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Three new species of *Cichlidogyrus* Paperna, 1960 (Monogenea, Ancyrocephalidae) parasitic on *Tylochromis jentinki* (Steindachner, 1895) (Pisces, Cichlidae) in West Africa

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Abstract

Descriptions of three new species of Monogenea are presented: *Cichlidogyrus berrebii* n. sp., *C. pouyaudi* n. sp. and *C. kothiasi* n. sp., all gill parasites of *Tylochromis jentinki* (Cichlidae) in West Africa (Ivory Coast and Guinea). These new species are considered primitive because of the morphology of the dorsal transverse bar of the haptor, but this is not considered sufficient to warrant their exclusion from the genus *Cichlidogyrus*.

Resumé

Trois Monogènes nouveaux: *Cichlidogyrus berrebii* n. sp., *C. pouyaudi* n. sp. et *C. kothiasi* n. sp., parasites branchiaux de *Tylochromis jentinki* (Cichlidae), sont décrits en Afrique de l'Ouest (Côte d'Ivoire et Guinée). Ces trois nouvelles espèces sont considérées comme primitives à cause de la morphologie caractéristique de la barre transversale dorsale du hapteur, mais elles sont cependant situées dans le genre *Cichlidogyrus*.

Introduction

A parasitological study of *Tylochromis jentinki* (Steindachner), caught in Ebrié Lagoon in the Ivory Coast and in the Kogon River in Guinea, revealed the presence of Monogenea which have been temporarily placed in the genus *Cichlidogyrus* Paperna, 1960. These species, considered to be new, are described below, and their systematic position in the genus is commented upon.

Materials and methods

Fish were caught in various rivers and lagoons in Guinea and in the Ivory Coast using gill nets, cast nets or after poisoning with Rotenone. Fish were either dissected on site immediately after capture or kept fresh and dissected later in the laboratory. In both cases, the left branchial arches, separated by dorsal and ventral section, were frozen at −20 °C or in liquid nitrogen until examination. To verify the specific identity of the host fishes, the carcasses were numbered, fixed and stored in formalin. After thawing, the parasites were detached by intense washing of the gill and transferred individually, with a mounted needle, directly into a drop of ammonium picrate-glycerine mixture on a slide, according to the method of Malmberg (1957). The preparation was then covered with a cover-slip and after several hours, necessary for the proper impregnation by the mounting medium, the cover slip was sealed with glyceel (Gurr). From these preparations, drawings were made of the haptoral sclerites and the copulatory complex using a camera lucida.

The method of naming and numbering of the haptoral sclerites is that adopted at ICOPA IV (Euzet & Prost, 1981) (Hooklets I medio-ventral, hooklets II

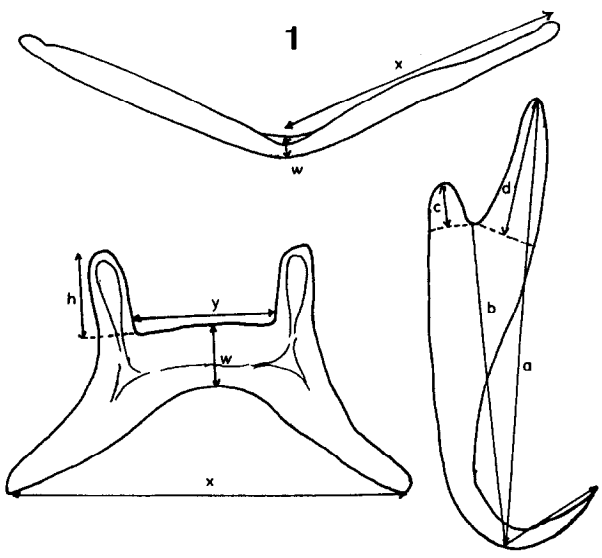

Fig. 1. Diagram to show the measurements used in this study.

ventral associated with ventral hooks, hooklets III–IV latero-dorsal, hooklets V–VI–VII latero-ventral). Measurements are those proposed by Gusev (1962) with a few additions (Fig. 1). Measurements are in micrometres as the mean followed by the range in parentheses.

Cichlidogyrus berrebii n. sp.

Host: Tylochromis jentinki (Steindachner, 1895).
Site: Gills.
Type-locality: Ebrié Lagoon, Ivory Coast. These parasites were also found on the same host in the Kogon River in Guinea.
Material measured: 30 individuals stained and mounted in Malmberg's solution.
Type-material: Holotype and paratypes deposited at the Muséum National d'Histoire Naturelle, Paris, No. 213 HF. Tk 14; paratypes deposited at The Natural History Museum, London BM(NH) Reg. No. 1993.3.4.1 and at the Musée Royal d'Afrique Centrale, Tervuren, MRAC Nos 37.330, 37.331, 37.333.

Description (Fig. 2)

Adult individuals 535 (450–630) long, 88 (75–100) wide at level of ovary; pharynx 29 (25–31) at widest point. Dorsal hooks (hamuli) have short shaft and long guard; characterised by long blade, median portion hollow (Fig. 2, DH); dimensions: a = 38.6 (32–43), b = 31.7 (27–37), c = 3.9 (3–5), d = 10.9 (7–13), e = 9.1 (8–10). Dorsal transverse bar, arched, with 2 short appendages on its convex surface (Fig. 2, DB); dimensions: x = 36 (32–42), w = 5.4 (4–7), h = 6.7 (5–8), y = 13.3 (11–16). Ventral hooks (hamuli) with shaft fused to guard (Fig. 2, VH); blade uniformly curved, short, dimensions: a = 32.8 (29–37), b = 29.7 (25–33), c = 4.2 (2–6), d = 7.2 (6–9), e = 9.3 8–11). Ventral transverse bar forming open 'V' (Fig. 2, VB); x = 36.6 (32–40).

Marginal hooklet I, small, 13.1 (12–15) long; hooklet II associated with ventral hooks have retained larval size, 10.7 (8–12). Marginal hooklets III = 16.9 (15–18), IV = 19.2 (15–20), V = 20.3 (18–22), VI = 18.3 (16–20), VII = 16.8 (14–18).

Male copulatory complex (Fig. 2, P) composed of spiral tubular penis (1.5 turns), with small basal bulb and massive proximal heel. Accessory piece a spiral ribbon, encircling distal portion of penis. Penis 40.4 (37–47) long; accessory piece 40.9 (35–48) long. Vaginal opening marked by thick, irregular sclerification.

Comments

This parasite is easily distinguished from all other known *Cichlidogyrus* spp. by the morphology of the dorsal transverse bar, which lacks real auricles. It is also distinguished by the morphology of the accessory piece which encircles the penis. The proposed name for this new species is *C. berrebii* n. sp. for Dr P. Berrebi.

Cichlidogyrus pouyaudi n. sp.

Host: *Tylochromis jentinki* (Steindachner, 1895).
Site: Gills.
Type-locality: Ebrié Lagoon, Ivory Coast. These parasites were also found on the same host in the Kogon River in Guinea.

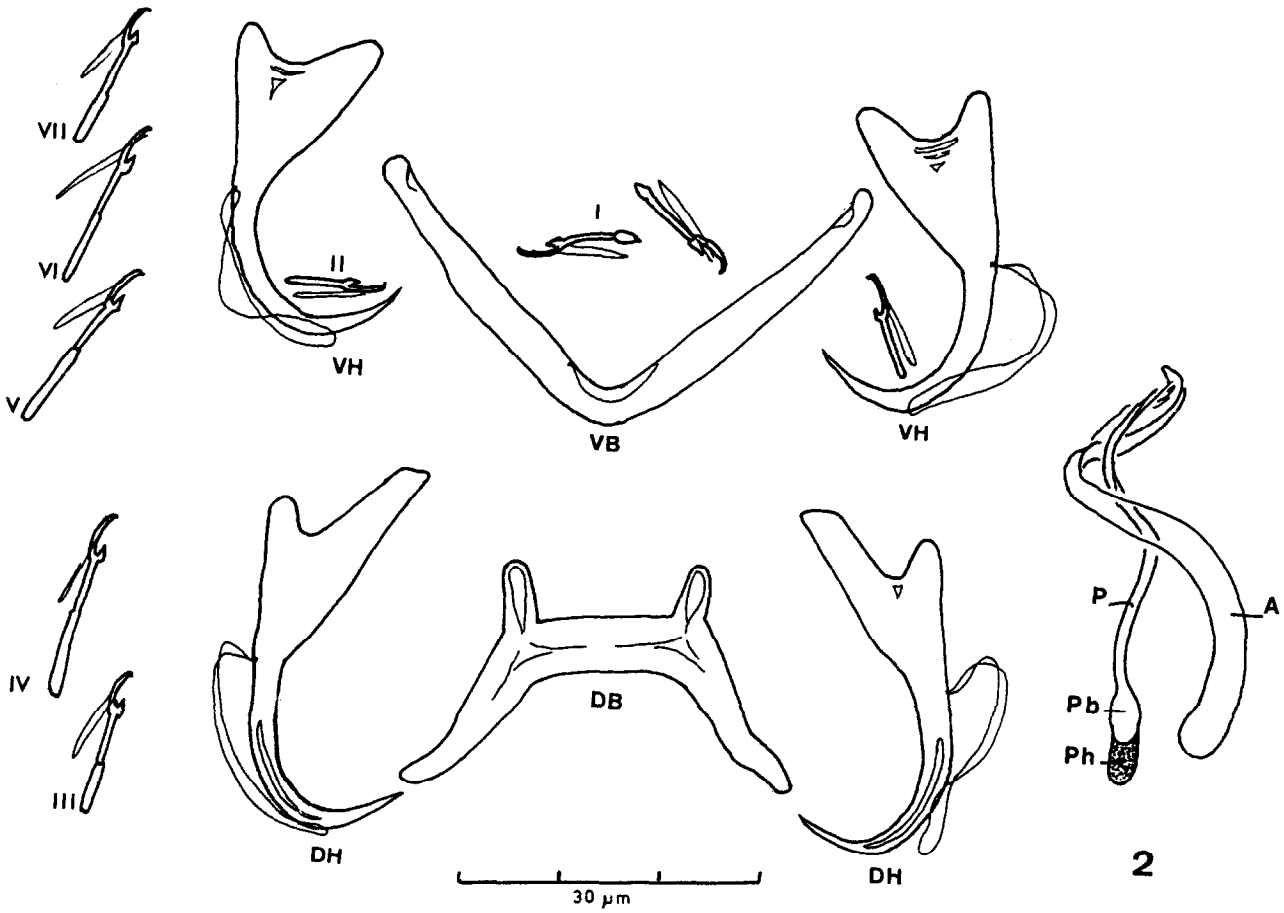

Fig. 2. Cichlidogyrus berrebii n. sp. *Abbreviations*: A, accessory piece; DH, dorsal hook; DB, dorsal bar; P, penis; Pb, penis bulb; Ph, penis heel; VB, ventral bar; VH, ventral hook; I–VII, marginal hooklets.

Material measured: 30 individuals stained and mounted in Malmberg's solution.

Type-material: Holotype and paratypes deposited at the Muséum National d'Histoire Naturelle, Paris, No. 214 HF. Tk 15; paratypes deposited at The Natural History Museum, London, BM(NH) Reg. No. 1993.3.4.3 and at the Musée Royal d'Afrique Centrale, Tervuren, MRAC No. 37.335.

Description (Fig. 3)

Adult individuals measured 377 (350–410) long, 86 (72–103) wide at level of ovary; pharynx 28.5 (24–32) at widest point.

Dorsal hooks (hamuli) characterised by regularly curved blade with hollow median portion (Fig. 3, DH); dimensions: a = 28.6 (23–33), b = 24.8 (22–29), c = 3 (2–5), d = 7.1 (6–8), e = 8.6 (6–9). Dorsal transverse bar arched, with 2 appendages on its anterior convex face (Fig. 3, DB); dimensions: x = 29.9 (25–35), w = 5.5 (4–8), h = 6.2 (5–8), y = 11 (8–15). Ventral hooks (hamuli) (Fig. 3, VH); dimensions: a = 27.6 (24–32), b = 24.5 (22–29), c = 3.2 (2–5), d = 6.3 (4–9), e = 8 (7–9). Ventral transverse bar thinner at middle, forming 'V' (Fig. 3, VB); x = 31.2 (26–34).

Hooklets I small, 12.3 (11–14) long; hooklets II, associated with ventral hooks, have retained larval size, 11.3 (10–13). Marginal hooklet lengths: III = 14.8 (13–17), IV = 16.7 (15–19), V = 20 (18–22), VI = 17.3 (16–19), VII = 16.2 (14–18).

Male copulatory complex composed of lightly spiral tubular penis, with small basal bulb and long proximal heel (Fig. 3). Accessory piece a spiral ribbon around entire length of penis; ribbon narrows from

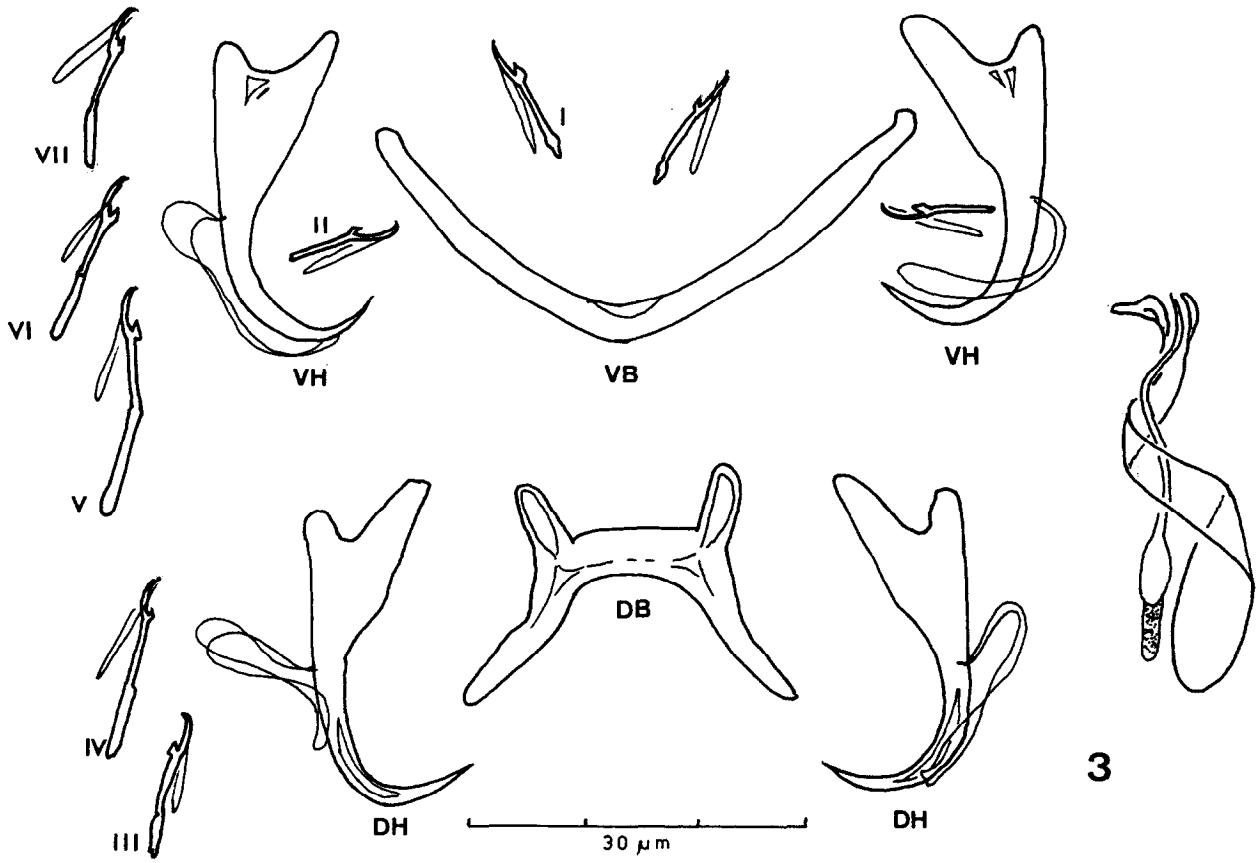

Fig. 3. Cichlidogyrus pouyaudi n. sp. *Abbreviations*: DB, dorsal bar; DH, dorsal hook; VB, ventral bar; VH, ventral hook; I–VII, marginal hooklets.

proximal to distal end; distal end thickened, forms lateral beak, perforated by canal through which passes penis. Penis 31.6 (28–34) long of which 4.9 (4–6) represents heel; accessory piece 37.4 (33–43). Vaginal opening lightly sclerified.

Comments

Like the previous species, this species is characterised by the morphology of the dorsal transversal bar which lacks true auricles. It can be distinguished from *C. berrebii* n. sp. by the morphology of the male copulatory complex.

This is considered a new species and the name *C. pouyaudi* n. sp. is proposed for L. Pouyaud.

Cichlidogyrus kothiasi n. sp.

Host: *Tylochromis jentinki* (Steindachner, 1895).
Site: Gills.
Type-locality: Ebrié Lagoon, Ivory Coast. These parasites were also found on the same host in the Kogon River in Guinea.
Material measured: 30 individuals stained and mounted in Malmberg's solution.
Type-material: Holotype and paratypes deposited at the Muséum National d'Histoire Naturelle, Paris, No. 212 HF. Tk 13; paratypes deposited at The Natural History Museum, London, BM(NH) Reg. No. 1993.3.4.2 and the Musée Royal d'Afrique Centrale, Tervuren, MRAC Nos 37.332, 37.334.

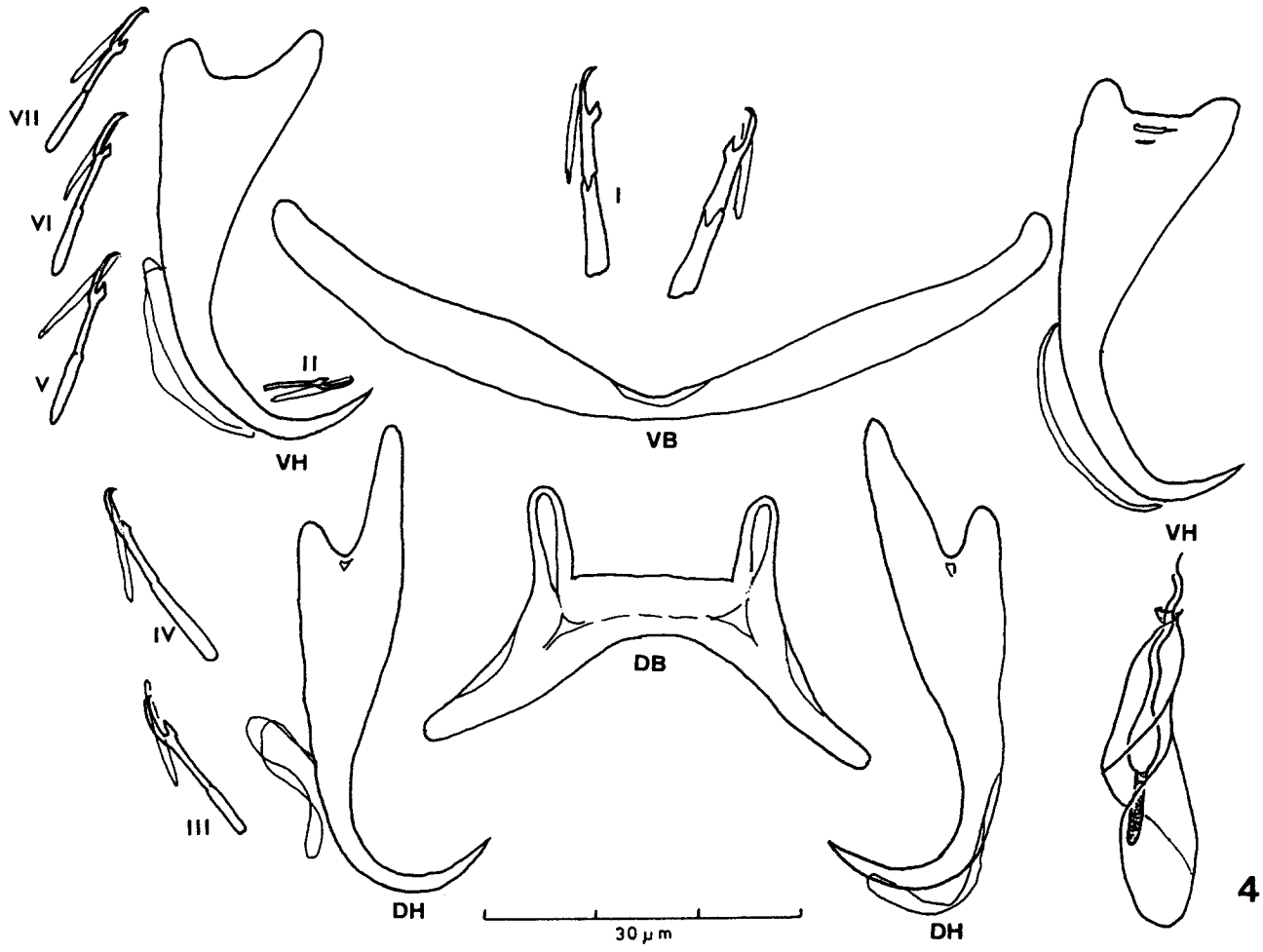

Fig. 4. Cichlidogyrus kothiasi n. sp. *Abbreviations*: DB, dorsal bar; DH, dorsal hook; VB, ventral bar; VH, ventral hook; I–VII, marginal hooklets.

Description (Fig. 4)

Adult individuals 405 (350–455) long, 92 (85–107) wide at level of ovary; pharynx 27 (22–30) at widest point.

Dorsal hooks (hamuli) have long guard forming acute angle with shaft; blade arched (Fig. 4, DH). Cavity found in hook blade of 2 previous species not observed; dimensions: a = 49.8 (39–56), b = 37.1 (32–41), c = 5 (3–8), d = 15.5 (10–19), e = 9.3 (8–11). Dorsal transverse bar arched, with 2 hollow appendages on its anterior convex face (Fig. 4. DB); dimensions: x = 46.5 (42–50), w = 7 (6–10), h = 9.6 (8–10), y = 18.1 (10–19). Ventral hooks (hamuli) with guard same size as shaft, to which it is fused; blade arched, with distal quarter bent (Fig. 4, VH); dimensions: a = 41 (35–47), b = 40.6 (35–46), c = 3.2 (2–4), d = 4.3 (2–5), e = 9 (7–10). Ventral transverse bar forming an open 'V' (Fig. 4, VB); dimensions: x = 48.6 (41–53).

Hooklets I, well developed, 20.6 (16–24) long, resembling marginal hooklets IV and V in size. Hooklets II associated with ventral hooks, small, 10.1 (9–12). Marginal hooklet lengths: III = 17.7 (16–20), IV = 19 (16–21), V = 18.9 (16–21), VI = 17.8 (16–20), VII = 17 (16–19).

Penis, small, 29.4 (26–33); long thin heel 7.5 (7–9), fused to small basal bulb. Spiral tubular penis with 3 turns (Fig. 4). Accessory piece a wide spiral

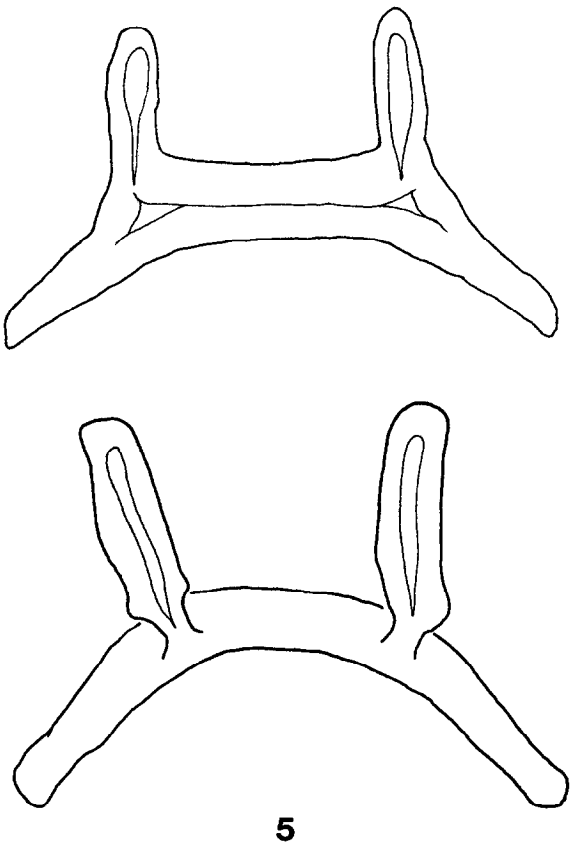

Fig. 5. Dorsal bar of *Cichlidogyrus kothiasi* n. sp. from *Tylochromis jentinki* and *C. ergensi* from *Tilapia zillii*.

ribbon, 30.8 (26–36), encircling entire penis. Vaginal pore funnel shaped, weakly sclerified.

Comments

This species has a transverse bar with a characteristic morphology. It can be clearly distinguished from the two previous species by the size of marginal hooklets I and by the morphology of the male copulatory complex.

This is considered a new species, and the name *C. kothiasi* n. sp. is proposed for Dr J.B. Amon Kothias, an authority on *T. jentinki*.

Discussion

The particular morphology of the transverse bar, as described for these three new parasites from *Tylochromis jentinki*, poses a problem concerning their attribution to the genus *Cichlidogyrus*. In effect, in these species, the dorsal transverse bar exhibits two small, hollow outgrowths on the anterior convex face, while in the genus *Cichlidogyrus* the transverse bar is characterised by the presence of two long, hollow auricles attached by a thin foot to the ventral face of the bar (Fig. 5). Are the outgrowths of the dorsal transverse bar of these parasites of *Tylochromis* homologous with the auricles of *Cichlidogyrus*? Is this morphology sufficiently different to justify the creation of a new genus? The structure of the dorsal transverse bars of these parasites of *Tylochromis jentinki* seems to represent a step closer to the simple morphology which can be observed in the majority of ancyrocephalids than the structure of this same bar in other species of *Cichlidogyrus* (e.g. *C. ergensi* Dossou, 1986). Is this morphology an archaic feature of the structure of the haptor? It can be linked to the isolated position and the recognised antiquity of the genus *Tylochromis* among the Cichlidae (Stiassny, 1991). Since the gill parasites of other primitive cichlids are unknown (particularly those of other species in the genus *Tylochromis*), it is difficult to determine if the two morphologies of the dorsal transverse bar are always present in a distinctive manner or if intermediate states exist. While awaiting the results of studies on primitive cichlids, these parasites of *T. jentinki* are retained in the genus *Cichlidogyrus*.

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