1990

Binder 039, Cyathocotylidae A-Z [Trematoda Taxon Notebooks]

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Family CYATHOCOTYLIDAE Poche, 1925

Digenea with distome like body arrangement and strigeid-like structure. It differs from the Strigeidae in that a large well developed cirrus pouch is present, which contains a seminal vesicle, pars prostatica and cirrus. The genital pore is posterior.

Parasites of reptiles, birds, and mammals.

CYATHOCOTYLIDAE Poche, 1926

Family diagnosis. — Body divided into distinct regions or not, rounded oval, pyriform or fusiform, massive or linguiform to foliiform and more or less concave ventrally. Tribocytic organ present, circular, elliptical or saucer-shaped, may contain genital organs. Oral sucker and pharynx present, esophagus short, ceca terminating at or near posterior extremity. Acetabulum present or absent. Testes entire, variable in position relative to ovary. Cirrus pouch present, occasionally rudimentary or practically absent. Genital pore terminal. Eggs large, not numerous, without filaments. Vitellaria follicular, variable in extent. Lateral excretory stems uniting with each other as well as with median stem anteriorly, latter divided posteriorly and opening into excretory vesicle. Parasites of reptiles, birds and mammals.

Type genus: *Cyathocotyle* Mühling, 1896.

Key to subfamilies of Cyathocotylidae from birds

Body not distinctly divided into two regions, massive, may be concave ventrally; tribocytic organ large; vitellaria extensive, but not intruding into tribocytic organ ..... Cyathocotylinae

Body bipartite; anterior region foliiform, posterior region short, poorly developed; vitellaria distributed in two regions ..... Pseudhemistominae

Body linguiform, pyriform or ovoid, not distinctly divided into two regions, or provided with small caudal appendage, in which gonads are absent; vitellaria confined to postacetabular region, grouped around or on each side of tribocytic organ, into which they may intrude ..... Prohemistominae

Body linguiform, more or less bipartite; posterior region well developed, containing whole or part of gonads; vitellaria confined to postacetabular region, divided into two parallel, lateral groups, or occupying most of tribocytic organ, behind which they are less strongly developed ..... Szidatiinae

Key to subfamilies of Cyathocotylidae from reptiles

Body massive, may be concave ventrally, not divided into two distinct regions; tribocytic organ large, vitellaria extensive, but not intruding into tribocytic organ ..... Cyathocotylinae

Body linguiform, pyriform or ovoid; tribocytic organ comparatively small, with median slit; vitellaria confined to postacetabular region, surrounding tribocytic organ . . . Prohemistominae

Body elongate, linguiform, more or less bipartite; posterior portion well developed and containing whole or part of gonads ..... Szidatiinae

All the known cyathocotylid genera from mammals are included in the subfamily Prohemistominae.

Cyathocotylinae Mühling, 1898

Subfamily diagnosis. — Cyathocotylidae: Body massive, oval, pyriform or foliiform, may be more or less concave ventrally. Tribocytic organ large, circular, elliptical, with or without central pit; vitellaria extensive, but not intruding into tribocytic organ.

Key to genera of Cyathocotylinae from birds

Body massive, not excavated ventrally; tribocytic organ large, projecting over ventral surface ..... *Cyathocotyle*

Body massive, but with ventral concavity, in which the tribocytic organ is enclosed ..... *Holostephanus*

Cyathocotyle Mühling, 1896

Syn. *Paracyathocotyle* Szidat, 1936
Neocyathocotyle Mehra, 1943

Generic diagnosis. — Cyathocotylidae, Cyathocotylinae: Body subglobular to ovoid, pyriform to fusiform, not concave ventrally. Tribocytic organ strongly developed, projecting prominently over ventral surface, excavated, with aperture variable in form. Oral sucker and pharynx well developed, esophagus very short or practically absent; ceca terminating at or near posterior extremity. Acetabulum smaller than oral sucker, often hidden by tribocytic organ, sometimes rudimentary or absent. Testes diagonal or symmetrical at varying levels. Cirrus pouch well developed, muscular, claviform, containing seminal vesicle at its base. Genital pore usually terminal. Ovary variable in position, pre- or intertesticular, or opposite anterior testis. Vitelline follicles coarse, distributed in peripheral part of body, surrounding tribocytic organ, into which they usually do not intrude. Parasitic in intestine of birds, rarely of reptiles.

Genotype: *C. prussica* Mühling, 1896 (Pl. 63, Fig. 765), in *Anas querquedula, Clangula hyemalis, Nyroca marila, Oidemia fusca, Mergus serrator;* Europe. Also in *Fulica, Anas, Asio;* W. Siberia.

Representatives from avian hosts:

C. anhingi Vidyarthi, 1948, in *Anhinga melanogaster;* India.

C. (?) *chungkee* Tang, 1941, in *Pelicanus onocrotalus roseus;* China.

C. fusa Ishii et Matsuoka, 1935, in *Anas platyrhyncha domestica* (exper.); Japan. Larva encysted in *Pseudorasbora parva.*

C. gravieri Mathias, 1935, in *Anas platyrhyncha* var. *domestica;* France. *Bithynia tentaculata* — gudgeons and minnows — domestic duck.

C. indica Mehra, 1943, in *Sturnopaster capensis capensis;* India. Mehra (1943) suggested *Neocyathocotyle* n. subg. for this species.

C. japonica Kurisu, 1931, in *Corvus coronoides japonensis;* Japan.

C. melanittae Yamaguti, 1934, in *Melanitta fusca;* Japan. Larva in *Pseudoperilampus* and *Pseudorasbora parva.*

C. orientalis Faust, 1922, in *Anas platyrhyncha* var. *domestica;* China, Japan. Also in *Larus ridibundus;* Far Eastern Russia. Cercaria in *Bulimus striatulus japonicus,* metacercaria in *Pseudorasbora parva, Acheilognathus lanceolata rhombea, A. lanceolata tabira, Zacco temminckii, Carassius carassius;* adult experimentally in *Milvus migrans lineatus* — Yamaguti (1940). Larva in *Pseudorasbora parva* and *Sarcocheilichthys sinensis;* Shanghai — Komiya and Murase (1951).

C. oviformis Szidat, 1936, in *Sterna hirundo;* Germany.

C. szidatiana Faust et Tang, 1938, in *Anas boschas;* Peiping, China.

C. teganuma Ishii, 1935, in *Poliocephalus ruficollis japonicus;* Japan.

Cyathocotyle Mühling, 1896

Generic diagnosis. — See p. 598.

Representatives from reptilian hosts:

C. brasiliensis Ruiz et Leão, 1943, in intestine of *Caiman sclerops;* Brazil.

C. crocodili Yamaguti, 1954 (Pl. 59, Fig. 715), in intestine of *Crocodilus porosus;* Celebes.

C. fraterna Odhner, 1902, in intestine of *Champse vulgaris;* Egypt.

CATHOCOTYLE Muhling, 1896

Characteristics of the family. Somewhat longer than wide. Holdfast organs well developed. Vitellaria lateral. Excretory pore somewhat subterminal, opening on the dorsal surface.

Type species: C. prussica Muhling, 1896

147—ERASMUS, D. A., 1967. "Ultrastructural observations on the reserve bladder system of *Cyathocotyle bushiensis* Khan, 1962 (Trematoda: Strigeoidea) with special reference to lipid excretion." *J. Parasit.*, **53** (3), 525–536.

The reserve bladder system of *Cyathocotyle bushiensis* consists of a series of lacunae extending over the dorsal and lateral regions of the body. The lacunar wall is composed of a layer of cytoplasm containing nuclei, mitochondria and ribosomes. The wall possesses an outer plasma membrane elevated to form stacks of lamellae and a basal plasma membrane demarcating the layer from other structures. In the adult (5-day) parasite the cytoplasm contains lipid droplets only, which become associated with the lamellae and are then released into the lumen of the lacuna. In the 18-hour parasite the cytoplasm and lamellae are associated with excretory corpuscles consisting of layers arranged concentrically around a central core. At 3 days, the excretory cytoplasm possesses both fat and excretory corpuscles. Histochemical tests suggest that the corpuscles contain calcium salts and the lipid droplets neutral fat. The lamellae exhibit acid and alkaline phosphatase activity. [A.S.] M.B-B.

25. *Cyathocotyle prussica* Mühling, 1896

[Syn. *Cyathocotyle orientalis* Faust, 1922 ;
Cyathocotyle fusa Ishii et Matsuoka, 1935 [1] ;
Cyathocotyle gravieri Mathias, 1935 ;
Cyathocotyle szidatiana Faust et Tang, 1938]

Les quatre synonymes de *C. prussica* ont été trouvés chez *Anas platyrhynchos* L. (ou sa sous-espèce *domestica*) ou obtenus expérimentalement chez cet hôte. Le tableau XI établit leur identité avec l'espèce de MÜHLING.

La topographie des glandes génitales est variable en fonction de l'extension ou de la contraction du Ver. On ne saurait donc considérer les positions relatives de ces organes pour caractériser l'espèce. C'est ainsi que dans deux matériaux de *C. prussica* provenant de *Anas querquedula* L. et de *Mergus serrator* L. (coll. Fuhrmann, Neuchâtel), nous avons constaté que les testicules pouvaient apparaître opposés transversalement ou obliquement, ou encore situés l'un derrière l'autre. Chez *C. szidatiana*, où ils ont été observés « en tandem » sur le côté gauche du corps, nous constatons qu'ils ne sont pas tout à fait dans le même champ chez l'holotype (vu de profil) [2], tandis que l'exemplaire représenté par la figure 1 de la description originale montre à l'évidence le refoulement de la poche du cirre par le testicule postérieur dévié de son *situs* normal.

[1] Cf. CHUAN 1962.

[2] L'holotype de *C. szidatiana* (Pe 971 c) mesure 0,615 mm de longueur ; diamètre dorso-ventral 0,455 mm. Ventouse buccale 63/76 μ, pharynx 47/60 μ, ventouse ventrale 42/45 μ, testicule antérieur 156/136 μ, testicule postérieur 141/136 μ, poche du cirre longue de 325 μ.

FAUST et TANG (1938) ont indiqué comme dimensions approximatives des œufs 143/86 μ ; nous constatons sur l'holotype et sur un paratype, obligeamment prêtés par le professeur E. C. Faust, que les œufs très fragiles, sont écrasés ; le mieux conservé mesure 100/73 μ.

En conséquence, nous considérons *C. szidatiana* comme synonyme de *C. prussica*.

Le *Cyathocotyle fusa* Ishii et Matsuoka, 1935, obtenu expérimentalement chez le Canard domestique, au Japon, a été retrouvé par CHUAN (1962) dans le gros intestin d'*Anas platyrhynchos* L., en Asie russe (Amour inférieur). Si l'on tient compte de l'aplatissement du spécimen figuré dans la description originale et de la déformation consécutive du corps on rétablira facilement les dimensions exagérées des gonades — celles des ventouses, du pharynx et des œufs restant dans les limites de *C. prussica*. De son côté, le *C. fusa* retrouvé par CHUAN est de petite taille (0,45-0,52 mm) malgré un léger écrasement qui écarte les testicules du plan médian et déforme l'organe tribocytique. L'utérus, faiblement développé, ne contient qu'un œuf mesurant 84/68 μ, ce qui laisse à penser que la maturité sexuelle serait incomplète. Dans l'exemplaire représenté par CHUAN (*op. cit.*, fig. 7), la ventouse ventrale est plus grande que le pharynx, alors que les dimensions consignées dans le texte indiquent un rapport inverse (28-31/28-37 μ pour la première, 50/53 μ pour le second).

Il semble donc bien qu'on puisse considérer *C. fusa* comme synonyme de *C. prussica*, d'autant plus que les testicules sont opposés transversalement comme c'est souvent le cas dans l'espèce de MÜHLING.

Quant au *Cyathocotyle orientalis* Faust, 1922, du Canard domestique décrit comme privé de ventouse ventrale, il doit s'identifier également à *C. prussica*. Nous avons signalé (1938, pp. 430, 431 et fig. 313) l'existence d'un acetabulum sur des exemplaires originaux favorablement orientés. Les dimensions des deux formes concordent bien (voir tableau XI).

FROM DUBOIS, 1964

CYATHOCOTYLE

LOOSE LEAF
ORGANIZER

SCHEDULE

ERIOD OR TIME								
COURSE MON. NSTRUCTOR								
COURSE TUE. NSTRUCTOR								
COURSE WED. INSTRUCTOR								
COURSE THU. NSTRUCTOR								
COURSE FRI. INSTRUCTOR								
COURSE SAT. NSTRUCTOR								

NAME _____

ADDRESS _____

SCHOOL _____ TELEPHONE _____

Duboisia Szidat, 1936

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body pyriform, with deep ventral pouch, in which a large massive tribocytic organ reaching the pharynx is enclosed, produced backward into a short, cylindrical portion, at the end of which opens the genital pore. Oral sucker much larger than acetabulum, latter weakly developed, covered up by tribocytic organ. Testes ovoid, diagonal, or almost symmetrical, not intruding into tribocytic organ. Cirrus pouch strongly developed. Ovary in front of posterior testis. Vitelline follicles large, massed together laterally and intruding into tribocytic organ. Parasitic in Gressores.

Genotype: *D. syriaca* (Dubois, 1934) Szidat, 1936 (Pl. 67, Fig. 809), syn. *Prohemistomum syriacum* D., in *Ciconia cinonia;* Syria.

Other species: *D. skrjabini* Sudarikov et Oschmarin, 1954, in *Alcedo atthis;* Russia.

Cyathocotylidae

Duboisia skrjabini Sudarikov et Oshmarin, 1954

Host: Alcedo atthis L.

see reprint

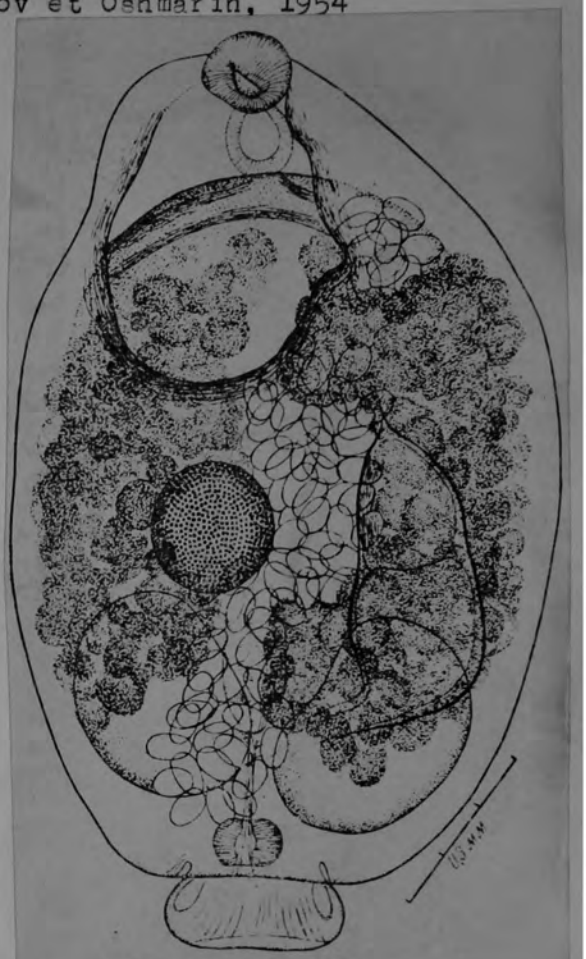


Рис. 1. *Duboisia skrjabini* n. sp. из кишечника зимородка.

Duboisia syriaca (Dubois, 1934) Szidat, 1936

Duboisia syriaca (Dubois)

Lg. jusqu'à 1,3 mm ; largeur 0,66-0,78 mm. Corps ovoïde à piriforme, marsupiforme, abritant l'OT dans sa profonde cavité, spinescent dans sa première moitié, prolongé en arrière par un court manchon cylindrique et rétractile, délimitant un large pore génital. PH ellipsoïdal (75-85/53-60 μ), plus petit mais plus musculeux que la VB (100-110/110 μ) qui est deux fois plus grande que la VV (50/60 μ). OT très développé, massif, presque aussi large que le corps, recouvrant la VV et atteignant à peu près le bord postérieur du PH.

OV submédian (140-145/140-160 μ), situé aux 43/100 du corps. TT (400/180-210 μ) situés l'un à côté de l'autre dans la seconde moitié de ce dernier. Poche du cirre longue d'environ 700 μ. FG relativement gros, groupés en deux masses latérales, pénétrant dans l'OT et s'étendant du niveau de la VV jusqu'au début du manchon postérieur. Sphincter vaginal (60-75 μ de diamètre)[1] pouvant se retirer jusqu'à 300 μ à l'intérieur du corps par rétraction de ce manchon. Œufs (87-99/55-68 μ), au nombre d'une vingtaine dans chacun des deux exemplaires.

Hôte : *Anastomus lamelligerus* Temm.

Habitat : intestin grêle.

Distribution : Bangweulu Swamp, Zambia.

Collection : 262/1-2 (2 exempl., août 1960). Univ. Neuchâtel (G. D.) Nos U 69-70.

[1] Celui du type mesure 110 μ de diamètre.

DUBOISIA

Gogatea Lutz, 1935

Generic diagnosis. — Cyathocotylidae, Szidatiinae: Body distinctly bipartite; forebody elongate, linguiform, concave ventrally, spinulate anteriorly, with its posterior border separating body into two regions; hindbody short cylindrical, containing posterior testis, cirrus pouch and distal part of uterus. Tribocytic organ large, elliptical, occupying entire posterior half of forebody, covering up acetabulum. Oral sucker much larger than acetabulum, pharynx small, esophagus bifurcating about midway between anterior extremity and tribocytic organ, ceca terminating just in front of posterior testis. Testes subglobular, tandem, anterior testis enclosed in tribocytic organ, posterior testis at anterior end of hindbody. Cirrus pouch well developed. Genital pore terminal. Ovary rounded, intertesticular, submedian, partly overlapping anterior testis. Uterine coils reduced; eggs very large. Vitelline follicles large, confined to tribocytic organ. Parasites of snakes.

Genotype: *G. serpentium* (Gogate, 1932) Lutz, 1935 (Pl. 44, Fig. 538), syn. *Prohemistomum* s. G., in intestine of *Tropidonotus piscator;* India.

Other species: *G. serpentium indica* Mehra, 1947, in *Natrix piscator piscator;* Allahabad.

G. Cyathocotylidae Poche (1925)

Gogatinae Dubois (1938) and Mehra (1947)

Gogatea Lutz (1935), *Gogatea serpentum* Gogate (1932), Lutz (1935)

***Gogatea serpentum* var. *indicum* Mehra (1947).** Mehra (1947) described this form from the intestine of the water-snake, *Tropidonotus piscator* at Allahabad. This worm occurs frequently in the same host, the water-snake, in Hyderabad State. The writer collected this parasite on numerous occassions from February to June, 1954. The writer has nothing to add to the detailed description given by Mehra (1947). The principal measurements of the body, however, are given below for reference:

Length, 1.03—1.27 mm.; length of fore body, 0.554—0.562 mm. breadth, 0.43—0.53 mm.; tail-end-length 0.47—0.483 mm., breadth, 0.26—0.31 mm.; oral sucker, 0.07—0.109 mm.; ventral sucker, 0.03 to 0.045×0.051 mm.; pharynx, 0.03—0.04 mm. in diameter; oesophagus, 0.083—0.12 mm. long. Anterior testis, 0.13—0.26×0.07—0.14 mm.; posterior testis, 0.109—0.18×0.13—0.182 mm; ovary, 0.09—0.103×0.065—0.069 mm.; eggs, 0.14—0.15×0.07—0.09 mm.

Host: *Tropidonotus piscator*. — Habitat: Intestine. — Locality: Hyderabad, India.

From Simha, 1958

-OVER-

Gogatea serpentium (Gogate, 1932) Lutz, 1935

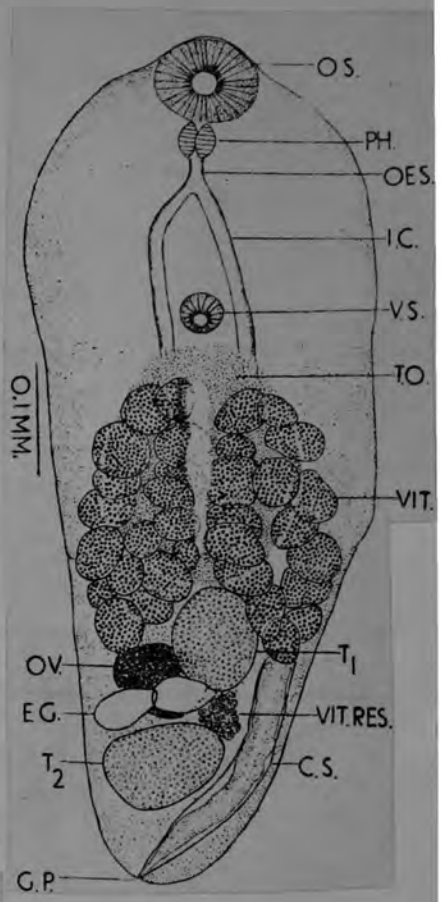
(Syn. *Prohemistomum serpentum* Gogate, 1932)

Five specimens of *Gogatea serpentium* (Gogate, 1932) Lutz, 1935, were found in the intestine of *Natrix piscator* (Schn) caught in Budha Nala, a rivulet in Ludhiana (Punjab, India). The body of the parasite is elongated with a broad anterior segment and narrow posterior segment and measures 0·59–1·104 mm. in length. The anterior segment is always larger than the posterior, the former being 0·4–0·73 × 0·24–0·3 mm., while the latter is 0·19–0·36 × 0·14–0·2 mm. Cuticular spines are found in the anterior segment.

The ventral sucker is 0·03–0·049 × 0·035–0·049 mm., the anterior edge of which lies 28–35/100 of the length of the body. The tribocytic organ is 0·19–0·28 mm. in longitudinal axis and 0·14–0·16 mm. in transversal. The oral sucker is much larger than the ventral sucker and measures 0·062–0·079 × 0·076–0·102 mm. The pharynx is 0·0304–0·049 mm. in length and 0·03–0·045 mm. in breadth. It is followed by an oesophagus which measures 0·019–0·072 mm. in length. The intestinal caeca are distinctly visible up to the anterior edge of the tribocytic organ, beyond which they become obscure on account of closely-aggregated vitellaria on each side of the body.

The unlobed testes are placed obliquely in the posterior segment, maybe well apart from, or very close to, each other. In two specimens the anterior testis lies partly in the anterior and partly in the posterior segments. The anterior testis, 0·095–0·12 × 0·083–0·095 mm., may be in the median line or to the left of it while the posterior testis, 0·087–0·106 × 0·087–0·106 mm., lies more towards the right of the median line. The cirrus sac is long and curved inwardly extending from the level of the posterior third of the anterior testis to the posterior end of the body. The vesicula seminalis fills the basal part of the cirrus sac. The pars prostatica is enveloped by prostate gland cells. The cirrus may be retracted or protrusible.

The ovary, 0·053–0·076 × 0·057–0·091 mm., lies to the right of the median line in between the two testes either partially overlapped by the anterior testis or right behind it and in front of the posterior testis. The vitelline follicles are large and are present in two groups, one on either side, extending a little behind the ventral sucker up to the level of the middle of the anterior testis. The anterior extent of the vitellaria is variable. It may commence at the level of anterior border of the tribocytic organ or a little behind it. In only one specimen two eggs measuring 0·06–0·095 × 0·03–0·041 mm. were seen.



Remarks

From the study of these specimens it appears that the position of the anterior testis, the ovary and the anterior extent of the vitellaria is variable. Their position seems to depend upon the contraction and relaxation of the posterior segment. My specimens show eggs slightly smaller in size.

Host—*Natrix piscator* (Schneider).

Location—Intestine.

Locality—Ludhiana (Punjab), India.

FROM N.K. GUPTA, 1966

GOGATEA SERPENTIUM (GOGATE, 1932) LUTZ, 1935
(Figs. 7—8)

A large number of specimens of this form were collected from the intestine of a snake, *Tropidonotus piscator* (Wall.)

The body is elongated, bipartite, 1.0-1.42X0.44-0.55 mm. in size. The forebody is concave ventrally while the hind body is short and cylindrical and much larger than hind body and rounded at the anterior end. The forebody is densely covered with small spines. The oral sucker is terminal and ovoid, 0.07-0.12X0.09-0.15 mm. in size. The prepharynx is short and thin walled. The pharynx is muscular and globular and measures 0.03-0.05X0.03-0.06 mm. in size. The oesophagus is long or short, narrow and measures 0.03-0.14 mm. in length. The intestinal caeca are simple running posteriorly dorsal to tribocytic organ and terminate some distance short of posterior extremity. The ventral sucker is spherical, smaller than oral sucker, intercaecal, situated near the middle of forebody close to anterior border of tribocytic organ. It measures 0.025-0 06×0.025-0.07 mm. in size and 0.24-0.49 mm. from anterior extremity. The ratio of oral to ventral sucker is 2:1. The tribocytic organ is large, spherical or elliptical with a median slit situated in the posterior half of forebody, 0.21-0.34×0.18-0.29 mm. in size.

Figs. 7. Dorsal view.

The excretory pore lies on hind end of body. The excretory bladder is V-shaped with long cornua extending far forward.

The genital pore is terminal and situated at posterior extremity.

The testes are spherical or oval, equal or subequal and tandem in position. The anterior testis is generally located in the forebody dorsal to tribocytic organ and posterior one in hind body. The anterior testis measurers 0.1-0.2×0.1-0.17 mm. in size and lies at 0.27-0.42 mm. from hind end. The posterior testis is larger, equal or smaller than anterior and measures 0.08-0.19×0.095-0.17 mm. in size at 0.08-0.3 mm. from hind end. The cirrus sac is elongated, club-shaped extending from hind end of body upto beyond of anterior testis. It measures 0.18-0.52×0.03-0.05 mm. in size. The vesicula seminalis is elongated, tubular occupying approximately proximal third of cirrus sac and measures 0.12-0.13×0.015-0.03 mm. in size. The pars prostatica is tubular measuring 0.02-0.16×0.01-0.02 mm. in size. The ejaculatory duct is narrow, long or short, 0.03-0.24 mm. in length opening at the genital pore. The space in the cirrus sac around vesicula seminalis and pars prostatica is surrounded by a large number of pear shaped prostate gland cells. In some forms the cirrus is everted and non-spiny.

8. Posterior end showing cirrus sac extending beyond testes.

The ovary is oval or spherical, intertesticular, median or lateral measuring 0.075-0.1×0.045-0.13 mm. in size and lies at 0.19-0.39 mm. from hind end of body. The vitellaria are follicular about 25 to 30 in number, arranged in two regular rows or irregular lateral rows on either

-OVER-

side of body, intruding into tribocytic organ, commencing from hind end of ventral sucker upto hind end of anterior testis. In few specimens the follicles are arranged in two lateral rows. The vitelline reservoir is very large and sometimes as large as the testes. The Mehlis' gland cells are posterior or lateral to ovary. The uterine coils are ventral to cirrus sac. The metraterm opens at the genital pore. The eggs are large, 1 to 3 in number measuring 0.08-0.14 × 0.05-0.08 mm. in size.

DISCUSSION

Lutz (1935) created the gennus *Gogatea* for the reception of *Prohemistomum serpentium* Gogate, 1932. Szidat (1936) added one more species Viz. *Prohemistomum joyeuxi* (Hughes, 1929) to the genus. Dubois (1938) created another genus *Szidatia* for the species *Gogatea joyeuxi* (Hughes, 1929) Szidat, 1936. Chatterji (1940) and Mehra (1947) did not accept the genus *Szidatia* and considered *Szidatia* as a synonym of *Gogatea*. Dubois (1951) recognised *Szidatia* as a valid genus distinguishing it from *Gogatea* by the shape of tribocytic organ and disposition of the vitellaria into two parallel rows. Dollfus (1953) accepted the genus *Szidatia* as valid and described a new species *Szidatia nemethi*. Baugh (1958) followed Chatterji (1940) and Mehra (1947) in considering the genus as a synonym of *Gogatea*, as the distinguishing characters taken into account by Dubois are not of sufficient generic importance. The author is in entire agreement with Catterji (1940), Mehra (1947) and Baugh (1958) in considering the two genera identical, as the distribution of vitellaria, the shape and size of tribocytic organ and the relative length of oesophagus are variable characters in the author's specimens also. Baugh (1958) described *G. incognitum* from the intestine of a snake and distinguished this species from *G. serpentium* by the more anterior extension of cirrus sac, in the possession of a distinct prepharynx and in having a well developed ventral sucker. In the opinion of author *G. incognitum* is a synonym of *G. serpentium* as the extension of cirrus sac and the presence of a well developed ventral sucker are variable characters. The difference existing between *G. serpentium* and *G. incognitum* is the presence of a prepharynx which in the opinion of author should not form a basis for the separation of one species from the other.

Host : *Tropidonotus piscator* (Wall.)
Location : Intestine.
Locality : Lucknow.

AGRAWAL, 1966
INDIAN J. HELMINTHOLOGY 18(1): 62-76

3. ***Gogatea serpentium*** (Gogate, 1932) Lutz, 1935.

Syn. *Gogatea serpentium* var. *indicum* H. R. Mehra, 1947 (3) ;
Gogatea incognitum Baugh, 1958.

Décrit par Gogate (1932) sous le nom de *Prohemistomum serpentum* (sic), ce parasite de *Natrix piscator* (Schn.) a été retrouvé par R. C. Chatterji (1940), H. R. Mehra (1947), K. S. Singh (1956), S.S. Simha (1958), V. Agrawal (1966) et N. K. Gupta (1966), toujours chez l'hôte-type (4).

S. C. Baugh (1958, pp. 218-220. fig. 6 *a-b*) décrivait un *Gogatea incognitum* d'un Serpent non identifié, provenant de Bénarès (U.P.). Il s'agit certainement de *G. serpentium*, comme le montre la figure 6 *a* et le tableau comparatif III : le diamètre de la ventouse buccale est le double de celui de la ventouse ventrale qui est un peu ou à peine plus grande que le pharynx ; la limite antérieure de la couronne vitelline correspond au niveau de l'acetabulum (39/100 d'après la figure 6 *a*) ; l'un des testicules se trouve dans la partie appendiculaire du Ver.

Gogatea serpentium paraît donc être une espèce endémique (région orientale : Inde, Birmanie).

From DuBois, 1969

Gogatea serpentium (Gogate)

	Gogate	Chatterji	Mehra (1)	Singh	Simha	Gupta	Baugh
Longueur du Ver (en mm)	1,34-1,44	—	0,95-1,65	1,2-1,5	1,03-1,27	0,59-1,10	0,85-1,08
Ventouse buccale (en µ)	64-80/103-126	—	105-117/120-138	112-128/140-170	70-109	62-79/76-102	82-90/99-115
Pharynx	46/53	—	45-48	48-60/60-68	30-40	30-49/30-45	36-41/33-41
Ventouse ventrale	64	—	48-60	68-76/68-80	30-45/51	30-49/35-49	41-52
Organe tribocytique	400-440/260-300	—	210-270/180-225	330-380	—	190-280/140-160	215/249
Œufs	120-140/73-80	—	100-134/54-90	156-182/64-108	140-150/70-90	(60-95/30-41)	134/73
Œsophage	106	—	36-80	80-120	83-120	19-72	49-91
Longueur poche du cirre	353-473	—	360-420	360-572	—	—	365-415
Situation ventouse ventrale (2)	38/100 (fig. 1)	36/100 (fig. 3)	35-38/100 (fig. 2)	34/100 (fig. 3)	—	34/100 (fig. 1)	39/100 (fig. 6 *a*)
Nombre d'œufs	1 à 2	—	1 à 2	1 à 2	—	2	1 à 2
Localités	Rangoon (Burma)	(Burma)	Allahabad	Lucknow	Hyderabad	Ludhiana (Punjab)	Banaras, U.P.

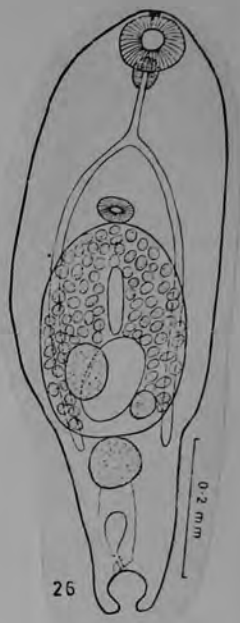
(1) Var. *indicum* Mehra.
(2) D'après les figures publiées par les auteurs.

Gogatea serpentum (Gogate, 1932) Lutz, 1935

(Fig. 26)

The following description is based upon five specimens collected from one specimen of a snake, *Ptyas mucosus*, from village Chehl, District Gujranwala.

The body of the worm is small and bipartite. The fore body is slightly more than twice as large as and as broad as the hind body, linguiform and spined to the mid level of the tribocytic organ. The oval tribocytic organ is extensive, occupyiug most of the area of the posterior half of the fore body. It may or may not enclose the ventral sucker. The oral sucker is well-developed, subterminal and roughly spherical. The ventral sucker is feebly developed, less than half the size of the oral sucker and lies near the anterior end of the tribocytic organ. There is no prepharynx. The pharynx is longer than broad and half the size of the oral sucker. The oesophagus is narrow and short. The intestinal fork lies at about one-fourth of the fore body from the anterior end. The intestinal caeca are narrow and terminate at the anterior level of the posterior testis.



26

The testes are subglobular to oval with smooth margin. The anterior testis lies within the area of the tribocytic organ; while the posterior testis lies near the junction of the fore and hind body. The intertesticular space is 0.068 – 0.070 mm. The cirrus pouch is well-developed, elongated with its opening at the posterior end of the body. A well-developed genital atrium is present. The cirrus pouch encloses a vesicula seminalis, a ductus ejaculatorius, prostatic complex and a protrusible unarmed cirrus. The ovary is rounded, slightly submedian, intertesticular and within the area of the tribocytic organ. The vitellaria are in the form of several large follicles, 0.033 – 0.038 × 0.030 – 0.033 mm in size, confined to the erea of the tribocytic organ and not divided into two distinct lateral groups. The uterus is not coiled and contains only one egg at a time. The metraterm is present. Oval eggs are large, yellowish brown and operculate.

MEASUREMENTS

(All measurements in millimeters)

Body length	0.823 – 0.911
Body breadth	0.264 – 0.294
Fore body length	0.568 – 0.627
Fore body breadth	0.264 – 0.294
Hind body length	0.254 – 0.294
Hind body breadth	0.127 – 0.176
Tribocytic organ	0.196 – 0.294 × 0.098 – 0.117
Oral sucker	0.081 – 0.096 × 0.081 – 0.102
Ventral sucker	0.038 × 0.051
Pharynx	0.043 – 0.051 × 0.038 – 0.040
Oesophagus	0.063 – 0.076
Ovary	0.063 × 0.061
Shell gland	0.061 × 0.063
Anterior testis	0.076 × 0.063 — 0.089
Posterior testis	0.089 – 0.109 × 0.063 – 0.089
Eggs	0.119 – 0.122 × 0.071 – 0.076

Host: *Ptyas mucosus*
Location: Intestine
Locality: Village Chehl, District Gujranwala

– over –

Discussion

The material available with us resembles *Gogatea serpentum* (Gogate, 1932) Lutz, 1935 in all essential features except that the present specimens are smaller with smaller organs, However, the egg size is same. The hind body in the present specimens is also comparatively narrower. There is, however, no doubt that the present material belongs to *Gogatea serpentum* (Gogate, 1932) Lutz, 1935. This species is being reported for the first time from Pakistan and also from a new host, *Ptyas mucosus*.

From BHUTTA AND KHAN, 1975

GOGATEA

1. ***Holostephanus calvusi*** (Verma, 1936) Mehra, 1943.

Syn. *Holostephanus neophroni* Mehra, 1943 ;

Holostephanus thaparus Vidyarthi, 1948 ;

Holostephanu elongatus R. Gupta, 1964 ;

? *Holostephanus pyriformis* R. Gupta, 1964.

Décrit par Verma (1936) sous le nom de *Cyathocotyle calvusi*, ce parasite de Falconiformes et dont l'hôte-type est *Torgos calvus* (Scop.) a été assigné au genre *Holostephanus* par Mehra (1943, p. 140), sous la réserve qu'il constitue une exception quant à la situation de l'ovaire. Cet organe, dans la diagnose de Verma, est antéro-latéral par rapport au testicule postérieur, tandis que dans les autres espèces congénériques, il se situe « as a rule to right side, in front of anterior testis or opposite to it in front of the middle of body » (Mehra, *op. cit.*, p. 154). C'est ce qu'on constate chez *Holostephanus neophroni* Mehra, de *Neophron percnopterus ginginianus* (Lath.), chez *Holostephanus thaparus* Vidyarthi, de *Neophron percnopterus* (L.), et chez *Holostephanus elongatus* R. Gupta.

Cette dernière espèce a été recueillie à Lucknow, en 1953, dans l'intestin grêle d'une Cigogne asiatique, *Xenorhynchus asiaticus* (Lath.) (2). L'exemplaire représenté par la figure 1 de Gupta est fixé en extension. Le syntype que nous avons reçu à l'examen a l'habitus normal et très caractéristique de *Holostephanus calvusi* : longueur 2 mm environ ; longueur du premier testicule 830 µ. Ovaire dextre, mesurant 210 µ de diamètre, situé au niveau du bord antérieur du précédent, et en opposition. Poche du cirre atteignant la mi-longueur du corps. Œufs nombreux.

From Dubois, 1969

Holostephanus calvusi

	calvusi	neophroni	thaparus	elongatus
Long./larg. du Ver (en mm) ..	2,06/1,02	1,5-2,3/0,87-1,24	2,2-2,5/1,28-1,35	2,11-3,65/1,07-1,34
Ventouse buccale (en µ)	150/190	100-138/135-180	123-128/152-160 (1)	187/161-210
Pharynx	90/97	78-96/84-100	64/80	110-137
Ventouse ventrale	—	81-90/105-120	67/85	81-110/134-160
Organe tribocytique	320-400	400-600	max. 600 (2)	438-653/501-744
Ovaire	280	180-220	208-224/240	168-215/210-319
Testicules	560-650/180	630-810/260-300	560-860/260-360	410-760/170-320
Œufs	81-92/42-47	66-78/44-48	64-88/32-45	75-81/58-67
Longueur poche du cirre	600	720-1270	800-880	1135-1700
Extension poche du cirre	67/100	46/100	54/100	53/100
Situation de l'ovaire	à droite	à droite	à droite (3)	à droite
Nombre d'œufs	27 (d'après fig.)	12 à 40	15 à 24	15 à 30
Hôtes	*Torgos calvus*	*Neophron percnopterus*	*Neophron percnopterus*	*Xenorhynchus asiaticus*
Distribution géographique	Allahabad	Bénarès	Lucknow	Lucknow

(1) Dans la description originale, Vidyarthi (1948) a interverti les dimensions de la ventouse buccale et celles du pharynx.
(2) D'après la figure 4. Les dimensions indiquées dans la description originale sont manifestement trop grandes (800-832/960-1280 µ) : l'organe excéderait la capacité de la concavité ventrale !
(3) « Situated towards the right... ». D'après la figure 4, l'ovaire serait à gauche !

-OVER-

Les mesures consignées dans le tableau I justifient nos considérations sur les synonymes de *H. calvusi*. Cette espèce ressemble à *Holostephanus nipponicus* = *H. metorchis* Yamaguti, 1939, obtenu expérimentalement à partir de larves enkystées chez *Pseudorasbora parva*, dans *Milvus lineatus* (Gray). Mais le taxon japonais a des dimensions plus petites (0,96-1,40/0,65-0,90 mm) et des œufs plus gros (90-105/57-66 μ), et ceux-ci sont peu nombreux (jusqu'à une dizaine).

REMARQUE. — R. Gupta (1964) décrit encore un *Holostephanus pyriformis* dont il trouve une douzaine de spécimens dans l'intestin grêle de deux *Xenorhynchus asiaticus* (Lath.), près d'Anupshahr, dans le district de Bulandshahr (U.P.). Les Vers sont plus petits (1,16-1,44/0,54-0,82 mm), probablement plus jeunes, mais contiennent cependant 10 à 25 œufs (75-91/50-58 μ). Le spécimen-type (fig. 2) apparaît quelque peu contracté, avec refoulement des testicules en arrière de l'équateur ; la poche du cirre subit de ce fait une extension considérable, atteignant les 3/4 de la longueur du Ver, si bien que la *pars prostatica* et la vésicule séminale se trouvent confinées dans la partie proximale renflée, localisées dans le champ de l'organe tribocytique, c'est-à-dire dans le second quart du corps. Les dimensions relatives des ventouses et du pharynx, ainsi que la distribution des vitellogènes correspondent à celles de *Holostephanus calvusi*. C'est pourquoi nous présumons identiques les deux espèces trouvées dans les Cigognes asiatiques.

From Dubois, 1969

(2) La possibilité d'infestation des Ciconiidés s'explique par leur régime alimentaire parfois assez semblable à celui des Aegypiinés (ou Vautours de l'Ancien Monde) : « Ce sont des Oiseaux de caractère souvent moins aquatique que les Ardéidés, vivant volontiers dans les grandes plaines herbeuses à la recherche de leur nourriture, qui consiste en organismes animaux de toutes sortes parfois aussi en détritus et en charognes » (*Traité de Zoologie*, de Pierre-P. Grassé, t. XV, Oiseaux, p. 876).

Holostephanus ictaluri Vernberg,1952

Host: Ictalurus punctatus

Locality: Indiana

Yamaguti (1958) thinks this is an accidental infection and that the final host is a fish-eating bird.

Ref. Jpur.Parasit. 38:327-340

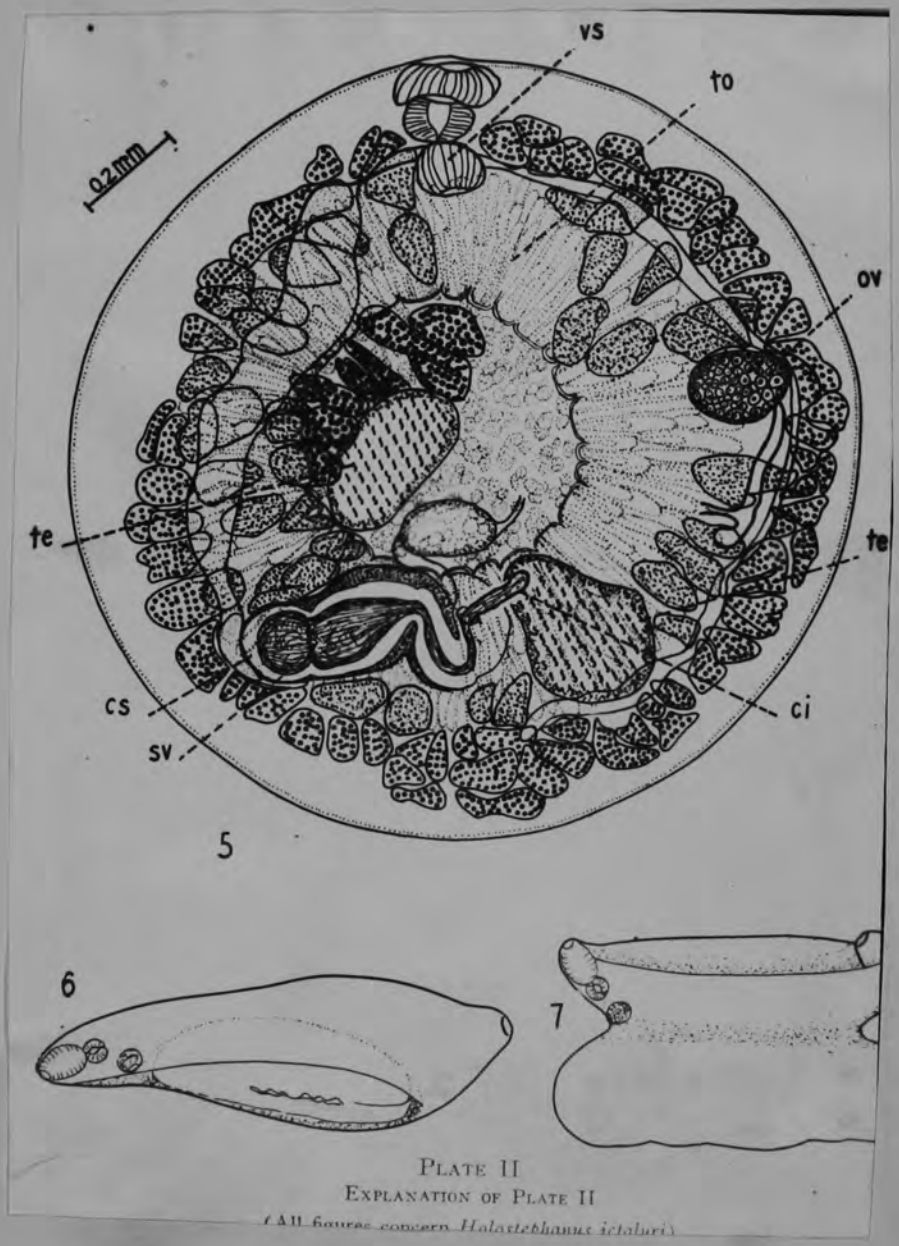
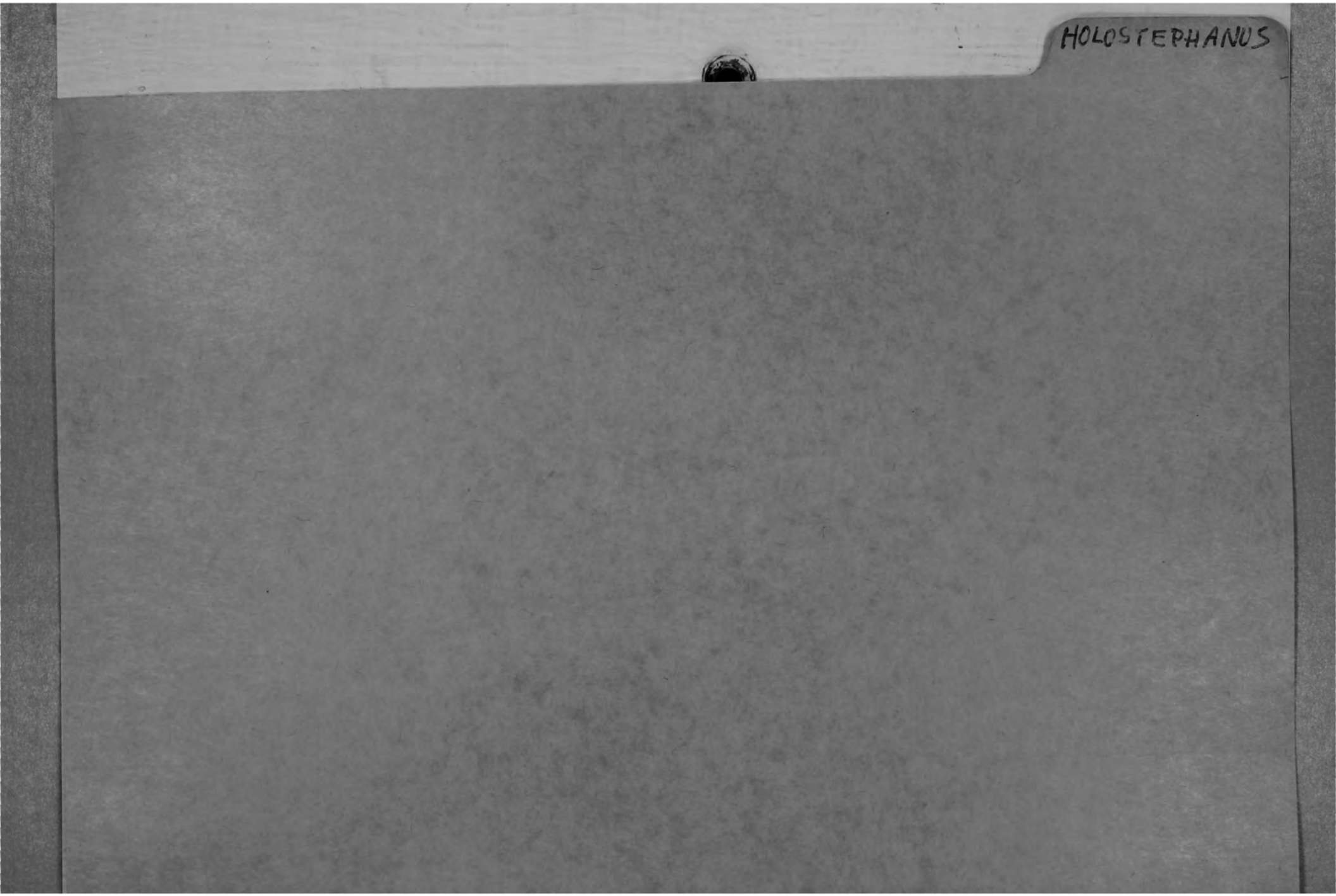


PLATE II

EXPLANATION OF PLATE II

(All figures concern *Holostephanus ictaluri*)


HOLOSTEPHANUS

Holostephanus Szidat, 1936
Syn. *Cyathocotyloides* Szidat, 1936

Generic diagnosis. — Cyathocotylidae, Cyathocotylinae: Body rounded or oval, not bipartite, with ventral pouch, in which the tribocytic organ with central cavity is enclosed. Acetabulum smaller than oral sucker, situated on prominent ventral fold. Testes and ovary variable in relative position. Cirrus pouch present. Vitelline follicles surrounding tribocytic organ, into which they usually do not intrude. Parasitic in birds.

Genotype: *H. lühei* Szidat, 1936 (Pl. 63 ,Fig. 764), syn. *H. bursiformis* Szidat, 1936, in *Sterna paradisea* and *Larus fuscus;* Germany.

Other species:

H. anhingi Mehra, 1943, in *Anhinga melanogaster;* India.

H. calvusi Verma, 1936, syn. *H. neophroni* Mehra, 1943; *H. thaparus* Vidyarthi, 1948, in *Sarcogyps calvus;* India.

H. corvi Mehra, 1943, in *Corvus splendens splendens;* India.

H. curonensis (Szidat, 1933) in *Anas platyrhyncha* var. *domestica;* Germany. *Bithynia tentaculata* — *Leucaspius delineatus* — domestic duck — Olivier (1940).

H. dubius (Szidat, 1936), syn. *Cyathocotyloides d.* S., in *Sterna hirundo* and *S. paradisea;* Germany.

H. ibisi Mehra, 1943, in *Ibis leucocephalus leucocephalus;* India.

H. ictaluri Vernberg, 1952, should probably be regarded as an accidental parasite due to ingestion of infected fish by the channel catfish. Natural hosts may be some piscivorous birds.

H. lutzi (Faust et Tang. 1938) Mehra, 1943, syn. *H. bambusicolae* (Faust et Tang, 1938), in *Gallus gallus domesticus* and *Anser* sp.; Foochow, China.

H. metorchis Yamaguti, 1939, in *Milvus migrans lineatus* (exper.); Japan. Metacercaria in *Pseudorasbora parva* — Yamaguti, (1939). Dubois (1953) ignored outstanding morphological differences between metacercaria of this species and that of *H. nipponicus.* These metacercariae are easily distinguishable one from the other even under a low power microscope!

H. nipponicus Yamaguti, 1939, in *Milvus migrans lineatus* (exper.); metacercaria in *Pseudorasbora parva* — Yamaguti (1939).

H. phalacrocoraxus Vidyarthi, 1948, [1]) in *Phalacrocorax niger;* India.

[1]) The specific name should have been inflected to *phalacrocoracis.*

HOLDSTEPHANUS

LOOSE LEAF
ORGANIZER

SCHEDULE

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SCHOOL _____ TELEPHONE _____

Linstowiella Szidat, 1933

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body not bipartite, pyriform, without acetabulum. Tribocytic organ inconspicuous, with median slit. Testes tandem; cirrus pouch apparently absent, seminal vesicle free in parenchyma. Genital pore terminal. Ovary opposite anterior testis. Vitelline follicles confined to posterior half of body, surrounding tribocytic organ. Parasitic in Longipennes and Gallinacea.

Genotype: *L. viviparae* (v. Lintow, 1877) Szidat, 1933 (Pl. 81, Fig. 984), syn. *Monostomum viviparae* Linstow, 1877, in *Sterna paradisea* and ? rats, Germany; *Circus aeruginosus*, W. Siberia.

Cercaria, *Monostomum viviparae* Szidat, 1933, with flame cell formula of 2[9+(3)]= 24, without acetabulum and fin-fold of tail; metacercaria (= *Monostomum viviparae* Linstow, 1877) encysts in *Vivipara vivipara*.

Other species: *L. szidati* (Anderson, 1944), syn. *Paracoenogonimus szidati* (Anderson, 1944) Dubois, 1951; cercaria in *Campeloma rufum*, metacercaria in *Notropis cornutus* subsp.; adults recovered from small intestine of chicks 3 days after feeding — Anderson & Cable (1950), Anderson (1944, 46).

CYATHOCOTYLIDAE

Linstowiella szidati (Anderson, 1944)

Made in United States of America
Reprinted from THE JOURNAL OF PARASITOLOGY
Vol. 48, No. 3, June, 1962
p. 503

THE OPOSSUM, *DIDELPHIS VIRGINIANA* (KERR), A HOST FOR THE CYATHOCOTYLID TREMATODE *LINSTOWIELLA SZIDATI* (ANDERSON, 1944) IN LOUISIANA

Anderson (1944, J. Parasit. **30:** 264–268) named, described, and later (1945, J. Parasit. **31** (Suppl.): 20) elucidated the life history of *Cercaria szidati*, a species of the genus *Linstowiella* Szidat, 1933. Anderson and Cable (1950, J. Parasit. **36:** 395–410) supplemented Anderson's original description of the cercaria and described the pre- and postcercarial stages.

A natural definitive host for *L. szidati* is unknown. Anderson and Cable (loc. cit.) recovered adults from experimentally infected chicks and a blue heron, *Ardea herodias*. As the metacercariae were found to occur in the body musculature of the minnow, *Notropis cornutus*, piscivorous birds were suspected as natural hosts for the adult worms. However, green herons, *Butorides virescens*, and lesser yellowlegs, *Totanus flavipes*, from the locality where the infected snails (*Campeloma rufum*) were obtained, were uninfected with *L. szidati*. *L. viviparae* (von Linstow, 1877) Szidat, 1933, the genotype, is known to occur in birds, *Sterna paradisca* and *Circus aeruginous*.

We have recovered one adult trematode (fig. 1) of the genus *Linstowiella* from the small intestine of one of seven opossums, *Didelphis virginiana*, collected near Norco, Louisiana. Several other small mammals and birds from the Norco locality have been examined and found uninfected with cyathocotylids. Furthermore, we have never found *Campeloma* or *Notropis* in the brackish water locality where the infected opossum was collected. *Notropis atherinoides* occurs at the Bonnet Carre Spillway, a distance of about 5 miles west of the collection area; *Campeloma* probably occurs in the Mississippi River at the spillway. We suspect the infected opossum may have migrated into the study area from the Bonnet Carre Spillway.

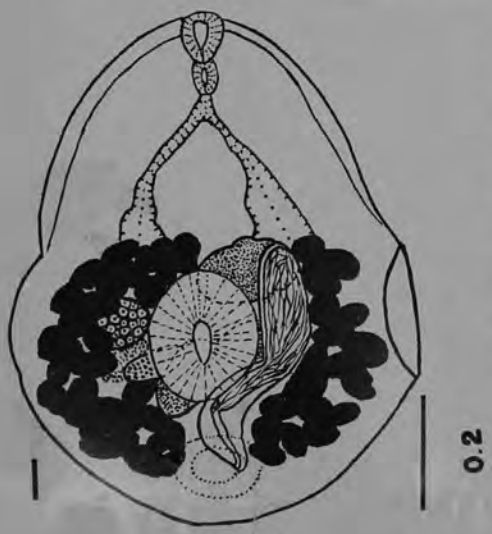


FIGURE 1

Measurements (in millimeters) of the cyathocotylid from the opossum are as follows: total length 0.991, width at midbody 0.673; oral sucker 0.078 long by 0.067 wide; tribocytic organ 0.192 long by 0.153 wide; pharynx 0.070 long by 0.047 wide; esophagus 0.041 long; anterior testis 0.115 long by 0.179 wide; posterior testis 0.102 long by 0.230 wide; ovary 0.084 long by 0.098 wide; eggs 0.112 to 0.118 long by 0.076 to 0.078 wide.

The above measurements, with the exception of egg size, are somewhat larger than those reported for *L. szidati* by Anderson and Cable, whose specimens from 3-day-old infections of chicks may not have reached maximum size. Our trematode from the opossum differs significantly from *L. szidati* in the anterior extent of the cirrus sac, which, in our material, is more like the sac of *L. viviparae*. We suspect with further development and increased sperm production *L. szidati* would resemble *L. viviparae* in size of the cirrus sac. For this reason, the specimen from the opossum is tentatively identified as *L. szidati*.

This study was supported in part by a research grant (E-3386) from the National Institutes of Health, and was done under the direction of Dr. Franklin Sogandares-Bernal.

—RICHARD D. LUMSDEN AND CAROL ANN WINKLER, *Department of Zoology, Tulane University, New Orleans, Louisiana.*

LINSTOWIELLA

Mesostephanoides Dubois, 1951

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body elongate; forebody flattened anteriorly but slightly concave posteriorly, with its border recurved ventrally; hindbody much smaller than forebody and appearing like its dorsoterminal appendage, and containing no gonads. Tribocytic organ small to medium-sized, with median cavity, situated immediately behind acetabulum. Oral sucker and pharynx distinct, esophagus of moderate length, ceca terminating in forebody. Acetabulum small, situated at or near middle of body anterior to tribocytic organ. Testes ovoid, tandem, in median intercecal field. Cirrus pouch well developed, claviform, containing seminal vesicle and prostatic complex and enormous spinulate protrusible cirrus. Genital pore terminal. Ovary rounded, posterolateral to anterior testis or intertesticular, opposite cirrus pouch or on the same side as latter. Uterus with few coils; metraterm with muscular wall, but no sphincter; eggs large, not numerous. Vitelline follicles encircling tribocytic organ in form of a horse-shoe, commencing at or behind level of acetabulum, not intruding into hindbody. Parasitic in intestine of reptiles.

Genotype: *M. burmanicus* (Chatterji, 1940) (Pl. 47, Fig. 575), syn. *Mesostephanus b.* C.; *Gogatea b.* (C.) Mehra, 1947, in intestine of *Enhydris enhydris;* Rangoon.

MESOSTEPHANOIDES

Mesostephanus Lutz, 1935

Generic diagnosis. — Cyathocotylidae, Prohemistominae: **Forebody foliiform or linguiform, slightly concave behind middle, produced into small dorsoterminal appendage, at the end of which opens the genital pore.** Tribocytic organ small to medium-sized, with median slit or central cavity. Acetabulum present. Testes tandem, nearly in median field. Cirrus pouch well developed. Ovary posterior or posterolateral to anterior testis. Vaginal sphincter present. Genital pore terminal. Vitelline follicles fairly large, confined to posterior half of body, commencing at or near level of acetabulum, surrounding tribocytic organ, not intruding into caudal appendage. Parasitic in birds and mammals; metacercaria in fishes.

Genotype: *M. fajardensis* (Price, 1934) Lutz, 1935 (Pl. 64, Fig. 782), syn. *Prohemistomum fajardensis* Price, 1934, *Mesostephanus prolificus* Lutz, 1935, in *Sula brasiliensis* and *S. leucogaster;* Brazil.

Other species from avian hosts:

M. appendiculatoides (Price, 1934) Lutz, 1935 (syn. *Prohemistomum a.* P.) in *Pelecanus occidentalis;* Dominican Republic, Canal zone.

M. cubaensis Alegret, 1941, in *Phalacrocorax auritus floridanus;* Cuba.

M. haliasturis Tubangui et Masiluñgan, 1941, in *Haliastur intermedius;* Philippines.

M. infecundus Lutz, 1935, in *Fregata aquila;* Brazil.

M. microbursa Caballero, Grocott et Zerecero, 1953, in *Pelecanus orientalis californicus;* Mexico, Panama.

Representatives from mammals:

M. appendiculatus (Ciurea, 1916) Lutz, 1935 (Pl. 102, Fig. 1231) in dog fed with *Tinca tinca*, *Aspius aspius* and *Blicca björkna*, as well as in cat fed with *Carassius carassius*.

M. longisaccus Chandler, 1950, in dog; U.S.A.

M. skworzowi Petrov, 1950 in cat; Gorkii.

Mesostephanus fajardensis (Price, 1934) Lutz, 1935

PROHEMISTOMUM FAJARDENSIS, ~~n. sp.~~ PRICE, 1934

Plate 1, fig. 6

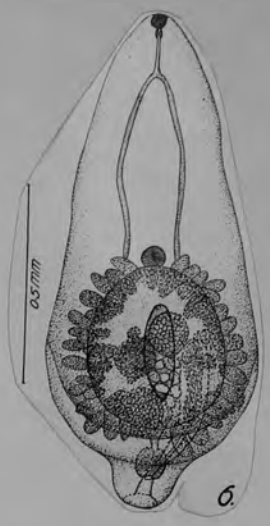
Description.—Body scoop-shaped, 1.105 to 1.360 mm long, divided into a widened anterior part 1.071 mm long by 0.51 to 0.795 mm wide and a short, dorsally directed, appendixlike posterior part 85 to 175 μ long by 160 to 204 μ wide. Oral sucker subterminal 52 to 60 μ in diameter; acetabulum 64 to 80 μ in diameter; adhesive organ slightly oval in outline, 320 to 400 μ long by 300 to 320 μ wide, with deep central depression. Pharynx 32 to 40 μ long by 24 to 35 μ wide; esophagus short; intestinal ceca slender, extending to junction of anterior and posterior parts of body. Genital aperture at posterior end of body, subterminal, directed dorsally; genital sinus spacious. Cirrus pouch slender, about 380 μ long by 80 μ wide at base, extending either to right or left around testes and ovary, its base lying in zone of anterior testis, and containing a seminal vesicle, prostate and cirrus. Testes globular or slightly oval, with zones separated and fields partly coinciding; anterior testis 120 to 140 μ long by 112 to 120 μ wide; posterior testis about 160 μ in diameter. Ovary subglobular, 100 to 140 μ long by 100 to 120 μ wide, situated between testes, either to right or left depending largely upon position of cirrus pouch. Vitellaria consisting of large follicles forming an almost complete circle around adhesive organ. Uterus completely covered by adhesive organ and containing 16 to 60 eggs; vaginal sphincter well developed, 80 to 120 μ in diameter. Eggs oval, 44 to 48 μ long by 32 to 36 μ wide.

Host.—*Sula leucogastra.*

Location.—Small and large intestine.

Type locality.—Fajardo Roads, between Palominos Island and Fajardo, Puerto Rico.

Type specimen.—U.S.N.M. Helm. Coll. no. 8696; paratypes no. 8697.



FAMILY CYATHOCOTYLIDAE Poche, 1926

Mesostephanus fajardensis (Price, 1934) Lutz, 1935 (Figure 3)

Synonyms:

Prohemistomum fajardensis Price, 1934.

Mesostephanus prolificus Lutz, 1935.

Description based on several hundred specimens, of which 10 representative ones were measured, with the characters of the genus. Body pyriform, 0.86 to 1.64 long, consisting of an expanded anterior segment, 0.76 to 1.11 long by 0.450 to 0.800 wide, and a short posterodorsal appendage, 0.129 to 0.186 long by 0.143 to 0.357 wide at the base. Cuticle spinose. Oral sucker 0.048 to 0.072 by 0.054 to 0.077; ventral sucker 0.045 to 0.090 by 0.075 to 0.125. Tribocytic organ with glandular cells radiating from the irregular slitlike opening. Prepharynx absent; pharynx 0.038 to 0.059 by 0.018 to 0.036; esophagus 0.029 to 0.098 in length; ceca slender, reaching to base of posterior appendage. Anterior testis 0.075 to 0.215 by 0.077 to 0.170; posterior testis 0.098 to 0.286 by 0.079 to 0.197; cirrus sac 0.322 to 0.609 long and 0.095 to 0.150 wide, extending to either left or right of gonads; coiled tubular seminal vesicle in base of cirrus sac, followed by elongate pars prostatica surrounded by numerous prostatic cells. A semicircle of about 8 lamelliform structures lies between end of cirrus sac and vaginal sphincter near their openings into genital atrium; genital pore at tip of posterior appendage; genital atrium large. Ovary globular, 0.075 to 0.143 by 0.070 to 0.161; vaginal sphincter well developed, 0.082 to 0.147 long and 0.093 to 0.166 wide. Vitellaria in large follicles encircling tribocytic organ. Uterus with numerous eggs measuring 0.045 to 0.064 by 0.032 to 0.043.

Host: *Sula leucogaster leucogaster* (brown booby).

Site: anterior half of intestine.

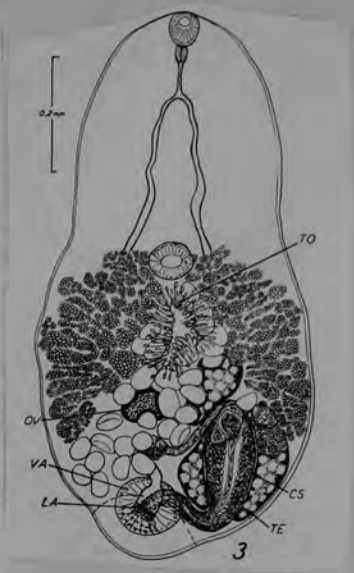
Locality: Lajas (Parguera), Puerto Rico.

Type host and locality: *Sula leucogaster*, Fajardo Roads, between Palominos Island and Fajardo, Puerto Rico, by Price (1934).

Other hosts and localities: *Sula brasiliensis* in Brazil by Lutz (1935).

Deposited specimen: No. 38206.

In living material the cirrus was never seen protruded, even under extreme pressure. Accordingly, it may be that this species lacks a protrusible cirrus and that the vaginal sphincter, absent in many cyathocotylids in which a protrusible cirrus has been demonstrated, may here be an accessory copulatory organ that may correspond, at least in part, to the complex genital structures of the strigeids. In that event such cyathocotylids would occupy a phylogenetic position between those that lack a vaginal sphincter and the more specialized strigeids.



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6

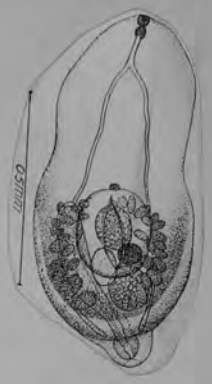
"PROHEMISTOMUM FAJARDENSIS"
FROM PRICE, 1934

From Cabke, Connor, & Balling, 1960

Mesostephanus appendiculatoides (Price, 1934) Lutz, 1935

PROHEMISTOMUM APPENDICULATOIDES, ~~n. sp.~~ PRICE, 1934

Plate 1, fig. 7



Description.— Body scoop-shaped, 680 to 970 μ long, divided into a widened anterior part 510 to 850 μ long by 240 to 369 μ wide, and a conical posterior part. Oral sucker subterminal, 40 to 48 μ in diameter; acetabulum 20 to 28 μ in diameter; adhesive organ prominent, 160 to 200 μ long by 100 to 180 μ wide, with a deep central depression. Pharynx 28 to 32 μ long by 20 to 32 μ wide; esophagus 42 to 120 μ long; intestinal ceca slender, terminating at or near junction of anterior and posterior parts of body. Genital aperture at posterior end of body, subterminal and directed dorsally; genital sinus spacious. Cirrus pouch 280 to 360 μ long by 50 to 85 μ wide, extending to right or left around testes and ovary, its base reaching level of anterior margin of anterior testis; it contains a small seminal vesicle, long pars prostatica and cirrus. Testes globular to oval, with zones separated and fields partly coinciding; anterior testis 80 to 100 μ long by 60 to 80 μ wide; posterior testis 100 to 120 μ long by 70 to 80 μ wide. Ovary globular, about 40 μ in diameter, situated between testes. Vitellaria well developed, forming an almost complete circle around base of adhesive organ. Uterus short and containing from two to four eggs; vaginal sphincter moderately developed. Eggs oval, 80 to 112 μ long by 60 to 80 μ wide.

Host.—*Pelecanus occidentalis occidentalis.*

Location.—Small intestine.

Type locality.—Levantade Keys, Samaná Bay, Dominican Republic.

Type specimen.—U.S.N.M. Helm. Coll. no. 8701; paratypes no. 8702.

The first of the species of *Prohemistomum, P. fajardensis,* described here may be distinguished from all other species of the genus by the size of the eggs, which are only about half as large as those of the other species. The second species, *P. appendiculatoides,* appears to be closely related to *P. appendiculata,* which was described by Ciurea (1916) from dogs and cats in Rumania; it differs, however, from that species in having a distinct esophagus (almost absent in *P. appendiculata*) and in having an acetabulum only about one half the size of the oral sucker (suckers about equal in size in *P. appendiculata*). *P. fajardensis* also resembles in some respects a species, *P. serpentum,* described from a snake, *Natrix piscator,* by Gogate (1932) at Rangoon, India. Aside from the difference in host relationship, the two species may be distinguished by the fact that *P. fajardensis* is much smaller than *P. serpentum,* and that in the former the adhesive organ does not cover the vitellaria as it does in the latter species.

Family CYATHOCOTYLIDAE Poche, 1925

7. *Mesostephanus appendiculatoides* (Price, 1934) Lutz, 1935

Fig. 1c

HOST: *Pelecanus occidentalis carolinensis* Gmelin, (Eastern) brown pelican, new host (subspecies) record; *Mugil cephalus* L., black or striped mullet, new second intermediate host; *M. curema* Valenciennes, white or silver mullet, new second intermediate host; *M. trichodon* Poey, fantail mullet, new second intermediate host.

INCIDENCE OF INFECTION: In 3 of 3 specimens of definitive host.

NUMBERS: 35, hundreds, 7 (immature).

LOCATION: Mainly in anterior 2/3 intestine.

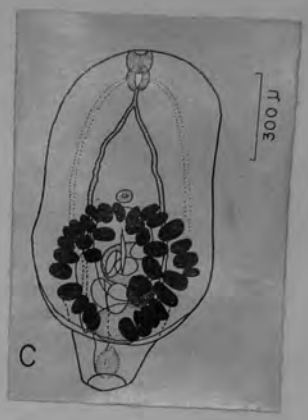
LOCALITIES: Boca Ciega Bay, Florida; Gasparilla Sound, Charlotte Harbor, Florida; new locality records.

DATES: May 9, 1958; May 28, 1958; June 19, 1958.

U. S. NAT. MUS. HELM. COLL. NO.: 56241.

Discussion. Price (1934) described the above species as *Prohemistomum appendiculatoides* from the small intestine of *Pelecanus occidentalis occidentalis* collected at Levantade Keys, Samana Bay, Dominican Republic. The present report indicates two new locality records and extends the known geographical range to include the west coast of Florida. Cysts fed to laboratory-raised opossums, *Didelphis virginianus,* and one of two laboratory-raised Black Crowned Night Herons, *Nycticorax nycticorax hoactli* (Gmelin), developed in the intestine into adult worms easily recognized as *M. appendiculatoides* (Price, 1934). We believe the first intermediate host of this species is *Cerithium muscarum* Say. *Cerithidea costata turrita* Stearns harbors a similar cyathocotylid cercaria which may be the same species as the one occurring in *Cerithium muscarum.*

FROM HUTTON & SOGANDARES-BERNAL, 1960



"PROHEMISTOMUM APPENDICULATOIDES" FROM PRICE, 1934

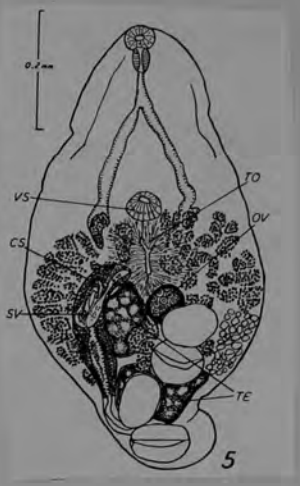
Mesostephanus appendiculatoides (Price, 1934) Lutz, 1935. (FIGURE 5)

Synonym:

Prohemistomum appendiculatoides Price, 1934.

Description based on 2 ovigerous specimens with the characters of the genus. Body pyriform, 0.714 to 0.793 long, anterior segment 0.643 to 0.714 in length by 0.386 in 0.400 in maximum width, posterior appendage 0.072 to 0.079 long and 0.166 to 0.203 wide at base; cuticle spinose to level of

anterior testis. Oral sucker 0.045 to 0.052 by 0.047 to 0.048; ventral sucker 0.052 by 0.059 to 0.063; tribocytic organ prominent, with glandular cells radiating from its slitlike opening; prepharynx absent; pharynx 0.045 to 0.050 by 0.029 to 0.030; esophagus 0.036 to 0.054 in length; ceca slender, terminating near base of posterior appendage. Testes subglobular; anterior testis 0.081 to 0.125 by 0.077 to 0.170; posterior testis 0.098 to 0.118 by 0.152 to 0.179; cirrus sac 0.304 to 0.350 by 0.059 to 0.064, extending to either right or left of gonads; lamellae at end of cirrus sac not evident; seminal vesicle slender, coiled; pars prostatica and cirrus long; genital atrium large; genital pore at posterior end of body. Ovary globular, 0.054 to 0.072 by 0.070 to 0.081, between testes or opposite anterior testis; uterus with few eggs; vaginal sphincter inconspicuous. Vitellaria encircle the tribocytic organ. Eggs 0.102 to 0.111 by 0.073 to 0.084.



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Host: *Sula leucogaster leucogaster* (brown booby).

Site: anterior half of intestine.

Locality: Lajas (Parguera), Puerto Rico.

Type host and locality: *Pelecanus occidentalis occidentalis*, Samana Bay, Dominican Republic, by Price (1934).

Deposited specimen: No. 38207.

Life history studies have demonstrated that cercariae of the cyathocotylids are of the "Vivax" furcocercous group. Two species of such cercariae described by Cable (1956) may well be the larvae of the above species of *Mesostephanus*. Both cercariae develop in a species of snail common in localities frequented by the brown booby. It is of interest that *Cercaria caribbea L* was much less common that *Cercaria caribbea LI* and that the single brown booby examined harbored but 2 specimens of *M. appendiculatoides* and several hundred of *M. fajardensis*. The infections probably were obtained by eating metacercariae in fish.

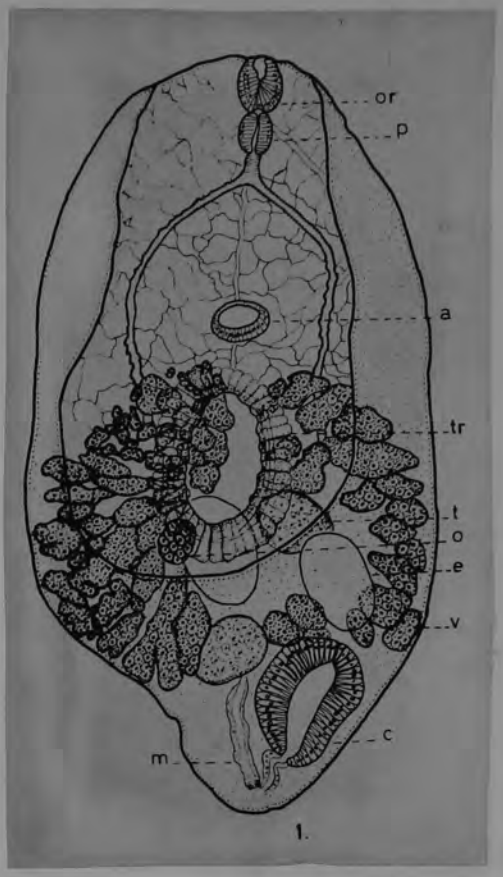
See note in Hutton + Sogandares (1960)

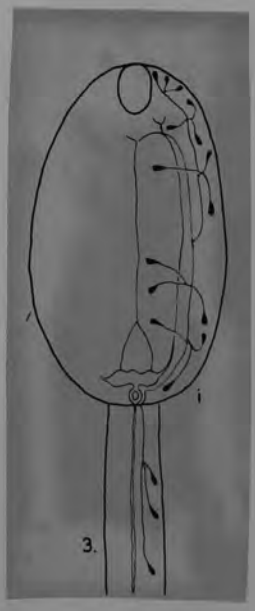
From Cable, Connor, & Balling, 1960

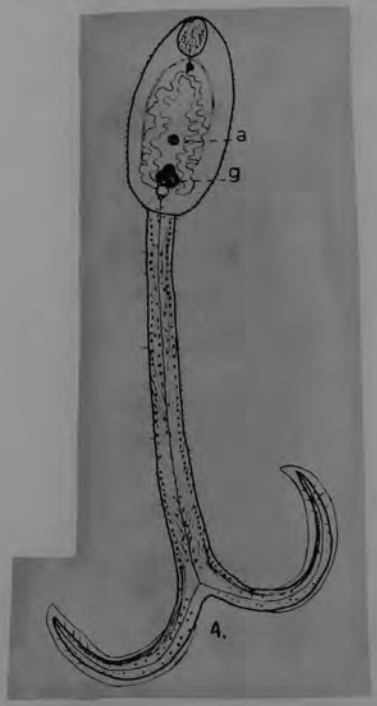
Mesostephanus appendiculatus (Ciurea, 1916) Lutz, 1935

ADULT (Fig. 1): Adult *Mesostephanus appendiculatus* were obtained from the small intestines of hatchery-raised chicks fed fish muscle and metacercariae. The chicks were examined 9 days after the experimental feeding. The following description and measurements are based on nine specimens. Body surface covered with scale-like spines arranged quincuncially. Body length 0.547–.763, av. 0.68; body width 0.346–.518, av. 0.41; oral sucker length 0.04–.059, av. 0.049; oral sucker width 0.047–.078, av. 0.055; acetabulum 0.04–.068, av. 0.06 in diameter; tribocytic organ well developed, opening usually slitlike; prepharynx very short; pharynx 0.037–.058, av. 0.05 long and 0.031–.044, av. 0.037 wide; esophagus approximately one-half pharyngeal length, with transverse muscle fibers; intestinal caeca sinuous, with occasional short diverticula, reaching to near posterior end of body; testes oblique, in posterior half of body, 0.109–.124, av. 0.116 long and 0.072–.087, av. 0.079 wide; cirrus sac and cirrus well developed; male genital opening communicates with common genital exit at posterior end of body; ovary intertesticular, 0.05–.08, av. 0.065 long and 0.04–.065, av. 0.05 wide; metraterm elongate, muscular, with sphincter at distal end where it empties into common genital exit; eggs yellow, operculate, 0.084–.137, av. 0.108 long and 0.058–.081, av. 0.07 wide; vitellaria composed of discrete follicles arranged in a circle in posterior half of body but not entering posterior conical body extension; excretory system more complex than in cercaria, anastomosing branches arise from main collecting ducts, some branches end blindly near body surface.

From Martin, 1961







FIGS. 1–4: 1, Adult *Mesostephanus appendiculatus*, ventral view; 2, sporocyst; 3, diagram to show most of excretory system; 4, cercaria, ventral view. Abbreviations: *a*, Acetabulum; *b*, birth pore; *c*, cirrus sac; *e*, egg; *g*, genital primordium; *i*, Island of Cort; *m*, metraterm; *o*, ovary, or oral sucker; *p*, pharynx; *t*, testis; *tr*, tribocytic organ; *v*, vitellaria. All drawings made with the aid of a camera lucida unless otherwise stated.

Cyathocotylidae

Mesostephanus cubaensis Alegret, 1941

Host: Phalacrocorax auritus floridanus

from Vigueras, 1944

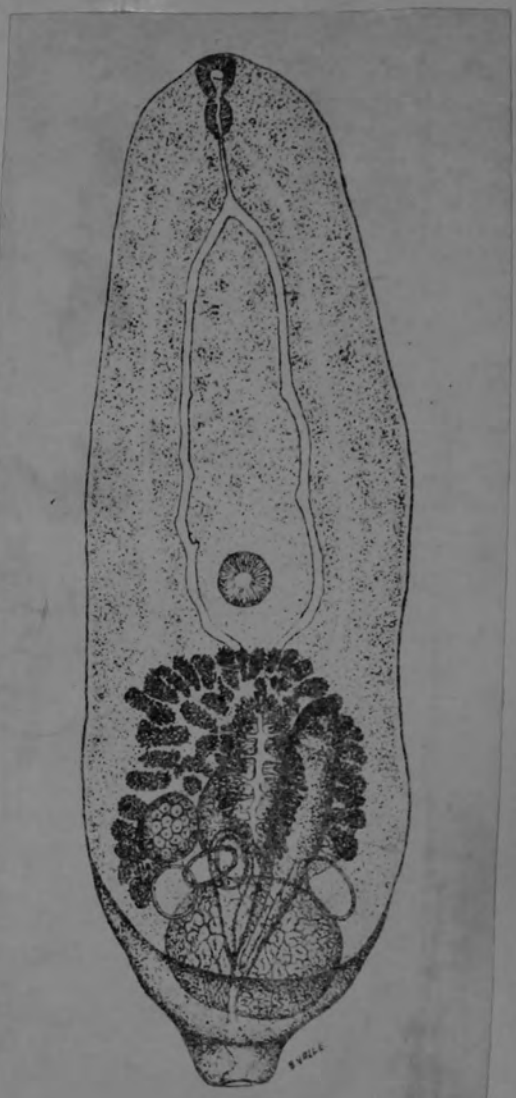


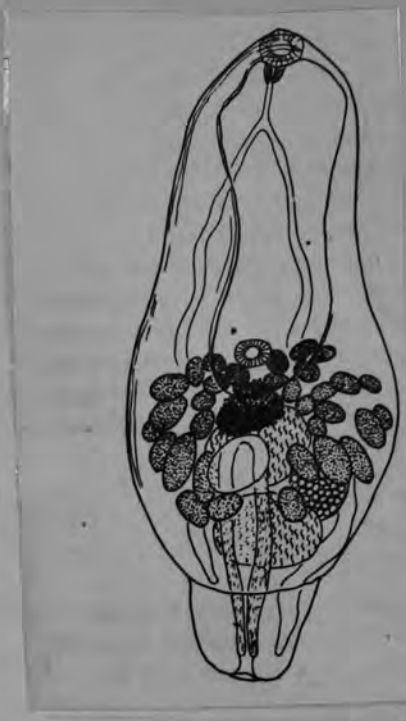
FIG. 16

Mesostephanus cubaensis (Alegret)

Famille **Cyathocotylidea** Poche, 1925

Sous-famille PROHEMISTOMATINAE Lutz, 1935

Mesostephanus dottrensi n.sp. Baer, 1957

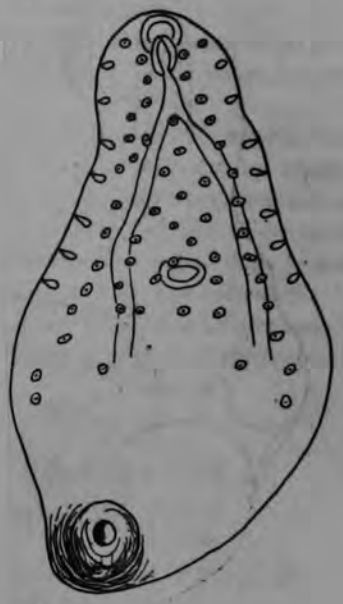


Matériel: En petit nombre dans le premier tiers de l'intestin de *Scotopelia peli* Bonap. en compagnie de l'espèce précédente (même hôte et même localité).

Nous nous faisons un plaisir de dédier cette nouvelle espèce à notre collègue et ami le Dr E. DOTTRENS, directeur du Muséum d'Histoire naturelle de Genève, en souvenir des expéditions de chasse que nous fîmes ensemble dans la brousse.

Une vingtaine d'exemplaires, seulement, ont été recueillis sur place, mais leur nombre était certainement plus élevé car nous n'avons pas pu prélever la totalité des spécimens des deux espèces, faute de temps.

Les Vers ont 685 à 780 μ de long et 310 à 325 μ de large à l'endroit où le corps atteint sa plus grande largeur, soit au niveau du testicule antérieur. Tous nos spécimens, fixés vivants au formol à 5% en les agitant vivement, sont bien étendus, mais l'extrémité antérieure du corps est légèrement repliée vers la face ventrale. La cuticule est recouverte d'un revêtement de très fines écailles formant un dessin quadrillé très caractéristique. Il existe, en outre, à la face dorsale du Ver, une série de petites glandes à contenu granulaire qui y débouchent individuellement. Elles sont disposées par rangées longitudinales et de façon plus ou moins symétrique (fig. 8), mais ne s'étendent pas, en arrière, au-delà du niveau du testicule antérieur. C'est la première fois, à notre connaissance, que de telles glandes sont observées dans ce groupe de Trématodes et l'on peut se demander quel rôle elles jouent du moment qu'elles débouchent à la face dorsale du Ver.



La ventouse buccale a 45 à 48 μ de diamètre et un pharynx lui fait suite, généralement allongé, mesurant 45 μ sur 30 μ. Les deux branches de l'intestin s'étendent jusque dans l'extrémité postérieure du corps. La ventouse ventrale est faiblement développée et, souvent, difficilement visible; elle mesure 45 μ de diamètre. L'organe tribocytique se trouve en arrière de la ventouse ventrale, il mesure 34 μ de long et s'ouvre par une fente longitudinale. L'ovaire a 90 μ de diamètre et se trouve entre les deux testicules dont l'antérieur mesure 102 μ dans son plus grand diamètre et le testicule postérieur, plus grand, 136 μ sur 91 μ. La poche du cirre a 227 μ de long sur 27 μ de diamètre; elle débouche dans un atrium génital sub-dorsal où aboutit, également, à la face dorsale, le vagin muni d'un puissant muscle sphincter (fig. 9). L'utérus ne renferme jamais plus de trois œufs, rarement quatre, de grande taille, 91 μ sur 59 μ. Les follicules vitellogènes, relativement très gros, sont disposés en fer-à-cheval autour de la ventouse ventrale, englobant l'organe tribocytique entre les deux branches postérieures.

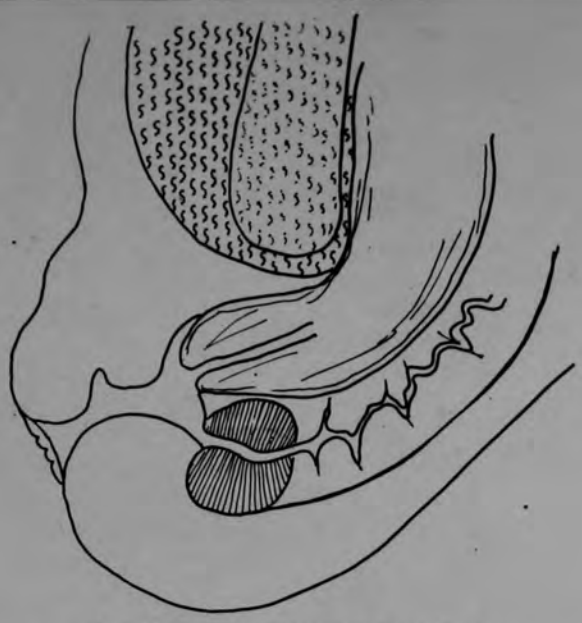


FIG. 9. — *Mesostephanus dottrensi* n.sp.
Vue sagittale de l'atrium génital montrant le volumineux muscle sphincter entourant le métraterme.

En dépit de la présence de glandes situées à la face dorsale du corps, l'anatomie ainsi que la morphologie générale de nos échantillons correspondent à celles du genre *Mesostephanus* Lutz, 1935, dont la présence en Afrique est nouvelle.

Des six espèces qui sont rangées, actuellement, dans ce genre (*vide* DUBOIS, 1953: 108), trois, à savoir *M. fajardensis* (Price), *M. appendiculatoides* (Price) et *M. cubanensis* Vigueras se rencontrent chez des Stéganopodes, aux Antilles, ainsi qu'au Brésil. A ces espèces il faudrait peut-être ajouter encore *M. haliasturis* Tub. si, comme le suppose DUBOIS, il y a eu erreur d'étiquette, car cette espèce décrite à l'origine chez un Accipitre, serait probablement un parasite de Frégate !

Quant aux deux dernières espèces, ***M. appendiculatus*** (Ciurea) et *M. texensis* Chandler, elles ont été signalées, l'une et l'autre, chez le Chien, la première en Europe centrale, en Ukraine et aux Etats-Unis et la seconde, aux Etats-Unis seulement.

Aucune des descriptions ne mentionne la présence de glandes dorsales, mais il est possible que celles-ci aient passé inaperçues car elles s'observent difficilement.

Nos échantillons se rapprochent le plus de ***M. appendiculatus***, parasite du Chien. Mais il est certain que cet hôte ne représente qu'un hôte accidentel et que c'est parmi les Carnivores sauvages, Mammifères ou Oiseaux, qu'il faudrait chercher l'hôte normal. Notre nouvelle espèce est constamment plus petite dans toutes ses dimensions, sauf pour celles des œufs, que ***M. appendiculatus***. Seule une meilleure connaissance de la faune strigéidienne africaine fournirait les points de repères nécessaires pour l'évaluation spécifique des échantillons.

Mesostephanus haliasturis Tubangui & Masilungan, 1941 — Cyathocotylidae

syn. *Mesostephanus minor* Dubois and Pearson, 1965

(OVER)

Family **PROHEMISTOMIDAE** (Dubois, 1938) Sudarikov, 1941

Subfamily PROHEMISTOMINAE Lutz

Mesostephanus haliasturis Tubangui & Masiluñgan, 1941: 138, pl. 3, fig. 3. Dubois & Pearson, 1965: 96, fig 14 (from *Haliastur*); 1967: 202 (from *Pelecanus*).
Mesostephanus minor Dubois & Pearson, 1965.

Host and origin: *Pelecanus conspicillatus* (Temminck), from Tailem Bend, S. Aust., date? (24 macerated specimens).
Habitat: unknown.

Tubangui & Masiluñgan recorded this species from the small intestine of *Haliastur intermedius* Blyth from the Pampanga Province (Luzon: Philippines). Dubois & Pearson (1965) redescribed it by the name of *Mesostephanus minor* from *Haliastur sphenurus* (Vieillot) from Brisbane, Qld., and subsequently (1967) from *Pelecanus conspicillatus* (Temminck) and *Anhinga novaehollandiae* (Gould), from Mackay and Kola, Qld. The fishing-kite is probably an occasional host.

Description: Body oval, with small caudal appendix 0.9–1.5 mm long by 0.3–0.5 mm in maximum width; anterior part well expanded, slightly concave ventrally, with lateral borders more or less rolled up into a gutter and meeting posteriorly. Oral sucker 38–52 μm; ventral sucker slightly larger, 37–55 by 40–60 μm, situated between the 40th and 45th hundredths of the length of the body; pharynx ellipsoidal, 32–50 by 24–40 μm; oesophagus 47–52 μm long. Tribocytic organ oval in shape, 200–210 by 150–160 μm, with a longitudinal slit.

Ovary globular, 60–80 μm, level with second half of anterior testis, slightly to one side of median line, opposite cirrus sac. Testes subglobular to ovoid, close behind one another, 110–190 by 90–150 μm. Vitellaria composed of fairly large follicles disposed in an eccentric wreath (diameter 300–520 μm) around tribocytic organ. The two characteristics of the species are that vitellaria (1) do not reach acetabular level (limit 44th to 50th hundredths of length of body, i.e. distant 28–35 μm from posterior border of ventral sucker), and (2) overlap only first half of posterior testis. Ratio of the length of the body to the diam. of the vitelline wreath ranging from 2.7–3.2 (average 3). Cirrus sac well developed, elongated, club-shaped, 310–530 by 50–100 μm, extending forwards to zone of first testis or even beyond. Uterus short, with vaginal sphincter conspicuous, 20–40 by 29–55 μm. Eggs one to six in number, 90–99 by 65–73 μm.

Mesostephanus minor ~~sp. n.~~ Dubois and Pearson, 1965

Trois exemplaires constituent le matériel original, recueilli dans l'intestin grêle de *Haliastur sphenurus* (Vieill.) [N° 465].

Diagnose : Corps de petite taille, cochléariforme, à bords latéraux relevés jusqu'aux « épaules » bien marquées, à appendice dorso-subterminal. Toute la surface ventrale est couverte de minuscules écailles disposées en quinconce. Ventouse buccale saillant légèrement sur le bord frontal, à peine plus petite que la ventouse ventrale située en avant de l'organe tribocytique. Pharynx ovoïde, œsophage court, caeca étroits. Testicules situés l'un derrière l'autre, le premier de forme variable, plus ou moins lobé ou échancré antérieurement ; le second bilobé, échancré en avant et en arrière, occupant presque toute la largeur du corps. Ovaire latéral, au niveau du premier testicule. Vitellogènes à gros follicules disposés en couronne n'atteignant pas la ventouse ventrale, mais masquant les glandes génitales (sauf la seconde moitié du testicule postérieur) et par rapport à laquelle l'organe tribocytique est excentré. Poche du cirre s'allongeant jusque dans la zone du premier testicule. Il semble exister un sphincter vaginal (d'un diamètre de 40-45 μ).

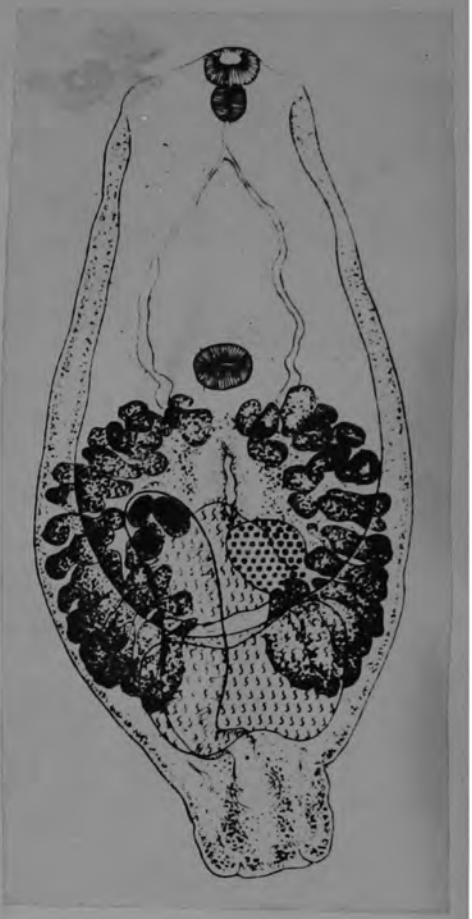


Fig. 14. *Mesostephanus minor* sp. n., de *Haliastur sphenurus* (Vieill.). Coll. J. C. Pearson, Univ. of Queensland. N° 465. Longueur 0,74 mm. Vue ventrale.

Hôte : Haliastur sphenurus (Vieill.).

Habitat : intestin.

Holotype : Institut de Zoologie de l'Université de Neuchâtel, collection G. Dubois (N° R 29).

Paratypes : Département de Parasitologie de l'Université du Queensland, Brisbane.

Longueur	0,62-0,75 mm
Largeur	0,32-0,34
Rapport longueur/largeur	1,94-2,18
Diamètres :	
ventouse buccale	37-40 45-47 μ
pharynx	32-37 29-31
ventouse ventrale	39-42 47-52
organe tribocytique	115-120 85-115 (rétracté)
ovaire	63 73
testicule antérieur	115-145 145
testicule postérieur	115-120 165-185
Longueur de l'œsophage	30 μ
Longueur de la poche du cirre	160
Diamètre de la couronne vitelline	300-310
Rapport longueur du corps diamètre de la couronne vitelline	2,1-2,4
Situation de la ventouse ventrale	34-42 100
Limite antérieure des vitellogènes	37-44 100

— OVER —

Cette espèce peut être comparée à *Mesostephanus indicus* Mehra, 1947 [syn. *Prohemistomum odhneri* Mehra, 1947 nec Travassos, 1924 ; *Mesostephanus lützi* Vidyarthi, 1948] car, dans les deux cas, les testicules sont développés transversalement et plus ou moins échancrés. Cependant le parasite australien, qui est nettement plus petit, n'a pas la forme ovale : l'extrémité antérieure est caractérisée par des épaules bien marquées, vers lesquelles remontent les bords latéraux du corps, repliés ventralement. Les vitellogènes n'atteignent pas le niveau de la ventouse ventrale et ne recouvrent qu'en partie le testicule postérieur. La poche du cirre est relativement plus longue : elle atteint la zone du premier testicule.

Mesostephanus minor Dubois et Pearson, 1965

L'espèce a été retrouvée dans l'intestin grêle d'un *Pelecanus conspicillatus* Temm., à Mackay, Qld., le 26 juin 1964 [N° 1077], et d'un *Anhinga novaehollandiae* (Gould), à Kola, Brisbane River, Qld., le 25 août 1965 [N° 1147].

Longueur	0,86-1,42 mm
Largeur	0,34-0,55
Rapport longueur/largeur	2,53-3,10
Diamètres :	
ventouse buccale	45-50/45-50 μ
pharynx	40-46/30-39
ventouse ventrale	50-60/55-62
organe tribocytique [1]	165-210/160-175
ovaire	75/95
testicule antérieur	125-230/95-155
testicule postérieur	115-210/90-170
œufs	84-100/58-70
Longueur de l'œsophage	80-105 μ
Longueur de la poche du cirre	420-500
Diamètre de la couronne vitelline	290-440
Rapport longueur du corps/diamètre de la couronne vitelline	3-4,3
Situation de la ventouse ventrale	45-51/100
de la limite antérieure des vitellogènes	51-52/100
Nombre d'œufs dans l'utérus	0 à 3

La poche du cirre claviforme, s'allongeant jusqu'au bord antérieur du second testicule, paraît bien caractériser l'espèce : dès les $^2/_3$ ou les $^3/_5$ de sa longueur, ses parois s'amincissent brusquement, si bien qu'à cet endroit une flexion de l'organe peut se produire à la faveur d'une contraction du corps. Les vitellogènes n'atteignent pas le niveau de la ventouse ventrale. Le pharynx est plus petit que la ventouse buccale. Les testicules, situés dorsalement, sont soit allongés dans l'axe du corps, soit développés transversalement. (Le second déborde la couronne vitelline.)

FROM DUBOIS AND PEARSON, 1967

Cyathocotylinae

MESOSTEPHANUS MILVI Yamaguti 1939

[Syn. *Prohemistomum milvi* (Yamaguti) Dubois 1951 ;
Mesostephanus indicus Vidyarthi 1948 *nec* Mehra 1947 =
Prohemistomum milvi var. *indianum* Dubois 1951 ;
Gelanocotyle milvi (Yamaguti) Sudarikov 1961].

(Fig. 7-10)

Un grand nombre d'exemplaires de ce parasite ont été récoltés, en 1954, dans deux Chats domestiques de la province de Daqahliya [PE-3967-T et PE-3969-T] et dans deux *Milvus migrans* (Bodd.), l'un de la province de Beheira [PE-3995-T], l'autre de la province de Faiyum [PE-4004-T].

Leur habitus rappelle beaucoup celui de *Mesostephanus milvi* Yamaguti 1939 (pp. 203-204, pl. XXVI, fig. 56), de *Milvus migrans lineatus* (Gray), que nous avons transféré (1951, pp. 651, 655, 656 et 684) dans le genre *Prohemistomum* Odhner, en nous basant principalement sur la prétendue absence de sphincter vaginal (cf. Yamaguti, *loc. cit.*). Or, la forme égyptienne possède ce muscle caractéristique des *Mesostephanus*, dont certains individus, colorés au carmin, montrent même distinctement les fibres circulaires. D'autres spécimens, fixés ou colorés différemment, ne le révèlent pas, si bien que nous sommes porté à croire que de telles conditions en ont empêché l'observation chez l'espèce japonaise, connue seulement par trois exemplaires.

On peut en dire autant du *Mesostephanus indicus* Vidyarthi 1948 *nec* Mehra 1947, de *Milvus migrans* (Bodd.), que nous avions considéré (1951, p. 651, note 1), pour la même raison (1), comme un *Prohemistomum*, en en faisant une variété *indianum* du *P. milvi* (Yamag.). Il ne se distingue de ce dernier que par les dimensions plus petites des œufs et par le fait que la ventouse buccale est un peu plus développée que la ventouse ventrale faiblement musculeuse.

Ces différences se retrouvent dans les quatre matériaux égyptiens, moins accusées en ce qui concerne les œufs, mais l'exemplaire recueilli au Congo ex-belge, chez *Buteo rufofuscus augur* Rüpp., et attribué à la variété *indianum* (cf. Dubois et Fain 1956, pp. 36-37, fig. 16), réunit des caractères propres au type *milvi* et à la variété *indianum* : égalité des ventouses, petitesse des œufs ! Il s'ensuit que la discrimination de ces formes est vaine et que la variété *indianum* doit être supprimée.

Les dimensions correspondant aux différentes formes précitées sont consignées dans le tableau II (colonnes 1-4), et la diagnose suivante résume les caractères de l'espèce.

Diagnose. — Corps ovale, cochléariforme, à petit appendice caudal, dorso-subterminal. Ventouse buccale souvent plus grande que la ventouse ventrale qui est faiblement musculeuse et située aux 2/5e de la longueur du corps. Pharynx plus petit que la ventouse buccale, mais plus musculeux. Œsophage court, cæca atteignant presque l'appendice caudal. Organe tribocytique circulaire en protrusion. Testicules ovoïdes, situés l'un derrière l'autre. Ovaire submédian, dextre ou sénestre, opposé à la poche du cirre (2) et placé dans la zone du premier testicule, ventralement par rapport à celui-ci. Glandes vitellogènes composées de gros follicules disposés en couronne autour de la base de l'organe tribocytique ; vitelloductes transversaux et intertesticulaires ; réservoir vitellin postovarien. Poche du cirre allongée, atteignant le premier testicule ou pouvant même dépasser son bord antérieur. Présence d'un sphincter vaginal. Œufs peu nombreux (jusqu'à 7).

En raison de la présence d'un sphincter vaginal chez le générotype *milvi* Yamaguti 1939 de *Gelanocotyle* Sudarikov 1961, ce genre tombe en synonymie avec *Mesostephanus* Lutz 1935.

Remarque. — Le « *Prohemistomum vivax* (Sonsino 1893) », que Fahmy et Selim (1959, p. 9 et fig. 4) citent comme parasite expérimental du Chien en Egypte, nous paraît identique aux exemplaires qui viennent d'être décrits. Ces auteurs se bornent à en communiquer quelques mesures, et la seule figure qu'ils publient tient lieu de description. Ils ne mentionnent pas de sphincter vaginal. Cependant, nous ne saurions croire qu'il s'agisse du *Prohemistomum* de Sonsino, car le Ver ne présente pas cette profonde concavité ventrale que nous avons observée très nettement (1938, fig. 331) sur le matériel original (coll. Pintner, Vienne) et qui caractérise aussi le *Prohemistomum secundum* de Vidyarthi (1948, pp. 24-25, fig. 1) (1), hébergé comme le précédent par *Milvus migrans* (Bodd.) et dont nous faisons un synonyme de *vivax* (2).

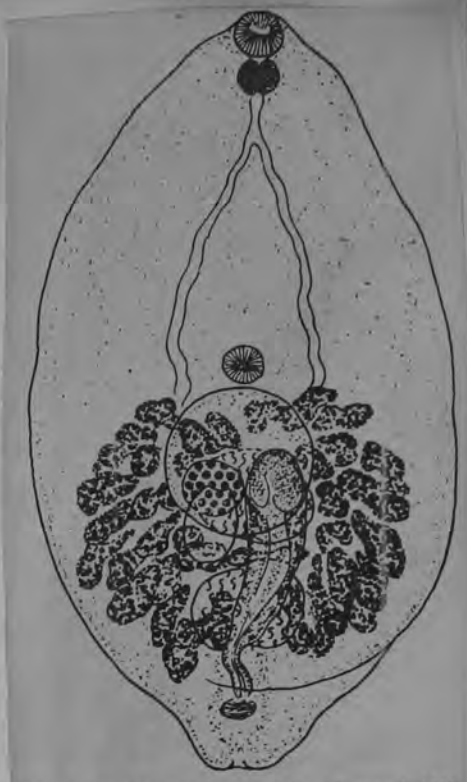


FIG. 8. — *Mesostephanus milvi* Yamaguti 1939, de *Milvus migrans* (Bodd.) [PE-3995-T]. Vue ventrale. Longueur 0,90 mm.

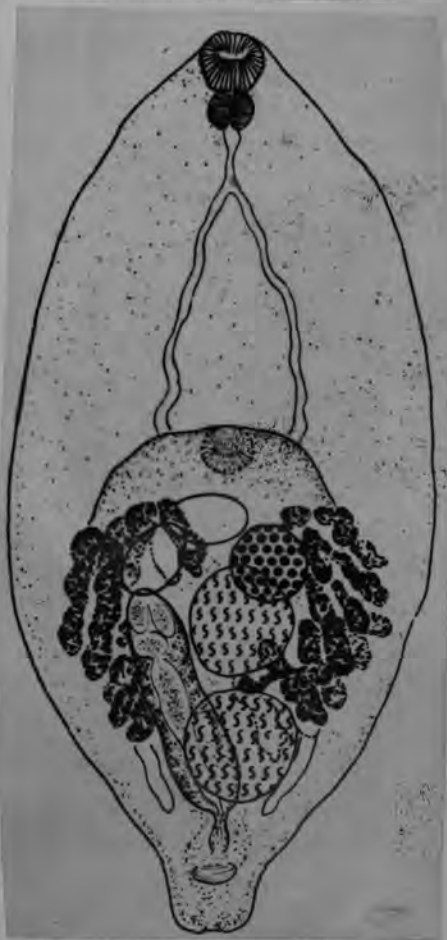


FIG. 7. — *Mesostephanus milvi* Yamaguti 1939, de *Milvus migrans* (Bodd.) [PE-3995-T]. Vue dorsale. Longueur 1,06 mm (organe tribocytique recouvrant la ventouse ventrale).

— OVER —

TABLEAU II — *Mesostephanus milvi*

	Mesostephanus milvi Yamaguti 1939	***Mesostephanus indicus*** Vidyarthi 1948 *nec* Mehra 1947	Coll. W. H. Wells	***Prohemistomum milvi*** var. ***indianum*** Dubois 1956	***Prohimostomum vivax*** (2) Fahmy et Selim 1959
Longueur du corps	1,60-1,65 mm	1,30-1,55 mm	0,74-1,34 mm	1,25 mm	1,31-1,55 mm
Largeur du corps	0,87-1	0,66-0,74	0,34-0,63	0,72	0,66-0,78
Rapport long./larg.	1,9 (fig. 56)	1,6 (fig. 2)	1,7-2,5 (moy. 2,07)	1,74	2,3 (fig. 4)
Diamètres :					
ventouse buccale	60/84-90 µ	56-67/76-82 µ	57-94/63-99 µ	78 µ	77-87/90-102 µ
pharynx	57-66	62-64	37-57/45-68	68/66	56-68/56-71
ventouse ventrale	84-90	48-64/75	42-65/45-75	70/84	—
organe tribocytique	450-500	528-640/432-556	180-260	460/400	—
ovaire	90-180	80-120/80-96	57-150/73-170	—	—
testicules	200-340/320-450	140-272/204-448	110-210/110-260	230-260/320-360	—
œufs	105-120/81-87	96-100/48-56	95-110/57-70	94-102/60-70	90-93/65-68
sphincter vaginal (1)	—	—	30-65	—	—
Longueurs :					
œsophage	60-150 µ	64-75 µ	40-70 µ	78 µ	court
poche du cirre	650-700	416-597	360-590	600	279-372 µ
Extension de la poche du cirre	« very slightly beyond the posterior testis »	« upto the hinder margin of anterior testis »	jusque dans la zone du 1er testicule ou même plus en avant	pénètre dans la zone du 1er testicule	très légèrement au-delà du testicule postérieur
Situation de la ventouse ventrale	« at anterior part of middle third of body » 40/100 (fig. 56)	« at the anterior part of the middle third of the body » 35/100 (fig. 2)	antérieure à la mi-longueur du corps 33-47/100 (moy. 42/100)	antérieure à la mi-longueur du corps 40/100	antérieure à la mi-longueur du corps 31-39/100
Limite antérieure des vitellogènes	40/100 (fig. 56)	36/100 (fig. 2)	40-53/100 (moy. 48/100)	40/100	41/100 (fig. 4)
Rapport longueur du corps/diamètre couronne vitelline	2,1 (fig. 56)	2 (fig. 2)	2,1-3,6 (moy. 2,6)	1,9	2,7 (fig. 4)
Hôtes	*Milvus migrans lineatus*	*Milvus migrans*	*Milvus migrans* *Felis domestica*	*Buteo rufofuscus augur*	Chien [expérim.]
Distribution géographique	Japon	Inde	Egypte	Congo ex-belge	Egypte

(1) Diamètre transversal.
(2) Mal orthographié.

FROM DUBOIS + PEARSON, 1963

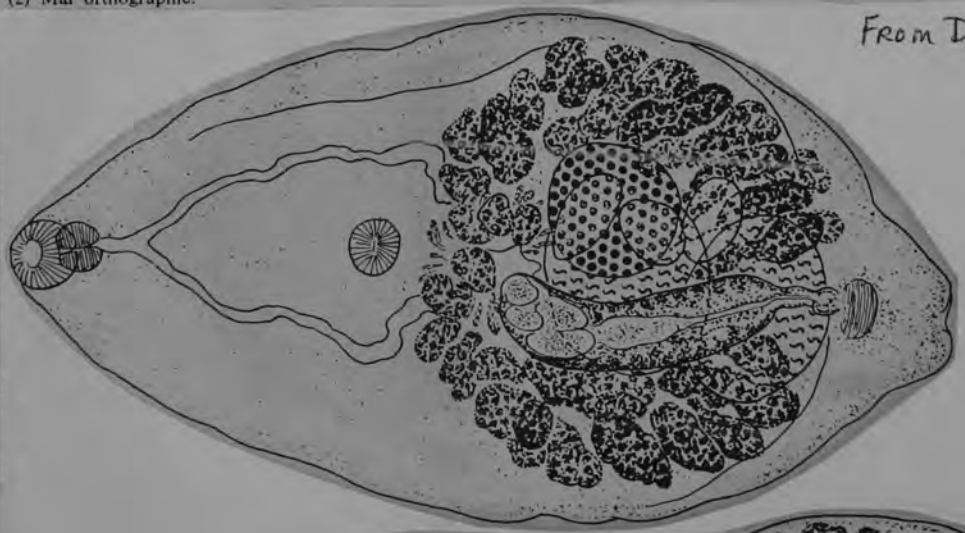


FIG. 10. — *Mesostephanus milvi* Yamaguti 1939, de *Milvus migrans* (Bodd.) [PE-4004-T]. Vue ventrale. Longueur 1,13 mm (organe tribocytique rétracté).

FIG. 9. — *Mesostephanus milvi* Yamaguti 1939, de *Milvus migrans* (Bodd.) [PE-4004-T]. Vue ventrale. Longueur 1,34 mm (organe tribocytique rétracté).

Mesostephanus odhneri (Travassos, 1924) Lutz, 1935

Mesostephanus odhneri (Travassos, 1924) Lutz, 1935

Synonymes:

Prohemistomum odhneri Trav., 1924, p. 835-838 (nec Mehra, 1947), Lutz, 1935, p. 160, 161, 163, 167, 168 (172, 173, 175, 180), pl. 1, fig. 5 et 5*a* (d'après Trav.); Szid. 1936, p. 287, 290; Dub., 1951, p. 651, 655, 656, 684.

Mesostephanus odhneri (Trav.) Lutz, 1935, p. 167 (180), pl. 1, fig. 8; Sbid., 1936, p. 296, fig. 1*d* (d'après Lutz); Dub., 1938*a*, p. 151; 1938*b*, p. 450-451, fig. 329 (d'après Trav.); 1951, p. 651, 656, 684.

Mesostephanus infecundus Lutz, 1935, p. 160, 167 (173, 180); Szid., 1936, p. 296; Dub., 1938*a*, p. 151; 1938*b*, p. 450.

Mesostephanus prolificus Lutz, 1935, p. 160, 167 (173, 180); Dub., 1938*a*, p. 151; 1938*b*, p. 448, 449; 1951, p. 653, 656; 1953, p. 108 (syn de *fajardensis* (Price, 1934)).

Mesostephanus gregarius Lutz, 1935, p. 160 (173).

Prohemistomum fecundum Lutz (nomen ineditum: préparation N.° 25705).

Dicranocercaria utriculata Lutz, 1933*b*, p. 366-367 (394-396).

Préparations:

N.os 17308 [?], 25434 et 25452-54 [18.VIII.1923], 25435-36 et 25459-60 [26.VIII.1923], 25437 et 25478-79 [8.IX.1924], 25451 [29.IX.1924], ... 25455-58 [20.VIII.1923], 25461-64 et 25469-70 [VIII. 1923]: de *Sula sula* (L.) = *S. brasiliensis* Spix (vulgo "atobá").

N.os 17103 et 25433 [21.VI.1924], 25438-47 [15.IX.1923], 25448 .... [16.IX.1923], 25471-72 [9.VI.1924], 25473-77 [21.VI.1924] et 25364 [1923]: de *Fregata aquila* (L.) (vulgo "João grande").

N.os 25449-50 [25.IX.1923]: de *Tigrisoma lineatum marmoratum* (Vieill.) (vulgo "socozinho novo").

N.° 25705 [?] ("Prohemistomum fecundum; ovos", sans indication d'hôte).

L'examen de toutes ces préparations prouve que Lutz n'a jamais eu sous les yeux le *Mesostephanus fajardensis* (Price) qui, pensait-il (1935, p. 167 ou 180), "entspricht meinem unpublizierten Namen *prolificus*...' La prétendue correspondance des deux espèces semblait ressortir du fait que toutes deux sont parasites de Sulidés et capables de produire un grand nombre d'oeufs: "Die Exemplares von *Sula brasiliensis* ware kleiner [que ceux des Frégates, *vide infra*], enthielten aber viel mehr Eier, oft in solcher Anzahl [jusqu'à une cinquantaine], dass sie den ganzen uebrigen Organismus verdeckten" (*op. cit.*, p. 160 ou 173). Mais les oeufs de *M. fajardensis*, dont le nombre peut atteindre 60, sont beaucoup plus petits (44-53 31-4 µ)[1] que ceux de *prolificus*.

Au contraire, les parasites de Frégates, quoique plus gros, sont en général plus faiblement ovigères [jusqu'à 28 oeufs]. C'est pourquoi Lutz les désigna sous l'appellation spécifique d'*infecundus* (*op. cit.*, p. 160, 167 ou 173, 180), tout en admettant la possibilité d'identité avec *prolificus*: "Indessen war nicht auszuschliessen, dass es sich in beiden Faellen um dieselbe Art handelt, fuer welche ich den Namen *gregarius* waehlte. Beide Formen waren sich im Ganzen vollstaendig aehnlich..."

DuBois, 1970

con't

Don't

Mesostephanus odhneri (Travassos, 1924) Lutz, 1935

L'examen des parasites de *Sula* et de *Fregata*, contenus dans les nombreuses préparations de la collection A. Lutz, nous a convaincu de leur identité et de leur appartenance au *Mesostephanus odhneri* (Travassos), dont ils présentent tous les caractères [2] (cf. *op. cit.*, pl. 1, fig. 8). L'attribution au genre *Mesostephanus* Lutz se trouve confirmée par la présence d'un sphincter vaginal très nettement observable, surtout dans les préparations colorées à l'acide osmique (N.º 25437) et à la cochenille-éosine (N.º 25478).

Diagnose. — Corps ovale à piriforme, faiblement concave ventralement, plan antérieurement, atténué en arrière (partie appendiculaire), s'élargissant et s'épaississant fortement dans la seconde moitié ou les trois derniers cinquièmes, où l'OT normalement rétracté, de contour elliptique et s'ouvrant par une fente médiane, peut déterminer par protrusion une protubérance ventrale arrondie, parfois très développée. PH ellipsoïdal, de même longueur que la VB mais plus musculeux et plus étroit; VV plus grande que celle-ci, prééquatoriale. CA s'allongeant jusqu'au niveau du bord postérieur du TP.

TT subglobulaires ou ovoïdes — le premier postéquatorial, le second plus ou moins engagé dans la partie appendiculaire du corps — à zones presque en contact et à champs pouvant coïncider. OV dextre ou sénestre, situé latéralement à la hauteur du TA. VG à gros follicules disposés en couronne excentrée par rapport à l'OT et pénétrant profondément dans cet organe lors de sa protrusion. PC longuement claviforme, opposée à l'OV et pouvant atteindre le bord frontal du TA, avec VS sinueuse, enroulée sur elle-même, *pars prostatica* et cirre délie. UT muni d'un sphincter vaginal subterminal. Oeufs gros, peu ou assez nombreux.

Corps: 0,80-1,34/0,40-0,59 mm (chez *Sula*)
1,12-2,23/0,57-0,90 mm (chez *Fregata*)

Rapport: longueur/largeur = 2 — 3

VB 43-63/38-57 µ, PH 32-63/22-45 µ, VV 45-66/52-84 µ, OT 180-530/30-320 µ, OV 75-125/65-95 µ, TT 170-300/130-275 µ/sphincter vaginal 42/35-50 µ, oeufs 100-115/66-73 µ, au nombre de 1 à 50 (chez *Sula*), à 2[illegible] (chez *Fregata*).

Longueur de l'oesophage: 30-90 µ; de la poche du cirre: 500-830 µ; diamètre du cirre: 10-16 µ.

Situation de la ventouse ventrale: 30-45/100; du front de la couronne vitelline: 31-46/100.

Rapport: longueur du corps/diamètre de la couronne vitelline = 2,06 — 3.

DuBois, 1970

Mesostephanus sp.

L'unique exemplaire de ce parasite trouvé dans l'intestin moyen d'un canard sauvage à Ambohibao (mai 1959) est un adulte jeune, immature.

Description (cf. fig. 6)

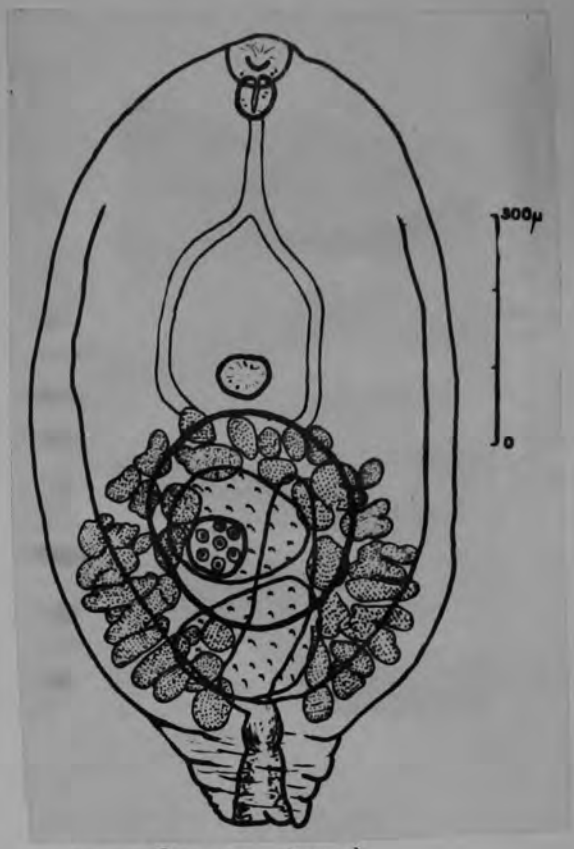
Dimensions :

Longueur	1,02 mm
Largeur	550 µ
Rapport longueur largeur	1,85
Ventouse buccale	70/90 µ
Ventouse ventrale	60/70 µ
Rapport ventouse buccale ventouse ventrale	1,3
Pharynx	60 µ
Organe tribocytique	280 µ
Ovaire	80 µ
Testicules	150/180 µ
Œsophage	130 µ
Poche du cirre	75/460 µ
Limite antérieure des vitellogènes	53/100
Rapport longueur du corps diamètre de la couronne vitelline	2,4

Corps ovale à petit appendice caudal subterminal. Ventouse buccale plus grande que la ventouse ventrale située environ au 42/100 de la longueur du corps. Pharynx contigu à la ventouse buccale, plus petit et plus musculeux que celle-ci. Œsophage représentant 1/8 de la longueur du corps. Organe tribocytique circulaire.

Appareil génital femelle : ovaire sphérique situé à droite et ventralement dans la seconde moitié de la longueur du corps. Glandes vitellogènes composées de gros follicules disposés en couronne autour de l'organe tribocytique et interrompus dans la région postérieure. Vitelloductes intertesticulaires. Pas d'œufs visibles.

Appareil génital mâle : testicules disposés l'un au-dessous de l'autre et dorsalement par rapport à l'ovaire. Poche du cirre atteignant la limite antérieure du premier testicule.



FROM RICHARD (1964)

Discussion

Nous éliminerons tout d'abord de notre discussion les espèces chez lesquelles la ventouse ventrale est plus grande ou égale à la ventouse buccale : *M. fajardensis* (Price, 1934) Lutz, 1935, *M. fregatus* Tubangui et Masiluñgan, 1941, *M. haliasturis* Tubangui et Masiluñgan, 1941, *M. microbursa* Caballero, Grocott et Zerecero, 1953, *M. doutrensi* Baer, 1957 et *M. parappendiculatus* Baer, 1959.

Trois espèces ont la ventouse ventrale plus petite que la buccale ; deux d'entre elles nous semblent très différentes de nos échantillons : *M. appendiculatoides* (Price, 1934) Lutz, 1935, la ventouse ventrale est très petite (45/70 µ au maximum) par rapport à la longueur du corps et *M. appendiculatus* (Ciurea, 1916) Lutz, 1935 ; nous avons examiné à Neuchâtel, chez le Professeur G. Dubois, quelques exemplaires de la collection Ciurea et avons constaté que l'œsophage très court, musculeux, présentait une striation non visible chez notre spécimen.

C'est donc de la troisième espèce *M. milvi*, décrite du Japon chez *Milvus migrans lineatus* (Gray) par Yamaguti (1939), que notre spécimen se rapproche le plus. Les dimensions du corps et des différents organes (ventouses, ovaires, testicules, organe tribocytique) sont supérieures à celles de notre échantillon ; cependant les rapports des dimensions restent égaux chez les deux espèces.

La ressemblance est encore plus grande avec *M. milvi* décrit d'Égypte par Dubois et Pearson (1963) chez le Chat et chez *Milvus migrans* (Bodd.). Les dimensions du corps et des organes correspondent parfaitement à nos mensurations. Notre spécimen est donc très proche de *M. milvi* Yamaguti, 1939. Nous ne lui attribuerons cependant pas de nom spécifique car nous n'avons qu'un seul exemplaire et il est immature ; il ne nous est donc pas possible d'en faire une étude complète. De plus, ce spécimen provient d'un canard non déterminé qui est peut-être un hôte accidentel (l'hôte normal serait un chat, un chien ou *Milvus migrans* (Bodd.), rapace particulièrement abondant à Madagascar.

Nous déterminerons donc notre parasite comme *Mesostephanus* sp. proche de *M. milvi* Yamaguti, 1939.

MESOSTEPHANUS

LOOSE LEAF
ORGANIZER

SCHEDULE

OD IME								
ISE N. UCTOR								
ISE . UCTOR								
ISE D. UCTOR								
ISE J. UCTOR								
SE UCTOR								
SE . UCTOR								

NAME _____

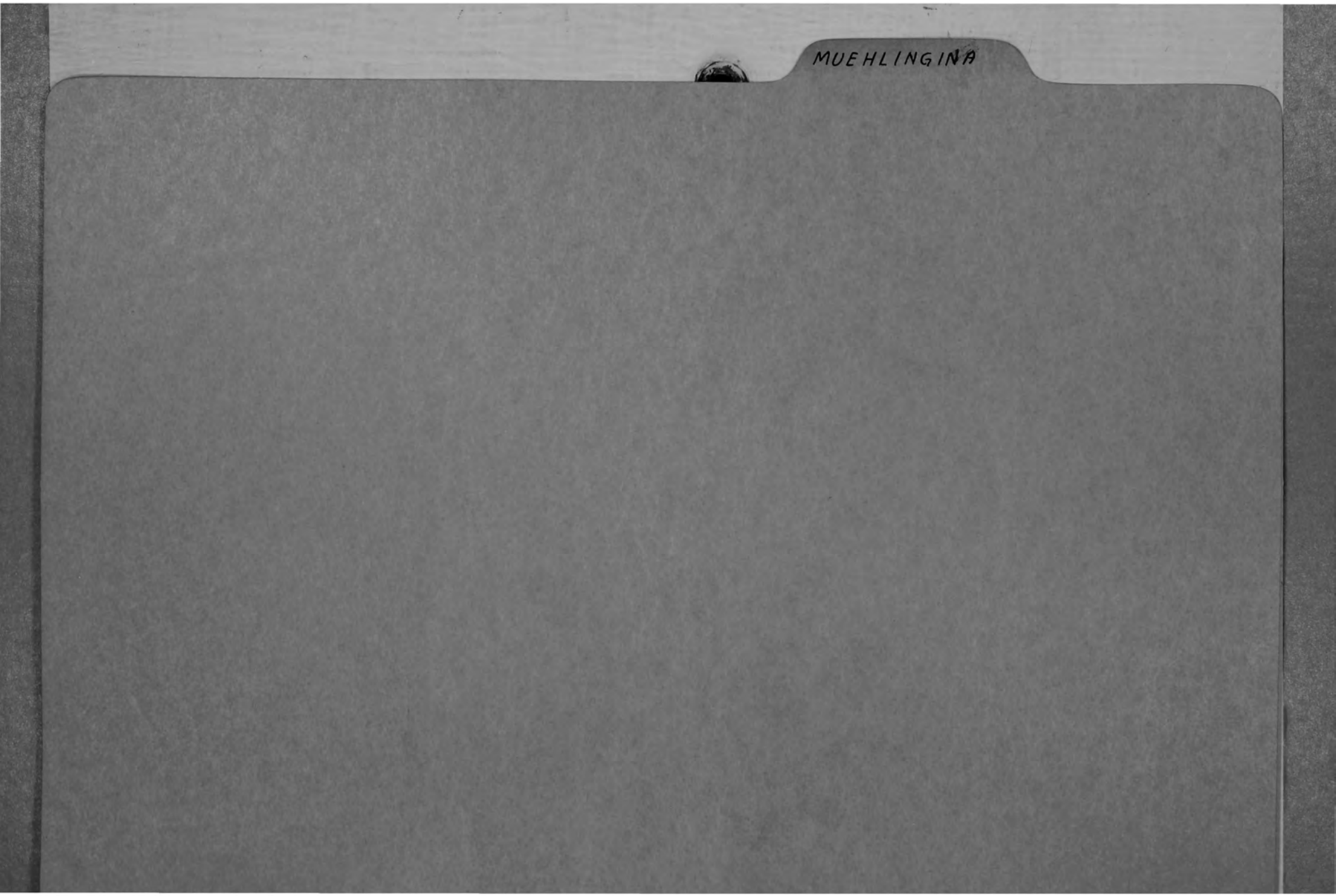
ADDRESS _____

SCHOOL _____ TELEPHONE _____

Muehlingina Mehra, 1950

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body massive, lageniform or dolioliform, with collar-like constriction at one-fourth or one-fifth of its length. Forebody cupuliform, without acetabulum; tribocytic organ moderately developed, with median slit. Ovary intertesticular, postequatorial. Vitellaria posterior to tribocytic organ, disposed into two semiovoid or semicircular masses. Parasites of mammals.

Genotype: *M. lutrai* Mehra, 1950, in *Lutra lutra nair;* India.


MUEHLINGINA

Neogogatea Chandler et Rausch, 1947

Generic diagnosis. — Cyathocotylidae, Szidatiinae: Body elongate, with leaf-like edges of anterior portion rolled ventrally but not united midventrally, tapered posteriorly to a truncate cone. Oral sucker poorly developed; pharynx large, muscular, esophagus short. Acetabulum absent. Tribocytic organ elongate, linguiform, wide apart from pharynx. Testes tandem or somewhat diagonal, in posterior portion of body. Cirrus pouch reduced. Genital pore terminal. Ovary opposite anterior testis or wedged between left ends of testes. Vitelline follicles large, confined mainly to tribocytic organ, extending posteriorly beyond it on either side to region of posterior testis. Uterus may extend a little further forward than anterior testis; eggs large, few in number. Parasitic in intestine of birds.

Genotype: *N. bubonis* Chandler et Rausch, 1947 (Pl. 64, Fig. 775), in *Bubo virginianus;* Wisconsin.

Other species: *N. pandionis* Chandler et Rausch, 1948, in *Pandion haliaetus carolinensis;* Wisconsin.

Neogogatea (Chandler and Rausch, 1947)

Generic diagnosis: Cyathocotylidae. Body elongate; broad and leaflike, with anterior edges usually slightly rolled ventrally; constricted into a short truncated cone posteriorly. Oral sucker terminal. Prepharynx very short, almost absent. Pharynx larger than oral sucker. Esophagus short, about equal to pharynx in length. Ceca sinuous to level of ventral sucker, usually converging slightly before ending at posterior $\frac{1}{6}$ body. Ventral sucker poorly developed, mesial in about anterior third of body. Holdfast organ mesial, in middle third of body, immediately following and sometimes overlapping ventral sucker, large in ventral view, but shallow from side view, elongate, linguiform, concave. Genital pore at posterior end of body, followed by short genital atrium. Testes large, tandem, intercecal, approximately between posterior $\frac{3}{7}$ to $\frac{6}{7}$ of body. Cirrus sac claviform, extending about from level of anterior testis to genital atrium; containing convoluted seminal vesicle in anterior $\frac{1}{4}$ to $\frac{1}{2}$, glandular pars prostatica in posterior $\frac{1}{2}$ and cylindrical cirrus in posterior $\frac{1}{4}$. Ovary smaller than testes, intertesticular and or dextral or sinistral to testes. Uterus ascending intercecally about to equator of body, descending along cirrus sac to terminate in weak vaginal sphincter connecting with genital atrium. Eggs large, operculate. Vitelline follicles large, confined to region of holdfast organ anteriorly, extending ventrally to posterior testis.

Type species: Neogogatea bubonis Chandler and Rausch, 1947, in *Bubo virginianus*; Wisconsin.

Other species: Neogogatea pandionis Chandler and Rausch, 1948, in *Pandionis haliaetus carolinensis*; Wisconsin. *N. kentuckiensis* (Cable, 1935) experimentally in baby chicks; cercaria in *Goniobasis livescens, G. semicarinata, G. depygis, Anaplocamus dilatatus*, and *Mudalia carinata*, flame-cell formula $2[(3+3+3)+(3+3+3)]$; prohemistomulum metacercaria in many fish (Myer 1960; this paper).

From Hoffman and Dunbar, 1963

Neogogatea pandionis Chandler and Rausch, 1948

Length 1.00 to 1.47 mm. Forebody not sharply demarcated from the hindbody. Anterior part of body, to anterior border of holdfast organ, thin, slightly rolled ventrally at sides, and 350 to 570μ long by 190 to 255μ wide. Posterior portion of body approximately as wide as deep, constricted posteriorly into a narrow, truncated cone; maximum diameter 200 to 286μ; cone 34 to 58μ in diameter, and 60 to 150μ long. Oral sucker not distinct in specimens at hand, obviously very small and poorly developed. Pharynx larger, 42 to 52μ in diameter, its anterior border only about 25μ from anterior end. Ventral sucker absent. Holdfast organ large and elongate, nearly as wide as body; posterior end not clearly defined.
Sex glands obscured by vitellaria in most specimens. Ovary small, about 66μ in diameter, situated at one side of posterior portion of anterior testis. Testes longer than wide, and apparently about as deep as wide; length of anterior testis 110 to 120μ long, and 75 to 96μ deep. Posterior testis larger, about 120μ in each direction in one specimen, and 167μ wide and 105μ long in another. Vitelline follicles large, confined to holdfast organ anteriorly, but extending beyond it posteriorly on either side, ventrally, to about level of middle of posterior testis. Cirrus pouch elongated; its proximal portion enlarged into a cylindrical, thin-walled seminal vesicle 155 to 175μ long, then narrowing to an ill-defined tube in posterior part of body, about 88 to 130μ long. Eggs 95 to 115μ long, and 58 to 73μ broad.
Host: Pandion haliaetus carolinensis (Gm.) (osprey).
Habitat: Small intestine.
Locality: Waushara County, Wisconsin; collected April 13, 1947.
Type: U.S. Nat. Mus. Helm. Coll. No. 46342.

Reference: J. Parasit. 34(3):207-210.

Note: The genus Neogogatea was established by Chandler and Rausch (1947) for a Cyathocotylid found in Bubo v. virginianus (Gm.). This second species possesses all the generic characters as given, but differs markedly in its smaller size, more elongate body, less obvious oral sucker, and smaller pharynx.

Neogogatea kentuckiensis (Cable, 1935) Hoffman and Dunbar, 1963

DISCUSSION

There is little doubt about the identity of *Cercaria kentuckiensis* as described by Cable (1935) and reported by Anderson (1944), Vernberg (1952), and Myer (1960). Likewise, there is no confusion regarding the experimental metacercaria of Hoffman (1959), Myer (1960), and this paper. The cercaria was described first; therefore, the specific name of this worm must be *kentuckiensis*. The generic name of the adult is controversial, however. Dr. G. Dubois (1961, pers. comm.) believes that *Neogogatea pandionis* (Chandler and Rausch, 1948) and our worm, which he has seen, are identical. Of this we are not certain. Myer (1960) believes that his experimental adult and ours are identical, but are not *N. pandionis*—he believes that the worm belongs in the genus *Mesostephanus* mainly because of the presence of a vaginal sphincter (Figs. 3, 4).

Morphologically, adults of the genera *Neogogatea*, *Mesostephanus*, and *Prohemistomum* are grossly similar although the latter is larger and broader. The holdfast of *Neogogatea* is linguiform but is small and oval in *Mesostephanus* and *Prohemistomum*. The vitellaria of *Neogogatea* are in the holdfast area but surround the holdfast of *Mesostephanus* and *Prohemistomum*. *Neogogatea kentuckiensis* possesses a vaginal sphincter (this can not be determined in *N. pandionis* and *N. bubonis*—possibly because of poor fixation of the type specimens); *Mesostephanus* does possess the sphincter, but *Prohemistomum* does not. *Neogogatea* and *Mesostephanus* possess feeble ventral suckers but that of *Prohemistomum* is well developed. The ventral sucker of the metacercaria of the present worm is prominent, however.

Little is known concerning other cercariae of these two genera, but *N. kentuckiensis* fits into the subgroup (b) of subgroup *Vivax* (Sewell, 1922) emended by Dubois (1951) which contains freshwater forms found in Melaniidae. Contrarily, the known cercariae of *Mesostephanus* fit into subgroup (a) of subgroup *Vivax* (op. cit.) which contains at least one freshwater form, but also all of the known cercariae of *Mesostephanus* that are found in marine cerithiid snails. In the latter group are the cercariae of *Mesostephanus* sp. (*C. utriculata* Lutz, 1933), *Mesostephanus appendiculatoides* (cf Hutton and Sogandares-Bernal, 1960) and *Mesostephanus appendiculatus* (cf Martin, 1961). This information supports the thesis that the present worm does not belong to the genus *Mesostephanus*. The subgroups (a) and (b) of Dubois (1951) are not well separated on the basis of the morphological details compared. However, we believe the biological data concerning the different snail hosts to be extremely helpful, i.e., *Neogogatea* in melanid freshwater snails and *Mesostephanus* in cerithiid marine snails.

We believe that the present worm fits the generic description of *Neogogatea* except for the presence of a ventral sucker which was overlooked by the original describers; it is very difficult to demonstrate in whole mounts of the adults. We, therefore, emend the description of the genus to include these characters.

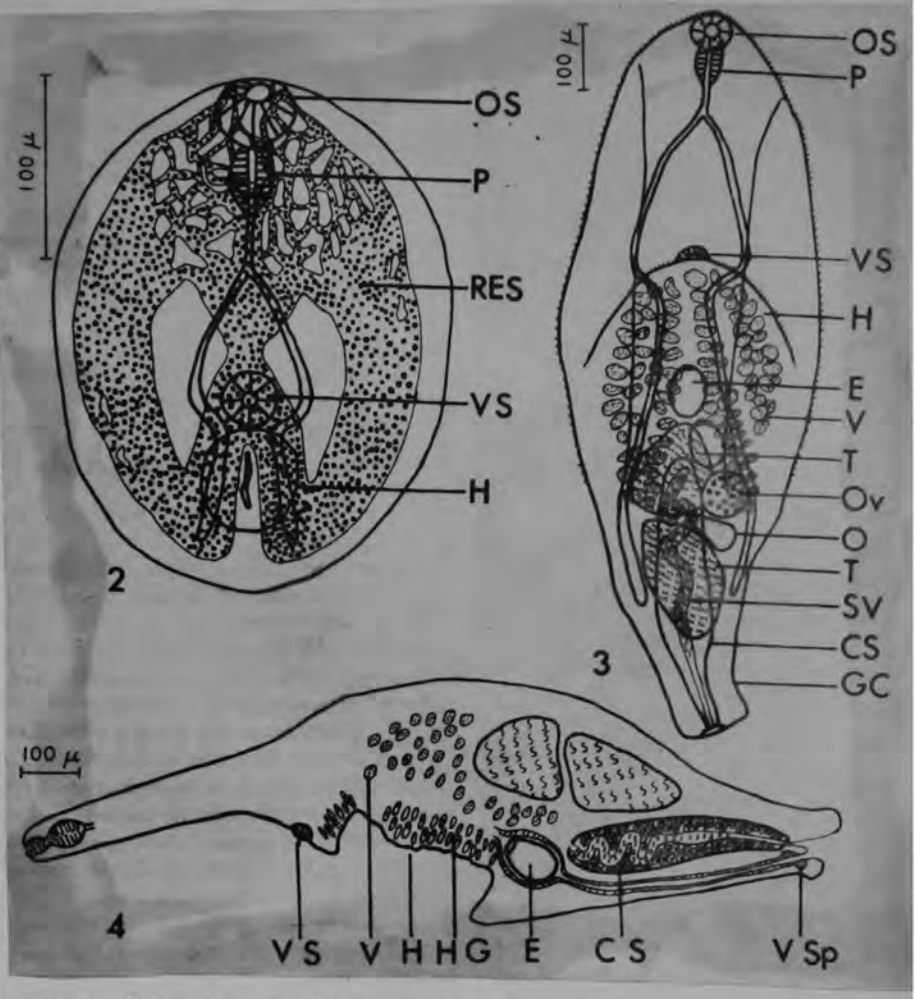


Figure 2. Mature (fully developed) metacercaria.
Figure 3. Eleven-day-old experimental adult from baby chick.
Figure 4. Composite drawing made from sagittal sections of two experimental adults.

From Hoffman and Dunbar, 1963

NEOGOGATEA

Prohemistominae Lutz, 1935

Subfamily diagnosis. — Cyathocotylidae: Body linguiform, pyriform or ovoid, undivided, may be provided with small caudal appendage, which, however, does not contain gonads. Tribocytic organ comparatively small, with central cavity. Vitellaria confined to postacetabular region, surrounding tribocytic organ.

Key to genera of Prohemistominae from reptiles

Body not divided into two distinct regions, oval, concave ventrally ..... *Prohemistomum*
Body with small caudal appendage ..... *Mesostephanoides*

Key to genera of Prohemistominae from birds

1. Vitellaria surrounding tribocytic organ, which has a median cavity 2
   Vitellaria mainly in tribocytic organ, which is strongly developed and massive ..... *Duboisia*
2. Cirrus pouch normally developed; acetabulum present 3
   Cirrus pouch reduced; seminal vesicle free in parenchyma; acetabulum absent ..... *Linstowiella*
3. Forebody linguiform, slightly concave posteriorly; vaginal sphincter present ..... *Mesostephanus*
   Forebody oval, deeply excavated posteriorly; vaginal sphincter absent ..... *Prohemistomum*

Key to genera of Prohemistominae

1. Vitelline follicles surrounding tribocytic organ, latter weakly developed, with median cavity 2
   Vitelline follicles confined to tribocytic organ, latter strongly developed, massive ..... *Prosostephanus*
   Vitelline follicles posterior to tribocytic organ, disposed into two masses ..... *Muehlingina*
2. Forebody linguiform or foliiform, slightly concave behind middle; vaginal sphincter present ..... *Mesostephanus*
   Body undivided, oval, without dorsoterminal appendage 3
3. Ventral concavity conspicuous, genital pore subterminal ..... *Prohemistomum*
   Ventral concavity practically absent or inconspicuous if at all; genital pore terminal ..... *Paracoenogonimus*

Prohemistomum Odhner, 1913

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body not bipartite, oval, with deep ventral pouch, in which comparatively small tribocytic organ with median slit is situated at middle of body. No dorsoterminal appendage. Acetabulum well developed. Testes tandem; cirrus pouch well developed, genital pore subterminal. Ovary submedian or lateral, in zone of anterior testis. Vitelline follicles fairly large, confined to postacetabular region lateral and posterior to tribocytic organ. Parasitic in Raptatores, experimentally in cat and dog.

Genotype: *P. vivax* (Sonsino, 1892) (Pl. 62, Fig. 754), syn. *P. spinulosum* Odhner, 1913, in *Milvus migrans aegypticus* (= *M. parasiticus*); Egypt.

Cercaria with flame cell formula: 2[?+(3)], in *Cleopatra bulimoides* — Sonsino (1892). Metacercaria obtained experimentally by Azim (1933) in *Gambusia affinis* (= *holbrooki*) and *Tilapia nilotica* (= *Chromis niloticus*).

Other species:

P. fregatae (Tubangui et Masiluñgan, 1941), syn. *Mesostephanus fregatus* T. et M., in *Fregata ariel ariel;* Philippines.

P. indicum (Mehra, 1947) Dubois, 1951 (syn. *Prohemistomum odhneri* Mehra, 1947, nec Travassos, 1924; *Mesostephanus lutzi* Vidyarthi, 1948), in *Buteo rufinus rufinus;* India.

P. lutzi (Vidyarthi, 1948) Dubois, 1951, in *Buteo rufinus;* India.

P. milvi (Yamaguti, 1939) in *Milvus migrans lineatus;* Japan, India.

P. odhneri Travassos, 1924, in *Nyctanassa violacea* (experim.); metacercaria in subcutaneous tissue of *Haemulon* sp. — Travassos (1924).

P. secundum Vidyarthi, 1948, in *Milvus migrans;* India.

P. vidyarthii nom. nov. pro *P. indicum* (Vidyarthi, 1948) nec Mehra, 1947, syn. *Mesostephanus indicum* Vidyarthi, 1948, in *Milvus migrans;* India.

Prohemistomum chandleri Vernberg, 1952 (Pl. 102, fig. 1238), recovered from the intestine of *Ictalurus punctatus, Cottus bairdii,* and *Natrix sipedon,* which had been fed encysted worms from *Huro salmoides* and *Micropterus dolomieu,* is apparently parasitic as adult in a piscivorous bird. Cercaria develops in *Pleurocera acuta.*

Genotype: *P. vivax* (Sonsino, 1892) (Pl. 62, Fig. 754), syn. *P. spinulosum* Odhner, 1913, in *Milvus migrans aegypticus* (= *M. parasiticus*); Egypt. Experimentally in cat and dog — Azim (1933).

Cercaria vivax Sonsino, 1892, with acetabulum, finfold of tail furcae and flame cell formula 2[(?)+(3)], develops in *Cleopatra bulimoides;* metacercaria obtained experimentally in muscle and abdominal cavity of *Gambusia affinis* (= *holbrooki*) and *Tilapia nilotica* (= *Chromis niloticus*) — Azim (1933). *Rana esculenta ridibunda, Bufo mauritanicus, Barbus antinorii, Hemichromis bimaculatus, Gambusia affinis;* Tunisia — Callot (1936).

~~Hemistidae~~ Strigeoidea

Prohemistomum Odhner, 1919

PROHEMISTOMUM Odhner 1919

Alariidae. Small trematodes not over 2 mm. in length, more
ess oval in shape, with the body not distinctly divided into an
rior and a posterior region. The cuticle is provided with spines
ith fine scales. The anterior lateral margins of the body are
aceous and rolled meso-ventrally to form ventral folds which unite
eriorly. Between the ventral folds and behind the acetabulum is
inging apparatus which takes the appearance of a round knob-like
ess, which may or may not present a central depression; or that
n extensively developed plug which reaches anteriorly so as to
in ventral view the acetabulum, pharynx and even the oral sucker.
simple intestinal branches extend almost to the posterior extremity
he body. The smooth or slightly indented testes lie one behind
other in the posterior half of the body and they may occupy the
ter part of the body length between the acetabulum and the posterior
of the body. An elongated cirrus sac enclosing the vesicula
nalis and cirrus lies ventral to the testes. The small globular
is found ventral to the anterior testis, opposite the cirrus sac.
diffuse shell gland, vitelline reservoir and the junction of the
e and Laurer's canal are located between the two testes. A
taculum seminis is absent. The vitellaria are in the form of
acini extending from a level posterior to the acetabulum to the
d testis or they may occupy the greater part of the substance
e clingling plug. The uterus is short and contains only a few but
eggs which measure from 100 to 146μ and 60 to 97 μ wide. The
al opening is ventral to that of the male in the posterior extremity
e body. A genital sinus may be present or absent but a bursa
atrix is lacking. The excretory system is in the form of a sub-
eous network of vessels and capillaries. The excretory pore is
al with respect to the genital opening.

Parasitic in birds and carnivores.

Type species: Prohemistomum spinulosum Odhner 1913

(above from Tubangui, 1922)

2. ***Prohemistomum indicum*** (Mehra, 1947) Dubois 1951.

Syn. *Mesostephanus indicum* Mehra, 1947 ;

Prohemistomum odhneri Mehra, 1947 nec Travassos, 1924 ;

Mesostephanus lutzi Vidyarthi, 1948 ;

Mesostephanus neophroni Baugh, 1958.

Mesostephanus indicum Mehra, *Prohemistomum odhneri* Mehra et *Mesostephanus lutzi* Vidyarthi ont été décrits d'après des matériels provenant de *Buteo rufinus* (Cretzsch.). Nous avons déjà indiqué (1953, p. 106) les raisons pour lesquelles le troisième peut être considéré comme identique au premier.

Baugh (1958) décrit un *Mesostephanus neophroni* de l'intestin d'un *Neophron percnopterus ginginianus* (Lath.), tué dans les environs de Bénarès. Cette forme présente les caractéristiques de *indicum* : corps ovale ou piriforme, pharynx presque aussi grand que la ventouse buccale, ventouse ventrale plus petite que cette dernière et située aux 32/100 de la longueur du Ver (fig. 5 *b*), testicules « usually transversely elongated... tandem in position » (Baugh, p. 217), « closely in front of one another..., characteristically bilobed » (Mehra, p. 23). Ce dernier auteur ajoute : « Anterior testis transversely situated, much broader than long, deeply cleft at about the middle of anterior margin ; posterior testis more or less obliquely situated, ...more or less deeply bifid on account of a cleft or notch at about the middle of its posterior margin » (Mehra, p. 23). La limite antérieure des vitellogènes coïncide avec la situation de la ventouse ventrale ; les follicules, de grande taille, constituent autour de l'organe tribocytique une couronne presque complète, interrompue seulement en arrière, « leaving a little space free at the end in median line behind posterior testis » (Mehra, p. 25). Les œufs sont très peu nombreux. Absence de sphincter vaginal.

Les mesures consignées dans le tableau II prouvent l'identité des trois formes attribuées par les auteurs à *Mesostephanus*.

Tableau II

Prohemistomum indicum (Mehra)

	indicum	*lutzi*	*neophroni*
Long./larg. du Ver (en mm)	1,14-1,46/0,66-0,74	1,03/0,74	0,96-1,32/0,75-0,95
Ventouse buccale (en μ) .	57-66/66-75	91/95	65-78/70-85
Pharynx	69/60	87/97	52-65/65-78
Œsophage	24-60	50	26-52
Ventouse ventrale	60-70/75-81 (1)	67/?	49-59/65-78
Organe tribocytique	225-300/240-300	200	—
Ovaire	90-120/120-150	80	83-104/124-150
Testicules	150-225/300-400	199/250-274	149-249/249-481
Œufs	81-102/51-69	95/76-80	91-96/65-68
Longueur poche du cirre .	300-500	—	481-630
Situation ventouse ventrale	25-33/100	31/100	28-32/100
Limite antér. vitellogènes .	25-34/100	31/100	28-33/100
Rapport long./larg. du Ver	1,55	1,38	1,4
Rapport longueur du Ver/diamètre couronne vitelline	1,8-1,9	1,8	1,6
Nombre d'œufs	1 à 3	1 (fig. 3)	3 à 5
Hôtes	*Buteo rufinus*	*Buteo rufinus*	*Neophron percnopterus*
Distribution géographique	Allahabad	Lucknow	Bénarès

(1) D'après les figures 4 et 5 de Mehra, la ventouse ventrale paraît un peu plus petite que la buccale.

a little space free at the end in median line behind posterior testis » (Mehra, p. 25). œufs sont très peu nombreux. Absence de sphincter vaginal.

Les mesures consignées dans le tableau II prouvent l'identité des trois formes tribuées par les auteurs à *Mesostephanus*.

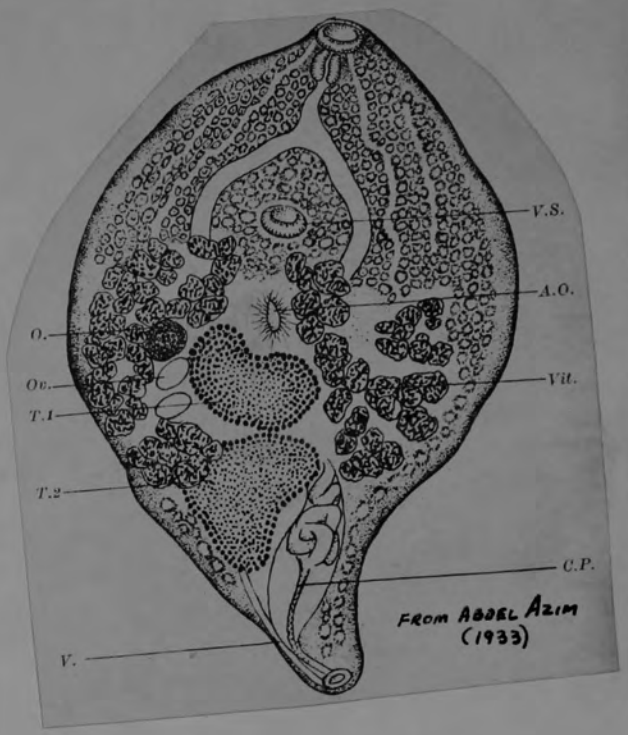
From Dubois, 1969

(3) Voir « Systématique des Strigeida », 1953, p. 109.

(4) K. Hanumantha Rao (thèse non publiée, 1957, Andhra University, Waltair) a obtenu *Gogaserpentium* de *Natrix piscator* et de *Atretium schistosum*.

Cyathocotylidae

Prohemistomum vivax (Sonsino, 1892) Abdel Azim, 1933



Prohemistomum Odhner, 1913

Generic diagnosis. — See p. 601.

Representatives from reptiles:

P. chandleri Vernberg, 1952 (Pl. 102, Fig. 1238), in ***Natrix sipedon.*** Cercaria of Vivax group and subgroup with flame cell formula 2[(3+3+3)+(3+3+3)] develops in ***Pleurocera acuta,*** encysts in *Huro salmoides* and *Micropterus dolomieu.* In feeding experiments with a variety of animals, living excysted worms were recovered from the intestine of *Ictalurus punctatus* and *Cottus bairdii,* and *Natrix sipedon;* several specimens from *N. sipedon* were almost mature — Vernberg (1952).

Au genre *Prohemistomum* Odhner, nous avons rattaché (1951, pp. 650, 655, 656 et 684) le *Mesostephanus indicum* Mehra 1947, de *Buteo rufinus* (Cretzsch.) [syn. *Prohemistomum odhneri* Mehra 1947 *nec* Travassos 1924, du même hôte, et *Mesostephanus lützi* Vidyarthi 1948, encore du même hôte]. Cette espèce est caractérisée par un pharynx aussi grand ou presque aussi grand que la ventouse buccale et par des testicules réniformes ou bilobés (à concavité ou échancrure médiane sur le bord antérieur du premier et le bord postérieur du second) (cf. Mehra 1947, p. 23 et fig. 4-5).

FROM DUBOIS + PEARSON, 1963

PROHEMISTOMUM

Prosostephanus Lutz, 1935

Syn. *Travassosella* Faust et Tang, 1938

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body oval to pyriform, may be produced backward into a blunt cone, at the top of which opens the genital pore. Ventral concavity occupied entirely by strongly developed massive tribocytic organ which may extend forward as far as the pharynx or the oral sucker and cover up the acetabulum, but may be depressed to a saucer. Oral sucker and pharynx well developed, esophagus very short or practically absent. Ceca may or may not extend to posterior conical portion. Acetabulum present or absent. Testes oval, tandem, dorsal, cirrus pouch well developed. Ovary median or submedian, ventral or posteroventral to anterior testis, both organs usually inclosed in tribocytic organ; posterior testis, however, may be inside or outside tribocytic organ. Shell gland complex intertesticular. Vitellaria consisting of coarse follicles, entirely or largely confined to tribocytic organ, in which they are massed laterally for the most part. Uterus usually turning back on itself ventral to anterior testis; eggs very large. Intestinal parasites of mammals.

Genotype: *P. industrius* (Tubangui, 1922) Lutz, 1935 (Pl. 88, Fig. 1063), in *Canis familiaris;* China.

Cercaria furcocercous, non-oculate, with pharynx and acetabulum, and flame cell formula of $2\times9\times2$ type, develops in *Parafossarulus eximius* and *P. striatulus*, encysts in *Carassius, Cyprinus, Ctenopharyngodon, Hypophthalmichthys;* adult experimentally in cats, dogs, *Vulpes vulpes, Herpestes urva, H. nobilis;* Foochow — Tang (1941).

Other species:

P. pagumae (Faust et Tang, 1938) Dubois, 1951, syn. *Travassosella p.* F. et T., 1938, in *Paguma larvata* and *Mustela* sp.; Foochow, China.

P. parvoviparus Faust et Tang, 1938, in *Meles leptorhynchus;* Foochow, China. Transferred by Dubois (1951) to *Duboisia* Szidat, 1936.

Alariidae

PROSOSTEPHANUS
~~Prohemistomum~~ industrium (Tubangui, 1922) LUTZ, 1935

Length: 1.5 to 1.9 mm.

Width: 1.0 to 1.2 mm. maximum.

Oral sucker: 0.10 to 0.13 mm. long by 0.18 to 0.19 mm. wide.

Acetabulum: (size:) 0.10 to 0.11 mm. in diameter.
(position): In anterior third of body, a short distance behind the pharynx, at angle formed by base of clinging plug with anterior region of body.
Sucker ratio:

Esophagus: Lacking.
Pharynx: Present.

Genital pore (location): Somewhat dorsally in posterior end of body.

Testes, shape: Oval, elongated ~~transversely~~ ANTERO-POSTERIORLY, ~~oriented marginally~~.
location: One in front of the other, occupying much of body space. POINT OF CONTACT AT MID-BODY REGION.
Cirrus sac (extent): From genital pore to anterior third of body.
Ovary, shape: Spherical.

location: Lies in substance of clinging plug, on ventral side of posterior surface of anterior testis, toward rt. or left side and opposite cirrus sac.
Vitellaria: Well developed and composed of large acini. Occupy greater part of substance of clinging plug.
Eggs: Large, thin-shelled, light-yellow, and operculated. 0.130-0.146 by 0.089 to 0.097 mm.
Other features: Clinging plug extensively developed and dome-shaped and occupying at least 2/3 of body length.

Host: Dog.

Locality: China.

Reference: Proc. of U.S. Nat. Museum, Vol 60, Art. 20, pp. 1-12, 1922.

Comparisons: P. spinulosum and P. appendiculatum. Also Cyathocotyle and Alaria.

Life cycle:

f3568plb

PROSTEPHANUS

Paracoenogonimus Katsurada, 1914

Generic diagnosis. — Cyathocotylidae, Prohemistominae: Body undivided, oval; ventral concavity practically absent or inconspicuous if at all. Tribocytic organ relatively small, with median slit, situated a little behind middle of body. Oral sucker and pharynx well developed. Esophagus short. Acetabulum present. Testes oblique, near posterior extremity. Cirrus pouch reaching level of middle of tribocytic organ. Genital pore terminal. Ovary? Vitelline follicles surrounding tribocytic organ and reaching posterior end of body. Eggs large. Parasitic in mammals.

Genotype: *P. ovatus* Katsurada, 1914 (Pl. 88, Fig. 1065), obtained experimentally in mouse fed with metacercariae from fish of the Elbe and the Alster, which are probably identical with *Prohemistomulum circulare* Ciurea, 1933, from muscle (rarely fins) of *Tinca tinca, Idus idus, Abramis blicca, A. brama, A. ballerus, Cyprinus carpio, Leuciscus rutilus, Scardinius erythrophthalmus, Esox lucius;* Rumania. In Komiya's adult specimen the body is distinctly provided with a caudal appendage, so it might better be assigned to *Mesostephanus* Lutz, 1935. Dubois (1951) emended Katsurada's genus on the basis of Komiya's description, but the present diagnosis of the genus is based on Katsurada's original.

Cercaria pharyngeal, furcocercous, with flame cell formula $2[(3+3+3)+(3+3+3)] = 36$, develops in *Viviparus viviparus* — Komiya (1938).

Unterordnung Cyathocotylata SUDARIKOV, 1959
amilie Prohemistomatidae (DUBOIS, 1938) SUDARIKOV, 1959
nterfamilie Prohemistomatinae LUTZ, 1935

1. ***Paracoenogonimus ovatus*** KATSURADA, 1914

Syn.: *Linstowiella viviparae* (v. LINSTOW, 1877) bei SZIDAT 1936, nec *Monostomum viviparae* v. LINSTOW, 1877, nec *Linstowiella viviparae* (v. LINSTOW, 1877) bei SZIDAT 1933; *Linstowiella viviparae* (v. LINSTOW, 1877) bei SZIDAT 1936; *Paracoenogonimus viviparae* (v. LINSTOW 1877) bei SUDARIKOV 1956 und bei ODENING 1962b, c, nec *Paracoenogonimus viviparae* (v. LINSTOW, 1877) bei SUDARIKOV 1961.

Wirte, Herkunft: *Mergus m. merganser* L., *Podiceps c. cristatus* (L.), *Pelecanus occidentalis* L. – Ein *Mergus* in Berlin tot aufgefunden. Sektion am 18. Dezember 1962; ein *Podiceps* desgl. Sektion am 25. Februar 1963; ein *Pelecanus* importiert 1956. Sektion am 15. März 1963.

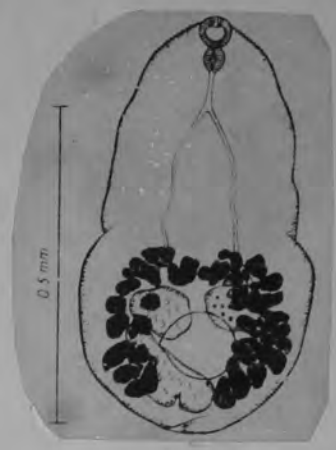
Lokalisation: Dünndarm.

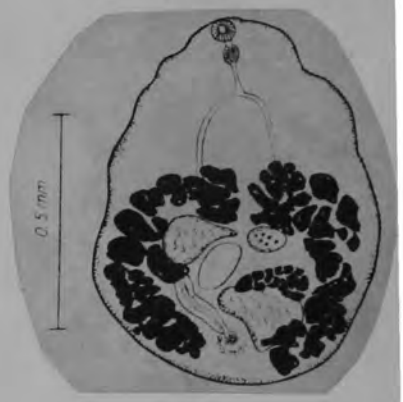
Präparat-Nr.: kT 13 26–27, 31 (13 Exemplare aus *Mergus*); kT 14 65 (ein Exemplar aus *Podiceps*); kT 14 76–83 (124 Exemplare aus *Pelecanus*).

Beschreibung (vgl. Tabelle 1 und Abb. 1): Cuticula fein bestachelt. Körper eiförmig 0,338–0,84 mm lang bei einer maximalen Breite von 0,242–0,631 mm. Bauchsaugnapf nur bei wenigen Exemplaren erkennbar. Die Tiere enthielten höchstens ein Ei. Eigröße 107 bis 155 × 65–106 µm. Tribocytisches Organ oval, 0,072–0,155 mm lang und 0,059 bis 0,131 mm breit.

Bemerkungen. Diese Art war von SUDARIKOV (1956), dem ODENING (1962b, c) folgte, als Synonym von *Paracoenogonimus* (= *Linstowiella*) *viviparae* (v. LINSTOW, 1877) bezeichnet worden. SUDARIKOV in SKRJABIN (1961) sieht jetzt *P. ovatus* und *P. viviparae* als verschiedene Arten an, die sich vor allem in der Morphologie der Cercarien und der Wahl der Hilfswirte unterscheiden. So finden sich die Metacercarien von *P. ovatus* in Fischen, die von *P. viviparae* dagegen in Schnecken (*Viviparus*-Arten). Die Maritae beider Formen sind freilich nur schwer unterscheidbar (*P. viviparae* soll nicht die Größe von *P. ovatus* erreichen). Als bisher einzigen natürlichen Endwirt von *P. viviparae* hat SUDARIKOV (1961) *Larus argentatus* PONT. nachgewiesen (zusätzlich dazu experimenteller Befund bei der Hausente). Die Silbermöwe wird von SUDARIKOV als gelegentlicher Wirt angesehen, den Hauptwirt vermutet er in der molluskenfressenden *Aythya fuligula* (L.). *P. ovatus* wurde bisher festgestellt in *Aquila nipalensis* HDGS., *Buteo buteo* (L.), *Circus aeruginosus* (L.), *Falco tinnunculus* L., *Haliaetus albicilla* L., *Larus ridibundus* L., *Mergus merganser* L., *Milvus migrans* (BODD.), *Pandion haliaetus* (L.), *Stercorarius parasiticus* (L.), *Sterna hirundo* L., *Sterna paradisea* BRÜNN., *Canis lupus* L. Dieser Wirtsliste können nun noch *Podiceps cristatus* und das Zootier *Pelecanus occidentalis* hinzugefügt werden. Im Falle des Meerpelikans kann angenommen werden, daß die Trematoden im Berliner Tierpark durch Futterfische übertragen worden waren (vgl. hierzu auch ODENING 1961a, über *Paracoenogonimus stresemanni*). Der Art *P. ovatus* sehr ähnlich (wenn nicht sogar mit ihr identisch) sind *P. skworzowi* (PETROV 1950) aus der Hauskatze und *P. stresemanni* ODENING, 1960, aus dem Zootier *Abdimia abdimii* LICHT.

Wirt	*Pelecanus occidentalis*					*Podiceps*	*Mergus merganser*			
Körperlänge	0,84	0,547	0,455	0,639	0,404	0,455	0,84	0,631	0,661	0,580
Maximale Körperbreite	0,697	0,440	0,348	0,484	0,352	0,338	0,631	0,422	0,375	0,338
Mundsaugnapf										
Länge	0,070	0,043	0,053	0,058	0,048	0,041	0,062	0,052	0,053	0,046
Breite	0,062	0,049	0,044	0,062	0,049	0,046	0,062	0,056	0,055	0,049
Bauchsaugnapf										
Länge	?	?	?	0,035	?	?	?	?	0,039	0,039
Breite	?	?	?	0,044	?	?	?	?	0,037	0,039
Pharynx										
Länge	0,055	0,039	0,039	0,046	0,046	0,037	0,046	0,046	0,049	0,044
Breite	0,039	0,026	0,018	0,028	0,028	0,032	0,049	0,033	0,039	0,037
Ösophagus-länge	0,053	0,055	0,028	0,026	0,026	0,019	0,035	0,040	0,056	?
Ovarium										
Länge	0,062	0,046	0,035	0,049	0,046	0,032	0,067	0,062	0,053	0,062
Breite	0,067	0,053	0,062	0,048	0,055	0,044	0,092	0,079	0,062	0,046
Vorderer Testis										
Länge	0,132	?	0,100	0,095	0,044	0,055	0,114	?	0,092	0,106
Breite	0,104	?	0,051	0,148	0,100	0,121	0,162	?	0,083	0,092
Hinterer Testis										
Länge	0,248	0,079	0,056	0,097	0,058	0,040 0,046	0,150	0,120	0,097	0,106
Breite	0,046 0,114	0,158	0,114	0,172	0,118	0,123	0,197	0,121	0,148	0,114





FROM ODENING, 1963

PARACOENOGONIMUS

Pseudhemistominae Szidat, 1936

Subfamily diagnosis. — Cyathocotylidae: Body bipartite; anterior region foliiform, posterior region usually short and poorly developed; vitellaria distributed in two regions.

Pseudhemistomum Szidat, 1936

Generic diagnosis. — Cyathocotylidae, Pseudhemistominae: Body bipartite; forebody oval or rounded, without pseudosuckers; hindbody short, almost rudimentary. Oral sucker large, acetabulum atrophied, very small. Tribocytic organ circular, about half as long as forebody, with central cavity. Testes very large, symmetrical, in forebody or partly intruding into hindbody. Cirrus pouch strongly developed. Ovary ventral or posterior to right testis. Vitelline follicles fairly small, distributed mainly in forebody up to oral sucker, partly intruding into hindbody. Parasitic in Longipennes.

Genotype: *P. unicum* Szidat, 1936 (Pl. 70, Fig. 849) in *Sterna hirundo* and *S. paradisea;* Germany.

Other species: *P. minus* Szidat, 1936, in *Sterna hirundo*, Germany.

PSEUDHEMISTOMUM

Szidatiinae Dubois, 1938

Syn. Gogateainae Mehra, 1943

Gogatinae Mehra, 1947

Subfamily diagnosis. — Cyathocotylidae: Body elongate, linguiform, more or less bipartite; posterior portion well developed, containing whole or part of gonads. Vitellaria may or may not intrude into tribocytic organ, latter variable in size, with or without median slit.

Key to genera of Szidatiinae

Vitellaria divided into two lateral groups ..... *Szidatia*

Vitellaria confined to strongly developed massive tribocytic organ ..... *Gogatea*

Szidatia Dubois, 1938

Generic diagnosis. — Cyathocotylidae, Szidatiinae: Body bipartite; forebody cochleariform or sublinguiform, spinulate anteriorly; forebody concave ventrally, with its posterior border distinctly separating body into two regions; hindbody cylindrical, containing gonads. Tribocytic organ small to medium-sized, elongate, with median slit. Oral sucker larger than pharynx, esophagus short, ceca terminating some distance short of posterior extremity. Acetabulum small, situated at about middle of forebody. Testes tandem. Cirrus pouch well developed, containing winding seminal vesicle and distinct prostatic complex. Genital pore nearly terminal. Ovary rounded, intertesticular, median or submedian, partly overlapping anterior testis; these two organs at base of forebody. Shell gland and vitelline reservoir intertesticular. Uterus reaching as far forward as tribocytic organ, eggs large, few. Vitelline follicles large, divided into two lateral groups, chiefly in posterior part of forebody, extending as far back as intertesticular level. Parasites of snakes.

Genotype: *S. joyeuxi* (Hughes, 1929) Dubois, 1938 (Pl. 47, Fig. 572), in intestine of *Tropidonotus viperinus;* Tunis, Morocco. Also in *T. natrix* var. *persa* experimentally.

Cercaria vivax Sonsino, 1984, (in part) from *Melanopsis* sp. is supposed to be the larva of this species. Metacercaria (*Diplostomulum joyeuxi* Hughes, 1929) in *Rana esculenta* var. *ridibunda; Astatotilapia desfontainesi* from Tunis. Cf. Joyeux (1923, 27), Langeron (1924), Joyeux and Baer (1934), Joyeux and Gaud (1945). *Melanopsis tunetana*, placed in water at 30° C, emitted cercariae. Four *Rana esculenta ridibunda* and one *Hyla arborea* were exposed to cercariae, and 6 months later cysts were found in their leg muscle, as well as in abdominal and thoracic muscles. Infected *Rana esculenta* were ingested by *Tropidonotus viperinus* (natural definitive host) which yielded after 9 days adult trematodes identified as *S. joyeuxi*. — Joyeux and Baer (1941). Cf. *S. joyeuxi* forma *maroccana* Dollfus, 1953.

Other species: *S. Nemethi* Dollfus, 1953, in *Natrix viperina;* Morocco.

SZIDATIA

For a Revision of the Cycloelidae, see DUBOIS, 1959