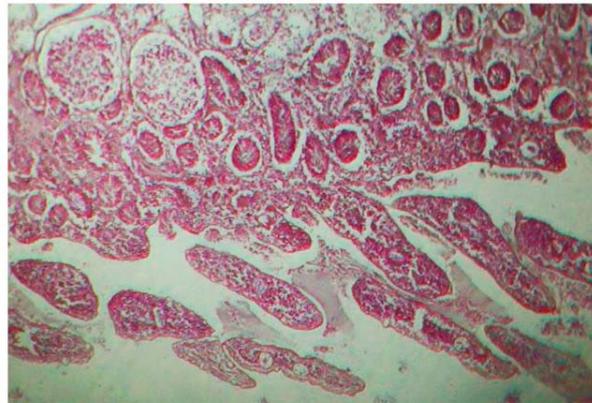


Fig. 6: Cyst of *P.shindei* in submucosa and mature proglottids among intestinal villi of *Columba livia*

It is non-penetrative type of scolex as worm invades only the villi but not the Crypts of Lieberkhun. Mature and gravid proglottids found

freely suspended in the lumen of intestine. Cysts found deep in the submucosa, just above the tissue muscularis and encircled with connective sheath.

The infected intestine of blue rock pigeon by *Paruterina* sp. is heavily destroyed, rupturing the villi and reaching deep up to submucosa. It is penetrative type of scolex. Mature proglottids found among the intestinal villi. A pair of cyst shows fibrosis deep in the submucosa. It leads to lesion on the intestine causing pores and bleeding. Gravid segments freely suspended in the lumen of intestine.

Various helminth parasites shows pathological consequences of parasitic effects on birds, cestode parasites influences the avian health, causes morbidity and also mortality which pose a major threat to avian population. However, the extent of damage depends upon depth of penetration of scolex, type and number of cestode parasite and site where they localize in the body of host (Paperna and Zwerner, 1976).

The infected intestines were diseased with swellings blood clot, all along the alimentary canal and bleeding at certain places. The intestine infected with *C. aurangabadensis* is superficial and not invades the Crypts of Lieberkhun, so the worm is non- penetrative type as also described by (Chincholkar and Shinde, 1956; Joshi and Kamalpur, 1971). In the present study tissue reaction and cellular infiltration occurs while according to Mitra and Shinde (1981) it is negligible when parasite attached superficially with non-penetrative type of scolex. It become extreme with extensive granuloma and fibrosis when the scolex is attached to the submucosa or entirely perforates the wall of intestine (McDonough and Gleason 1981).

Histopathology revealed disseminated erosion at the site of attachment, lymphocyte migration and hyperplasia of connective tissue in the submucosa (Ivona, 2006).

Conclusion

Cotugnia aurangabadensis has non-penetrative scolex as attaches superficially to the intestinal villi but causes fibrosis, tissue reaction and cellular infiltration. This interrelation of the parasite with the host results in the survival of the parasite and a slight damage to the host intestine as the parasite is non-penetrative type.

The *Paruterina* sp. are penetrative type and it pierces through crypts of Lieberkhun, mucosa and up to the submucosa layer. It pose a serious threat to the birds. However, the extent of damage or

pathogenic conditions depends on number of invasive parasites and the site where they localize in the host body.

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