

A NEW SPECIES OF THE GENUS *LEUCOCHLORIDIUM* CARUS, 1835 (TREMATODA: LEUCOCHLORIDIIDAE (POCHE, 1907) DOLLFUS, 1934 FROM THE SPOTTED RED SHANK *TOTANUS FUSCUS* FROM ALLAHABAD, INDIA

*V. K. Kharoo

Department of Zoology, University of Allahabad, Allahabad, India

*Author for Correspondence

ABSTRACT

Leucochloridium fuscussi Sp.nov, a digenean parasite of the bursa fabricii of a Spotted Red Shank *Totanus fuscus* is described from Allahabad. The new species coincides very much in certain morphological and anatomical features with *L.indicum* Singh, 1962, *L.gallinuli* Kharoo et Dhar, 1981 and *L.mehrui* Kharoo, 2011 described from India. However, there are marked variations in shape and size of gonads, ratio of suckers, extent and distribution of vitellaria and uterine coils. From the other closely resembling species *L.melospizae* McIntosh, 1932, *L.hypotaenidiarum* Tubangui, 1932 and *L.sime* Yamaguti, 1935 the flukes of the new species collected by the author differ in many anatomical details which have been discussed.

Key Words: Trematode, Digenea, *Leucochloridium*, *Totanus fuscus*, *Bursa fabricii*, Allahabad.

INTRODUCTION

The genus *Leucochloridium* as it stands today consists of a large number of species described from various parts of the world, though there are certain descriptions which are either inadequate or confused. Many species have been raised without valid grounds. Carus, 1935 created the genus *Leucochloridium* to include a larval trematode from the snail of the genus *Succinea*. Zeller (1874) worked out its life history and showed that it developed into the adult of *Fasciola macrostomum* described earlier by Rudolphy in 1803. Heckert (1889) also followed the course of larval development and after feeding metacercariae in birds artificially, succeeded experimentally in obtaining adults which he believed to be *Distoma macrostomum* described previously by Rudolphy (1803) as *Fasciola macrostomum*. This species later on became *Leucochloridium macrostomum* Rudolphy. The earliest record of the genus is of *L.americanum* reported by Dall in 1892 but it was ignored due to lack of any description. Monticelli (1893) described *L.cerecatum* without knowing its host. Looss (1899) described *L.insignis* from Egypt and Solowiow (1912) described *L.turanicum* from Turkey. Travassos (1922) identified two new species *L.parcum* and *L.flavum* from South America. Several other species were thereafter added to the list from various parts of the world. Luhe (1909) and Nicoll reported the presence of *L.macrostomum* (Rud.) from Germany and British isles respectively. McIntosh (1927) described five new species of *Leucochloridium* from U.S.A. and again in 1932 he added six more new species to the list from birds of the same locality and one new species from Alaska. Yamaguti (1958) accepted the validity of only 32 species, synonymised eight and declared four species as *species inquirende*. From India the three species which have been described so far are: *L.indicum* Singh, 1962 from Himalayan Red Crowned Jay *Garrulus bispecularis* in Kumaon region; *L.gallinuli* Kharoo and Dhar, 1981 from Indian Moorhen *Gallinula chloropus* in Kashmir and *L.mehrui* Kharoo, 2011 from *Totanus fuscus* in Allahabad. The aim of the present investigation is to describe a new digenean Trematode parasitizing the Spotted Red Shank in India.

MATERIALS AND METHODS

Totanus fuscus (Linnaeus, 1758) commonly known as Spotted Red Shank belongs to the wader family Scolopacidae. It is found throughout India during winter and also in Myanmar and Srilanka. It is a long

Research Article

billed migratory wader found usually solitary or in small groups. Though a seashore bird, it is also found on edges of rivers, lakes and mud banks foraging for insects and plant material. During the course of survey of the endohelminth parasites of the birds of Allahabad, one adult specimen of Red Shank was investigated for helminthes. The bird was necropsied in accordance with ethical procedures and the dissected organs were kept in petri dishes with 0.85 solt. and examined under high power of microscope. Only one mature specimen referable to the genus *Leucochloridium* was recovered from the bursa fabricii of the bird. The trematode was mounted in toto, compressed-fixed in Bouin's fluid, stained in Ehrlich's haematoxylin, dehydrated in graded series of alcohol, cleared in xylol and kept as whole mounts in Canada balsom between cover slips to facilitate handling and observation. Drawings were made with the help of camera lucida. Identification of the parasite was done at Zoology Department, University of Allahabad. The only holotype obtained was deposited in the helminthological collection of the said department.

RESULTS AND DISCUSSION

Family: Leucochloridiidae (Poche, 1907) Dollfus, 1934

Sub-family: Leucochloridiinae Poche, 1907

Genus: *Leucochloridium* Carus, 1835

Species: *Leucochloridium fuscussi* Sp. Nov. (Fig.1)

Description: Based on only one mature specimen; all dimensions are in mm. The worm in living condition as observed was yellowish white in colour and translucent with little movements. Body oval in outline, with a broadly rounded anterior end and blunt posterior end, 2.0564 long and 0.9312 broad across acetabulum. Cuticle smooth and aspinose. The muscular and rounded oral sucker well developed, 0.5044 in diameter, lying subterminally at the anterior end with a wide circular opening. Spherical acetabulum slightly smaller than oral sucker, situated mesially in the equatorial zone, 0.1746 behind intestinal bifurcation and 0.4268 in diameter with a large circular opening at the center. Pharynx more or less rounded, 0.1164 x 0.194 in size, attached directly to oral sucker without intervention of pre-pharynx which is absent. Oesophagus absent. The two intestinal caeca originate from the posterior margin of pharynx, run laterally towards the sides for about 0.25 distance, then bend downwards and run parallel and close to the sides of the body to terminate blindly just in front of cirrus pouch at about 0.32 distance in front of the posterior extremity of the body. The diameter of the caeca gradually increases antero-posteriorly from 0.077-0.097. Testes two with entire margins and situated obliquely behind one another in third quarter of body. The sub-globular anterior testis 0.135 x 0.190 in size lies close to the right caecum at 0.0468 distance behind acetabulum. Posterior testis 0.125 x 0.198 in size, roughly triangular with apex pointing inwards. It lies close to the left intestinal caecum at 0.3104 distance in front of hinder body end. Cirrus pouch is roughly triangular situated subterminally at the posterior end measuring 0.1552 x 0.2328 in size. Ovary more or less rounded, entire, 0.125 x 0.175 in size, situated close in front of posterior testis and 0.144 behind acetabulum. Shell glands form a diffused mass mesially on the inner side of the posterior testis at 0.388 distance in front of the posterior body end. Uterus though convoluted but not very long, extending hardly beyond the level of intestinal bifurcation. It mostly occupies an intercaecal position around acetabulum and terminally it opens at the genital pore situated dorsally near the posterior end. Eggs are numerous and thin walled, light brown in colour, 0.0144-0.018 x 0.0108-0.0144 in size. Vitellaria lateral, extracaecal and caecal with a few follicles entering the intercaecal field, extend from the posterior one fourth part of oral sucker to the blind ends of caeca. The crescent shaped vitelline reservoir of 0.025 x 0.054 size lies dorsal to the shell gland mass with its convex margin facing backwards.



Figure 1: *Leucochloridium fuscussii* sp.nov. Holotype; whole mount from *Totanus fuscus*

Abbreviations: PH - Pharynx; C - Caecum; UT - Uterus; VIT - Vitellaria; VS - Ventral sucker; AT - Anterior testis; OV - Ovary; PT - Posterior testis; CP - Cirrus pouch

DISCUSSION

The new species under discussion belongs undoubtedly to the genus *Leucochloridium* because of certain peculiar characteristics which accommodate it under the genus are: well developed two powerful suckers, muscular pharynx, confinement of reproductive organs beyond equatorial line behind acetabulum in a triangular sort of arrangement and a large cirrus sac in relation to size of gonads situated at the posterior end of body. In its relationship the present form resembles several species described from India and abroad but differs markedly in several anatomical features with all. The only three species of *Leucochloridium* which have been described from India are: *L.indicum* Singh, 1962 in Red Crowned Jay *Garrulus bispecularis* from Kumaon region; *L.gallinuli*, Kharoo et Dhar in Indian Moorhen *Gallinula chloropus* from Kashmir and *L.mehrii* Kharoo, 2011 in Spotted Red Shank *Totanus fuscus* from Allahabad. From *L.indicum* Singh, 1962 the new species can be distinguished in body dimensions, size of oral sucker, testes, cirrus pouch and length of caeca which are definitely larger in the later; ratio of sucker which are almost of equal size in the former and size of ova which are larger in *L.indicum*. From *L.gallinuli* Kharoo et Dhar, 1981 the new species differs in shape and size of body which is fairly constricted at the acetabular level, besides large size of suckers, pharynx and ovary in the former though the size of testes and cirrus pouch are comparatively smaller in the later. The unique feature of *L.gallinuli* is the formation of an intestinal loop immediately after its origin from pharynx which is absent in the new species. Vitelline follicles cross the horizontal wings of caeca in the new species as against *L.gallinuli* where they do not extend beyond transverse wings of caeca. The new species can also be characterized from *L.mehrii* Kharoo, 2011 (same host) in shape and size of body, ratio of suckers and size of pharynx, gonads and cirrus pouch which are comparatively smaller in the former species. Whereas in the new species uterus is slightly convoluted but not very long, mostly confined intercaecally and extending hardly beyond the level of intestinal bifurcation but in *L.mehrii* uterus is highly convoluted with uterine coils occupying most of the intercaecal space and extending outside caeca anteriorly as far as middle level of oral sucker. Vitellaria in the present form under

Research Article

discussion overlap caeca, even entering the intercaecal field but in *L.mehrii* they are exclusively extracaecal.

The new species can be separated from *L. sime* Yamaguti, 1935 primarily in having almost equal suckers and in absence of prepharynx and oesophagus. *L.hypotaenidiarum* Tubangui, 1932 differs from the new species in extension of intestinal caeca and vitellaria into zone of cirrus pouch besides much smaller sized gonads situated at a longer distance from acetabulum. The new species can also be distinguished from *L.melospizae* McIntosh, 1932 on account of the position of anterior testis in the ovarian zone and situation of gonads close to one another in the later. Since the present form under discussion cannot be accommodated in any species described under the genus so far, it is therefore proposed to raise a new species *Leucochloridium fuscussi* for it. The new species is named after the specific name of the host.

ACKNOWLEDGEMENTS

The present work is part of an unpublished Doctoral dissertation submitted and accepted by the University of Allahabad, Allahabad, U.P. India in 1974 for award of D.Phil. degree. The same has been reviewed, emended and updated by incorporating the contributions of subsequent researchers through their published records and original data on the group/family/genus wherever necessary as on date. Certain details concerning bird nomenclature, habit, habitat is also added to the previous description. The author expresses deep sense of gratitude to the late Dr. R.K.Mehra, Reader, Department of Zoology, for his valuable suggestions and inspiring guidance. Thanks are also due to Head, Zoology Department for providing library and laboratory facilities.

REFERENCES

- AVIS-IBIS** (2010). (Avian Information System – Indian Biodiversity Information System) **1.0**.
- Grimmet Richard et al. (1999)**. Birds of Indian sub-continent. (Book). *Oxford University Press*. U.K.
- Kagan I G (1950)**. Revision of the subfamily Leucochloridiinae (Trematoda : Brachylaemidae). *Journal of Parasitology*. **36(6)**, Sect 2, 19.
- Kagan I G (1952)**. Revision of the subfamily Leucochloridiinae Poche, 1907 (Trematoda: Brachylaemidae) *The American midland Naturalist*. **48**, 257-301.
- Kharoo V K (1974)**. Systematics and morphology of some digenetic trematodes of certain vertebrates. *Ph.D. Thesis*. University of Allahabad, Allahabad. U.P.
- Kharoo V K and Dhar R L (1981)**. On a new species of trematode *Leucochloridium gallinuli* from the Indian Moorhen *Gallinula chloropus* from Kashmir. *Indian journal of Helminthology*. **33**, 15-19.
- Kharoo V K (2011)**. Studies on the trematode genus *Leucochloridium* Carus, 1835 (Digenea : Leucochloridiidae (Poche, 1907) Dollfus, 1934 with description of *Leucochloridium mehrii* Sp.Nov. from the Spotted Red Shank *Totanus fuscus*. *Biochemical and Cell Archives*. **11(1)**. 237-243.
- Kharoo V K (2011)**. First record of a digenetic trematode *Leucochloridium actitis* from India. *Bionotes*. **13(3)**, 111-112.
- McIntosh A (1927)**. Notes on the genus *Leucochloridium* Carus (Trematoda) *Parasitology*. **19**, 353-364.
- McIntosh A (1933)**. Some new species of trematode worms of the genus *Leucochloridium* Carus parasitic in birds from Northern Michigan with a key and notes on other species of the genus. *Journal of Parasitology*. **19**, 32-53.
- Odening K (1963a)**. Ein neuer type von trematoden der vogelniere und andere Brasiliensche trematoden aus der schmucktangare. *Zeitschrift fur parasitenkunde*. **23**, 504-515.
- Pojmanska T (2002)**. Family Leucochloridiidae Poche, 1907. In (Eds. D.I.Gibson, Arlene Jones and Alan Bray). *Keys to Trematoda*. **I**, 46-50. CABI Publishing and the Natural History Museum, Wallingford, London. U.K.

Research Article

Singh K S (1962). Parasitological survey of Kumaon region. Part III. *Leucochloridium indicum* n.sp. (Trematoda: Leucochloridiidae) from the Himalayan Red Crowned Jay. *Indian Journal of Helminthology*. **14**, 57-61.

Tubangui M A (1932). Trematode parasites of Philippine vertebrates. V. Flukes from birds. *Philippine Journal of Science*. **47**(3), 369-404.

Yamaguti S (1935). Studies on the helminth fauna of Japan. Part 25. Trematodes of birds, IV. *Japanese Journal of Zoology*. **8**, 129-210.

Yamaguti S (1958). *Systema Helminthum*. Vol. **I**. (Book). The digenetic trematodes of vertebrates. Interscience Publishers Inc. New York.