

On some blood flukes (Spirorchiidae : Coeuritrematinae) from freshwater chelonians in India

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Abstract. *Coeuritrema sutlejensis* Mehrotra, 1973 and *C. sheilae* are described in detail and their validity is discussed. A key to the species of *Coeuritrema* is provided and a few of the diagnostic features of the genus are emended.

C. lyssimus Mehra, 1933 is recorded from a new locality and some variations from the original description are mentioned.

Keywords. Blood flukes; chelonians; *Coeuritrema*; Spirorchiidae.

During the period from January 1969 to September 1971, 156 specimens of freshwater chelonians, namely *Kachuga tectum tectum* (29), *K.t. tentoria* (5), *K. sylhetensis* (69) and *Lissemys punctata punctata* (53) from different localities in Punjab, Haryana and Uttar Pradesh were dissected for the collection of the digenetic flukes. A thorough examination of heart and blood of the hosts revealed the presence of many flukes. Of these, detailed accounts of two species *Coeuritrema sutlejensis* Mehrotra, 1973 and *C. sheilae* Mehrotra, 1973 are given here and their validity is discussed. Earlier, only the diagnostic features of these species had been given in an abstract form (Mehrotra 1973). Another species, *Coeuritrema lyssimus* Mehra, 1933, has also been recorded.

Bouin was used as a fixative for the parasites. The flattened flukes were stained with Mayer's carmalum, borax carmine or Ehrlich's haematoxylin. The last-mentioned stain and eosin were used to stain the serial sections cut at a thickness of 5 μ .

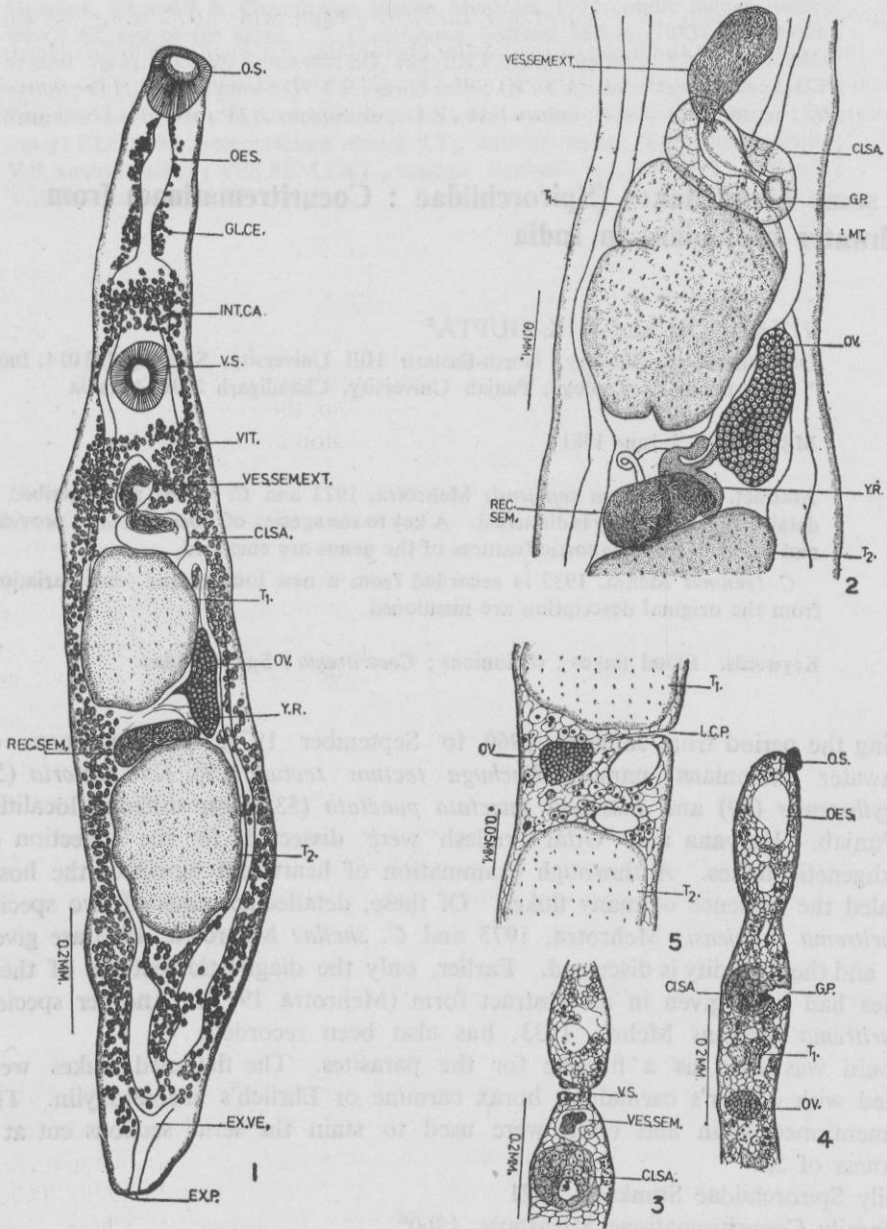
Family Spirorchiidae Stunkard, 1921

Subfamily Coeuritrematinae Srivastava, 1960*

Genus *Coeuritrema* Mehra, 1933

Coeuritrema sutlejensis Mehrotra, 1973 (figures 1-5)

* Yamaguti (1971) has mentioned the subfamily name Cocuritrematinae Dwivedi, 1968. In fact Srivastava (1960), not Dwivedi, had proposed this subfamily name in view of the priority of the genus *Coeuritrema* over *Tremarhynchus*. Dwivedi (1967) has only referred to Srivastava's (1960) views.



Figures 1-5. *Coewitrema sutlejensis* Mehrotra, 1973 1. a whole mount (ventral view); 2. a portion from another specimen showing the terminal genital ducts and other reproductive organs (magnified); 3. a portion of sagittal section showing the depth of the ventral sucker; 4. genital pore and cirrus sac in sagittal section; 5. a portion of sagittal section showing the Laurer's canal pore.

Thirteen specimens of *Coeritrema sutlejensis* Mehrotra, 1973 were recovered from the ventricle of the heart of freshwater chelonians, *Kachuga sylhetensis* (Jerdon) collected from the River Sutlej at Ropar (Punjab) and *Lissemys punctata punctata* Bonnaterre procured from Lucknow (U.P.) and Sangrur (Punjab). The number of flukes in one host was one or two.

Description (based on 10 specimens ; all the measurements are in mm) : Body slightly tapering towards extremities, ending in blunt rounded tips, 1.32–2.15 in length by 0.22–0.40 in maximum breadth across testes. Tegument smooth, suckers prominent but with weak musculature ; oral sucker terminal, 0.08–0.12 × 0.06–0.11, ventral sucker situated almost at level of middle of anterior half of body, 0.09–0.12 × 0.08–0.13, almost equal to oral sucker. Oesophagus 0.16–0.31 long, irregularly distended and surrounded by gland cells. Intestinal caeca at first forming broad dilated shoulders and then extending backward as slender tubes, dilating again in post-testicular region and terminating asymmetrically a little in front of rear end of body.

Excretory vesicle Y-shaped with a short stem ; excretory pore terminal.

Testes enormously developed, tandem, intercaecal, with a wavy contour, anterior testis 0.17–0.27 × 0.14–0.29 and posterior testis 0.19–0.33 × 0.13–0.26. Vesicula seminalis externa a little posterior to ventral sucker, thin-walled 0.09–0.15 × 0.04–0.08. Cirrus sac almost transversely situated in between vesicula seminalis externa and anterior testis, 0.04–0.08 × 0.09–0.15. Genital pore dorsal, to left of median line, close and external to left intestinal caecum, in front or at level of anterior border of anterior testis.

Ovary sinistral, intertesticular, close to left intestinal caecum, elongated, 0.06–0.19 × 0.016–0.05. Receptaculum seminis median, intertesticular. Laurer's canal present. Uterus short, running along left margin of anterior testis. Eggs not observed in any specimen. Vitellaria extending laterally from level of intestinal bifurcation up to close behind caecal termination, coalescing in the regions just in front and behind ventral sucker and also in post-testicular zone ; in some specimens, however, the vitelline follicles have been found scattered in the region in front of the intestinal bifurcation. Yolk reservoir dorsal to receptaculum seminis.

Remarks : So far, seven species have been assigned to the genus *Coeritrema* Mehra, 1933. These are *C. lyssimus* Mehra, 1933 from *Lissemys punctata* in Allahabad (U.P.) ; *C. odhnerensis* Mehra, 1933 from the same host and locality ; *C. indicus* (Thapar 1933) Mehra 1934 (syn. *Tremarhynchus indicus* (Thapar 1933) from *Trionyx gangeticus* in Lucknow (U.P.) ; *C. yoshidai* (Ozaki 1939) Takeuti 1942 (syn. *Hapalorhynchus yoshidai* Ozaki 1939) from *Ocadisinensis* in China ; *C. oca-diae* Takeuti 1942 from *Ocadia sinensis* in Formosa ; *C. oschmarini* Belous 1963 from *Amyda sinensis* from the Khanka lake and the River Mo in the far east of the USSR ; and *C. macrotesticularis* Rodhe, Lee et Lim, 1968 from *Dogania subplana* in Malaya.

C. sutlejensis can be distinguished from *C. lyssimus* in which the body surface is covered with conical tubercles, the cirrus sac is flask-shaped and obliquely placed and the vitellaria are postacetabular in distribution ; and from *C. macrotesticularis* which possesses deeply lobed testes, the genital pore more or less in level with the ventral sucker, and the intestinal caeca showing many undulations in the posttesticular region,

In the general shape of the body *C. oschmarini*, *C. indicus*, *C. odhnerensis* and *C. oca diae* approach *C. sutlejensis* but there are many other differences. *C. sutlejensis* stands apart from *C. oschmarini* in which the testes are entire and oval, the ovary is rounded, and the cirrus sac is flask-shaped and obliquely placed; from *C. indicus* in which the testes are deeply lobed and the vesicula seminalis lies behind the cirrus sac; from *C. odhnerensis* in which the testes are small and irregularly lobed and the vesicula seminalis lies opposite to the crescent-shaped cirrus sac; and from *C. oca diae* in which the testes are small and oval and the vesicula seminalis lies anterodorsally to the elongated and conical cirrus sac. *C. sutlejensis* stands very close to *C. yoshidai* in having the cirrus sac behind the vesicula seminalis but the position and the shape of the ovary and the commencement of the vitellaria are the characters which differentiate the two species; in *C. yoshidai*, the ovary is median and transversely elongated and the vitellaria commence behind the intestinal bifurcation.

Hosts : *Kachuga sylhetensis* (Jerdon)

Lissemys punctata punctata Bonnaterre

Location : Heart

Localities : Ropar and Sangrur (Punjab), Lucknow (U.P.)

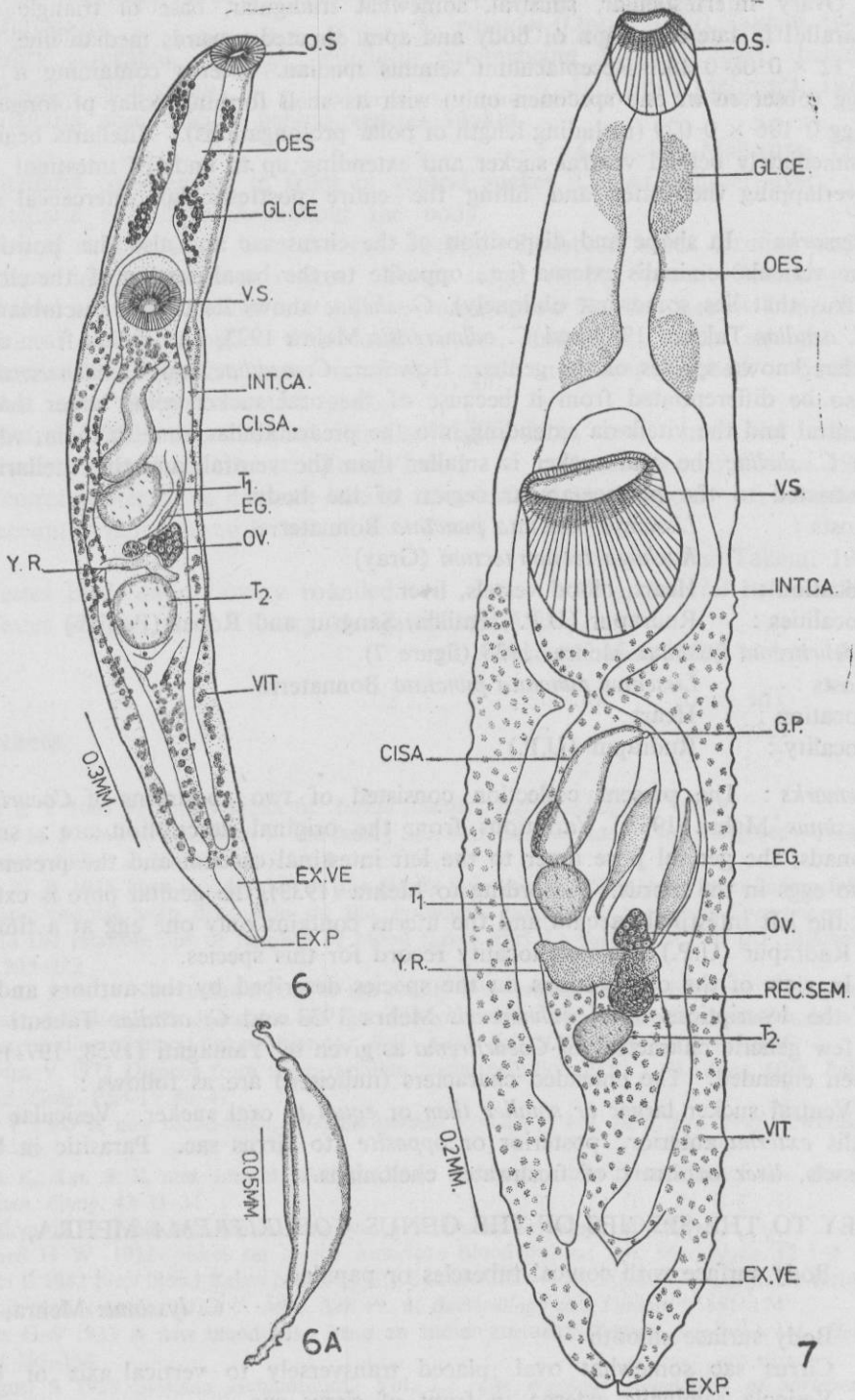
Coelotremata sheilae Mehrotra, 1973 (figures 6, 6a)

The material consisted of eight specimens collected from the heart, blood and teased hepatic tissue of *Lissemys punctata punctata* Bonnaterre in Rudrapur (U.P.), Patiala and Sangrur (Punjab) and *Kachuga tectum tectum* (Gray) in Ropar (Punjab). The number of specimens in one host was never more than two. Of the flukes recovered, two were immature and one was distorted.

Description (five specimens measured): Body elongated, somewhat tapering towards extremities, 1.61–2.11 in length and 0.18–0.28 in maximum width across testicular region. Body surface smooth. Oral sucker 0.06–0.12 long by 0.05–0.09 wide. Ventral sucker just behind intestinal bifurcation, 0.11–0.13 × 0.09–0.16, larger than oral sucker. Oesophagus a wide tube, 0.29–0.41 long, surrounded by gland cells. Intestinal caeca slender, bending a little inwards just behind ventral sucker and again turning outwards and running parallel to body margins, converging behind posterior testis and continuing as straight tubes, terminating symmetrically 0.13–0.19 in front of posterior end of body.

Excretory system Y-shaped, pore terminal at rear extremity of body.

Gonads in middle third of body. Testes rounded or irregular, anterior testis 0.12–0.16 × 0.11–0.13, posterior testis 0.11–0.16 × 0.11–0.14. Vesicula seminalis externa (observed in two specimens only) small, opposite to basal portion of cirrus sac; the latter elongated, somewhat sinuous, placed more or less obliquely or longitudinally between ventral sucker and anterior testis, 0.24–0.28 long by 0.11–0.14 wide across its basal region, enclosing a small vesicula seminalis interna, pars prostatica and protrusible cirrus. Genital pore a little behind ventral sucker, sinistral, close to left intestinal caecum, may be inter or extracaecal (since inward bending of the intestinal caeca has been found to be variable, depending upon the flattened state of the fluke).



Figures 6, 6A, 7. See page 282 for caption.

Ovary intertesticular, sinistral, somewhat triangular, base of triangle being parallel to lateral margin of body and apex directed towards median line, $0.08-0.12 \times 0.08-0.13$. Receptaculum seminis median. Uterus containing a single egg (observed in one specimen only) with its shell forming polar prolongations. Egg 0.186×0.029 (including length of polar prolongations). Vitellaria beginning immediately behind ventral sucker and extending up to ends of intestinal caeca overlapping the latter and filling the entire posttesticular intercaecal space.

Remarks : In shape and disposition of the cirrus sac and also the position of the vesicula seminalis externa (i.e., opposite to the basal portion of the elongate cirrus that lies somewhat obliquely), *C. sheilae* shows its closest resemblance to *C. ocaediae* Takeuti 1942 and *C. odhnerensis* Mehra 1933, and differs from all the other known species of the genus. However, *C. ocaediae* and *C. odhnerensis* can also be differentiated from it because of the oral sucker being larger than the ventral and the vitellaria extending into the preacetabular zone in them, whereas in *C. sheilae* the oral sucker is smaller than the ventral and the vitellaria are restricted to the postacetabular region of the body.

Hosts : *Lissemys punctata punctata* Bonnaterre,
Kachuga tectum tectum (Gray)

Location : Heart, blood vessels, liver

Localities : Rudrapur (U.P.), Patiala, Sangtur and Ropar (Punjab)

Coeuritrema lyssimus Mehra, 1933 (figure 7)

Hosts : *Lissemys punctata punctata* Bonnaterre

Location : Heart

Locality : Rudrapur (U.P.)

Remarks : The present collection consisted of two specimens of *Coeuritrema lyssimus* Mehra 1933. Variations from the original description are : smaller gonads, the genital pore inner to the left intestinal caecum and the presence of two eggs in the uterus. According to Mehra (1933), the genital pore is external to the left intestinal caecum and the uterus contains only one egg at a time.

Rudrapur (U.P.) is a new locality record for this species.

In view of the observations on the species described by the authors and also of the descriptions of *C. odhnerensis* Mehra 1933 and *C. ocaediae* Takeuti 1942, a few generic characters of *Coeuritrema* as given by Yamaguti (1958, 1971) have been emended. The emended characters (italicised) are as follows :

Ventral sucker larger *or smaller than* or *equal to* oral sucker. Vesicular seminalis *externa* anterior, posterior or *opposite* to cirrus sac. Parasitic in blood vessels, *liver* or heart of freshwater chelonians.

KEY TO THE SPECIES OF THE GENUS *COEURITREMA* MEHRA, 1933

1. Body surface with conical tubercles or papillae.
 - ... *C. lyssimus* Mehra, 1933
 - Body surface smooth ... 2
2. Cirrus sac somewhat oval, placed transversely to vertical axis of body.
 - Vesicula seminalis externa in front of cirrus sac ... 3
 - Cirrus sac elongate, flask-shaped, placed obliquely. Vesicula seminalis externa behind cirrus sac or opposite to it ... 4

3. Ovary elliptical, median. Vitellaria commencing at a level behind intestinal bifurcation ... *C. yoshidai* (Ozaki 1939) Takeuti 1942.
Ovary elongated, sinistral. Vitellaria commencing at the level behind intestinal bifurcation ... *C. sutlejensis* Mehrotra, 1973
4. Vitellaria commencing behind ventral sucker ... *C. sheilae* Mehrotra, 1973
Vitellaria commencing in front of ventral sucker, i.e., at bifurcal level ... 5
Vitellaria extending throughout the body ... 7
5. Ventral sucker larger than the oral sucker. Intestinal caeca forming undulations in posttesticular region. Testes large, deeply lobed. Genital pore at level of ventral sucker ... *C. macrotesticularis* Rohde, Lee et Lim, 1968
Ventral sucker smaller than oral sucker. Intestinal caeca straight in posttesticular region. Testes relatively small, not deeply lobed. Genital pore quite behind ventral sucker ... 6
6. Ventral sucker close behind intestinal bifurcation, both intestinal caeca bending inwards behind it. Testes lobed ... *C. odhnerensis* Mehra 1973
Ventral sucker some distance behind intestinal bifurcation, only left intestinal caecum bending inwards behind it. Testes entire ... *C. ocadiae* Takeuti 1942
7. Testes oval, entire, ovary rounded. ... *C. oschmarini* Belous 1963
Testes deeply lobed. Ovary elongated and lobed. ... *C. indicus* (Thapar 1933) Mehra 1934.

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Figures 6, 6A and 7. 6. *Coewitrema sheilae* Mehrotra 1973 (whole mount, ventral view); 6A. egg of the same. 7. *Coewitrema lyssimus* Mehra, 1933 (whole mount, ventral view). (CL.SA., cirrus sac; EG, egg; EX.P., excretory pore; EX.VE, excretory vesicle; G.P., genital pore; GL.CE., gland cells; INT.CA., intestinal caeca; L.C.P., Laurer's canal pore; MT, metraterm; O.S., oral sucker; OES, oesophagus; OV, ovary; REC.SEM., receptaculum seminis; T₁, anterior testis; T₂, posterior testis; V.S. ventral sucker; VES.SEM.EXT., vesicula seminalis externa; VIT, vitellaria; Y.R. yolk reservoir).