MONOGENEANS FROM PANGASIIDAE (SILURIFORMES) IN SOUTHEAST ASIA: I. FIVE NEW SPECIES OF *THAPAROCLEIDUS* JAIN, 1952 (ANCYLODISCOIDINAE) FROM *PANGASIUS PANGASIUS*, *P. KINABATANGANENSIS*, *P. RHEOPHILUS* AND *P. NIEUWENHUISII*

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Summary :

The examination of gill parasites from *Pangasius pangasius* (Hamilton, 1822); *P. kinabatanganensis* Roberts & Vidthayanon, 1991; *P. rheophilus* Pouyaud & Teugels, 2000 and *P. nieuwenhuisii* (Popta, 1904) (Siluriformes, Pangasiidae) in Southeast Asia revealed the presence of six species of *Thaparocleidus* Jain, 1952 (Monogenea, Ancylodiscoidinae). One has been previously described from *P. pangasius*: *T. pangasi* (Tripathi, 1957). The other five are new species: *T. chandpuri* n. sp. from *P. pangasius*; *T. bahari* n. sp. and *T. sabanensis* n. sp. from *P. kinabatanganensis*; *T. redebensis* n. sp. from *P. rheophilus* and *T. mahakamensis* n. sp. from *P. nieuwenhuisii*.

KEY WORDS : Monogenea, Pangasiidae, *Thaparocleidus pangasi*, *T. chandpuri* n. sp., *T. bahari* n. sp., *T. sabanensis* n. sp., *T. redebensis* n. sp., *T. mahakamensis* n. sp

Résumé : MONOGÈNES DE PANGASIIDAE (SILURIFORMES) EN ASIE DU SUD-EST: I. CINQ ESPÈCES NOUVELLES DE *THAPAROCLEIDUS* JAIN, 1952 (ANCYLODISCOIDINAE), CHEZ *PANGASIUS PANGASIUS*, *P. KINABATANGANENSIS*, *P. RHEOPHILUS* ET *P. NIEUWENHUISII*

L'examen des parasites branchiaux de Pangasius pangasius *(Hamilton, 1822);* P. kinabatanganensis *Roberts & Vidthayanon, 1991;* P. rheophilus *Pouyaud & Teugels, 2000 et* P. nieuwenhuisii *(Popta, 1904) (Siluriformes, Pangasiidae), en Asie du sud-est, a révélé la présence de six espèces du genre Thaparocleidus Jain, 1952 (Monogenea, Ancylodiscoidinae). L'une,* T. pangasi *(Tripathi, 1957), a été retrouvée sur* P. pangasius. *Cinq autres espèces nouvelles, du même genre, sont décrites:* T. chandpuri *n. sp. chez* P. pangasius; T. bahari *n. sp. et* T. sabanensis *n. sp. chez* P. kinabatanganensis; T. redebensis *n. sp. chez* P. rheophilus *et* T. mahakamensis *n. sp. chez* P. nieuwenhuisii.

MOTS CLÉS : *Monogenea, Pangasiidae,* Thaparocleidus pangasi, T. chandpuri *n. sp.*, T. bahari *n. sp.*, T. sabanensis *n. sp.*, T. redebensis *n. sp.*, T. mahakamensis *n. sp.*

INTRODUCTION

Within the framework of an EC project on the biodiversity and culture of Southeast Asian catfishes, the gills from pangasiid fishes (Siluriformes, Pangasiidae) were examined for monogenean parasites. Twenty two of the 23 known species of fishes belonging to this family have been examined. This paper presents the descriptions of the five new species of *Thaparocleidus* Jain, 1952 (Monogenea, Ancylodiscoidinae) found on four *Pangasius* Valenciennes, 1840 species, viz., *P. kinabatanganensis* Roberts & Vidthayanon, 1991; *P. nieuwenhuisii* (Popta, 1904); *P. rheophilus* Pouyaud & Teugels, 2000 and *P. pangasius* (Hamilton, 1822) and a redescription of *Thaparocleidus pangasi*. The first three fish species from Borneo (Indonesia and Malaysia) have not been examined for parasites; while the fourth species (from Bangladesh), was examined by Tripathi (1957) in India. Monogenea from the other 18 pangasiid species will be described elsewhere.

To date a total of three species of *Thaparocleidus* have been described from *P. pangasius* and *P. hypophthalmus* (Sauvage, 1878) from India and Peninsular Malaysia, respectively (see Tripathi, 1957; Lim, 1990).

MATERIALS AND METHODS

Fish were bought in fish markets or directly from fishermen in Indonesia (East Kalimantan region, South part of Borneo Island), Malaysia (Sabah state, North part of Borneo Island) and Bangladesh. Fish were caught in the rivers using lines. The fish were dissected as soon as possible; the left branchial arches, separated by dorsal and ventral section, were frozen in liquid nitrogen, until examination. To verify the specific identity of host fishes, the carcasses were num-

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bered, fixed and preserved in formalin. In the laboratory, the gills were thawed and the monogeneans were detached from the gill using a strong water current. The worms were then transferred individually on a slide with a mounted needle directly into a drop of ammonium picrate-glycerine (mixture described by Malmberg (1957)). The preparation was then covered with a round cover slip and sealed with Glyceel (GURR - BDH Chemicals Ltd.). From these preparations, drawings were made of the sclerotised pieces of the haptor and of the copulatory complex using a camera lucida. Measurements, made with a digitiser, in micrometers as the mean ± the standard deviation followed by the range in parentheses, are those proposed by Gussev (1962) (Fig. 1). The method of numbering of the haptoral pieces is that adopted at ICOPA IV (Euzet & Prost, 1981). The terminologies proposed by Pariselle and Euzet (1995) and by N'Douba *et al.* (1999) are used.

RESULTS

Six species of Monogenea were recorded; one, *Thaparocleidus pangasi* (Tripathi, 1957), had already been described, while the other five are new species of *Thaparocleidus* (Ancylodiscoidinae, Monogenea) as defined by Lim (1996).

REDESCRIPTION

THAPAROCLEIDUS PANGASI (TRIPATHI, 1957) (Fig. 2)

Type-host: *Pangasius pangasius* (Hamilton, 1822).
Site: gills.
Type-locality: Rivers Malta, Ganga (Buxar), Cauvery and Hoogly.
Other locality: also found on the same host at Chandpur, Ganges Delta, Bangladesh.

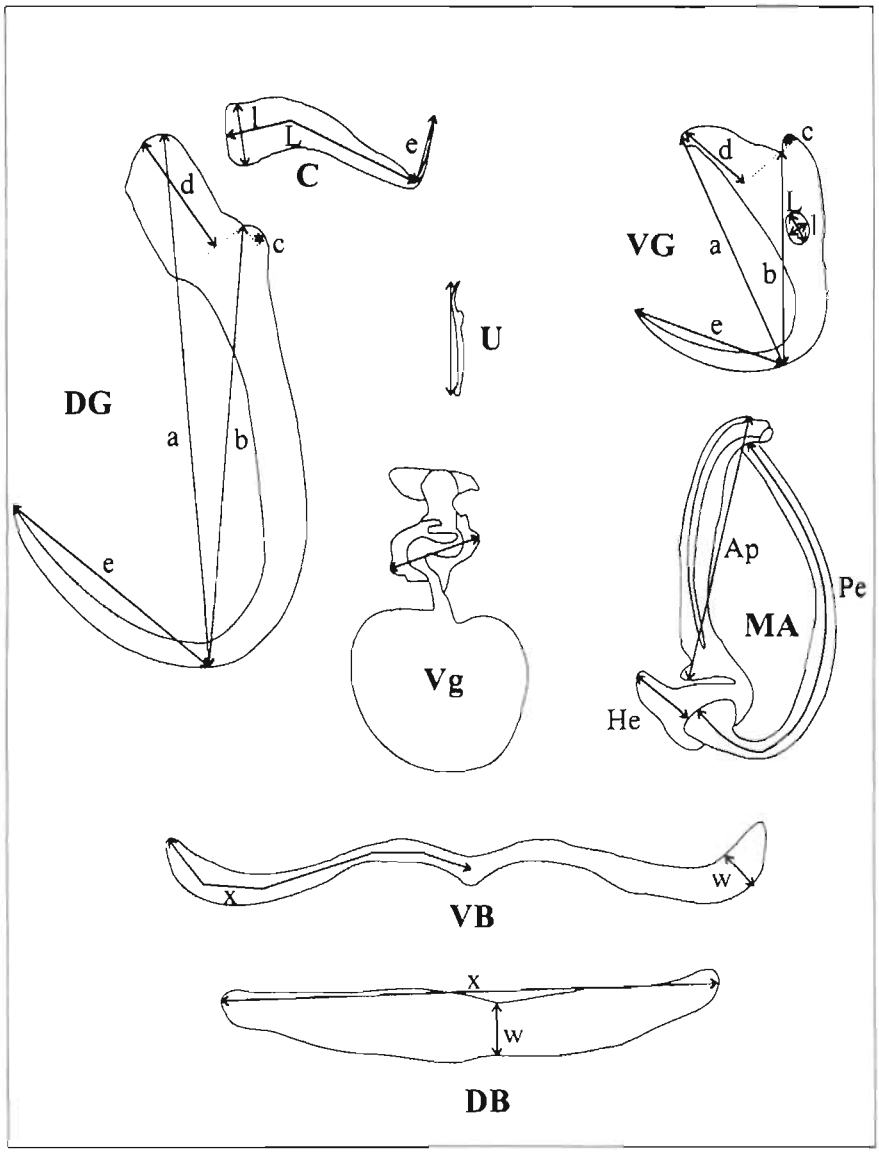

Fig. 1. – Measurements used in this study.
C = cuneus: L = length; l = largest width; e = extension length.
DB = dorsal transverse bar: x = total length; w = width in the middle.
DG = dorsal gripus; a, b, c, d and e = standard measurements.
MA = male apparatus: Pe = total length of the penis; Ap = length of the accessory piece; He = length of the heel.
U = total length of the uncinulus.
VB = ventral transverse bar: x = length of one branch; w = largest width.
VG = ventral gripus: a, b, c, d and e = standard measurements; L and l = length and width of gripus aperture.
Vg = vagina.

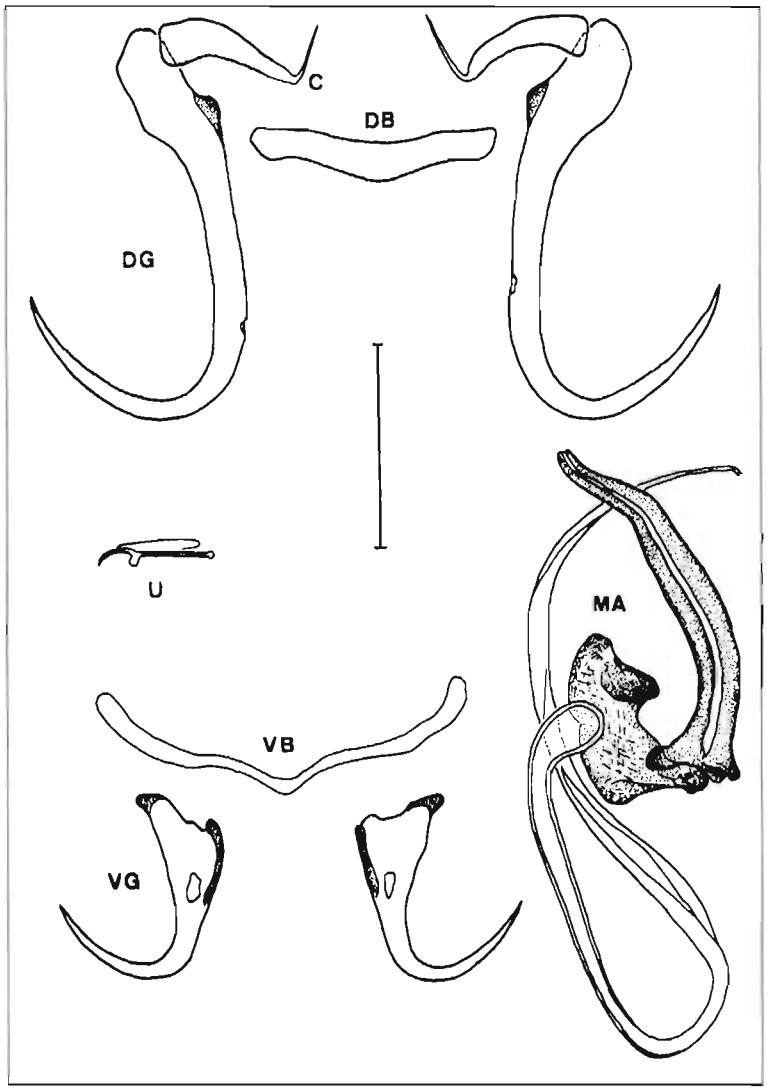

Fig. 2. – *Thaparocleidus pangasi* (Tripathi, 1957) : C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; U = uncinulus. Bar = 30 µm.

Material studied: 30 individuals stained and mounted in Malmberg solution.

Adults 534 ± 103.5 (407-800) long, 109 ± 12.3 (76-129) wide at the level of the penis. Pharynx 49 ± 6.1 (37-63) wide. Dorsal gripus with blade bent in middle, very short guard: a = 61 ± 1.7 (55-64), b = 50 ± 1.6 (44-53), c = 2 ± 0.5 (1-4), d = 14 ± 1.2 (12-17), e = 30 ± 1.1 (26-32). Cuneus with long extension: L = 20 ± 1.1 (17-22), l = 6 ± 0.5 (5-8), e = 11 ± 1.4 (8-15). Slightly curved dorsal transverse bar: x = 38 ± 1.5 (35-42), w = 6 ± 0.6 (5-7). Ventral gripus with well marked aperture, poorly marked outer root: a = 28 ± 0.8 (25-30), b = 25 ± 0.8 (23-26), c = 2 ± 0.4 (1-3), d = 9 ± 0.7 (7-10), e = 18 ± 0.9 (15-19), L = 4 ± 0.5 (3-5), l = 2 ± 0.3 (1-2). Thin V-shaped ventral transverse bar: x = 33 ± 1.4 (29-36), w = 4 ± 0.5 (3-4). Uncinuli II = 16 ± 1.3 (13-21), uncinuli I and III to VII = 16 ± 1.8 (9-19). Long and folded penis, with ovoid basal bulb and large heel: Pe = 181 ± 4.7 (169-192), He = 11 ± 1.5 (8-15). Curved accessory piece linked to the basal bulb of the penis: Ap = 54 ± 2.1 (50-58). No sclerotised vaginal system

Comments

This species is identified as *Thaparocleidus pangasi* first described by Tripathi (1957) from *Pangasius pangasius* in India. The measurements for the present specimens are not different from those given by Tripathi (1957). The shape of the sclerotised parts are also similar. The parasites were recovered from the same fish species, *P. pangasius* which is the only *Pangasius* species occurring naturally in India and the present host species were from one of the type localities River (Ganga), as noted by Tripathi (1957).

DESCRIPTION

THAPAROCLEIDUS CHANDPURI N. SP. (Fig. 3)

Type-host: *Pangasius pangasius* (Hamilton, 1822).
Site: gills.
Type-locality: Chandpur, Ganges Delta, Bangladesh.
Material studied: 29 individuals fixed and mounted in Malmberg solution.

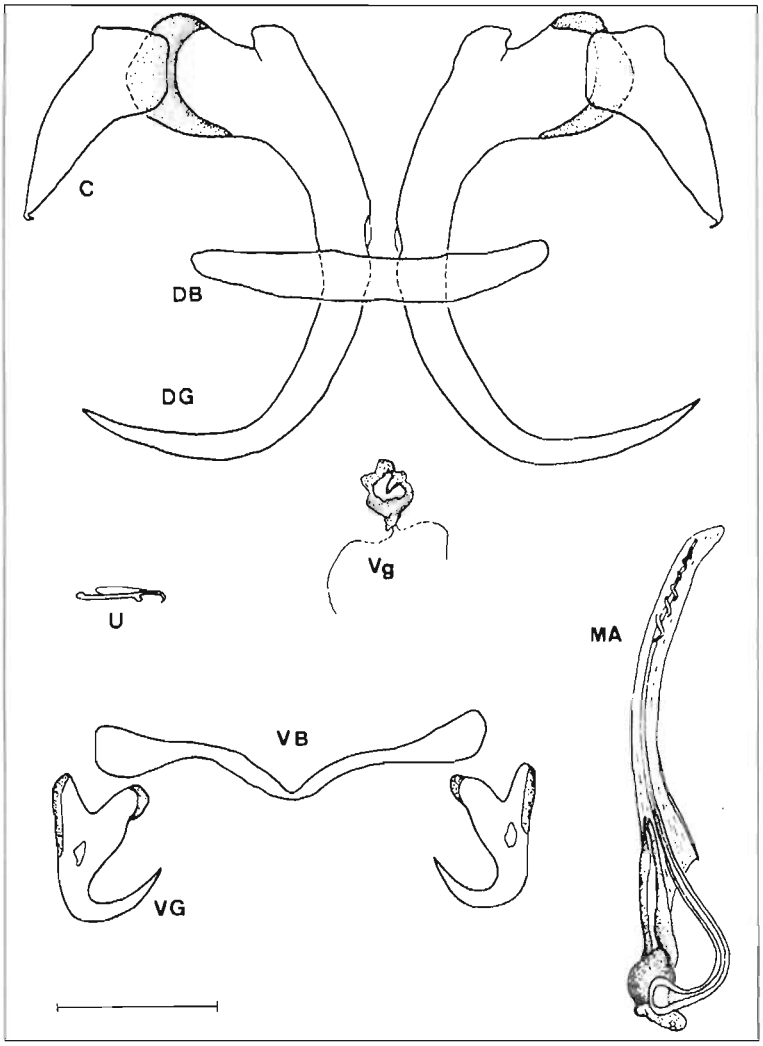

Fig. 3. – *Thaparocleidus chandpuri* n. sp. : C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; Vg = vagina; U = uncinulus. Bar = 30 µm.

Type-material: holotype deposited at the Muséum National d'Histoire Naturelle (Paris): n° 3 HG, slide Tg 118. Paratypes deposited at the Muséum National d'Histoire Naturelle (Paris): n° Tg 119; The Natural History Museum (London): Reg. n° 2000.9.14.1.

Adults 1434 ± 227.1 (992-1929) long, 180 ± 21.6 (148-220) wide at the level of the penis. Pharynx 73 ± 9.4 (58-95) wide. Dorsal gripus with blade regularly bent and well marked guard: a = 82 ± 3.1 (67-86), b = 74 ± 2.3 (69-79), c = 4 ± 0.9 (2-6), d = 19 ± 1.8 (15-23), e = 33 ± 2.5 (23-37). Large cuneus with very short extension: L = 39 ± 2.5 (32-46), l = 16 ± 1.6 (11-19), e = 3 ± 1 (1-7). Nearly straight dorsal transverse bar: x = 68 ± 2.5 (63-74), w = 11 ± 1.1 (8-13). Ventral gripus with well marked aperture and well developed guard: a = 27 ± 0.8 (25-28), b = 21 ± 0.9 (19-23), c = 7 ± 0.8 (5-8), d = 10 ± 1 (6-12), e = 17 ± 0.9 (14-19), L = 4 ± 0.7 (2-5), l = 2 ± 0.5 (1-4). Thin V-shaped ventral transverse bar with bubbled extremities: x = 41 ± 2 (37-47), w = 8 ± 0.8 (6-10). Uncinuli II = 17 ± 1.3 (13-19), uncinuli I and III to VII = 15 ± 1.6 (11-21). Long and thin penis folded just after the ovoid basal bulb, with a spirally coiled thickening (5-7 turns) at its extremity, small heel: Pe = 106 ± 3.1 (98-113), He = 5 ± 1.4 (4-9). Long, straight and thin slightly sclerotised accessory piece linked to the basal bulb of the penis: Ap = 45 ± 3 (38-50). Slightly sclerotised vagina with round well sclerotised part: diameter = 11 ± 1.3 (9-16).

Comments

Besides *T. pangasi* (see above) only two other species belonging to *Thaparocleidus* have already been described from pangasiid hosts: *T. caecus* (Mizelle & Kristsky, 1969) and *T. siamensis* (Lim, 1990) from *P. hypophthalmus* (syn. *P. sutchi*) (see Lim, 1990).

This species is the only species of *Thaparocleidus* with the dorsal gripus having a regularly arched blade, a spirally coiled thickening at the extremity of the copulatory tube and a sclerotised part of the vagina.

Thaparocleidus chandpuri n. sp. is named after the type locality, Chandpur Riverine Station (Bangladesh).

THAPAROCLEIDUS BAHARI N. SP. (Fig. 4)

Type-host: *Pangasius kinabatanganensis* Roberts & Vidthayanon, 1991.

Site: gills.

Type-locality: Kinabatangan River, Sukau, Sabah State (North part of Borneo Island), Malaysia.

Material studied: 30 individuals stained and mounted in Malmberg solution.

Type-material: holotype deposited at the Muséum National d'Histoire Naturelle (Paris): n° 2 HG, slide Tg 116. Paratypes deposited at the Muséum National d'Histoire Naturelle (Paris): n° Tg 117; The Natural History Museum (London): Reg. n° 2000.9.14.2.

Adults 659 ± 107 (456-1060) long, 124 ± 13.5 (88-157) wide at the level of the penis. Pharynx 45 ± 4.8 (34-57) wide. Dorsal gripus with blade bent in middle and very short guard: a = 53 ± 1.3 (50-56), b = 43 ± 1.3 (40-45), c = 1 ± 0.3 (0.4-2), d = 14 ± 0.8 (12-17), e = 28 ± 1.1 (25-31). Cuneus with long extension: L = 16 ± 1.1 (13-19), l = 6 ± 0.6 (4-7), e = 12 ± 1.6 (9-17). Slightly curved dorsal transverse bar: x = 40 ± 1.3 (37-42), w = 5 ± 0.4 (4-6). Ventral gripus with well marked aperture and short guard: a = 27 ± 0.6 (26-28), b = 23 ± 0.8 (21-24), c = 1 ± 0.5 (1-3), d = 9 ± 0.7 (7-11), e = 17 ± 0.6 (16-18), L = 4 ± 0.6 (3-6), l = 2 ± 0.4 (1-3). Thin V-shaped ventral transverse bar: x = 39 ± 1.6 (35-43), w = 3 ± 0.4 (3-4). Thin uncinuli II = 15 ± 1 (13-17), uncinuli I and III to VII = 15 ± 1.7 (12-19). 3-shaped, thin walled and large penis with ovoid basal bulb and large heel: Pe = 89 ± 5.9 (75-99), He = 9 ± 1 (6-12). Curved accessory piece with slightly sclerotised vast extension linked to the basal bulb of the penis: Ap = 35 ± 1.5 (31-39). No sclerotised vaginal system.

Comments

This species is easily distinguished from *T. caecus*, *T. chandpuri* n. sp. and *T. pangasi* by having a large penis shaped like a 3 (*vs. T. caecus* with thin and curved one and *T. siamensis* with a sinuous one) and in having a long extension on the cuneus (*vs.* no extension). *Thaparocleidus bahari* n. sp. is proposed for M. Basri Bahar responsible for the Sukau River Lodge (Wildlife Expedition SDN. BHD.) who kindly found, bought and provided the rare *Pangasius kinabatanganensis* specimens.

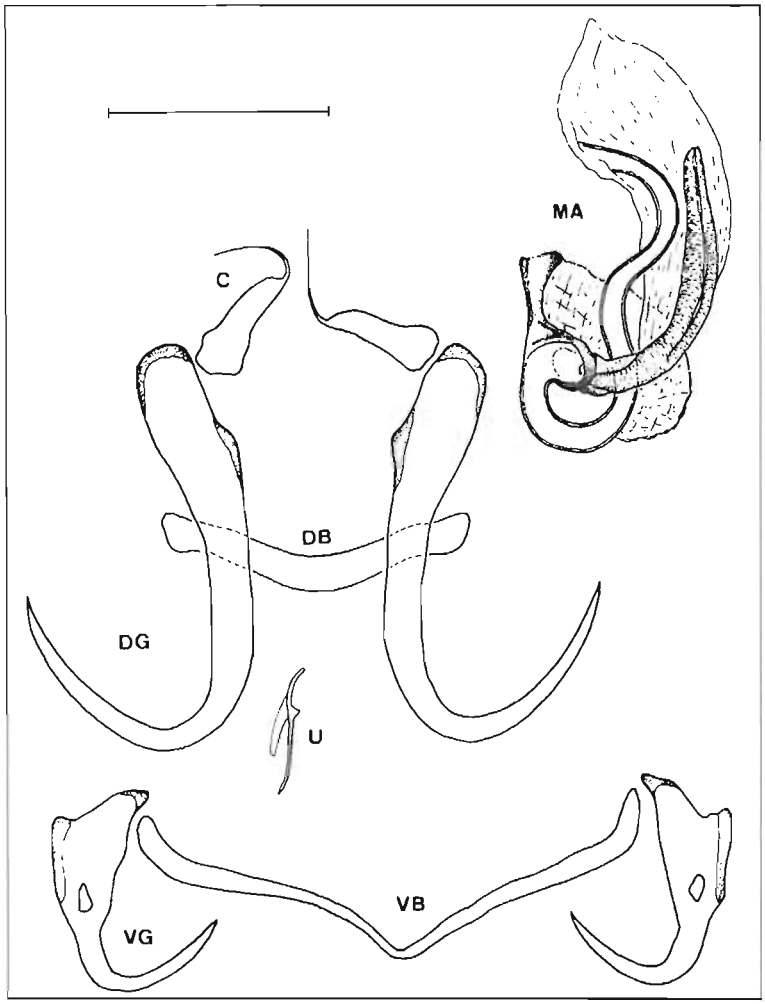

Fig. 4. – *Thaparocleidus bahari n.* sp. C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; U = uncinulus. Bar = 30 µm.

THAPAROCLEIDUS SABANENSIS N. SP. (Fig. 5)

Type-host: *Pangasius kinabatanganensis* Roberts & Vidthayanon, 1991.
Site: gills.
Type-locality: Kinabatangan River, Sukau, Sabah State (North part of Borneo Island), Malaysia.
Material studied: 6 individuals stained and mounted in Malmberg solution.
Type-material: holotype deposited at the Muséum National d'Histoire Naturelle (Paris): n° 5 HG, slide Tg 122. Paratypes deposited at the Muséum National d'Histoire Naturelle (Paris): Tg 123; the Natural History Museum (London) n° 2000.9.14.3.

Adults 1289 ± 151.7 (1017-1462) long, 165 ± 37.3 (128-231) wide at the level of the penis. Large and well marked pharynx: 94 ± 9.8 (79-107) at its width. Dorsal gripus with regularly arched blade and short guard: a = 77 ± 3.1 (72-82), b = 66 ± 2.6 (61-70), c = 3 ± 0.5 (2-4), d = 15 ± 1.1 (14-18), e = 34 ± 1 (32-36). Large cuneus with very short extension: L = 35 ± 0.8 (33-36), l = 10 ± 0.8 (9-11), e = 3 ± 1.3 (2-6). Slightly curved dorsal transverse bar: x = 56 ± 1.6 (54-58), w = 9 ± 0.7 (8-9). Ventral gripus with small aperture and short guard: a = 33 ± 0.7 (32-34), b = 27 ± 0.8 (26-28), c = 2 ± 0.7 (1-3), d = 10 ± 0.7 (8-11), e = 19 ± 1 (18-21), L = 4 ± 0.5 (3-4), l = 2 ± 0.3 (1-2). Thin V-shaped ventral transverse bar: x = 36 ± 1.7 (34-39), w = 4 ± 0.6 (4-6). Thin uncinuli II = 18 ± 1 (16-19), uncinuli I and III to VII = 17 ± 1.9 (12-20). Curved and short penis with ovoid basal bulb and medium heel: Pe = 56 ± 3.8 (52-62), He = 8 ± 1.9 (5-9). Slightly curved and short accessory piece with gutter-like depression, linked to the basal bulb of the penis: Ap = 31 ± 1 (30-33). No sclerotised vaginal system.

Comments

Only six specimens of this species were recovered from two of five fishes sampled, while 125-350 specimens of *T. bahari* n. sp. where found on the same fishes. *Thaparocleidus sabanensis* n. sp. is easily distinguishable from *T. siamensis* and *T. bahari* by the shape

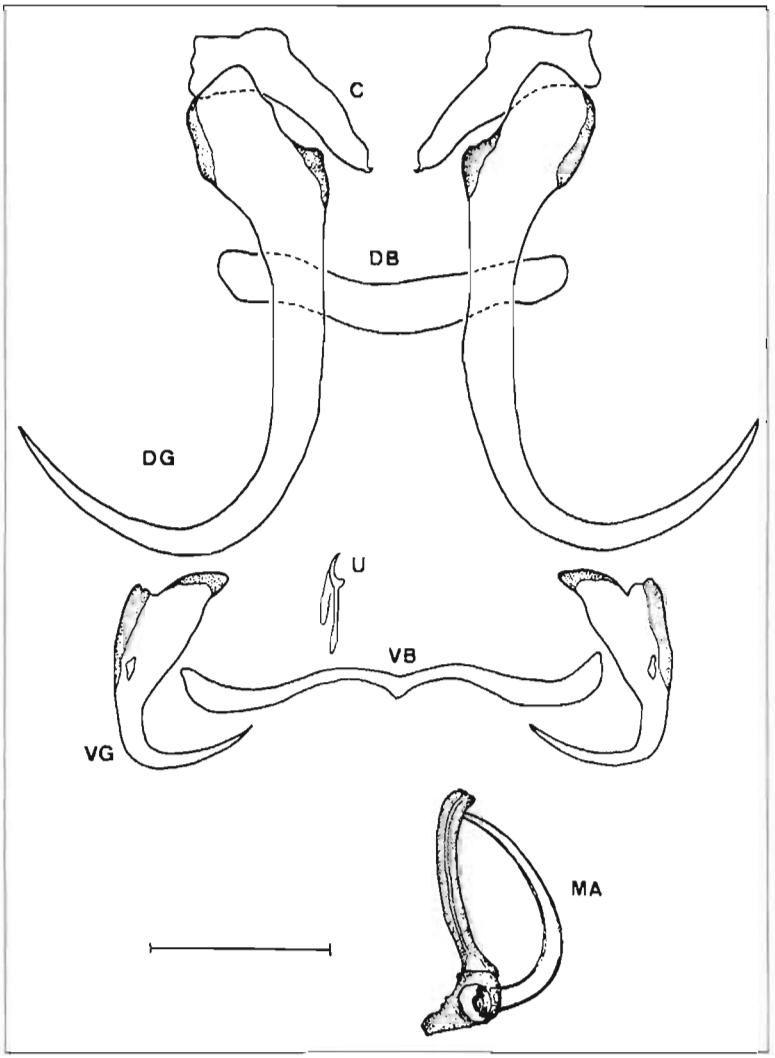

Fig. 5. – *Thaparocleidus sabanensis* n. sp. C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; U = uncinulus. Bar = 30 µm.

of the penis (sinuous or M-shaped *vs.* curved); from *T. caecus*, and *T. pangasi* mainly by having a very short extension on the large cuneus (*vs.* long extension and small cuneus) and from *T. chandpuri* by the shape and size of the penis (simple and 56 µm long *vs.* spirally coiled thickening at the extremity and 106 µm long). *Thaparocleidus sabanensis* n. sp. is named after the type locality (Sabah State).

THAPAROCLEIDUS MAHAKAMENSIS N. SP. (Fig. 6)

Type-host: *Pangasius nieuwenhuisii* (Popta, 1904).
Site: gills.
Type-locality: Mahakam River, Samarinda, East Kalimantan (Southeast part of Borneo Island), Indonesia.
Material studied: 30 individuals stained and mounted in Malmberg solution.
Type-material: holotype deposited at the Muséum National d'Histoire Naturelle (Paris): n° 1 HG, slide Tg 114. Paratypes deposited at the Muséum National d'Histoire Naturelle (Paris): n° Tg 115; The Natural History Museum (London): n° 2000.9.14.4.

Adults 1004 ± 157.5 (716-1320) long, 182 ± 24.3 (135-218) wide at the level of the penis. Pharynx 61 ± 6 (50-75) wide. Dorsal gripus with blade bent in the middle and very short guard: a = 59 ± 2.5 (53-65), b = 49 ± 2.1 (45-54), c = 1 ± 0.3 (0.5-2), d = 14 ± 1.3 (11-17), e = 32 ± 1.5 (29-36). Cuneus with medium extension: L = 13 ± 1.4 (13-19), l = 5 ± 0.5 (4-7), e = 8 ± 1.3 (4-10). Nearly straight dorsal transverse bar: x = 33 ± 1.4 (31-39), w = 6 ± 0.4 (5-7). Ventral gripus with well marked aperture and very short guard: a = 27 ± 0.7 (26-29), b = 25 ± 0.7 (23-27), c = 1 ± 0.3 (1-2), d = 5 ± 0.6 (4-7), e = 16 ± 0.7 (14-17), L = 6 ± 0.6 (5-8), l = 3 ± 0.3 (2-3). Thin V-shaped ventral transverse bar: x = 34 ± 1.5 (30-38), w = 4 ± 0.4 (3-5). Thin uncinuli II = 13 ± 1 (10-16), uncinuli I and III to VII = 13 ± 0.7 (11-15). Long, thin and regularly folded penis with a small spine-like structure at its distal third, an ovoid basal bulb and a large heel: Pe = 169 ± 7 (155-181), He = 12 ± 1.3 (10-16). Curved accessory piece with a central gutter-like depression, linked to the basal bulb of the penis: Ap = 80 ± 3.7 (72-87). No sclerotised vaginal system.

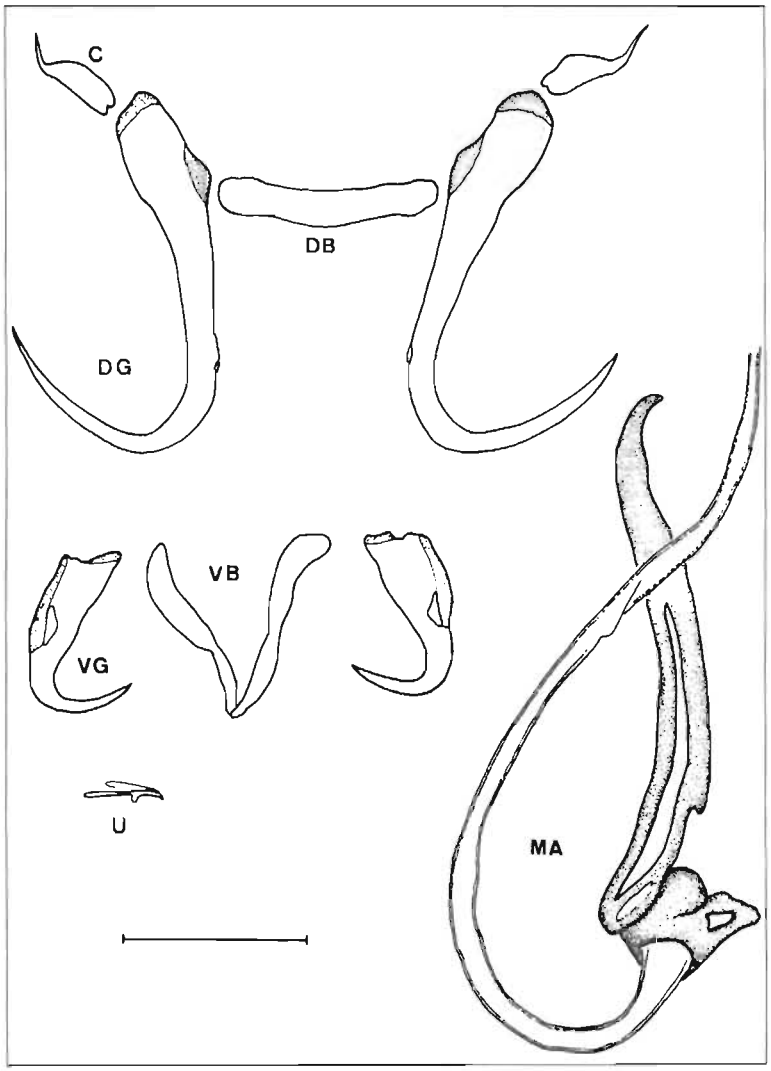

Fig. 6. – *Thaparocleidus mahakamensis* n. sp. C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; U= uncinulus. Bar = 30 µm.

Comments

This species is easily distinguished from:
- *T. pangasi* by the size of the accessory piece of the penis (80 µm *vs.* 54 µm), the cuneus (13 µm *vs.* 20 µm in length), the presence of a spine-like structure at the distal third of the penis (*vs.* absence) and the shape of ventral gripus (thick *vs.* thin) even if the measurements are similar;
- *T. caecus* by the sizes of the sclerotised parts which are larger in the present species *T. mahakamensis*, even if the shapes are morphologically similar (i.e. same spine-like structure at the distal third of the penis), penis is 169 µm in length (*vs.* 62 µm), dorsal gripus 59 µm (*vs.*43 µm), accessory piece 80 µm (*vs.* 41 µm),
- *T. chandpuri* by the shape of the penis (spirally coiled thickening), the shape and size of dorsal gripus (regularly curved blade, total length 82 µm *vs.* bent in the middle, total length 59 µm) and ventral gripus (well developed guard 7 µm *vs.* very short outer root 1 µm);
- *T. siamensis* and *T. bahari* n. sp. by the shape of the penis (regularly folded *vs.* sinuous or 3-shaped);
- *T. sabanensis* n. sp. by the size of the sclerotised parts: i.e. penis (169 µm *vs.* 56 µm), cuneus (L = 13 µm *vs.* 35 µm or extension = 8 µm *vs.* 3 µm), etc.

The name *Thaparocleidus mahakamensis* n. sp. refers to the type locality.

THAPAROCLEIDUS REDEBENSIS N. SP. (Fig. 7)

Type-host: *Pangasius rheophilus* Pouyaud & Teugels, 2000.
Site: gills.
Type-locality: Berau River, Tanjung Redeb, East-Kalimantan state (East part of Borneo Island), Indonesia.
Material studied: 30 individuals fixed and mounted in Malmberg solution.
Type-material: holotype deposited at the Muséum National d'Histoire Naturelle (Paris):n° 4 HG, slide Tg 120. Paratypes deposited at the Muséum National d'Histoire Naturelle (Paris):n° Tg 121; The Natural History Museum (London): n° 2000.9.14.5.

Adults 1489 ± 180.6 (1238-1985) long, 233 ± 23.4 (175-

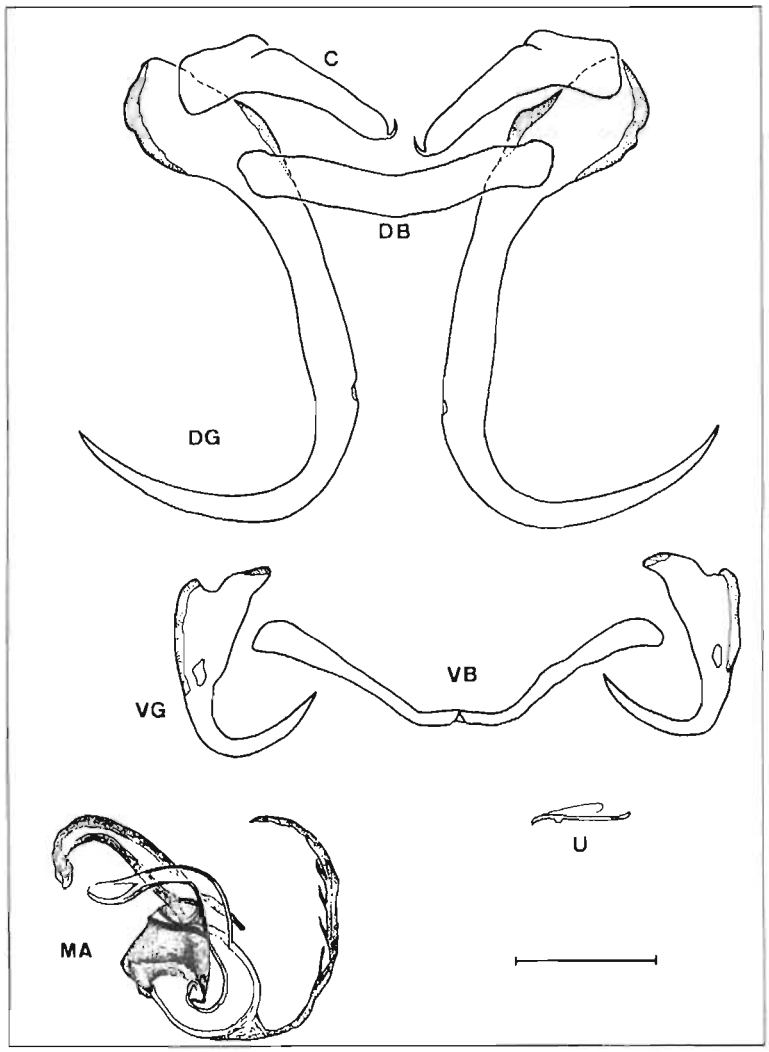

Fig. 7. – *Thaparocleidus redebensis* n. sp. C = cuneus; DB = dorsal transverse bar; DG = dorsal gripus; MA = male apparatus; VB = ventral transverse bar; VG = ventral gripus; U = uncinulus. Bar = 30 µm.

295) wide at the level of the penis. Pharynx 80 ± 6 (70-91) wide. Large dorsal gripus with blade bent in the middle and very short guard: a = 97 ± 2.9 (91-103), b = 83 ± 2.9 (77-89), c = 2 ± 0.6 (1-4), d = 21 ± 1.8 (16-25), e = 48 ± 2.3 (44-54). Large cuneus with short extension: L = 44 ± 2.1 (40-49), l = 12 ± 0.9 (11-16), e = 8 ± 2.1 (5-12). Slightly curved and long dorsal transverse bar: x = 66 ± 2.3 (62-71), w = 9 ± 0.7 (8-12). Ventral gripus with well marked aperture and short guard: a = 38 ± 1.3 (35-42), b = 34 ± 1.1 (31-36), c = 2 ± 0.6 (1-4), d = 11 ± 1 (9-13), e = 25 ± 0.9 (22-26), L = 5 ± 0.6 (4-7), l = 2 ± 0.4 (2-3). Thin and long V-shaped ventral transverse bar: x = 47 ± 2 (42-53), w = 6 ± 0.5 (5-7). Long uncinuli II = 19 ± 1.4 (14-22), uncinuli I and III to VII = 19 ± 3 (11-25). Short large and 3-shaped penis with a long thin branched wall expansion at the first quarter, an ovoid basal bulb and a large heel: Pe = 68 ± 3.9 (60-78), He = 9 ± 1.8 (7-14). Curved accessory piece with a central gutter-like depression, linked to the basal bulb of the penis: Ap = 40 ± 1.6 (38-44). No sclerotised vaginal system.

Comments

This species is different from the other *Thaparocleidus* species from pangasiids by the presence of a branched expansion at the first quarter of the penis wall and in having large anchors and bars. *Thaparocleidus redebensis* n. sp. is named after the type locality

CONCLUSIONS

The present five new species bring the number of *Thaparocleidus* species found on five species of pangasiids (*P. pangasius, P. hypophthalmus, P. rheophilus, P. nieuwenhuisii* and *P. kinabatanganensis*) to eight. In India only one species, *T. pangasi*, has been recorded on *P. pangasius*, while the same host species in Bangladesh harbours two species of *Thaparocleidus*. The diversity of monogenean species on the five host species is low, ranging from one to two monogenean species per host species.

ACKNOWLEDGEMENTS

This work was part of a project on the characterisation utilisation and maintenance of biological diversity for the diversification and sustainability of catfish culture in Southeast Asia supported by the European Commission (grant IC18-CT96-0043). We would like to thank Dr G.C. Haldar (Chief Scientific Officer), Dr A.K. Yousuf Haroun (Principal Scientific Officer) and MD Rabiul Awual Hossain (Scientific Officer) of the Chandpur Station in Bangladesh for assistance in getting *Pangasius pangasius*.

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Reçu le 2 novembre 2000
Accepté le 5 février 2001