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Four new species of the genus Holostephanus Szidat, 1936 from Indian birds, with a brief review of the genus (Trematoda: Cyathocotylidae)*

by

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Family.—CYATHOCOTYLIDAE Poche, 1925
Supersubfamily.—Cyathocotylidi Dubois, 1938.
Subfamily.—Cyathocotylinae Mühling, 1898.
Holostephanus elongatus sp. nov.

A dozen specimens of this trematode were obtained from the small intestine of a Black-necked Stork, *Xenorhynchus asiaticus* (Latham), collected in the vicinity of Lucknow. The infection with this parasite is rare.

The body (Fig. 1) of the parasite is elongated, fusiform or pyriform, with a broad anterior and a narrow posterior end. It measures 2.110 - 3.654 mm in length and 1.071 - 1.338 mm in maximum breadth. A prominent ventral concavity is present in the anterior part of the body. Small, backwardly directed cuticular spines are present in the anterior region of the body.

The terminal oral sucker measures 0.187 mm by 0.161 - 0.210 mm. A small ventral sucker, measuring 0.081 - 0.110 mm by 0.134 - 0.160 mm, is situated near the anterior border of the holdfast organ. The holdfast organ is situated in the anterior third of the body within the ventral concavity. It is large ,appears transversely oval, and measures 0.438 - 0.653 mm by 0.501 - 0.744 mm. Deeply staining gland cells are present in the walls of the holdfast organ.

Prepharynx and oesophagus are absent. The pharynx measures 0.110 - 0.137 mm in diameter. The intestinal caeca terminate posteriorly a little in front

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of the hind end of body. They are mostly obscured by the vitelline follicles and other organs.

The testes are large, elongate-oval or oblong structures, and they are nearly equal in size. The anterior testis is sinistral and located behind the holdfast organ. It measures 0.475 - 0.647 mm by 0.170 - 0.206 mm. The posterior part testis is median, situated in the narrow posterior of the body, and measures 0.410 - 0.761 mm by 0.241 - 0.320 mm. The cirrus pouch is a large, club-shaped structure extending from about the middle of the body to the posterior end. It measures 1.135 - 1.698 mm in length. The proximal part of the cirrus pouch encloses a bipartite seminal vesicle and a prominent pars prostatica which is thickly surrounded by the prostatic gland cells. The ductus ejaculatorius, enclosed within the shorter distal tubular part of the cirrus pouch, terminates in an eversible cirrus of considerable length. The cirrus pouch opens into a genital atrium located at the posterior end of the body.

The ovary is dextral, subglobular or oval, partly overlapped by the holdfast organ and measures 0.210 - 0.319 mm by 0.168 - 0.215 mm. The vitellaria are composed of large follicles which are laterally distributed, mostly in double rows, on each side. Anteriorly, the follicles extend to the region of the ventral sucker where they tend to meet mesially, and posteriorly to the hind testis. The vitelline reservoir is large and prominent. The Mehlis' gland is situated just posterior to the ovary. A receptaculum seminis uterinum is present. The uterus is moderately developed, with a short ascending and a long descending limb, and it contains about 15 to 30 eggs. The metraterm is strongly muscular. The eggs are small, oval, yellowish in colour, and measure 0.0748 - 0.0811 mm by 0.0579 - 0.0667 mm.

DISCUSSION: Of all the hitherto known species of the genus *Holostephanus* Szidat, 1936, the present form most closely resembles *Holostephanus neophroni* Mehra, 1943 and *H. metorchis* Yamaguti, 1939. It, however, differs markedly from these species in the larger size of its cirrus pouch and in the distribution of its vitelline follicles. The vitellaria, in the present form, do not enter into the post-testicular zone, but in the said species the vitelline follicles enter into the post-testicular zone as far back as the genital atrium.

Besides these distinguishing features, the eggs in the present form are larger than those of *H. neophroni,* but smaller than those of *H. metorchis.*

In view of the above distinctive features, the present form is considered to represent a new species of the genus *Holostephanus* Szidat, 1936, and the name *Holostephanus elongatus* is proposed for it.

Holostephanus pyriformis sp. nov.

A dozen specimens of this trematode were obtained from the small intestine of two Black-necked Storks, *Xenorhynchus asiaticus* (Latham), collected near Anupshahr in the District of Bulandshahr in Uttar Pradesh. Other host specimens examined by the author in Hardoi and Lucknow were found free from the infection of this fluke.

The body (Fig. 2) of the fluke is small and pyriform, measuring 1.164 - 1.440 mm in length and 0.538 - 0.827 mm in maximum breadth. It is studded with small, backwardly directed cuticular spines up to the region of the testes. A ventral concavity is present in the anterior part of the body (Figs. 2 and 3).

The oral sucker is terminal and measures 0.098 - 0.110 mm by 0.110 - 0.141 mm. The ventral sucker is situated immediately behind the intestinal bifurcation, and it is partly or completely overlapped by the anterior border of the holdfast organ. It is feebly muscular and measures 0.053 - 0.076 mm in diameter. The holdfast organ is large with a narrow slitlike opening. It is situated within the ventral concavity in the anterior half of the body and measures 0.267 - 0.390 mm by 0.318 - 0.379 mm.

Prepharynx and oesophagus are absent. The pharynx is subspherical and measures 0.065 - 0.080 mm by 0.072 - 0.078 mm. The intestinal caeca are greatly masked by the vitelline follicles and other organs.

The testes are obliquely situated one behind the other in the post-equatorial region of the body. They are large, round or oval in outline, and greatly covered by the vitelline follicles. The anterior testis is sinistral and measures 0.281 - 0.410 mm by 0.150 - 0.204 mm. The posterior testis is rather median in position and measures 0.235 - 0.350 mm by 0.160 - 0.228 mm. The cirrus pouch is extremely long, about three-fourths of the entire length of body. It is situated on the left side of the body and extends behind from about the anterior border of the holdfast organ. It measures 0.953 - 1.187 mm in length. The short proximal part of the cirrus pouch is dilated, containing a bipartite seminal vesicle and a short pars prostatica surrounded with postatis gland cells. The ductus ejaculatorius is long and traverses through the entire narrow distal part of the cirrus pouch, which is about three times longer than the proximal part. It opens, together with the metraterm, in the genital atrium situated at the posterior end of the body.

The ovary is dextral and pre-equatorial in position. It may be subspherical or oval in shape and measures 0.129 - 0.161 mm by 0.103 - 0.160 mm. It is partly or completely overlapped by the holdfast organ. The vitellaria are extensively developed and consist of a number of large follicles distributed laterally from the level of ventral sucker to the posterior end of the body. Posteriorly, the follicles o fthe two sides tend to merge together. The vitelline reservoir and the Mehlis gland are situated immediately posterior to the ovary. A receptaculum seminis uterinum is present. The uterus extends anteriorly usually up to the intestinal bifurcation from which it runs posteriorly and eventually continues into a weakly muscular metraterm, which opens into the genital atrium. It contains ten to twentyfive eggs which are light-yellow in colour and measure 0.0748 - 0.0907 mm by 0.0501 - 0.0576 mm.

DISCUSSION: The present form resembles *Holostephanus corvi* Mehra, 1934, *H. phalacrocoraxus* Vidyarthi, 1948, and *H. anupshahrensis* sp. nov, more closely than any other, hitherto known, species of the genus *Holostephanus* Szidat, 1936.

From *H. corvi* and *H. phalacrocoraxus,* the present form differs in hav-

ing a very large cirrus and a weakly muscular metraterm. It further differs from *H. phalacrocoraxus* in the absence of a prepharynx and an oesophagus, and from *H. corvi* in the distribution of its vitellaria. The vitellina follicles in *H. corvi* enter into the region of the pharynx where they become confluent, whereas in the present form the vitelline follicles neither enter into the region in front of the holdafst organ nor do they merge.

From *H. anupshahrensis* sp. nov., the present form differs in having cuticular spines and a weakly muscular metraterm, and in the distribution of its vitellaria. The vitelline follicles in *H. anupshahrensis* enter anteriorly into the pharyngeal region, but posteriorly they are limited to the level of the testes, whereas in the present form the vitelline follicles never enter anteriorly into the preacetabular zone, but posteriorly they extend into the hind end of the body.

The present form is, therefore, regarded a new species of the genus *Holostephanus* Szidat, 1936 and the name *H. pyriformis* is proposed for it.

Holostephanus anupshahrensis sp. nov.

Seven specimens of this trematode were collected from the small intestine of an Open-billed Stork, *Anastomus oscitans* (Boddaert), collected at the outskirts of Anupshahr in the District of Bulandshahr in Uttar Pradesh.

The body (Fig. 4) of the parasite is small, aspinose, and pear-shaped, with a broadly rounded anterior and a bluntly pointed posterior end. It measures 1.030 - 1.327 mm in length and 0.637 - 0.834 mm in maximum breadth. A distinct ventral concavity is present in the broad anterior part of the body.

The terminal oral sucker measures 0.078 - 0.091 mm by 0.107 - 0.142 mm. The ventral sucker is feebly developed and measures 0.051 - 0.059 mm by 0.057 - 0.065 mm. The holdfast organ is large with a central opening, and it conspicuously projects from the ventral concavity of the body in most of the specimens. It is roughly circular in outline and measures 0.406 - 0.542 mm by 0.420 - 0.491 mm.

Prepharynx and oesophagus are absent. The pharynx measures 0.059 - 0.071 mm by 0.051 - 0.065 mm. The intestinal caeca are mostly obscured by vitelline follicles and other organs.

The testes are subglobular or oval, post-equatorial, and opposite in position. In two specimens they are rather obliquely situated, one close behind the other. They are almost equal in size and measure 0.334-0.389 mm by 0.197-0.286 mm. The cirrus pouch is long club-shaped, and sinistral in position. It extends posteriorly from behind the first quarter of the body up to the hind end, and measures 0.719 - 1.186 mm in length. The proximal dilated part of the cirrus pouch encloses a bipartite seminal vescicle and a pars prostatica with prominent prostatic gland cells, while the distal narrow part, which is as long as the proximal part, encloses a long ductus ejaculatorius and opens into a small genital atrium located at the posterior end of the body.

The ovary is dextral, situated close to the holdfast organs by which it is partly overlapped. It is oval and measures 0.134 - 0.175 mm by 0.121 - 0.130

mm. The vitellaria are composed of large follicles which are distributed laterally from the level of the pharynx up to the region of the testes. The follicles of the two sides do not meet medially either anteriorly or posteriorly. The vitelline reservoir and the Mehlis' gland are situated just behind the ovary. A receptaculum seminis uterinum is present. The uterus is short, containing only two to five eggs, and it is continued behind into a well-developed muscular metraterm which runs along the cirrus pouch and opens into the genital atrium. The eggs are large, elongate-oval, with a yellowish shell, and measure 0.0823 - 0.0992 mm by 0.0501 - 0.0621 mm.

DISCUSSION: Of all the species of the genus *Holostephanus* Szidat, 1936, the present form shows closest resemblance with *H. metorchis* Yamaguti, 1939, *H. phalacrocoraxus* Vidyarthi, 1948 and *H. ibisi* Mehra, 1943. From these species, the present form can, however, be distinguished by the fact that its vitelline follicles neither enter into the post-testicular region, nor do the follicles of the two sides of the body become confluent in any region.

The present form further differs from *H. phalacrocoraxus* in the absence of cuticular spines, prepharynx and oesophagus. The cirrus pouch of the present form is much larger than that of *H. phalacrocoraxus*. The absence of cuticular spines also distinguishes the present form from *H. metorchis*. From *H. ibisi*, the present form further differs in having a much larger cirrus pouch and eggs. Moreover, the holdfast organ is roughly circular in the present form, whereas it is elongate-oval in *H. ibisi*.

From the above-mentioned distinguishing features, it is evident that the present form represents a new species of the genus *Holostephanus* Szidat, 1936, and the name *H. anupshahrensis* is proposed for it.

Holostephanus breviformis sp. nov.

Over a dozen specimens of this trematode were collected from the small intestine of the Painted Stork, *Ibis leucocephalus leucocephalus* (Pennant). Only two host birds, one taken in the environs of Lucknow and the other in Anupshahr, were found infected with this fluke.

The body (Fig. 5) is very small, pyriform, and broadly round anteriorly, but bluntly pointed posteriorly. It measures 0.857 - 1.011 mm in length and 0.480 - 0.612 mm in maximum breadth. A conspicuous ventral concavity is present in the anterior part of the body. Small, cuticular spines are present on the anterior half of the body as well as on the holdfast organ.

The oral sucker is terminal and measures 0.089 - 0.110 mm by 0.102 - 0.125 mm. The ventral sucker is situated just in front of the holdfast organ which partly overlaps it. It measures about 0.032 mm in diameter. The holdfast organ is a well-developed circular structure with a central opening. It is situated in the ventral concavity just anterior to the equatorial line of the body and measures 0.190 - 0.219 mm by 0.240 - 0.278 mm.

Prepharynx and oesophagus are absent. The pharynx is well-developed

and measures 0.097 - 0.103 mm by 0.089 - 0.099 mm. The intestinal caeca are largely concealed by the vitelline follicles and other organs.

The testes are obliquely situated in the posterior half of the body, or may be slightly more anterior in position. They are large oval structures, but unequal in size. The anterior testis is slightly displaced to the left side of the body and measures 0.213 - 0.271 mm by 0.130 - 0.152 mm. The posterior testis is slightly deflected to the right side of the body and measures 0.192 - 0.238 mm by 0.201 - 0.251 mm. The cirrus pouch is a well-developed cylindrical structure, almost of a uniform width throughout, and measures 0.298 - 0.421 mm in length. It extends behind from a level posterior to the equatorial line of the body. It contains a bipartite seminal vesicle whose proximal part is about double the size of the distal part, a pars prostatica surrounded by prostatic gland cells, and a ductus ejaculatorius. Its proximal broader part is considerably longer than the distal tubular part. It opens, along with the metraterm, into a large genital atrium situated at the posterior end of the body.

The ovary is dextrally situated in the anterior half of the body, usually lying in the region of the holdfast organ by which it is greatly overlapped. It is subspherical and measures 0.070 - 0.081 mm by 0.062 - 0.085 mm. The vitellaria are composed of numerous large follicles which are distributed laterally from behind the pharynx up to the level of the testes. In the pharyngeal region, the follicles of both sides merge and form a wreath around the anterior border of the holdfast organ. The vitelline reservoir and Mehlis' gland are situated obliquely behind the ovary. A receptaculum seminis uterinum is present. The uterus is short, containing eggs varying from one to seven in number. The eggs are oval, yellowish in colour, and larger than the ovary, measuring 0.0842 - 0.0958 mm by 0.0473 - 0.0624 mm.

DISCUSSION: Of all the species of the genus *Holostephanus* Szidat, 1936, the present form closely resembles the species *H. ibisi* Mehra, 1943, described from the same avian host viz., *Ibis leucocephalus leucocephalus* (Pennant) in Allahabad.

However, it can be distinguished from *H. ibisi* by the following important features:

Cuticular spines are present in the form, while they are absent in *H. ibisi.* The cirrus pouch is a short structure extending from behind the middle of body in the present form, but in *H. ibisi* it is comparatively very long, extending behind almost from the anterior third of the body. The holdfast organ of *H. ibisi* is elongate-oval, whereas it is circular in the present form. Moreover, the ventral sucker in the present form is much smaller than the pharynx, whereas in *H. ibisi,* it is equal to or even larger than the pharynx. Consequently, the present form is regarded as new species of the genus *Holostephanus* Szidat, 1936, and the name *H. breviformis* is proposed for it.

A BRIEF REVIEW OF THE GENUS HOLOSTEPHANUS SZIDAT, 1936

The genus *Holostephanus* was created by SZIDAT (9) with *Holostephanus luhei* as the genotype. He characterised the genus chiefly by a ventral excavation or depression in the anterior part of the body, wherein is placed a comparatively small holdfast organ. In the same paper SZIDAT (9) established another genus, *Cyathocotyloides,* with *Cyathocotyloides curonensis* as the genotype, and he distinguished this genus from *Holostephanus* merely by a comparatively large holdfast organ occupying almost the entire ventral excavation which is, consequently, reduced to a narrow chink around the holdfast organ. This distinction between *Cyathocotyloides* and *Holostephanus* in the comparative size of the holdfast organ is meagre and, therefore, YAMAGUTI (14) merged the genus *Cyathocotyloides* into synonymy with *Holostephanus.* This view of YAMAGUTI (14) was supported by MEHRA (6), DUBOIS (2), VERNBERG (12), and SUDARIKOV (7, 8), and the present writer is also in agreement with these authors in regarding *Cyathocotyloides* as a synonym of *Holostephanus.*

MEHRA (6), while distinguishing the genus *Holostephanus* from *Cyathocotyle* Mühling, 1898, recorded the opinion "It is not easy to distinguish the former genus from the latter on the basis of entire mounts of flattened specimens, as the ventral concavity disappears when the specimens are subjected even to gentle pressure for flattening, unless we take other characters into consideration". To distinguish *Holostephanus* from *Cyathocotyle,* MEHRA (6) took the position of the ovary into account as a substitute for the ventral excavation and stated, "The ovary in the genus *Holostephanus* lies, as a rule, to right side in front of anterior testis, or opposite to it in front of the middle of body (except in *H. calvusi),* whereas in *Cyathocotyle* it lies to the left side, rarely right side, just behind, or level with hinder part of left testis, rarely right testis, occupying subequatorial, equatorial, or post-equatorial positions in the body". Accordingly, MEHRA (6) emended the diagnosis of the genus *Holostephanus.* DUBOIS (3) agreed with MEHRA (6) in using the position of ovary to distinguish *Holostephanus* from *Cyathocotyle* and stated that the ovary is generally pre-testicular or opposite to anterior testis in *Holostephanus* and in zone of testes in *Cyathocotyle.* VERNBERG (12) also held the opinion that the nature and position of gonads should be considered in defining these two genera. ERASMUS (4), working on a large number of experimentally obtained specimens of *Holostephanus luhei* Szidat, 1936, observed a great individual variation in the position of gonads, and even the occurrence of amphitypy, in these specimens. Consequently, ERASMUS (4) recorded the opinion that it is unwise to put great stress on the relative position of gonads in distinguishing these two genera from each other. The present writer also considers that the position of ovary, as defined by MEHRA (6) and DUBOIS (3) to distinguish *Holostephanus* from *Cyathocotyle,* is not of generic importance. In his opinion, the presence of a ventral excavation in *Holostephanus* is a significant taxonomic feature of generic importance, and it clearly distinguishes *Holostephanus* from *Cyathocotyle.* This character is never lost in flattened, fixed specimens as

MEHRA (6) stated in his account, unless excessive pressure is used in flattening. Further, in fresh specimens and in unflattened fixed specimens, the ventral excavation appears too prominent to be overlooked by any worker.

A DISCUSSION ON THE SYSTEMATIC POSITION OF CERTAIN SPECIES OF HOLOSTEPHANUS SZIDAT, 1936

SZIDAT (9), while establishing the genus *Holostephanus* with *H. luhei* as the genotype, described a second species, *H. bursiformis* under it. YAMAGUTI (14) described two new species viz., *H. metorchis* and *H. nipponicus,* and also placed *Cyathocotyloides curonensis* Szidat, 1936 and *Cyathocotyloides dubis* Szidat, 1936 under *Holostephanus* in view of the fact that he synonymised *Cyathocotyloides* with *Holostephanus.* MEHRA (6) described four new species namely, *H. corvi, H. anhingi, H. neophroni,* and *H. ibisi* from Indian birds. Further, he transferred *Cyathocotyle calvusi* Verma, 1936. *Linstowiella lutzi* Faust and Tang, 1938 and *Linstowiella bambusicolae* Faust and Tang, 1938 to the genus *Holostephanus.* VIDYARTHI (13) added two new species to *Holostephanus, H. thaparus* and *H. phalacrocoraxus.* VERNBERG (12) described *H. ictaluri* from the Channel Catfish, *Ictalurus punctatus.* SUDARIKOV (8) transferred *Cyathocotyle desmanae* Sobolev, Maschkov et Maschkov, 1940 to *Holostephanus.*

The transfer of *Cyathocotyle calvusi* Verma, 1936, to *Holostephanus* by MEHRA (6) was accepted by DUBOIS (2), YAMAGUTI (15), and SUDARIKOV (8), but VERNBERG (12) and BAUGH (1) preferred to retain it under the genus *Cyathocotyle* Mühlings, 1898. The account of this species, as given by VERMA (11), is inadequate and does not give any information about the presence of a ventral excavation or of a ventral sucker. The present writer is, therefore in agreement with VERNBERG (12) and BAUGH (1) in retaining this species in its original place under *Cyathocotyle,* until details are available from fresh specimens. The distribution of the vitelline folicles and the presence of a well-developed cirrus pouch in *Linstowiella lutzi* and *Linstowiella bambusicolae* justify the removal of these species from the genus *Linstowiella* Szidat, 1933. The transfer of these species to *Holostephanus* by MEHRA (6) was accepted by DUBOIS (2) and YAMAGUTI (15). VERNBERG (12), on the other hand, accepted the transfer of *L. lutzi* to *Holostephanus,* but not of *L. bambusicolae* SUDARIKOV (8), in SKRJABIN'S *Trematody jivotnyi i cheloveka,* enlisted both these species under *Cyathocotyle.* In view of the fact that a ventral concavity is not described in these species, the allocation of the latter in the genus *Cyathocotyle* appears to be justified until further details about these species are avilable.

DUBOIS (3), in his "Systematics of Strigeida", invalidated a number of species and listed only eleven valid species. He synonymised *H. bursiformis* Szidat, 1936 with the genotype *H. luhei* Szidat, 1936; *H. metorchis* Yamaguti, 1939 with *H. nipponicus,* 1939; and *H. thaparus* Vidyarthi, 1948 with *H. neophroni* Mehra, 1943. YAMAGUTI (15) followed DUBOIS (3) in treating *H. bursiformis* as a synonym of *H. luhei,* and *H. thaparus* as a synonym of *H. neophroni,* but he

maintained *H. metorchis* as a valid species on the basis of evidence which he had obtained from his work (YAMAGUTI, 14) on the life-histories of *H. metorchis* and *H. nipponicus*. SUDARIKOV (8) listing twelve species under *Holostephanus*, maintained *H. bursiformis* as a synonym of *H. luhei*, but *H. metorchis* as a valid species. He seems to have missed the species *H. neophroni* and *H. thaparus*, which he neither mentioned in his discussion nor included under the genus. Recently, ERASMUS (4), working on a large number of experimentally obtained specimens of *H. luhei*, found that the range of individual variations observed in his specimens covers the differences between this species and *H. dubius* (syn. *Cyathocotyloides dubius* Szidat, 1936). Consequently, he synonymised *H. dubius* with *H. luhei*. The present writer agrees with DUBOIS (3) regarding *H. bursiformis* as a synonym of *H. luhei*, and *H. thaparus* of *H. neophroni*, but differs from him in regarding *H. metorchis* as a valid species on the evidence produced by YAMAGUTI (14). The writer also agrees with ERASMUS (4) in regarding *H. dubius* as a synonym of *H. luhei*.

TANG (10) described a new cyathocotylid from *Pelicanus onocrotalus roseus*, and named it *Cyathocotyle chungkee*. In the description of this species, TANG (10) mentioned, "In a lateral view, the holdfast organ protrudes prominently and a deep cleft between it and the anterior portion of the worm can be readily observed". This statement gives clear evidence of the presence of a ventral excavation in the anterior part of body in this species and, hence, the writer proposes to transfer it to the genus *Holostephanus* under the name of *H. chungkee* (Tang, 1941) nov. comb.

According to the foregoing review, the genus *Holostephanus* Szidat, 1936 includes the following sixteen species:

1. *Holostephanus luhei* Szidat, 1936
   Syn.: *H. bursiformis* Szidat, 1936
   H. dubius (Szidat, 1936) Yamaguti, 1939

2. *H. curonensis* (Szidat, 1936) Yamaguti, 1939.

3. *H. metorchis* Yamaguti, 1939.

4. *H. nipponicus* Yamaguti, 1939.

5. *H. corvi* Mehra, 1943.

6. *H. neophroni* Mehra, 1943.
   Syn.: *H. thaparus* Vidyarthi, 1948.

7. *H. anhingi* Mehra, 1943.

8. *H. ibisi* Mehra, 1943.

9. *H. phalacrocoraxus* Vidyarthi, 1948.

10. *H. ictaluri* Vernberg, 1952.

11. *H. desmanae* (Sobolov, Maschkov et Maschkov, 1940) Sudarikov, 1961

12. *H. chungkee* (Tang, 1941) nov. comb.

13. *H. elongatus* sp. nov.

14. *H. anupshahrensis* sp. nov.

15. *H. pyriformis* sp. nov.

16. *H. breviformis* sp. nov.

A KEY TO THE SPECIES OF THE GENUS HOLOSTEPHANUS SZIDAT, 1936.

1. Oesophagus present. 2
   Oesophagus absent. 5

2. Body round or oval. Pharynx smaller than oral sucker 3
   Body spindle-shaped. Pharynx larger than oral sucker 4

3. Testes subspherical. Cirrus sac about half of body length. Parasites of birds ..... *H. curonensis* (Szidat, 1936) Yamaguti, 1939.
   Testes elongated. Cirrus sac about one-fourth of body length. Parasites of fishes ..... *H. ictaluri* Vernberg, 1952.

4. Cirrus spinose ..... *H. chungkee* (Tang, 1941) nov. comb.
   Cirrus aspinose ..... *H. phalacrocoraxus* Vidyarthi, 1948

5. Eggs smaller than ovary 6
   Eggs larger than ovary 15

6. Testes lobed ..... *H. anhingi* Mehra, 1943.
   Testes entire. 7

7. Seminal vesicle strongly coiled ..... *H. desmanae* (Sobolov, Maschkov et Maschkov, 1940) Sudarikov, 1961.
   Seminal vesicle not coiled 8

8. Prepharynx present ..... *H. nipponicus* Yamaguti, 1939.
   Prepharynx absent 9

9. Body spinose 10
   Body aspinose 14

10. Cirrus pouch not extending beyond middle of body 11
    Cirrus pouch extending beyond middle of body 13

11. Proximal, vesicular part of cirrus pouch longer than distal, tubular part. ..... *H. elongatus* sp. nov.

Proximal, vesicular part of cirrus pouch shorter than or equal to distal, tubular part. 12

12. Proximal, vesicular part of cirrus pouch about one-third of the entire length of the latter. ..... *H. neophroni* Mehra, 1943.
Proximal, vesicular part of cirrus pouch about half of the entire length of the latter. ..... *H. corvi* Mehra, 1943.

13. Vitellaria enter into preacetabular zone ..... *H. metorchis* Yamaguti, 1939.
Vitellaria do not enter into preacetabular zone ..... *H. pyriformis* sp. nov.

14. Holdfast organ circular or oval. Vitellaria do not enter into post-testicular region. ..... *H. anupshahrensis* sp. nov.
Holdfast organ elongated. Vitellaria enter into post-testicular region ..... *H. ibisi* Mehra, 1943.

15. Oral sucker about the size of pharynx. ..... *H. breviformis* sp. nov.
Oral sucker about twice as large as pharynx ..... *H. luhei* Szidat, 1936.

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SUMMARY

Four new species are described from Indian birds under the genus *Holostephanus* Szidat, 1936. The genus is briefly reviewed. A key to differentiate the various species of the genus is also given.

RESUMEN

El autor describe cuatro nuevas especies de *Holostephanus* Szidat, 1936 (Trematoda: Cyathocotylidae) de aves de la India.

Se revisa el género y se presenta una llave para diferenciar las especies conocidas.

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Fig. 1. *Holostephanus elongatus* sp. nov. - Ventral view.
Figs. 2 and 3. *Holostephanus pyriformis* sp. nov.
Fig. 2. Type specimen. Ventral view.
Fig. 3. Co-type. Lateral view, with holdfast organ protruding.

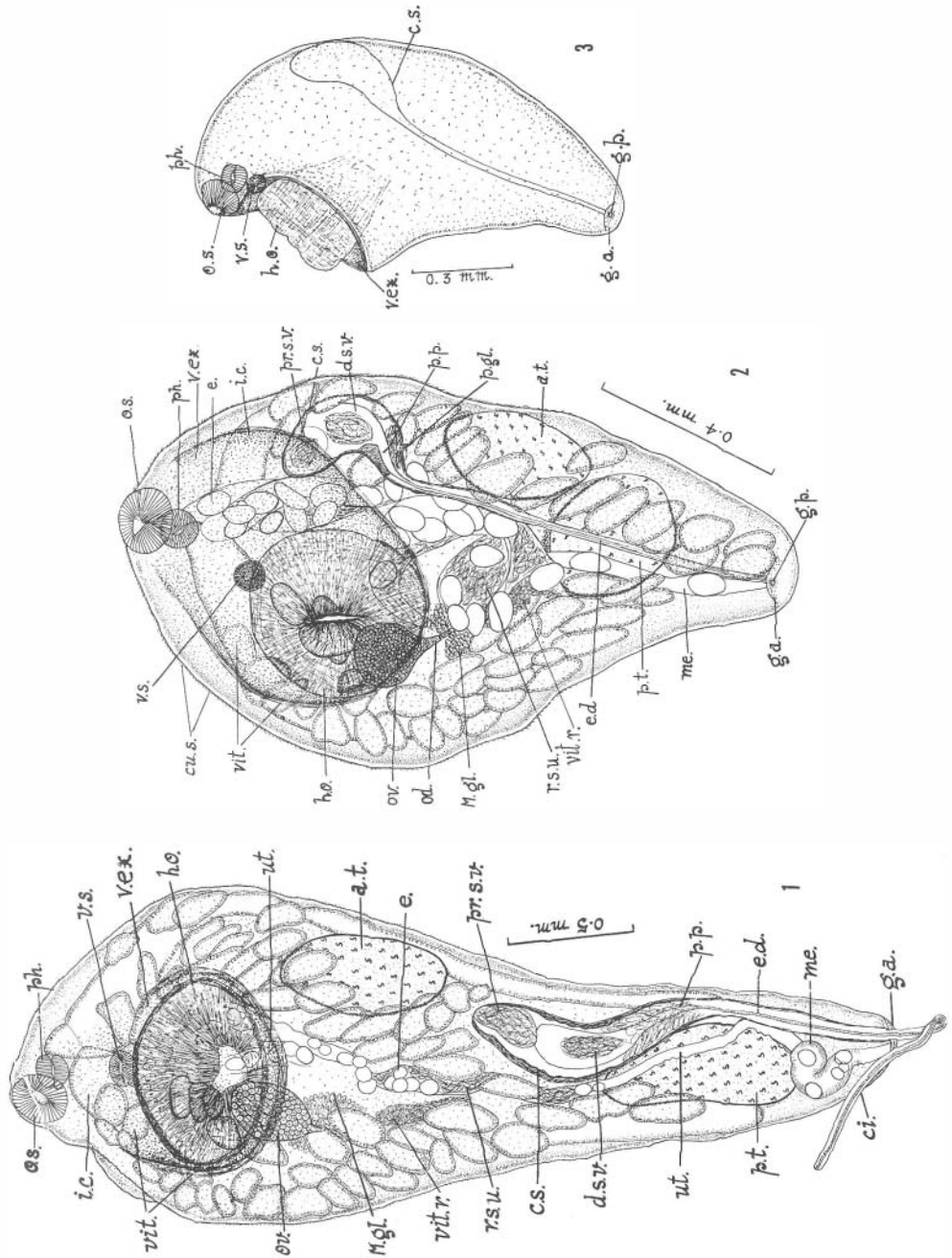
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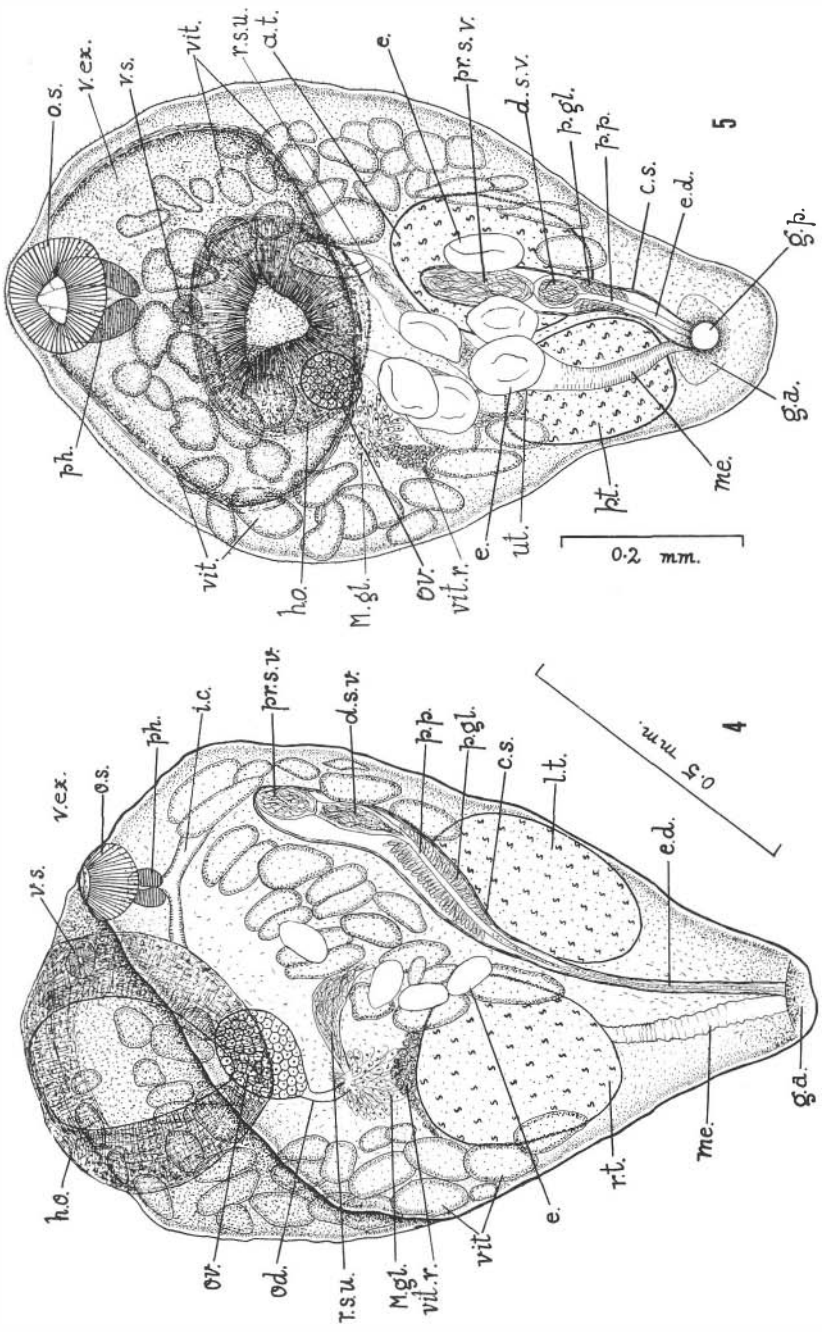
Fig. 4. *Holostephanus anupshahrensis* sp. nov. Type specimen with protruded holdfast organ.

Fig. 5. *Holostephanus breviformis* sp. nov. - Type specimen. Ventral view.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