
A STUDY ON CESTODE PARASITES OF *CORVUS* SPECIES OF KASHMIR – INDIA

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(E-mail: javid60@gmail.com)**ABSTRACT**

During the present study, three species of the genus *Corvus* namely *Corvus monedula*, *C. splendens* and *C. macrorhynchos* were collected from different localities of Kashmir valley and were investigated for the presence of cestode parasites. *Anomotaenia galbulae* (Gmelin, 1790) Furhrmann, 1932 was recovered from all the three host species. While, *Choanotaenia micracantha* Chishti *et al.*, 1986 was recovered only from *C. monedula* and no specimen of this cestode was obtained from *C. Splendens* and *C. macrorhynchos* during the present study. The specimens thus collected were identified as *Anomotaenia galbulae* and *Choanotaenia micracantha* on the basis of various morphological and morphometric characters when compared to the known species of genera *Anomotaenia* and *Choanotaenia* respectively. However some intraspecific variations were observed.

KEY WORDS: *Corvus*, Cestode, Kashmir, Morphology,**INTRODUCTION**

The present study is based on the cestode parasites recovered from the three *Corvus* species of Kashmir. *Corvus monedula* is a Black-plumaged passerine bird with distinctive white irises (Goodwin, 1983). It is omnivorous and feeds on plant material and invertebrates (Lockie, 1956). Sexes and ages are alike. *Corvus splendens* Vieillot, 1817 is about 40 cm in length with lighter grey-brown neck and breast. The wings, tail and legs are black. It appears to be associated with humans and no populations are known to exist independently of humans (Nyari *et al.*, 2006). *Corvus macrorhynchos* Wagler, 1827 is Large-billed Crow with black glossy wings, tail, face and throat. Systematic knowledge of parasites from birds of Kashmir including *Corvus* is represented through stray references as is obvious by tracing the historical review of parasites from aves of Kashmir (Gupta, 1967; Chishti and Khan, 1982). Thus a thorough study was undertaken to examine the composition of Helminth Parasites of *Corvus* Species of Kashmir from November 2007 to May 2009.

MATERIALS AND METHODS

During the present study, 65 birds belonging to three species of *Corvus viz.*, *Corvus monedula* Linnaeus, 1758; *C. splendens* Vieillot, 1817 and *C. macrorhynchos* Wagler, 1827 were caught alive with the help of nylon net traps, locally known as “walwash” using suitable baits. The hosts were slaughtered and dissected for parasitological investigation and the cestode parasites thus collected were fixed in Cornoy's fixative, stained in Acetoalum carmine and transferred to xylene for clearing before mounting them in DPX (Dextrine Plasticised Xylene). The drawings of the specimens were made with the help of prism type camera lucida. Measurements were taken with objective and stage micrometers and expressed in mm. The specimens were identified on the basis of various taxonomic characters; Yamaguti (1961), Chishti (1986). Photomicrography was conducted with the help of Digital Olympus Camera.

RESULTS AND DISCUSSION

During the present study a total of two cestode species viz., *Anomotaenia galbulae* and *Choanotaenia micracantha* were recovered from three species of the genus *Corvus* from Kashmir valley. A detailed morphological and morphometric study of both these species has been conducted and some minor intraspecific variations have been observed. The parasites are redescribed as.

I. Anomotaenia galbulae* (Gmelin, 1790) Furhrmann, 1932*Hosts:** *Corvus monedula*, *C. splendens* and *C. macrorhynchos***Locality:** Kashmir**Location:** Intestine

These parasites species are 56-75 mm in length and 0.88-1.4 mm in maximum breadth. The mature proglottids are 0.40-0.60 mm in length and 0.66-0.80 mm in breadth. Gravid proglottids measure 1.2 – 2.6 mm in length and 0.8 – 1.4 mm in breadth. The scolex measures 0.20-0.26 mm in length upto the base of suckers and 0.36 – 0.44 mm in width across suckers. Rostellum with sac measures 0.27 – 0.32 mm in length and 0.1- 0.14mm in breadth. It bears 22-24 slender hooks arranged in a double crown. The blade of the hooks is smaller than the handle and the guard is a conical knob-like structure. The hooks measure 34- 40 μ and 32-36 μ in the outer and inner row respectively. The four suckers measures 0.08-0.13mm in diameter. The testes are rounded 45-54 in number and lie posterior to the ovary. They are bounded laterally by the longitudinal excretory ducts. The vas-deferens is coiled and present in the anterior half of the proglottid. The vesicular seminalis is absent. The cirrus pouch is oval to rounded, cortical in position and measures 0.1-

0.16 mm in length and 0.04 -0.05 mm in width. The genital pores are irregularly alternate, may be deeply embedded and present in the anterior 1/4th to 1/3rd of the proglottid laterally. The ovary is slightly lobulated and measures 0.26-0.30 × 0.12 -0.15 mm in dimensions. The oval receptaculum seminis is present dorsal to the ovary. The vagina runs behind the cirrus pouch opening posterior to the male genital pore. The irregularly rounded, compact vitelline gland lies posterior to the ovary and measures 0.08-0.12 × 0.06 – 0.08 mm. The eggs measure 47-49μ × 40-43μ and oncospheres are 30μ × 21–23μ in size. The embryonic hooks (oncosphere hooks) are 10-12 μ in size. (Figs.1-4).

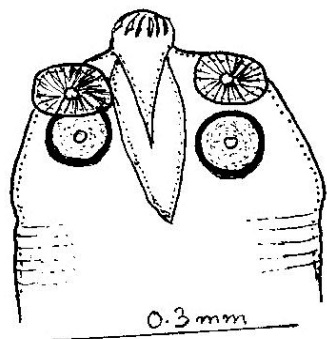


Fig. 1: Scolex showing suckers and rostellum

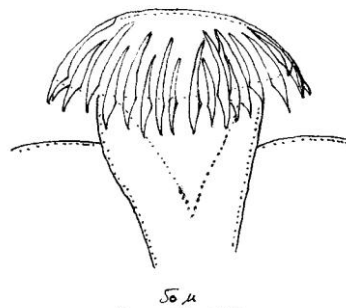


Fig. 2: Rostellum showing hooks.

Pmg. 1. Scolex showing suckers and rostellum with hooks.

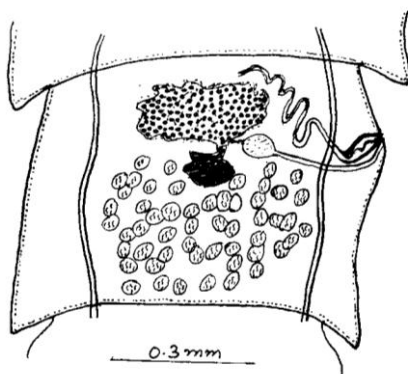


Fig. 3: Mature proglottids showing reproductive

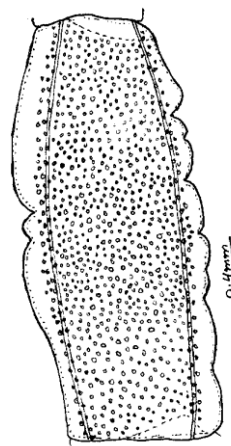


Fig. 4: Gravid

Figure 1-4. *Anomotaenia galbulae* (Gmelin, 1790) Furhrmann, 1932

DISCUSSION

The differentiating characters of the present cestode specimens are: 22-24 rostellar hooks arranged in a double crown; the hooks measuring 34-40μ and 32-36μ in the outer and inner row respectively; testes 45-54 in number; cirrus pouch cortical in position; genital pores irregularly alternate situated in the anterior one fourth to one third on the lateral margin of mature proglottids. When compared with the known species of genus *Anomotaenia* described from different avian hosts, the present specimens show a large similarity of all morphological features with *A. galbulae*. This species has been redescribed by several authors giving variations in the size of strobila, rostellar hook size and number, and the number of testes (Table 4). This species was recorded earlier by Chishti (1974) in *Corvus monedula* and *C. macrorhynchos* from Kashmir. It is evident from the Table - 1 that the present measurements also come in the range of those described by various authors. In view of these measurements and other similarities as described above, the present cestode specimens are assigned to *Anomotaenia galbulae* (Gmelin, 1790) Furhrmann, 1932.

Table1: Comparative measurements of *Anomotaenia galbulae* (Gmelin, 1790) Furhrmann, 1932.

Particulars	Cohn, (1901)	Skrjabin, (1914)	Meggitt, (1927)	Chishti, (1974)	Present Author
Size of strobila	-	113 mm	17 ×0.4mm	52-65mm × 1.45mm	56 -75mm × 0.88-1.4mm
Number Rostellar hook	21	20	21	24	22-24
size of Rostellar hook	36-40 μ	36 μ	36-40 μ	34-42 μ (outer row) 30-35 μ (inner row)	34-40 μ (outer row) 32-36 μ (inner row)
No. of testes	35-45	50	35-45	55-60	45-54

2. *Choanotaenia micracantha* Chishti et al., 1986

Hosts: *Corvus monedula*

Locality: Kashmir

Location: Intestine

The parasite measures 62-76mm in length, and 1.30mm in their maximum breadth. In most of the proglottids especially mature and gravid, the posterior margin is broader than long. Mature proglottids measure 0.84-1.2mm × 0.95-1.12mm in size. Gravid proglottids are much longer than broad measuring 2.2-3.0mm in length and 1.5-1.8mm in maximum. The scolex is more or less rectangular in outline, 0.26-0.28mm in length up to the base of suckers (with rostellum) and 0.38-0.45mm in breadth across suckers.

The rostellum with sac is 0.32-0.36 mm in length and 0.1-0.15mm breadth and bears a single crown of 20 slender hooks each measuring 40-43 μ in length. The suckers measure 0.12-0.15mm in diameter. Testes 55-62 in number, located mostly in post-ovarian field but some may extend to the postero-lateral fields of the ovary. They are rounded and measure 0.06-0.08mm in diameter. The vas-deferens forms a number of tight coils in the anterior region of the proglottid before entering the cirrus pouch.

The ductus ejaculatorius is rather slender and shows usually one or two coils. Cirrus pouch is elongated oval in outline and restricted to the cortical region. It measures 0.07-0.1mm in length and 0.04mm in breadth. The vesiculae seminales are absent. Fine hair like bristles protrude out from the genital atrium. The genital pores are irregularly alternate and are located in the anterior 1/5th of lateral margin of mature proglottid.

The ovary is well developed, lies in the anterior half of the proglottid and is bounded by the longitudinal excretory ducts. It is bilobed and is connected by an isthmus. It measures 0.46-0.60mm x 0.14-0.17mm in size. The vagina arises as a simple tube but soon enlarges into an oval or fusiform receptaculum seminis. It runs parallel to the cirrus pouch to open just posterior to the male genital pore. Vitelline gland is compact, lies posterior to the ovary and measures 0.12-0.20mm × 0.07-0.10mm in size. The gravid proglottids are compactly filled with eggs which measure 48-52 μ × 38-42 μ and their embryo are 30-32 μ × 25-30 μ in size with hooks 12 μ in length (Figs. 5-7).

DISCUSSION

The present specimens possess characteristics like single crown of rostellar hooks; craspedote proglottides; testes numerous, posterior to female gonads in intervascular field ; genital pores alternating irregularly; ovary pre-equatorial, with compact vitelline gland behind; vagina posterior to cirrus pouch and seminal receptacle present. All these characteristics are in conformity with the description of the genus *Choanotaenia* Railliet, 1896. While comparing with the known species of the genus *Choanotaenia* Railliet, the present form shows a large similarity of characters with those of *C. micracantha* Chishti et al., 1986 as regards the size and shape of scolex, number and size of rostellar hooks, extent of cirrus pouch, number of testes etc. However, some intraspecific variations were recorded in different structures as indicated in Table 2.

The reason for which could be the age of parasite, host species, intensity of infection (higher intensity, smaller parasites), methodology (fixation), environmental factors of the study area, body conditions of the host, etc. (Ternopolskaya, 1984; Kuchai et al., 2012). Since these variations are of minor significance, therefore the present specimens, in view of above similarities, are assigned to *Choanotaenia micracantha* Chishti et al., 1986.

Table 2: Comparative measurements of *Choanotaenia micracantha* Chishti et al., 1986 with the present form (measurements in mm, unless stated otherwise)

Particulars	<i>Choanotaenia micracantha</i> Chishti et al., 1986	Present Specimen
Strobila	60-80 × 1.65	62-76 × 1.30
Scolex	0.24-0.28 × 0.42-0.52	0.26-0.28 × 0.38-0.44
Rostellum with sac	0.30-0.32 × 0.10-0.16	0.32-0.36 × 0.09-0.13
Rostellar hook no.	20	20
Hook size	40-45µ	40-43 µ
Sucker diameter	0.12-0.18 × 0.09-0.12	0.12-0.15
Gravid proglottid	2.8-3.2 × 1.58-1.65	2.2-3.0 × 1.50-1.80
Testes number	55-60	56-64
Cirrus pouch extent	Cortical, oval	Cortical, oval
Cirrus pouch size	0.08-0.10 × 0.04	0.07-0.12 × 0.05
Position of genital pore	1/5 th	1/5 th
Ovary size	0.52-0.62 × 0.14-0.16	0.46-0.60 × 0.14-0.17
Vitelline gland size	0.15-0.20 × 0.07-0.09	0.12-0.20 × 0.07-0.10
Egg size	48-52 µ × 38-42 µ	49-50 µ × 40 µ
Embryo	30-32 µ × 25-30 µ	29-33 µ × 28-30 µ
Embryonic hook size	12 µ	12 µ

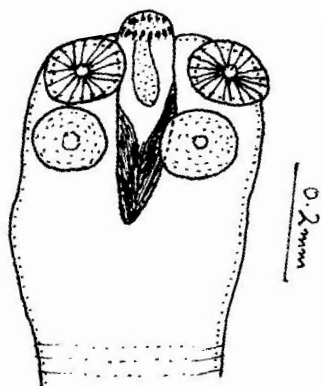


Fig. 5: Scolex showing suckers and rostellum

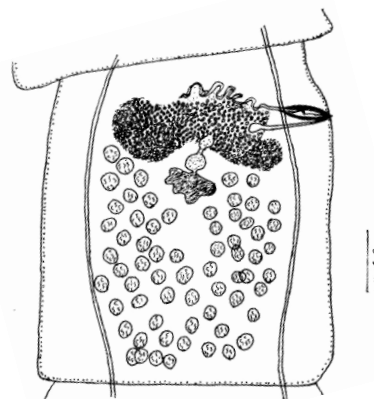


Fig.6: Mature proglottid

Pmg. 1. Scolex showing suckers and rostellum with hooks.

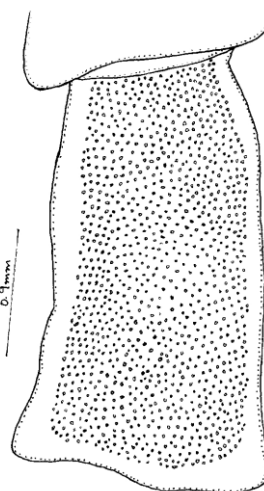


Fig. 7: Gravid proglottid

Figures 5-7 *Choanotaenia micracantha* Chishti et al., (1986)

CONCLUSION

During the present study only two species of cestode parasites were recovered from three species of the genus *Corvus* which indicates that cestode infection is very low with regard to its species diversity. Also several factors were found associated with their morphology.

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REFERENCES

- Chishti M.Z., Mir A.A. and Rasool A. (1986).** *Choanotaenia micracantha* sp. nov. (Dilepoidea: Cestoda) from *Corvus monedula* in Kashmir. *Indian J. Helminthol.* **38**(2): 107-111.
- Chishti M.Z., and Khan A.R. (1982).** *Mayhewia kavini* sp. nov. (Hymenolepididae Railliet et Henry, 1909: Cestoda) from *Corvus monedula* in Kashmir. *Indian J. Helminthol.* **34**(2): 139-142.
- Cohn L. (1901).** Zur Anatomie und systematic der vagelestoden. *Nova Acta Leop. Carol.* **79**: 263-450.
- Goodwin D. (1983).** *Crows of the World.* Queensland University Press, St Lucia, Qld.
- Gupta S.P. (1967).** Helminthic fauna of Kashmir. *Kmr. Sci.* **4**(12): 56-61.
- Kuchai J.A. Fayaz A. Chishti M.Z. Tak H. Javid A.D. Dar S.A. and Muzaffar R. (2012).** A study on morphology and morphometry of *Haemonchus contortus*. *Pakistan J. Zool.* **44** (6): 1737-1741.
- Lockie J.D. (1956).** The Food and Feeding Behavior of the Jackdaw, Rook and Carrion Crow. *J. Animal Ecology.* **25**(2): 421-428.
- Meggitt F.J. (1927).** Report on a collection of Cestoda mainly from Egypt, Part 2 Cyclophyllidea Family Hymenolepididae, *Parasitology.* **19**: 420-450
- Nyari A., Ryall C. and Peterson A.T. (2006).** Global invasive potential of the house crow *Corvus splendens* based on ecological niche modeling. *J. Avian Biol.* **37**: 306-311.
- Skrjabin K.I. (1914).** Bectraj Zur kennetis einiger vogelcestoden centralbl. Bkt. Abt. 1 Org. **75**: 59-83.
- Ternopolskaya L.D. (1984).** Variability of *Fasciola hepatica* L., 1785 in different hosts. *Bulletin Vsesoyuznogo Instituta Gel. Mintologil Im. K. I. Skrybin.* **38**: 47-51.
- Yamaguti S. (1961).** Systema Helminthum. Vol. 2. The Cestodes of Vertebrates. *Interscience Publisher, John Wiley and Sons, New York.* 860.