

FIVE NEW SPECIES OF ANCYLODISCOIDINS (MONogenea:
ANCYLODISCOIDIINAe) FROM NOTOPTERUS CHITALA
(HAMILTON) AND NOTOPTERUS NOTOPTERUS (PALLAS)
IN PENINSULAR MALAYSIA

L. H. S. LIM and J. I. FURTADO

Department of Zoology, University of Malaya, Kuala Lumpur

Abstract. Five new species of aencylodiscoidins were collected and described from two notopterids, *Notopterus chitala* (Hamilton) and *Notopterus notopterus* (Pallas) in Peninsular Malaysia. They are *Notopterodiscooides belidus* n. g. et n. sp., *Notopterodiscooides ornatohamus* n. g. et n. sp., *Silurodiscoides tasekensis* n. sp. and *Silurodiscoides platamauxili* n. sp. from *N. chitala*, and *Malayanodiscooides bilhamuli* n. g. et n. sp. from *N. notopterus*. The new genera belong to the subfamily Aencylodiscoidinae and are characterised by unusual features in their marginal hooks: each of the first pair of marginal hooks in *Notopterodiscooides* gen. n. has a process protruding from its handle, while *Malayanodiscooides* gen. n. has a bar between the individuals of the ventral pair of marginal hooks. A previously described species ("*Urocleidus*" *notopteri* Jain, 1955) was also collected from *N. notopterus*. However, based on the structure of the seminal vesicle which is characteristic of the subfamily Aencylodiscoidinae, this species should be re-designated as *Silurodiscoides notopteri* (Jain, 1955) comb. nov.

The genus *Notopterus* (Notopteridae) of the order Isopondyli is limited in distribution to the Oriental zoogeographical region (*Notopterus chitala* (Hamilton) and *Notopterus notopterus* (Pallas)) and to Central Africa (*N. afer* (Gunther)). Hitherto there is only one monogenean species "*Urocleidus*" *notopteri* Jain, 1955 (Ancyrocephalinae) (Gussev 1976) collected from *N. notopterus* in India. Gussev (1976) has renamed it *Ancyrocephalus* (s. l.) *notopteri* but the present collection of the same species reveals that the structure of the seminal vesicle characterizes it as an aencylodiscoidin rather than an ancyrocephalin (see: *Silurodiscoides notopteri* (Jain, 1955) comb. nov.).

Five new monogenean species have also been collected from *N. chitala* (four species) and *N. notopterus* (one species).

MATERIALS AND METHODS

Notopterus chitala and *N. notopterus* were collected from several habitats in Peninsular Malaysia. *N. chitala* was collected from Tasek Bera, Pahang ($3^{\circ}5'N$ and $102^{\circ}38'E$) and around Selangor while *N. notopterus* was collected from Tasek Bera and Bukit Merah Reservoir ($5^{\circ}1'N$, $100^{\circ}40'E$). The monogeneans were recovered from gills freshly removed from the hosts, mounted on slides and fixed with ammonium—picrate and (or) glycerine-gelatine (Gussev, pers. comm.). Some specimens were studied alive under a phase contrast microscope.

The measurement techniques and terminologies used are according to Gussev (1978), while the enumeration of hooks is that of Llewellyn (1963). To avoid confusion (since both dorsal and ventral anchors are present), the terms "dorso-apical" length and "ventro-apical" length are replaced by "inner" and "outer" length (Gussev, pers. comm.). The morphometrical data are given in micrometers, with the holotype data first followed by minima-maxima ranges in parentheses. The type specimens are deposited in the Department of Zoology, University of Malaya, Kuala Lumpur, and also in the helminthological collection, Institute of Parasitology, Czechoslovak Academy of Sciences, České Budějovice (IPCAS).

DESCRIPTION OF NEW GENERA AND SPECIES

1. *Notopterodiscoides belidus* gen. et sp. n.

Host: *Notopterus chitala* (Hamilton).

Localities: Selangor (type locality) and Tasek Bera, Pahang.

Number of specimens collected: 55 specimens from 2 individuals of *N. chitala*.

Type specimens: Holotype (UMZD(P)3) in Dept. of Zoology, U.M.K.L., and one paratype in IPCAS.

Description (15 specimens): Body length 666 (333—708); greatest body width 117 (58—117). Four anterior eyespots. Alimentary system as in dactylogyrids, intestinal crura uniting above the almost rectangular-shaped haptor. Fourteen marginal hooks which can be morphologically divided into four types: 1. Dorsal pair (hook no. 1) with a process protruding from well demarcated handle; total length 28 (27—29). 2. Ventral pair (hook no. 7) with well demarcated handle as in hook no. 1 but without processes;

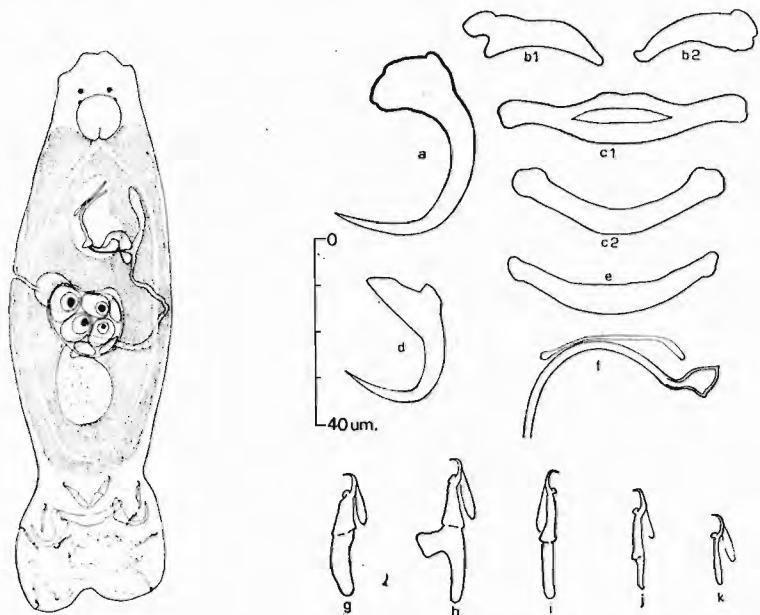


Fig. 1. Composite illustration of *Notopterodiscoides belidus* gen. et sp. nov. (ventral view).

Fig. 2. Hard parts of haptor, copulatory organ and vaginal armament of *Notopterodiscoides belidus* gen. et sp. n. (a — dorsal anchor; b1, b2 — different views of patches; c1, c2 — different views of dorsal bar; d — ventral anchor; e — ventral bar; f — copulatory organ; g — ventral marginal hook; h — dorsal marginal hook; i — marginal hook no. 2; j — marginal hook no. 3, 4, 5; k — marginal hook no. 6). (Illustrated from holotype and paratype (No 26. 1. 83 (26)).

total length 29 (28—29). 3. Others (No. 2, 3, 4, and 5) with well demarcated handles and varied sizes; total length 19 (17—25). 4. "Larval" form (No. 6); total length 15 (15—17). Four anchors. Dorsal anchors without roots, length 36 (35—40), recurved point 18 (13—19) and a pair of large triangular patches 30 (29—31). Ventral anchors inner length 27 (27—29), outer length 24 (19—25), inner root 10 (6—14), stumpy outer root and recurved point 15 (13—17). Two V-shaped connective bars, dorsal bar larger 6 (6—8) ×

Figs. 1, 2

52 (42—52); ventral bar 6 (4—6) × 46 (42—46). Vitellaria of dactylogyrid-type. Ovary situated in posterior half of body. Uterus opens just below the copulatory organ. Vagina dextral, with tube leading into seminal receptacle. Testis single, situated posterior dorsal to ovary. Vas deferens extends from the right- dorsal side, crosses diagonally to the left intestinal trunk to emerge on to the ventral side. The vas deferens ends in a blind appendage, the seminal vesicle, which is connected to the initial part of the copulatory tube by the ejaculatory duct. Also entering the copulatory tube is the prostate gland. The copulatory organ consists of a short copulatory tube 40 (33—46) and a rod-like accessory piece 31 (21—35).

Differential diagnosis: The structure of the seminal vesicle and the presence of the patches on the dorsal anchors indicate that this species belongs to the subfamily Aencylodiscoidinae. It is different from the existing species of Aencylodiscoidinae in the structure of the marginal hook (especially no. 1 in which the handle has a protruding process). The structures of the dorsal anchors without roots and solid non-paired bars are also different from those of *Silurodiscoides*, *Cornudiscoides*, *Bychowskyella* and *Quadrifacanthus*, however the anchors are quite similar to the large dorsal anchors of *Bifurcohaptor* species.

The anchors and copulatory organs of the present species are rather similar to those of "Urocleidus" *notopteri* Jain, 1955 but "U". *notopteri* differs in having marginal hooks which are unlike those of the present species (see *Silurodiscoides notopteri* (Jain, 1955) comb. nov.).

Following current trends in taxonomy, a new genus, *Notopterodiscoides* n. g., is created to accommodate the present species. The species is named *Notopterodiscoides belidus* gen. et sp. n. after the local name of the host "belida".

2. *Notopterodiscoides ornatahamus* gen. et sp. n.

Fig. 3

Host: *Notopterus chitala* (Hamilton).

Localities: Selangor (type locality) and Tasek Bera, Pahang.

Type specimens: Holotype (UMZD(P)4) in the Dept. of Zoology and one paratype in IPCAS.

Number of specimens collected: 13 specimens from 2 individuals of *N. chitala*.

Description (10 specimens): Body length 79 (417—791); greatest body width 167 (125—167). Four anterior eyespots. Dactylogyrid-type of alimentary system. Rectangular haptor well set off from body. Fourteen marginal hooks, morphologically divided into 4 groups (as in *Notopterodiscoides belidus* gen. et sp. n.): 1. Dorsal pair (no. 1) with a process projecting from the handle; length 35 (33—37). 2. Ventral pair (no. 7) without protruding process but with well demarcated handle; length 39 (37—42). 3. Others (No. 2, 3, 4 and 5) with well demarcated handles and varied sizes; length 27 (25—31). 4. "Larval" type of marginal hooks (No. 6); length 19 (15—19). Four anchors: dorsal anchors without roots, length 56 (54—58), recurved point 18 (13—19) and a pair of large patches 46 (42—46). Ventral anchors, inner length 23 (21—25), outer length 16 (16—21), inner root 12 (10—13), stumpy outer root and slightly recurved point 9 (8—13). Two slightly V-shaped bars; dorsal bar 15 (10—15) × 65 (62—69) and ventral bar 6 (4—6) × 48 (48—52). Dactylogyrid-type of vitellaria. Small ovary situated in the posterior half of the body. Muscular uterus opens on the ventral side of the body near the copulatory organ. Vagina is dextral with tube leading into seminal receptacle. Testis situated in the dorsal part of the body, posterior to the ovary. The vas deferens arises from the testis on the right dorsal side extends to the left side, twists around the left intestinal trunk to the ventral side forming the seminal vesicle which is an enlarged elongated blind appendage on the vas deferens. The seminal vesicle and the prostate gland are connected separately via separate thin tubes to the initial part of the co-

pulatory tube. The copulatory organ consists of a long tube 171 (166 — 187) \times 3 (2 — 3) (which is usually displaced in a slightly undulating fashion along the length of the body) and thin sclerites (accessory piece) twining along the length of the tube.

Differential diagnosis: This species is similar to *Notopterodiscoides belidus* gen. et sp. n. in possessing the same type of haptoral sclerites. It is different from *N. belidus* in the structure of the copulatory organs and in the sizes of the haptoral sclerites.

This species is the second species to be described for the new genus *Notopterodiscoides* gen. n. It is named *Notopterodiscoides ornatohamus* gen. et sp. n. because of the unusual marginal hooks (ornatohamus).

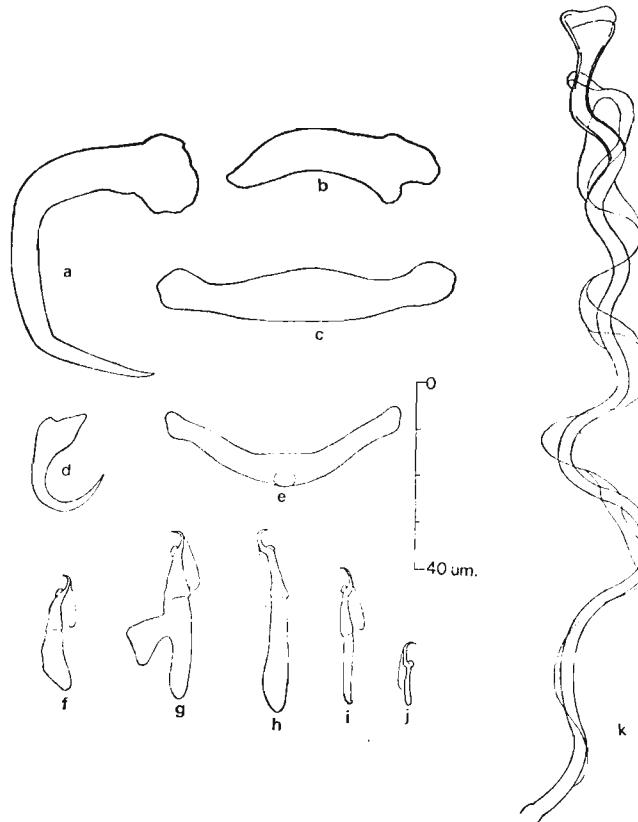


Fig. 3. Hard parts of haptor, copulatory organ and vaginal armament of *Notopterodiscoides ornatohamus* gen. et sp. n. (a — dorsal anchors; b — patch; c — dorsal bar; d — ventral anchor; e — ventral bar; f — ventral marginal hook; g — dorsal marginal hook; h — marginal hook no. 2; i — marginal hooks nos. 3, 4, 5; j — marginal hook no. 6; k — copulatory organ). (Illustrated from paratype (No 955; No 2).

Notopterodiscoides gen. n.

Diagnosis: Ancyrocephalidae; Aneylodiscoidinae; monogeneans possessing dactylogyrid-type of alimentary system and vitellaria. Haptor well set off from body proper. Four anchors, dorsal anchors without roots, but with a pair of patches. Two connective bars. Fourteen marginal hooks which can be differentiated morphologically into 4 types: 1. Dorsal pair (no. 1) with a process protruding from the well demarcated han-

gle. 2. Ventral pair, without protruding processes but with well demarcated handles. 3. Others (2, 3, 4 and 5) with well demarcated handles and varied sizes. 4. "Larval" type of marginal hooks (No. 6). Ovary situated in posterior half of the body, with muscular uterus opening on the ventral side along the midline of the body. Vagina dextral. Testis single, situated in the dorsal side posterior to the ovary. Vas deferens twists around the left intestinal trunk. Seminal vesicle is an elongated blind appendage on the vas deferens which opens into the initial part of the copulatory organ via thin tube. The prostate gland also enters the initial part of the copulatory organ. Copulatory organ present. Type species: *Notopterodiscoides belidus* gen. et sp. n.

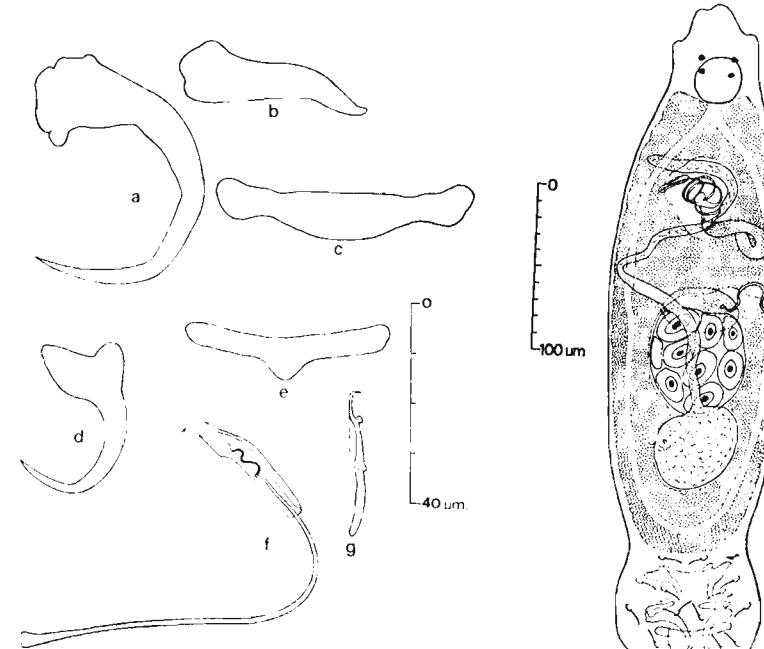


Fig. 4. Composite illustration of *Silurodiscoides tasekensis* sp. n. (dorsal view).

Fig. 5. Hard parts of haptor, copulatory organ and vaginal armament of *Silurodiscoides tasekensis* sp. n. (a — dorsal anchor; b — patch; c — ventral anchor; e — ventral bar; f — marginal hook; g — copulatory organ; h — vaginal tube). (Illustrated from holotype).

Silurodiscoides tasekensis n. sp.

Figs. 4, 5

Host: *Notopterus chitala* (Hamilton).

Localities: Selangor (Type locality) and Tasek Bera, Pahang.

No. of specimens collected: 15 specimens from 2 individuals of host.

Type specimens: Holotype (UMZD(P)5) in the Dept. of Zoology, UM., K. L. and one paratype in IPCAS.

Description (10 specimens): Body length 500 (333 — 583); greatest body width 100 (83 — 133). Four anterior eyespots. Alimentary system dactylogyrid-type. Haptor well set off from body. Fourteen marginal hooks, length 16 (10 — 17), larval type. Four anchors. Dorsal anchors without roots, length 33 (31 — 37), slightly recurved point 13

(8—15) and two knee-shaped patches 21 (19—21). Ventral anchors with inner length 25 (25—26), outer length 18 (15—19), inner root 9 (8—10), stumpy outer root and recurved point 10 (8—15). Two slightly V-shaped connective bars. Dorsal bar 6 (4—6) \times point 10 (8—15). Ventral bar 4 (2—4) \times 33 (31—35). Vitellaria of dactylogyrid-type. Ovary is located in the posterior half of the body. Uterus opens on the ventral side along the midline of the body. Vagina dextral, consisting of a simple sclerotized tube. Testis single, located dorsal-posterior to ovary. Vas deferens twists around the left intestinal trunk to the ventral side of the body. Near the copulatory organ the vas deferens enlarges and elongates forming a "blind" appendage, which is the seminal vesicle. The seminal vesicle curves above the copulatory organ in the region just below the pharynx. The seminal vesicle and prostate glands are connected to the initial part of the copulatory tube separately via thin tubes. The copulatory organ consists of coiled tube 42 (29—46) and a tubular or grooved accessory piece 25 (21—25) which is at the distal end of the copulatory tube.

Differential diagnosis: The presence of seminal vesicle in the form of a blind appendage on the vas deferens and the pair of patches indicate that the present species is an aencylodiscoidin. The structure of the dorsal anchors and solid bars of the present species are similar to those of *N. belidus* gen. et sp. n. and *N. ornatohamus* gen. et sp. n., however, the present species lacks the unique type of marginal hooks found in the *Notopterodiscoides* species. Of the existing genera in Aencylodiscoidinae, *Silurodiscoides* is most able to accommodate the present species, although it differs from other *Silurodiscoides* in the general structure of the anchors.

The present species is named *Silurodiscoides tasekensis* sp. n. after Tasek Bera.

4. *Silurodiscoides platamauxili* sp. n.

Fig. 6

Host: *Notopterus chitala* (Hamilton).

Localities: Tasek Bera (type locality) and Selangor.

No. of specimens collected: 12 specimens from 3 individuals of *N. chitala*.

Type specimens: Holotype (UMZD(P)6) in the Dept. of Zoology and one paratype in IPCAS.

Description (9 specimens): Body length 666 (392—666); greatest body width 125 (83—125). Four eyspots. Alimentary system is of dactylogyrid-type. Fourteen marginal hooks, with well demarcated handles except hook no. 6, the smallest hook measuring 15 μm . The longest hooks measure 29 (27—31), while medium size hooks are 24 (21—25). Four anchors. Dorsal anchors without roots, length 46 (44—48), recurved point 15 (13—21) and a pair of very large patches 36 (33—37). Ventral anchors with inner length 29 (29—33), outer length 25 (23—31), inner root 10 (8—10), stumpy outer root 1 (1—4) and recurved point 10 (8—13). Vitellaria of dactylogyrid type. Ovary is located in the posterior half of the body. Uterus opens on the ventral side at the level of the copulatory organ. Vagina dextral, with thin tube leading into seminal receptacle.

Testis is situated dorsal-posterior to the ovary. Vas deferens twists round the left intestinal trunk (from the dorsal to the ventral side). Near the copulatory organ it forms the elongated blind sac, the seminal vesicle. Both the prostate gland and seminal vesicle enter the initial part of the copulatory organ via separate tubes. The copulatory organ consists of a short straight tube 79 (62—83) and a tubular accessory piece 25 (21—31). **Differential diagnosis:** The anchors and bars of the present species are similar to that of *S. tasekensis* sp. n. and the 2 *Notopterodiscoides* species, but they differ in the structures of the patches, marginal hooks and copulatory organs. The marginal hooks (nos. 1—5, 7) of the present species are similar to type 2 marginal hooks of *Notopterodiscoides* species, but the present species lacks marginal hooks of type 1.

It is named *Silurodiscoides platamauxili* sp. n. because of its very large patches.

5. *Silurodiscoides notopteri* (Jain, 1955) comb. nov.

Host: *Notopterus notopterus* (Pallas).

Comparison of the present specimens with those of Jain (1955) and Gussev (1976) as well as the drawings given by Gussev (1976) (Table 1) shows that they are the same species with a few exceptions in size. The study of live specimens indicates that the

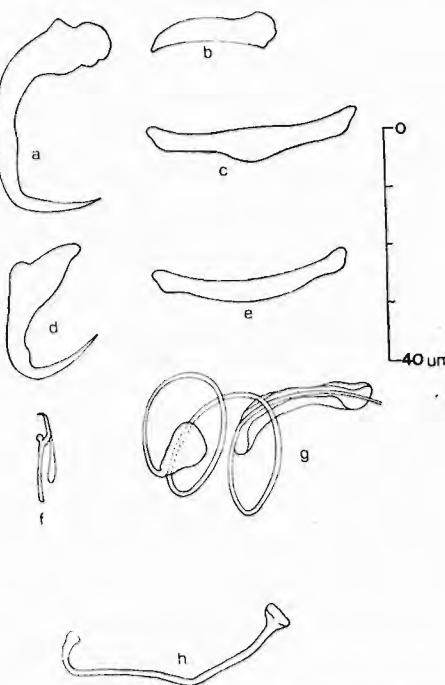


Fig. 6. Hard parts of haptor, copulatory organ and vaginal armament of *Silurodiscoides platamauxili* sp. n. (a — dorsal anchor; b — patch; c — dorsal bar; d — ventral anchor; e — ventral bar; f — copulatory organ; g — marginal hook). (Illustrated from paratype (No 26. 1. 83 (26)).

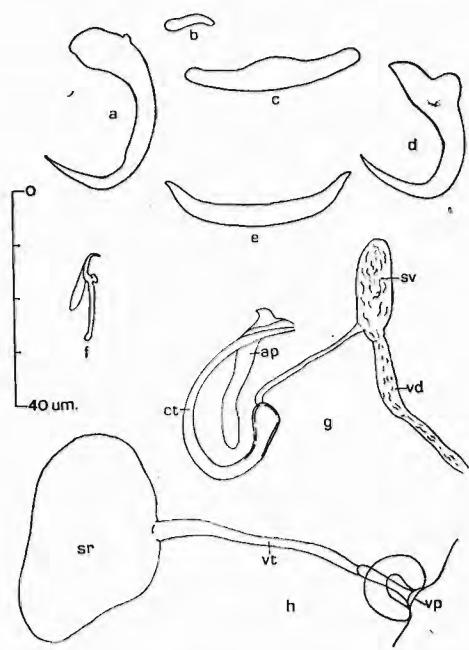


Fig. 7. Hard parts of haptor, copulatory, organ and vaginal armament of *Silurodiscoides notopteri* (Jain, 1955) comb. nov. (a — dorsal anchor; b — patch; c — dorsal bar; d — ventral anchor; e — ventral bar; f — marginal hook; g — copulatory organ (ct — copulatory tube; ap — accessory piece; sv — seminal vesicle; vd — vas deferens); h — vaginal armament (vp — vaginal pore; vt — vaginal tube; sr — seminal receptacle)). (Illustrated from paratype Nn TB 14/32).

seminal vesicle is a blind sac (Fig. 7g) similar to those found in aencylodiscoidin necessitating the re-designation of the present species as an aencylodiscoidin instead of an aencyrocephalin as proposed by Jain (1955) (*Urocleidus*) and Gussev (1976) (*Aencyrocephalus* (s. l.)). Like *S. tasekensis* sp. n. and *S. platamauxili* sp. n., the present species differs from the previously described *Silurodiscoides* species in the general shape and structure of the anchors and bars (both the dorsal and ventral bars are solid V-shaped). This species is hence re-designated as a *Silurodiscoides*, although the host of the present species does not belong to the catfish group (up till now the aencylodiscoidins have been located in catfishes only) (see Gussev 1976, 1978).

Table 1. Morphometric data of *Silurodiscoides notopteri* (Jain 1955) comb. nov. (in μm) from different sources

Characters	“ <i>Urocleidus</i> ” <i>notopteri</i> Jain, 1955	“ <i>Ancyrocephalus</i> (s. l.)” <i>notopteri</i> Gussev, 1976	Present specimens
Body length \times width	420 \times 70	550 \times 15	(300—583) \times (50—142)
Haptor length \times width	—	—	(66—133) \times (42—142)
Dorsal anchor:			
Outer length	40—41	33—35	(29—31)
Inner length	—	—	(29—31)
Inner root	—	—	(8—10)
Outer root	—	—	—
Point	—	15	(8—10)
Patch size	22—24	10—14	(8—10)
Dorsal bar size:			
Length \times width	— \times (40—41)	6 \times 34	(3—6) \times (29—35)
Ventral anchor:			
Outer length	35—42	27—30	(25—27)
Inner length	—	—	(23—25)
Shaft	—	24	—
Inner root	—	8	—
Outer root	—	1	(2—4)
Point	—	14—15	(10—14)
Ventral bar: length \times width	— \times (35—37)	6 \times 40	(3—4) \times (31—35)
Marginal hooks	14—17	15—18	(15—17)
Copulatory organ:			
(a) tube length	55—60	78	(25—31)
(b) diameter of initial	—	10	(4—6)
(c) diameter of midpart	—	4	—
(d) Accessory piece	—	—	(19—27)
Vaginal tube:			
Length \times diameter	—	20 \times 10	—
No. measured	—	—	12
No. studied alive	—	—	18

6. *Malayanodiscoides bihamuli* gen. et sp. n.

Figs. 8, 9

Host: *Notopterus notopterus* (Pallas).

Localities: Tasek Bera (type locality) and Bukit Merah Reservoir.

No. of specimens collected: 52 from 4 individuals of *N. notopterus*.

Type specimens: Holotype (UMZD(P)7) in the Dept. of Zoology and one paratype in IPCAS.

Description (21 specimens): Body length 475 (492—608); greatest body width 133 (75—142). Four anterior eyespots. “Hair-like” structures observed in the head region of live specimens. Alimentary system as in dactylogyrids. Fourteen marginal hooks of which two pairs are structured differently (Fig. 9f, g), one of these two pairs (the ventral pair) possesses a bar 1.0 (0.5—1.0) \times 10 (10—15). Observations of live specimens showed that these two pairs are always associated with their partners and located anterior to the dorsal and ventral anchors. The two pairs measured 21 (19—21) whereas the others are 17 (15—17). Dorsal anchors, inner length 35 (33—40); outer length 27 (25—40); inner root 11 (8—11); outer root 2 (2—3); point 17 (15—21), and a pair of patches 8 (6—10). Ventral anchors possess inner length 29 (27—29); outer length 19 (17—21); inner root 11 (10—13), outer root 3 (2—4) and has a point of 15 (10—17). Dorsal bar, V-shaped 4 (3—6) \times 29 (23—33); ventral bar also V-shaped, 2 (3—4) \times 31 (29—40). Vaginal pore is dextral, consisting of an atrium which is connected

to the seminal receptacle by a tube. Ovary is slightly elongated, situated almost at midbody. Follicular vitellaria, connected anteriorly, at midbody and posteriorly as in dactylogyrids. Testes elongated, dorsal to ovary. Vas deferens arises from testes on dorsal side, ascends to left side of body into ventral side, forming elongated “blind” pear-shaped seminal vesicle. A thin tube leaves the seminal vesicle to copulatory tube. Copulatory organ consists of a straight pipe 37 (33—37) which tapers and ends in a little hook (like a pencil with a hook), and 3—4 thin spicule-like accessory pieces which probably are used to enlarge ventral sphincter-like genital atrium into which the copulatory tube is directed. Also entering the initial part of the copulatory tube is the accessory gland (possibly the prostate gland).

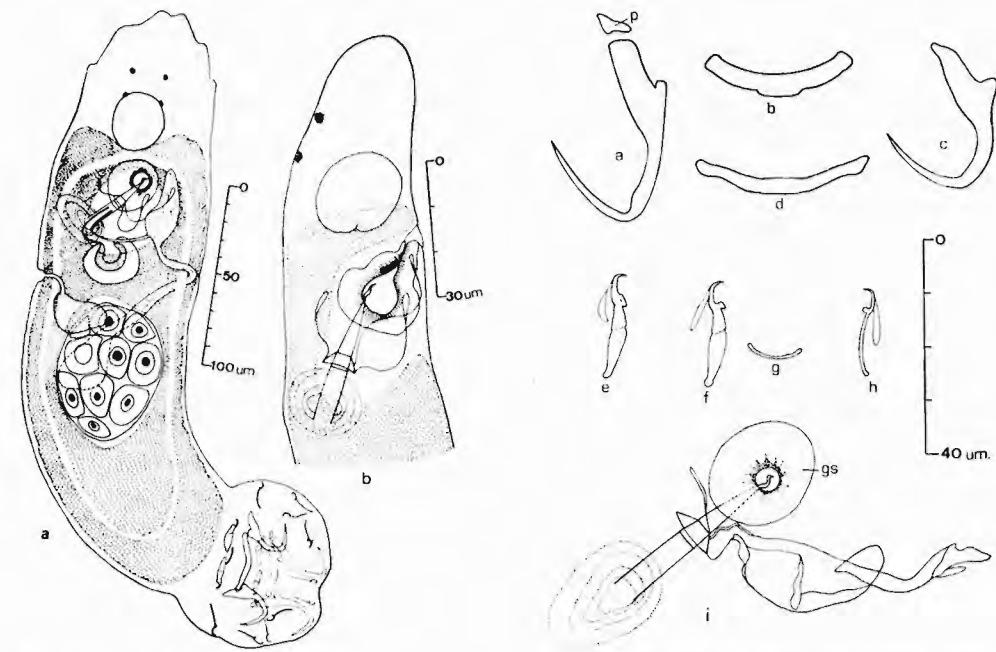


Fig. 8. a — Composite illustration of *Malayanodiscoides bihamuli* gen. et sp. n. (ventral view). Side view of *Malayanodiscoides bihamuli* gen. et sp. n. showing the position of the genital sphincter (male).

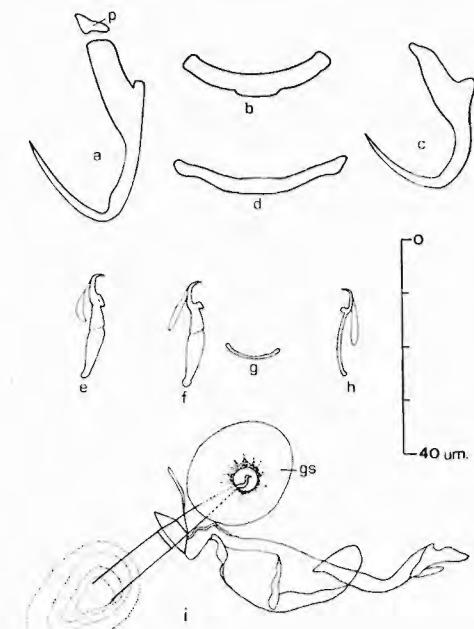


Fig. 9. Hard parts of haptor, copulatory organ and vaginal armament of *Malayanodiscoides bihamuli* gen. et sp. n. (a — dorsal anchor with patch (p); b — dorsal bar; c — ventral anchor; d — ventral bar; e — dorsal marginal hook (n. 1); f — ventral marginal hook (no. 7) with bar (g); h — marginal hook nos. 2, 3, 4, 5, 6; i — copulatory organ (gs — genital sphincter). (Illustrated from holotype).

Differential diagnosis: This belongs to the aencylodiscoidins because of the presence of the seminal vesicle as a blind appendage on the vas deferens and the presence of patches on the dorsal anchors. It however differs from known aencylodiscoidin species in possessing a bar between the ventral pair of marginal hooks, the structure of the copulatory organ and a sphincter-like genital opening. The presence of the bar linking the ventral pair of marginal hooks, necessitate the creation of a new genus, *Malayanodiscoides* gen. n. to accommodate this species.

It is named *Malayanodiscoides bihamuli* gen. et sp. n. because of the close association of the ventral pair of marginal hooks.

Malayanodiscoides gen. n.

Diagnosis: Ancyrocephalidae; Ancylodiscoidinae; monogeneans with dactylogyrid-type of alimentary and vitellarial systems. Haptoral armaments consists of two pairs of anchors, a pair of patches connected with dorsal anchor; two robust connective bars. Fourteen marginal hooks in which two pairs are more robust than the rest and one of these pairs (the ventral pair) possesses a bar. The reproductive system is that of subfamily Ancylodiscoidinae except for the presence of genital pore sphincter. Type species: *Malayanodiscoides bihamuli* sp. n.

DISCUSSION

The present new species from notopterids, *Silurodiscoides* (2 species) and *Notopterodiscoides* gen. n. (2 species) and *Silurodiscoides notopteri* comb. nov. possess similar types of anchors, patches and connective bars with the exception of *Malayanodiscoides* gen. n. (1 species). All the present species belong to the subfamily Ancylodiscoidinae (as indicated by the structure of the seminal vesicle). In both the new genera the dorsal (hook no. 7) and ventral (hook no. 1) pairs of marginal hooks are very different from the other hooks: *Notopterodiscoides* gen. n. has been created to accommodate two species of ancylodiscoidins which possess a pair of marginal hooks with protrusions on the handles (see Figs. 1, 2), while in *Malayanodiscoides* gen. n. there is a bar between the ventral pair of marginal hooks. (Fig. 9f).

The present two new species of *Silurodiscoides* (*S. tasekensis* sp. n. and *S. platamauxili* sp. n.) and *S. notopteri* are different from the existing *Silurodiscoides* found in catfishes (Gussev 1976). In catfishes, the *Silurodiscoides* species have fine W-shaped ventral bars, while the present *Silurodiscoides* species have solid robust V-shaped bars. In fact, the present three *Silurodiscoides* species are more similar to the *Notopterodiscoides* species in the structures of the anchors and bars. In spite of the differences to existing *Silurodiscoides* (especially from India; see Gussev 1976) and the similarities to *Notopterodiscoides* gen. n. the present *Silurodiscoides* species are classified as such because of the structure of their seminal vesicle and the fact that there are no other extra structures that could justify the creation of a genus to accommodate them.

Acknowledgements. This paper forms a part of a Ph.D. project of one of us (Lim). We would like to express our thanks to Dr. A. V. Gussev of the Zoological Institute, USSR Academy of Sciences, Leningrad, for his invaluable comments and help.

ПЯТЬ НОВЫХ ВИДОВ ПОДСЕМЕЙСТВА ANCYLODISCOIDINAE
(МОНОГЕНА) ОТ *NOTOPTERUS CHITALA* (HAMILTON),
И *N. NOTOPTERUS* (PALLAS) МАЛАЙСКОГО ПОЛУОСТРОВА

Л. Г. С. Лим, Й. И. Фуртадо

Резюме. Дано описание 5 новых видов и 2 новых родов моногеней подсемейства Ancylodiscoidinae от двух видов рода *Notopterus*, *N. chitala* (Hamilton) и *N. notopterus* (Pallas) Малайского полуострова: *Notopterodiscoides belidus* n. g. et n. sp., *N. ornatothamus* n. g. et n. sp., *Silurodiscoides tasekensis* n. sp., *S. platamauxili* n. sp. и *Malayanodiscoides bihamuli* n. g. et n. sp. у видов рода *Notopterodiscoides* из рукоятки краевых крючков первой пары отходит отросток, у *Malayanodiscoides* между краевыми крючками вентральной пары находится пластина. На *N. notopterus* обнаружен тоже раньше описанный вид „*Urocleidus*“ *notopteri* Jain, 1955 но на основании структуры его семенного пузырька можно этот вид считать видом рода *Silurodiscoides* — *S. notopteri* (Jain, 1955) comb. nov.

REFERENCES

- GUSSEV A. V., Freshwater Indian Monogeneida. Principles of systematics, analysis of the faunas and their evolution. Ind. J. Helm. 25—26: 1—241, 1976.
—, Monogeneida of freshwater fishes. Principles of systematics, analysis of world fauna and its evolution. Parazitol. sb. Publ. House Nauka, Leningrad, 28: 96—198, 1978. (In Russian).
JAIN S. L., Monogenea of Indian freshwater fishes. III. *Urocleidus notopteri* n. sp. (subfamily Tetraonchinae) from the gills of *Notopterus notopterus* (Pallas), from Lucknow. Proc. Ind. Acad. Sci., Sec. B, 41: 31—37, 1955.
LLEWELLYN J., Larvae and larval development of monogeneans. In: Advances in Parasitology 1. Academic Press, London, etc., pp. 287—326, 1963.

Received 6 September 1984

L. H. S. L., Jabatan Zoology
Universiti Malaya, Kuala Lumpur,
Malaysia

FOLIA PARASITOLOGICA 33: 325, 1986.

M. Anciaux de Faveaux: Les Parasites des Chiroptères du Continent Africain.

Musée Royal de l'Afrique Centrale, Tervuren, Zool. Wetensch. 244 — Sci. Zool., 1984, 92 + IX pp.

Having published the Catalogue des Acariens Parasites et Commensaux des Chiroptères (Bruxelles 1971—1976) which comprises seven volumes, the author set himself the task of compiling a catalogue of all groups of bat parasites on the African continent. As mentioned in the introduction the term parasite is used to the broadest extent. It includes all organisms with direct and indirect relation to bats, that means commensal, foretic and guanobiont forms as well as pathoergonts and vectors of zoonoses. After a systematic summary of hosts and parasites the author presents a survey of parasites of individual bat species in relation to their microbiotope. These chapters constitute the main part of the catalogue. After a survey of organisms found in the shelters of bats, in guano and on undetermined hosts, the author gives characteristics of the host — parasite association in caves and subterranean localities, rocky crevices and crannies, in

hollows of trees, in holes under the bark and in branches of trees, in nests of weavers and cobwebs, on the top meristem of banana-trees, in shelters and in refuges in the foliage and in the head of trees, shrubs, bushes and roots as well as in hiding places inside and outside of human dwellings. The catalogue ends with alphabetical indices of hosts and parasites and with a comprehensive bibliography including 1080 references.

The catalogue is compiled most carefully and comprises a complete review of the fauna of micro- and macroorganisms living in association with bats. The author's ecological approach in compiling the whole work is particularly valuable. As well as the former catalogues also this one will certainly become a means of great value not only to zoologists and parasitologists but also to epidemiologists, virologists and further specialists.

Dr. F. Dusbábek, C.Sc.