

***Rhabdalestes aeratis*, new species  
(Characiformes: Alestidae):  
first occurrence of the genus  
from the Middle Congo River basin**

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*Rhabdalestes aeratis*, new species, is described from the outlet of Lake Tumba at Irebu. It is assigned to the genus *Rhabdalestes*, pending the determination of phylogenetic diagnoses for genera of the non-monophyletic tribe Petersiini. It is distinguished from all putative congeners by the combination of a slender body form, a complete lateral line with 27-28 pored scales, 4.5 scale rows above the lateral line, 14-15 branched anal-fin rays, 17-19 gill rakers on the lower limb of the first arch, and by a distinctive coloration pattern consisting of dark pigmentation on the dorsum, head, and posterior scale margins overlying a golden-bronze reflective ground coloration, without a broad dark midlateral stripe. Despite problems with the diagnosis of genera currently assigned to the Petersiini, and difficulty in distinguishing species within genera due to variation and broad overlap of features, recognition of species-level diversity from poorly-known geographic regions is both warranted and useful, pending detailed revisionary study.

*Rhabdalestes aeratis* est une nouvelle espèce décrite de l'exutoire du Lac Tumba à Irebu. Elle est provisoirement placée dans le genre *Rhabdalestes*, dans l'attente d'une diagnose phylogénétique des genres de la tribu non-monophylétique des Petersiini. Elle se distingue de tous ses supposés congénères par la combinaison: corps de forme élancée, ligne latérale complète avec 27-28 écailles avec pores, 4,5 rangées écailles au-dessus de la ligne latérale, 14-15 rayons ramifiés à la nageoire anale, 17-19 branchiospines sur la branche inférieure du premier arc branchial, et un patron de coloration distinctif consistant en une pigmentation foncée sur le dos, la tête et le bord postérieur des écailles, superposée à une coloration de fond bronze-dorée brillante, sans large bande sombre le long du corps. Malgré les problèmes liés à la diagnose des genre actuellement placés dans les Petersiini et la difficulté à distinguer les espèces à l'intérieur de ces genre du fait de la variabilité des caractère et du chevauchement de cette variabilité, la reconnaissance de la diversité au niveau spécifique dans les régions peu étudiée est justifiée et utile, en attendant une révision détaillée.

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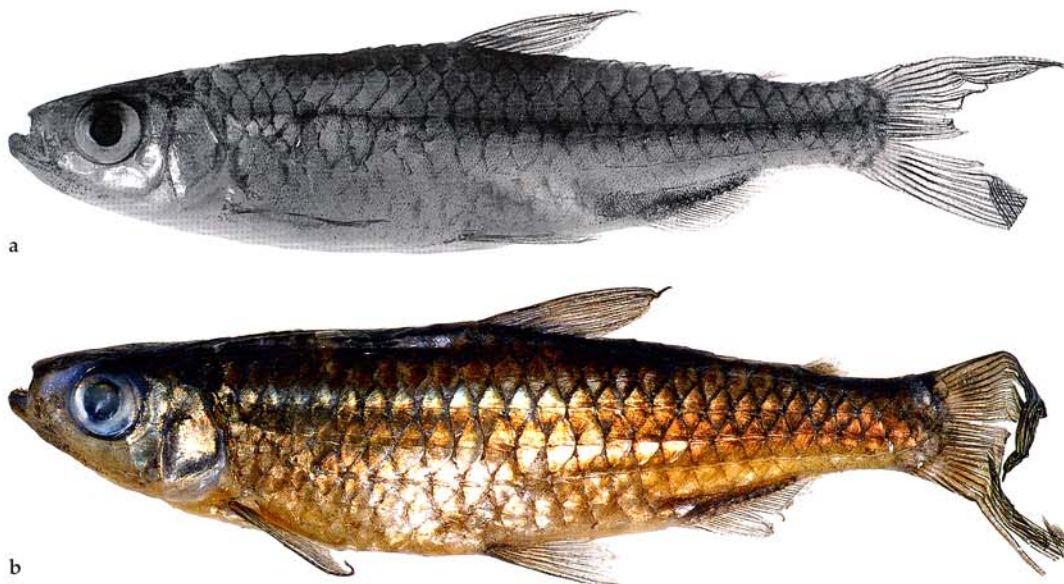


Fig. 1. *Rhabdalestes aeratis*, D. R. Congo: Lake Tumba; a, holotype, AMNH 235767, 48.3 mm SL; b, paratype, AMNH 235768, 50.8 mm SL.

### Introduction

The taxonomy of the African Alestidae currently assigned to the tribe Petersiini has come under recent scrutiny (e.g., Paugy, 1990; Géry, 1995) with the recognition that much generic-level classification is tenuously based on relatively few quantitative contrasts that display broadly overlapping ranges among taxa. Only a few genera are recognized by qualitative contrasts that may ultimately prove to represent synapomorphies. At present, all of these genera are monotypic (e.g., *Arnoldichthys*, *Clupeocharax*, *Lepidarchus*, *Petersius*), while the remaining genera lack apomorphy-based diagnoses and are poorly differentiated by combinations of proportional and meristic features that often display broad overlap. Furthermore, examination of character variation within populations of some species (e.g., Amiet & Nzeyimana, 1990; Géry, 1995) casts doubt on the utility of certain of the discrete characters that form the basis of much of Poll's (1967) classification.

Problems with the taxonomy of the genus *Rhabdalestes* Hoedeman (1951) are emblematic of the controversy surrounding the systematics of the Petersiini as a whole, and their ultimate resolution clearly requires a comprehensive phylogenetic analysis incorporating all character varia-

tion. Therein lays additional argumentation for the desirability of an accurate recording of species diversity among petersiini despite the current limitations of generic classification. Resolution of phylogenetic relationships and precise delimitation of monophyletic units is heavily dependent on accurate sampling of character variation among extant species (Stiassny & de Pinna, 1994). Such an analysis is far beyond the scope of the present paper and here, as a pragmatic device to satisfy nomenclatural stricture, we follow the differential generic diagnoses provided by Poll (1967) in order to formally describe the new species. We conclude with comments on the dwarf alestids of the Lake Tumba region and problems concerning the taxonomy of *Rhabdalestes* species.

### Materials and methods

Counts and measurements follow Paugy et al. (2003). Counts of canal-bearing scales and examination of teeth was aided by directing a fine jet of compressed air onto the structures and from specimens cleared-and-stained following Taylor & Van Dyke (1985). Institutional abbreviations follow Leviton et al. (1985). For some taxa discussed herein we have relied on data culled from

original and subsequent literature on morphometric and meristic attributes, as well as illustrations and photographs.

*Rhabdalestes aeratis*, new species  
(Fig. 1)

**Holotype.** AMNH 235767, 48.3 mm SL; Democratic Republic of Congo: main channel outlet from Lake Tumba near Irebu, 0°35.84'S 17°46.96'E; R. S. Schelly & C. A. Shumway, 9 Oct 2002.

**Paratypes.** AMNH 235768, 39.8-50.8 mm SL (8 alcoholic, 2 cleared-and-stained): same data as holotype.

**Diagnosis.** Distinguished from all putative congeners by having 17-19 gill rakers on the lower limb of the first arch (vs. 11-17). Further distinguished from all congeners by the combination of a slender body, its depth contained 3.7-4.2 times in standard length, 14-15 branched anal-fin rays, 26-28 lateral-lines scales, all of which bear lateral-line canals, flanks with golden-bronze reflective coloration overlain by dark brown chromatophores, and dark midlateral pigmentation stripe absent.

*Rhabdalestes aeratis* differs from *R. leleupi*, *R. rhodesiensis*, and *R. tangensis* in having fewer scales in the lateral line (27-28, vs. 35-39). It differs from

all other *Rhabdalestes* species, with the exception of *R. maunensis*, by an extremely slender body form (body depth 24-27 % SL, vs. 28-33). *Rhabdalestes aeratis* is distinguished from *R. maunensis* by a greater number of gill rakers (17-19, vs. 12) and fewer branched anal-fin rays (14-15, vs. 17). It differs from *R. brevidorsalis*, included in *Rhabdalestes* by Paugy (1990), in having a complete lateral line with 27-28 pored scales (vs. 6-7 pored scales) and a higher number of gill rakers (17-19 vs. 11-13).

**Description.** Maximum size 50.8 mm SL. Counts and proportional measurements are presented in Table 1. Body slender, greatest depth 23.3-26.9 % SL (mean 25.1), head length 23.8-25.8 % SL (mean 24.8). Greatest body depth at vertical through posterior two-thirds of pectoral fin length. Dorsal head profile gently convex from upper lip margin to nostril region, more-or-less straight from that point to dorsal-fin origin. Dorsal body profile slightly concave along dorsal-fin base, more-or-less straight from that point to caudal-fin base. Ventral head profile gently convex from acute angle formed by anterior margin of lower jaw to isthmus. Ventral body profile somewhat convex between isthmus and anal-fin origin.

Mouth terminal, lower jaw prominent and prognathous, with a depth slightly more than twice that of upper jaw. Premaxilla with 2 teeth in outer row, each bearing 3 cusps, positioned

**Table 1.** Morphometric and meristic data for holotype and eight paratypes of *Rhabdalestes aeratus*, new species.

	holotype	paratypes (N=8)		
		mean	min	max
Standard length [mm]	48.3	46.3	42.1	50.8
<b>Percents of standard length</b>				
Body depth	24.2	25.1	23.3	26.9
Head length	25.5	24.8	23.8	25.8
Predorsal length	52.0	51.5	48.9	53.5
Prepelvic length	52.8	54.2	53.7	55.3
Preanal length	72.9	74.0	72.4	76.9
<b>Percents of head length</b>				
Snout length (% HL)	35.8	30.9	29.6	32.0
Eye diameter (% HL)	31.3	33.1	30.0	36.0
Lateral line scales	28	27.6	27	28
Transverse scales	4.5	4.5	4.5	4.5
Branched anal fin rays	14	14.0	14	14
Gill rakers on lower limb first arch	17	18.7	18	19

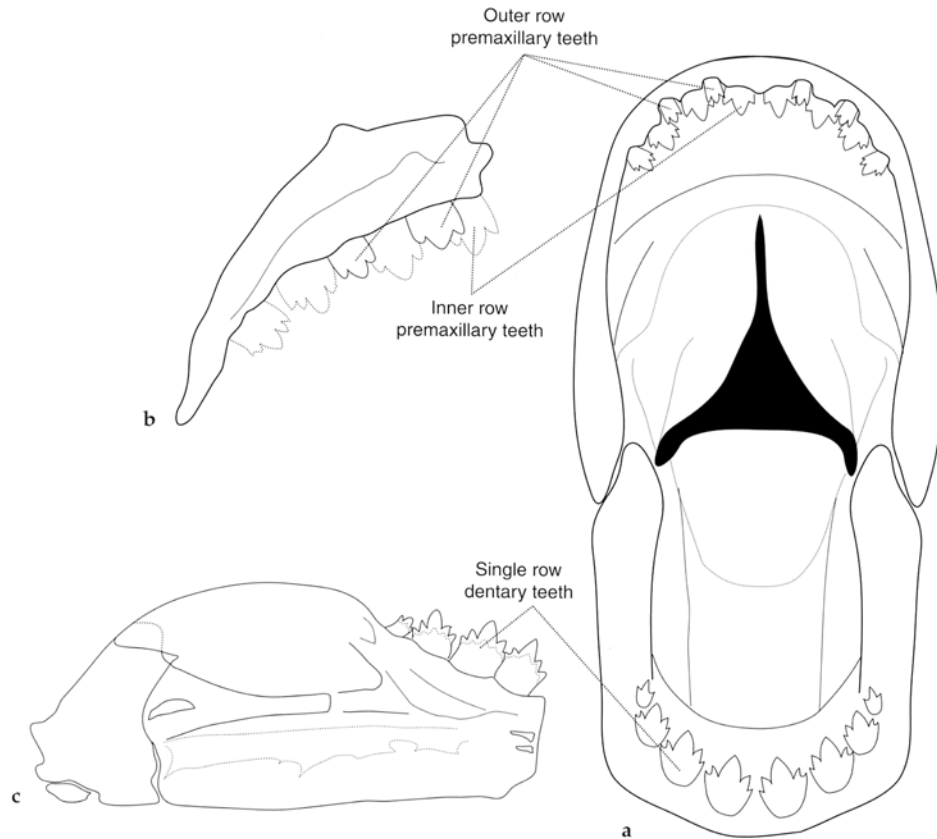


Fig. 2. *Rhabdalestes aeratis*, AMNH 235768, 45.3 mm SL; **a**, mouth open in lingual view; **b**, isolated premaxilla in lateral view; **c**, isolated dentary in medial view.

opposite the interspaces between, and alternating with, the inner row teeth; four teeth in inner row, each bearing 3-5 cusps (Fig. 2). Dentary with 4 teeth in outer row each bearing 3-5 cusps, inner dentary teeth absent. Eye moderately large, bony orbit diameter 30-36 % HL; anterior margin of eye flanked by adipose tissue. Dorsal-fin rays ii,8, anal-fin rays iii,14-15. Origin of dorsal fin at vertical through pelvic-fin origin. Anterior unbranched rays of anal fin of males with concave anterior margin, the third ray hypertrophied, thickened medially and prominent; shape of first three branched rays similarly concave anteriorly in the "Virilia-like" configuration (Roberts, 1967; Fig. 3). Scales in longitudinal series 27-28, 4½ transverse scales between lateral line and dorsal-fin origin. Lateral line complete, 27-28 scales, canal-bearing scales continuing posteriorly onto base of caudal-fin rays. Gill rakers on lower limb of first arch 17-19.

**Coloration.** Base body coloration brown dorsally and laterally with highly reflective golden-bronze iridescence. Dorsum of head and body darkly pigmented, concentration of chromatophores along posterior scale margins. Chest and belly creamy brown. All fins dusky, with pigment concentrated along margins of fin rays and interspaces. Dorsal fin occasionally with pigment concentration at apical tip. Anal fin base with dark band along entire length of fin-ray insertion, becoming diffuse and lighter grey distally. Caudal fin dusky black, without pigment concentration along median fin rays.

**Distribution.** Currently known only from the type locality (Fig. 4). Collections were made during the rainy season (average October rainfall 200-220 mm) and rising water levels had already inundated surrounding swamp grasslands and lowland forest. Specimens were collected using

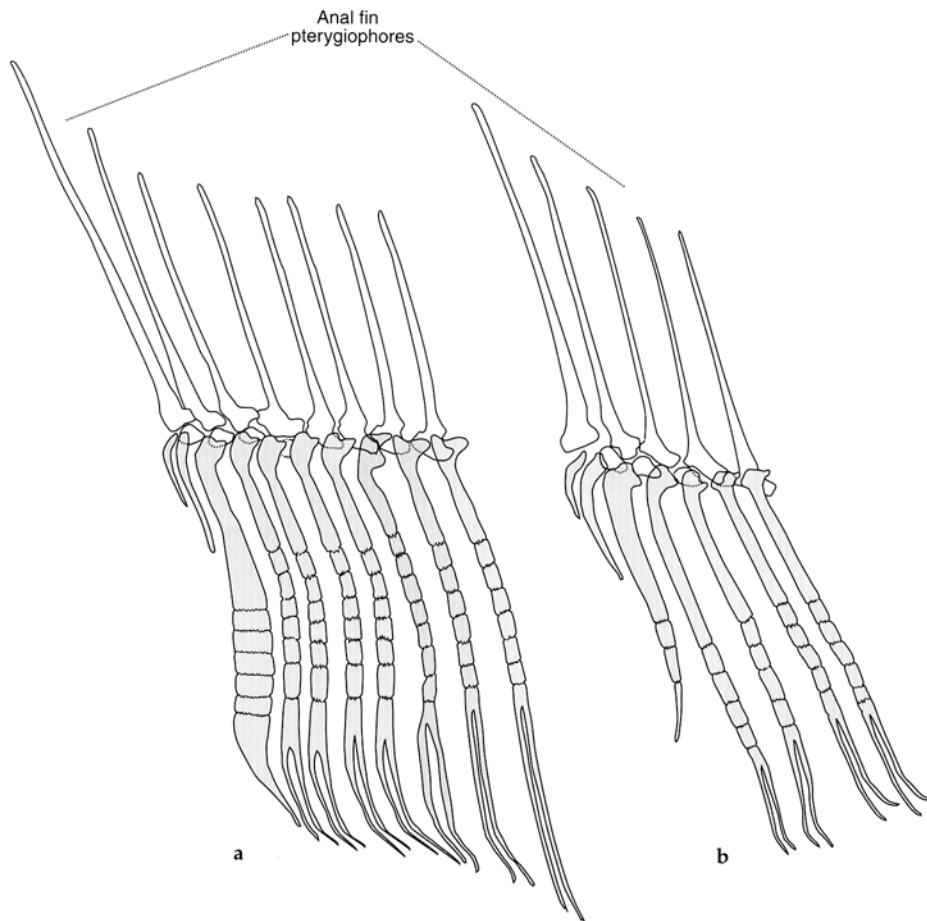


Fig. 3. *Rhabdalestes aeratis*, AMNH 235768; anterior anal fin rays of: a, male, 45.2 mm SL; b, female, 45.0 mm SL.

cast nets from pirogues and were taken in the large, black water, main channel outlet of Lake Tumba close to the flooded shoreline near Irebu.

**Etymology.** The species name, *aeratis*, is from the Latin noun *aeratus*, of copper, bronze, brassy, in reference to the bronze flank coloration.

### Discussion

As part of a general ecological study, Matthes (1964) made extensive collections in Lake Tumba and its surrounds and recorded the presence of nine species of Petersiini (currently classified as *Clupeopetersius schoutedeni*, *Micralestes humilis*,

*Bathyaethiops caudomaculatus*, *Phenacogrammus deheyni*, *P. altus* (= *Brachypetersius altus* in Poll, 1967), *Alestopetersius hilgendorfi*, *A. leopoldianus*, *A. caudalis*, and *Duboisalestes cf. tumbensis*. Poll (1967) also recorded *Micralestes acutidens*, *M. congcicus*, and *Tricuspidalestes caeruleus* as occurring around the outflow of Lake Tumba.

Prior to the present study, the only *Rhabdalestes* species recorded from the Congo River basin is *R. rhodesiensis* from the Bangwelo-Luapula region of the upper Congo River. For much of the African continent the distributions of freshwater fishes remain poorly known and our understanding of biogeographical relationships is rudimentary (Lundberg et al., 2000). The discovery of a new *Rhabdalestes* in the middle Congo therefore serves to underscore the importance of intensified



Fig. 4. Main channel outlet from Lake Tumba near Irebu, type locality of *Rhabdalestes aeratis*.

survey efforts in poorly sampled regions of Africa. For areas such as the Lake Tumba region, where fishing and agricultural development is increasingly impacting the aquatic community (Thieme et al., 2005), these surveys have an additional imperative.

Assignment of the new species to *Rhabdalestes* is essentially phenetic and based on the shared possession of the following combination of attributes: lower jaw prognathous, absence of inner-row dentary teeth, presence of 4-6 outer-row premaxillary teeth, posterior cranial fontanel present, lateral line complete or incomplete, and fins without elongate filamentous extensions.

Poll (1967) recognized seven species of *Rhabdalestes* (*R. eburnensis*, *R. leleupi*, *R. loennbergi*, *R. maunensis*, *R. rhodesiensis*, *R. septentrionalis*, *R. tangensis*). *Rhabdalestes eburnensis* has been transferred back to *Micralestes* on the basis of presence (although variable) of inner mandibular teeth (Paugy, 1990). Regardless of its ultimate placement, *M. eburnensis* is readily distinguished

from the new species by the possession of 13-15 gill rakers on the lower limb of the first gill arch (vs. 17-19), and 35-38 pored scales in the lateral line (vs. 27-28). *Hemigrammopetersius brevidorsalis*, a robust, deep-bodied species with four outer-row premaxillary teeth and no inner mandibular teeth, is regarded by Paugy (1990) and Lévêque et al. (1990) as a *Rhabdalestes* and, for that reason, is included here in differential comparison with the new species. Paugy (1990) also regarded the West African species *Alestopetersius smykalai* as belonging to *Rhabdalestes*, perhaps in part because of its occurrence in the Niger River basin (all other *Alestopetersius* are known only from the Congo River basin). However, *A. smykalai* exhibits an elongation of the dorsal and anal fins in males that is lacking in *Rhabdalestes* but typical of many *Phenacogrammus*, *Nannopetersius* and *Alestopetersius* and is therefore excluded here from differential comparison with the new species. Another petersiini species that exhibits close phenetic similarity with *Rhabdalestes*, particularly in com-

bination with a consistent absence of inner mandibular teeth, is *Micralestes ambiguus*. Géry (1995) acknowledged this problematic character of *M. ambiguus* and its apparent similarity to *Rhabdalestes*, but opted to include the species in *Micralestes* based on aspects of habitat association and coloration similarities with members of the *M. argyrotaenia* group. Again, regardless of the ultimate placement of this species, *M. ambiguus* is readily distinguished from the new species by its subterminal mouth, larger head (26.0-27.8 % SL vs. 23.8-25.8), non-alternating implantation of inner and outer row premaxillary teeth (vs. alternating implantation, Fig. 2) and the presence of a well-marked midlateral band passing from the opercle to the caudal peduncle.

Finally, mention should be made of *Phenacogrammus pabrensis*. Based on the observation of a distinctive modification of the anal fin of male *P. pabrensis*, most notably an extensive expansion of the third unbranched anal-fin ray, Roberts (1967) designated *P. pabrensis* as the type species of the monotypic genus *Virilia*. Paugy (1990) subsequently assigned the species to *Micralestes*, while Géry (1995) considered *Virilia* a subjective synonym of *Rhabdalestes*. Placement of this taxon remains problematic, but certainly other *Rhabdalestes*, including the new species, exhibit similar modification and expansion of the male anal fin (see Géry, 1995; Fig. 3). Again, ultimate placement of *P. pabrensis* must await a thorough phylogenetic analysis, but for the purposes of the current description, this species can be readily differentiated from the new species by the possession of an incomplete lateral line with only the anterior 6-8 scales pored (vs. a complete lateral line with 27-28 pored scales) and two conical inner row teeth at the dentary symphysis (vs. no inner row teeth on the dentary).

**Comparative material.** *Alestopetersius caudalis*: MRAC 82-21-P-422-426. *A. hilgendorfi*: MRAC 138616-634. *A. smykalai*: MRAC 92-052-P-0245-0285, MRAC 92-063-P-0138-0147. *Bathyaethiops caudomaculatus*: MRAC 79-09-P-051-053. *Duboisalestes* cf. *tumbensis*: AMNH uncat. *Micralestes acutidens*: AMNH 71874, MRAC 88-25-P-1159-184. *M. congicus*: MRAC 99-090-P-0517-0521. *M. eburneensis*: AMNH 32763. *M. elongatus*: AMNH 215389, MRAC 91-100-P-0013-0017. *M. humilis*: AMNH 230646, MRAC 91-24-P-352-362. *M. pabrensis*: AMNH 50831, AMNH 233417. *Phenacogrammus altus*: MRAC 82-21-P-176-181. *P. deheyni*: MRAC 137853-861. *Rhabdalestes loennbergi*: AMNH97604. *R. maunensis*: AMNH 217434, AMNH 37911, 215603. *R. rhodesiensis*: AMNH50894. *R. septen-*

*trionalis*: AMNH 230605, AMNH 228732, AMNH 71875. *Tricuspidadestes caeruleus*: MRAC 96573.

### Acknowledgements

Our thanks to Caroly Schumway for organizing, and IRM/USAID for funding, the 2002 fieldwork in D.R. Congo, and to the Marjorie Merriweather Post Foundation for additional support for Robert C. Schelly. We are particularly grateful to an anonymous reviewer for an extremely constructive and helpful critical review of an earlier submission. Finally, our thanks to Victor Mamonekene whose initial examination first brought these specimens to our attention.

### Literature cited

- Amiet, J. & F. Nzeyimana. 1990. Notes d'ichthyologie camerounaise (1). A propos de *Phenacogrammus major* (Boulenger, 1903) et de *Hemigrammopetersius pulcher* (Boulenger, 1907). Rev. Fr. Aquariol. Herpétol., 17: 1-8.
- Géry, J. 1995. Description of new or poorly known Alestinae (Teleostei: Characiformes: Alestidae) from Africa, with a note on the generic concept in the Alestinae. Aqua, 1: 37-64.
- Hoedeman, J. J. 1951. Studies on African characid fishes I. The tribe Alestidi. Beaufortia, 3: 1-8.
- Lévêque, C., D. Paugy & G. G. Teugels. 1990. Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest. Faune tropicale 28. Orstom, Paris & MRAC, Tervuren, 384 pp.
- Leviton, A. E., R. H. Gibbs, J. E. Heal & C. E. Dawson. 1985. Standards in herpetology and ichthyology: Part 1. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia, 1985: 802-832.
- Lundberg, J. G., M. Kottelat, G. R. Smith, M. L. J. Stiassny & A. C. Gill. 2000. So many fishes, so little time: an overview of recent ichthyological discovery in continental waters. Ann. Missouri Bot. Garden, 87: 26-62.
- Matthes, H. 1964. Les poissons du lac Tumba et de la région d'Ikela. Etude systématique et écologique. Ann. Mus. R. Afr. Centr., Sér. in-8°, Zool., 126: 1-204.
- Paugy, D. 1990. Note à propos des Petersiini (Teleostei: Characidae) d'Afrique occidentale. Ichthyol. Explor. Freshwaters, 1: 75-84.
- Paugy, D., C. Lévêque & G. G. Teugels. 2003. The fresh and brackish water fishes of West Africa. Volume 1. Faune et Flore Tropicales 40. IRD, Paris, MHNH, Paris & MRAC, Tervuren, 457 pp.
- Poll, M. 1967. Révision des Characidae nains africains. Ann. Mus. R. Afr. Centr., Sér. in-8°, Sci. Zool., 162: 1-158.

- Roberts, T. R. 1967. *Virilia*, a new genus of sexually dimorphic characid fishes from West Africa, with remarks on characoids having an incomplete lateral line. *Stanford Ichthyol. Bull.*, 8: 251-259.
- Stiassny, M. L. J. & M. C. C. de Pinna. 1994. Basal taxa and the role of cladistic patterns in the evaluation of conservation priorities: a view from freshwater. Pp. 235-249 in: P. Forey, C. J. Humphreys & R. I. Vane-Wright (eds.), *Systematics and conservation evaluation*. Clarendon Press, Oxford.
- Taylor, W. R. & G. C. Van Dyke. 1985. Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybium*, 9: 107-109.
- Thieme, M. L., R. Abell, M. L. J. Stiassny, B. Lehner, P. Skelton, G. Teugels, E. Dinnerstein, A. K. Toham, N. Burgess & D. Olsen. 2005. *Freshwater ecoregions of Africa and Madagascar. A conservation assessment*. Island Press, Washington, (in press).

Received 1 April 2005  
Revised 13 May 2005  
Accepted 20 June 2005