

ZOOLOGISCHE MEDEDELINGEN

UITGEGEVEN DOOR HET

RIJKSMUSEUM VAN NATUURLIJKE HISTORIE TE LEIDEN

(MINISTERIE VAN CULTUUR, RECREATIE EN MAATSCHAPPELIJK WERK)

Deel 42 no. 20

22 november 1967

FRESHWATER FISHES OF SURINAME: THE GENUS HEPTAPTERUS (PIMELODIDAE)

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With four text-figures

Ichthyological investigations in Suriname, carried out in connection with the "Brokopondo project", financed jointly by the Rijksmuseum van Natuurlijke Historie and the Stichting voor Wetenschappelijk Onderzoek in de Tropen, have yielded large collections of freshwater fishes. These collections will form the basis of a number of systematic papers and revisions, by several authors, of which this, dealing with a single genus, *Heptapterus*, of the family Pimelodidae, is one.

For more particulars on the collections, etc., I refer to Boeseman (in press); a map and a description of collecting-localities will be published later.

Unless otherwise stated, the material is in the Rijksmuseum van Natuurlijke Historie, and the numbers given, are the registered numbers in that collection.

The X-ray photographs, from which the vertebrae were counted, were taken for me by Mr. J. Simons (Zoologisch Laboratorium, Leiden); the figures 2 to 4 were drawn by Mr. W. C. G. Gertenaar of this institute.

Five species of the expanded genus *Heptapterus* as defined below are known from Suriname.

Heptapterus Bleeker

Heptapterus Bleeker, 1858, Visschen Ind. Arch. 1: 197 — type by monotypy, *Pimelodus mustelinus* Valenciennes.

Acentronichthys Eigenmann & Eigenmann, 1889, Proc. Calif. Acad. Sci. (2) 2: 28 — type by original designation, *Acentronichthys leptos* Eigenmann & Eigenmann.

Chasmocranus Eigenmann, 1912, Mem. Carnegie Mus. 5: 131 (in key), 160 — type by original designation, *Chasmocranus longior* Eigenmann.

Long, slender Pimelodidae lacking spines in D and P, and with the upper surface of the head entirely covered with thick mucous skin, showing no exposed bone; no free orbital rim; adipose fin present, long, either broadly connected with the membrane of the caudal fin or clearly separated from it.

Characters which the Suriname species, but not necessarily the extralimital species of the genus, have in common are shape and position of the nostrils: the posterior pair half way between eyes and tip of snout, the anterior pair on a level with the maxillary barbels, both pairs on short tubes; large mucous pores in upper and lower lips; the uniform dull brown colour, with only in one species some ill-defined whitish markings; a well-developed, complete, almost straight lateral line; implantation of the adipose fin exactly opposite or behind implantation of anal fin; anus between the ventrals, but well behind their implantation.

As indicated in the synonymy given above, three generic names are available, and a short discussion of these is in place here. Characters that from time to time have been regarded as of generic value are number of rays in dorsal and anal fins, shape of the caudal fin, and shape of the adipose fin: more especially whether or not it is confluent with the caudal fin.

Several authors have previously queried the validity of these characters for generic distinction. Inger (1956) discussed the three genera, and decided that some of the characters used for their distinction had been over-emphasized; particularly shape of caudal fin he regarded as not of generic value. Evidently he did not regard number of fin-rays to have generic value either, as he proposed to transfer *Heptapterus surinamensis* to *Chasmocranus*. Inger did not definitely reject any of the proposed genera, but this was done by P. de Miranda Ribeiro (1962) who placed *Acentronichthys* in the synonymy of *Heptapterus*; he did not discuss *Chasmocranus*.

My own evaluation of the three characters used for generic distinction, on the basis of the Suriname species, is as follows.

Number of rays in the anal fin. Though Inger (1956) had already dismissed this character for generic distinction by transferring *Heptapterus surinamensis* to *Chasmocranus*, there was still a gap in anal ray numbers between the genera *Chasmocranus* (up to 14 rays), and *Heptapterus* (18 or more rays). The difference is now practically bridged by *Heptapterus tapana-honiensis* n. sp. which has A 14-15, whereas *H. surinamensis* may have as few as 17. It looks therefore as if the number of fin-rays varies from species to species rather than that there are two clear-cut groups which would make it useful to give fin-ray numbers generic significance.

In shape of the caudal fin there is a great deal of variation; it is forked with pointed lobes in *Chasmocranus brevior*, forked with rounded lobes in *C. longior*, and *H. tapanahoniensis*; lanceolate in small individuals of *Heptapterus surinamensis*, though slightly forked with rounded lobes or more or less rounded in larger specimens; unevenly forked, or lanceolate and undivided in *H. bleekeri*. It appears thus that even individual variation cuts through the supposed generic character of tail-shape.

The remaining character is that of the shape and extent of the adipose fin. In *C. brevior*, *C. longior* and *H. tapanahoniensis* it is moderately short, not confluent with the caudal fin. In *H. surinamensis* the adipose fin is long and low, but by a distinct notch separated from the membrane of the caudal fin. *H. bleekeri*, finally, has the adipose fin continuous with the caudal fin, showing but a slight notch on the place of connection. My impression is that the more slender a fish is, the more anal fin rays it has, the longer the adipose fin is, and the closer the contact between adipose and caudal fins is. Moreover it is quite evident that every intermediate stage between well-separated and continuous adipose and caudal fins exists, and it is mainly for this reason that I consider it inadvisable to treat the presence or absence of continuous contact between adipose and caudal fins as a generic character. See also the discussion of *H. surinamensis*.

Therefore I have concluded that the five Suriname species should all be placed in one genus, *Heptapterus*. The species can be identified as follows.

- 1a. anal fin with 20-22 rays, adipose fin broadly connected with caudal fin, with only a slight notch *H. bleekeri*.
- b. anal fin with less than 20 rays, adipose fin entirely free from caudal fin or separated from it by a deep notch 2
- 2a. anal fin with 17-19 rays, adipose fin separated from caudal by a deep notch *H. surinamensis*.
- b. anal fin with 10-15 rays, adipose fin entirely free from caudal fin 3
- 3a. anal fin with 13 (rarely), 14 or 15 rays *H. tapanahoniensis*.
- b. anal fin with 10-12 rays 4
- 4a. tail forked, but the lobes posteriorly rounded *H. longior*.
- b. tail forked with pointed lobes *H. brevior*.

Heptapterus brevior (Eigenmann)

Chasmocranus brevior Eigenmann, 1912, Mem. Carnegie Mus. 5: 162, pl. 15 fig. 1 — Waratuk, British Guiana.

Chasmocephalus brevior Eigenmann, 1910, Rep. Princeton Univ. Exped. Patagonia 3: 384 — nomen nudum (Potaro River).

Chasmocranus brevior; Borodin, 1927, Amer. Mus. Novit. 266: 6 (no locality, ex Eigenmann); Gosline, 1941, Stanford Ichth. Bull. 2: 88 (no locality); Gosline, 1945,

Bol. Mus. Nac. Zool. **33**: 32 (Guiana Inglesa); (pt.) Fowler, 1951, Arq. Zool. **6**: 520 (Guiana, ex Eigenmann); Boesman, 1953, Zool. Meded. **32**: 6 (Marowini Basin, Nassau Mountains); Inger, 1956, Fieldiana, Zool. **34**: 428 (no locality).

Characters. — This species has a short anal fin with 10 or 11 rays, as otherwise only found in *H. longior*. From *H. longior*, however, it differs in shape (forked, with pointed lobes) and pigmentation (mostly hyaline, with dark base) of the caudal fin, the relatively shorter adipose fin (5.6-6.3 in standard length instead of 3.8-4.8 in standard length), the number of vertebrae, and the different dentition.

Description. — D 7, A 10-11, P 9, V 6, C with 20-21 well-developed rays, besides numerous rudiments; number of vertebrae (two specimens) 37; gillrakers on the outer branchial arch 8-9, well-spaced, slender, their greatest length a little more than half the diameter of the eye; branchiostegals 7; teeth in the upper jaw in a fairly broad band, without a backward projection laterally, in the lower jaw in a narrow band (fig. 1a); eyes small, their greatest diameter 2.5-3 times in snout, about 2 in interorbital, and about 9 in head; the maxillary barbels reach to the base of P, the outer pair of mental barbels is about three-fifths of their length, and the inner pair is one-third to three-quarters of the length of the outer pair.

Head 4.3 to 4.7 in standard length, greatest width of body 5.8 to 6.3 in standard length, depth of body 7.5 to 8.8 in standard length; distance from tip of snout to origin of D, 2.5 to 2.6 in standard length.

Dorsal fin with one simple and six divided rays, its base 9.5 to 9.7 in standard length, longest dorsal ray about two-thirds length of head, or equal to head without snout. Anal fin with two simple and eight or nine divided rays; distance of origin of A to tip of snout twice distance of origin of A to caudal base. Pectorals lanceolate-rounded with one undivided and eight divided rays, the third ray longest, equal to length of head without snout. Ventrals more or less rounded, with six rays, their third ray longest, the outer ray simple, though distally flattened and broadened, the others divided, their origin opposite origin of D; ventrals equal in length to pectorals. Adipose fin originating behind origin of A, its anterior part very low and consequently its origin not always easy to find, the posterior part higher, its height about three times in the depth of the body below it; it is widely separated from the caudal fin. Caudal fin forked, the lobes about equal in length, pointed; the cleft less than half its length, with 15 or 16 divided and about 5 simple, well-developed rays, besides numerous rudiments, becoming progressively smaller, on each side.

Colour. Only fairly old material has been available; this is now light brown in colour, slightly paler below than above; the caudal fin is, like all

other fins, mostly hyaline and but slightly pigmented, but it has a very conspicuous dark brown base.

Material. — 3 specimens, 25 February 1949, forest brook, Nassau Mountains (D. C. Geijskes & P. Creutzberg, no. 19337), standard length 41, 48, 52½ mm. These are the specimens previously mentioned by Boeseman (1953).

Discussion. — The dark tail-base may be a diagnostic character of the

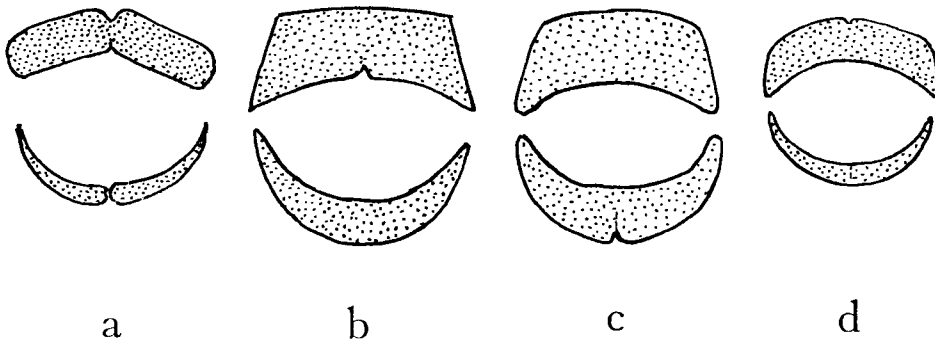


Fig. 1. Dentition of *Heptapterus*-species. a, *H. brevior*; b, *H. longior* and *H. tapana-honiensis*; c, *H. surinamensis*; d, *H. bleekeri*.

species, as Eigenmann's (1912, pl. 15) plate also shows it. This further shows a white spot at the base of the dorsal fin and a white bar across the nape. These are the colour characters of *H. longior* and I am puzzled by the fact that Eigenmann's plate of *H. longior* does not show these markings. The presence in *H. brevior* of white markings similar to those of *H. longior*, will have to be verified in fresh material. In Eigenmann's plate, the adipose fin is shown as originating almost opposite the origin of the anal fin, but actually its origin is distinctly behind it.

The difference in dentition, and number of vertebrae, in addition to the other characters, indicates that this species is not so close to *H. longior* as Eigenmann's (1912) very succinct description might lead one to believe.

Borodin (1927), without any description or comment, listed a small fish from Franca, Prov. S. Paulo, Brazil, as *Chasmocranus brevior*. The specimen was only 30 mm long, so that identification would have been difficult, and on zoogeographical grounds I consider it likely that it was misidentified. A request for a loan of the specimen (in the American Museum of Natural History) was declined as it is currently being studied. The results of this study are not yet available, and for the time being I regard it as justified to ignore the record.

Heptapterus longior (Eigenmann)

Chasmocranus longior Eigenmann, 1912, Mem. Carnegie Mus 5: 160, pl. 14 fig. 2 — Amatuk, British Guiana.

Chasmocephalus longior Eigenmann, 1910, Rep. Princeton Univ. Exped. Patagonia 3: 384 — nomen nudum (Central British Guiana).

Chasmocranus longior; Fowler, 1914, Proc. Acad. Nat. Sci. Philad. 66: 258 (Rupununi River, British Guiana); Borodin, 1927, Amer. Mus. Novit. 266: 6 (no locality, ex Eigenmann); Myers, 1928, Ann. Mag. Nat. Hist. (10) 2: 84 (São Gabriel Rapids, Rio Negro, Brazil); Gosline, 1941, Stanford Ichth. Bull. 2: 88 (British Guiana); Gosline, 1945, Bol. Mus. Nac. Zool. 33: 32 (Guiana Inglesa, Brasil, Peru); van der Stigchel, 1946, South Amer. Nematognathi: 46 (Warraputa Falls, Essequibo river, British Guiana); van der Stigchel, 1947, Zool. Meded. 27: 46 (Warraputa Falls, Essequibo river, British Guiana); Fowler, 1951, Arq. Zool. 6: 520 (Rio Negro, Guiana, ex Eigenmann and Myers); Inger, 1956, Fieldiana, Zool. 34: 428 (no locality); Lowe, 1964, J. Linn. Soc. (Zool.) 45: 140 (Rupununi).

Characters. — The least slender of all species; easily recognized by its short anal fin, with 10-12 rays, a white spot at the base of the dorsal fin, a distinct crossbar over the nape, and the pigmented anterior part of the caudal fin, which colour is clearly defined against the hyaline fin-tips.

Description. — D 6 (once), normally 7, A 10-12, P 8-10, V 6, C with 20-22 well-developed rays, besides numerous rudiments; number of vertebrae (four specimens) 39; gillrakers on the outer branchial arc 8-10, well-spaced, slender, their greatest length a little less than the diameter of the eye; branchiostegals 7, well-developed; teeth in both jaws in a broad band, the maxillary band projecting backwards laterally (fig. 1b); eyes slightly larger than in the preceding species, their greatest diameter 2 to 2.6 in snout, 1 to 1.5 in interorbital, and 6.5 to 7.5 in head. The maxillary barbels reach to just beyond the base of P, the outer pair of mental barbels is one-half to two-thirds their length, and the inner pair is about two-thirds the length of the outer pair.

Head 4.0 to 4.8 in standard length, greatest width of body 5.5 to 6.5 in standard length, depth of body 7.3 to 10.0 in standard length, distance from tip of snout to origin of D, 2.5 to 2.7 in standard length.

Dorsal fin with one simple and six divided rays¹⁾, its base 8.5 to 9.5 in standard length, longest dorsal ray about two-thirds length of head, or equal to head without snout. Anal fin with ten to twelve rays, of which the first two or three simple, the others divided; distance of origin of A to tip of snout about 2.3 times its distance from base of caudal. Pectorals rounded, with one simple and eight or nine (occasionally seven) divided rays, the third ray longest, equal to postorbital part of head. Ventrals rounded, with one simple and five divided rays, their fourth ray longest, but third and

1) A single individual from Sipaliwini, 59 mm in standard length, has D 6 (i. 5), A 10.

fifth rays almost equal; the origin of the ventrals is almost exactly opposite the origin of the dorsal. Adipose fin originating opposite origin of A, or slightly more backwards, its height about 2.5 times in the depth of the body below it; near its origin the adipose fin is low, and over the rest of its length fairly even, though slightly convex, the middle part highest; it is continued backwards to the base of the tail, but clearly separated from the caudal fin; length 3.8 to 4.8 in standard length. Caudal fin forked, with lobes about equal in length, rounded, but in small specimens often more or less pointed, with 20 to 22 well-developed and divided rays, besides numerous rudiments, becoming progressively smaller, on each side.

Colour. Dark earth brown, paler below, especially under surface of head and breast; a conspicuous whitish bar across the nape, and a whitish spot at the origin of D; the fins dusky, but D rather darker, with a hyaline edge, and C strongly pigmented, with broad sharply demarcated, hyaline margins.

Material. — 367 specimens as follows. Five specimens, 28 December 1963, Kwambaolo Creek, a tributary of the Sara Creek above Dam (M. Boeseman, no. 25524), standard length 46, 47, 57, 67, 67 mm. One specimen, 31 July 1964, rapids in middle course Gran Creek (M. Boeseman, no. 25525), standard length 77 mm. One specimen, 19 April 1965, Compagnie Creek (Mees, no. 25526), standard length 45 mm. Eight specimens, 17 July 1965, Awaradam, Gran Rio (Mees, no. 25527), standard length 111 to 139 mm. 46 specimens, same data (no. 25528), standard length 22 to 78 mm. Six specimens, 18 July 1965, Grandam, Gran Rio (Mees, no. 25529), standard length 34 to 44 mm. 54 specimens, 13 August 1965, Mamadam, Suriname River (Mees, no. 25530), standard length 31 to 122 mm. 15 specimens, same data (no. 25537), standard length 35 to 68 mm. 22 specimens, same data (no. 25532), standard length 97, 102, 117, 133 mm. Two specimens, 13 September 1965, Avanavero Falls, Kabalebo River (Mees, no. 25561), standard length 40 and 40 mm. One specimen, 24 September 1965, Avanavero Falls, Kabalebo River (Mees, no. 25533), standard length 34 mm. Two specimens, 19 December 1965, Compagnie Creek (Mees, no. 25534), standard length 69, 78 mm. Eleven specimens, 28 December 1965, Marchall Creek (Mees, no. 25535), standard length 32½ to 70 mm. 34 specimens, 23 January 1966, Sipaliwini (Mees, no. 25536), standard length 36 to 67 mm. 38 specimens, same data (no. 25537), standard length 35 to 68 mm. 22 specimens, same data (no. 25538), standard length 34 to 72 mm. Six specimens, 2 February 1966, Sipaliwini (Mees, no. 25539), standard length 46 to 60 mm. Nine specimens, 4 February 1966, Sipaliwini (Mees, no. 25540), standard length 53 to 70 mm. 19 specimens, 6 February 1966, Sipaliwini (Mees, no. 25541), standard length 45 to 83 mm. 80 specimens, 9 February 1966, Sipaliwini (Mees, no.

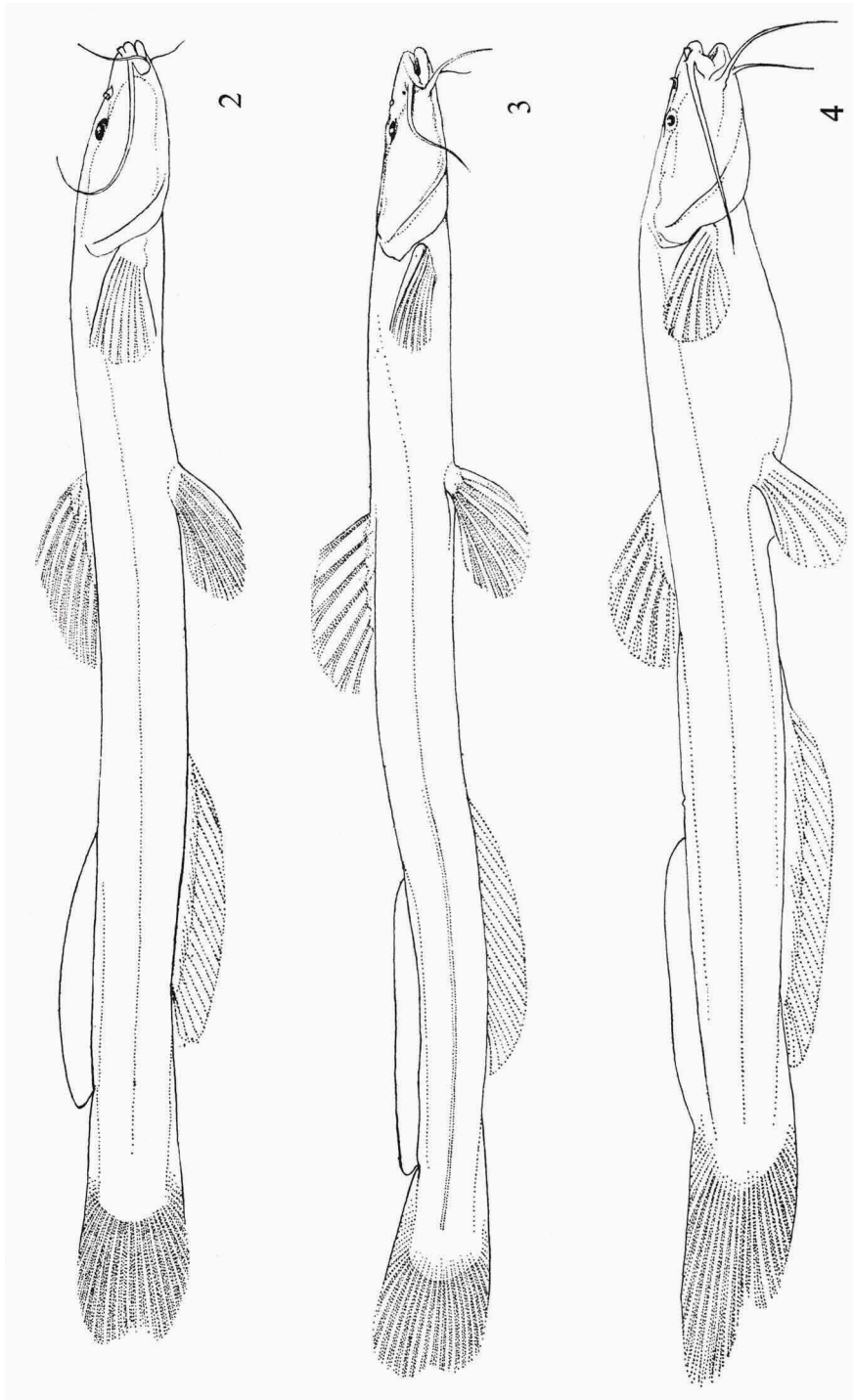


Fig. 2. *Heptapterus taparahoniensis*, specimen of 87 mm standard length (no. 25548).

Fig. 3. *Heptapterus swinhonis*, specimen of 77 mm standard length (no. 25558).

Fig. 4. *Heptapterus bleekeri*, specimen of 66 mm standard length (no. 25559).

25542), standard length 31 to 70 mm. One specimen, same data (no. 25543), standard length 26 mm. Two specimens, same data (no. 25544), standard length 93, 110 mm. One specimen, 12 March 1966, tributary of the Mama Creek near Berg-en-Dal (Mees, no. 25545), standard length 81 mm. Also examined one specimen, paratype of the species, 1908, Warraputa Falls, Essequibo, standard length 38½ mm (Zool. Mus. Amsterdam, no. 100992).

Habitat. — A common species in rapids, where it lives under stones and in dense growths of Podostemaceae. Less common and of a smaller size in the smaller creeks, providing that there is a good current.

Discussion. — Inger (1965, p. 428, 429), separated *H. longior* and *H. brevior* on number of anal rays, 12 to 13 in the former, 10 in the latter. As his count was taken from the type of *H. brevior*, and the type and seven paratypes of *H. longior*, it is unexpected to see these numbers, when Eigenmann (1912) found for *H. longior* A 10-12. A paratype of *H. longior* examined by me has A 11, and in large series I found also A 10-12, and in *H. brevior*, A 10-11. Inger to the contrary, the two species are therefore not separable by number of anal fin rays.

Heptapterus tapanahoniensis species nova

Characters. — Very similar to *H. longior*, but anal fin slightly longer, with 14-15 (rarely 13) rays. A pale spot at the origin of D is only very faintly indicated, and there is no transverse pale line across the nape; the caudal fin is only weakly pigmented, without a demarcation between a pigmented and a hyaline section.

Description. — D 7, A 13-15, usually 14-15, P 8-9, V 6, C about 22, excluding the numerous rudiments; number of vertebrae (three specimens) 43; gillrakers on the outer branchial arch 8-9, well-spaced, slender, their greatest length nearly equal to the diameter of the eye; branchiostegals 7, well-developed; teeth in broad bands, similar to *H. longior*; eyes small, their greatest diameter 2 to 3 times in snout, about 1.5 in interorbital, and 7 to 8 in head. The maxillary barbels reach to the base of P or beyond it, almost to half-way the length of P, the outer pair of mental barbels is half their length or a little more, and the inner pair is one-half to two-thirds the length of the outer pair.

Head 4.5 to 5.4 in standard length, greatest width of body 6.5 to 7.4, usually about 7 in standard length, depth of body 10.7 to 13.0 in standard length, distance from tip of snout to origin of D, 2.5 to 2.8 in standard length.

Dorsal fin with one simple and six divided rays, its base 8.8 to 12.0 in standard length, longest dorsal ray about two-thirds length of head, or equal to head without snout. Anal fin with fourteen or fifteen rays (one specimen

has only thirteen rays), of which the first three of four are simple, though flattened towards the extremity, the others divided, and the last one usually split right down to its base; distance of origin of A to tip of snout about 1.8 times its distance to base of caudal. Pectorals rounded, with one simple and seven or eight divided rays²⁾, the third ray longest, but the second and fourth rays almost equal; length of P equal to postorbital part of head. Ventrals rounded, with six rays, their fourth ray longest, but third and fifth rays almost equal; the outer ray is simple, though distally flattened and broadened, the others divided; the origin of the ventrals is opposite the origin of the dorsal, or slightly in advance of it; ventrals about one-fourth longer than pectorals. Adipose fin originating opposite the second to fourth ray of anal fin, its height about three times in the depth of the body below it; its height is even over most of its length; it is continued backwards to the tail, but clearly separated from the caudal fin; length 3.7 to 4.7 in standard length. Caudal fin lobed, the lobes about equal in length, rounded, but in small specimens often more or less pointed, with about 22 well-developed and divided rays, besides numerous rudiments, becoming progressively smaller, on each side.

Colour. Dark earth brown; the fins, including the caudal fin, dusky hyaline, hence the caudal fin without a pattern as found in *H. longior*; some specimens show a faint indication of a lighter spot at the basis of the dorsal fin.

Material. — 34 specimens, 17, 19 and 27 November 1965, various places in the Tapanahoni River, from about two kilometres below to two kilometres upstream of its confluence with the Paloemeu River (Mees, nos. 25546-51), standard length 34 to 110 mm. Type, the largest specimen, 17 November 1965, Tapanahoni, about two kilometres downstream of its confluence with the Paloemeu, total length 130 mm, standard length 110 mm, RMNH regd. no. 25546.

Habitat. — These fishes were very common in the Tapanahoni River, under stones.

Discussion. — There is little doubt that *H. tapanahoniensis* is closely related to *H. longior*, to which it is geographically adjacent. In proportions and dentition the two are practically identical, and traces of the colour pattern of *H. longior* remain in *H. tapanahoniensis*. Since the differences in colour, pigmentation of the caudal fin, and number of rays of the anal fin are clear cut, and all species of the genus are morphologically extremely

2) One specimen has the right pectoral fin with only six rays (i. 5), though the other fin has a normal number of nine; this is evidently an aberration.

similar to each other, I consider it in the present imperfect state of our knowledge advisable to describe *H. tapanahoniensis* as a species rather than as a subspecies.

Heptapterus surinamensis Bleeker

Heptapterus surinamensis Bleeker, 1862, Versl. Meded. Kon. Akad. Wetensch. **14**: 387 — Surinama.

Heptapterus surinamensis; Günther, 1864, Cat. Fishes Brit. Mus. **5**: 271 (Surinam); Bleeker, 1864, Nat. Verh. Holl. Maatsch. Wetensch. (2) **20**: 91, pl. 15 fig. 1 (Surinama); Eigenmann & Eigenmann, 1888, Proc. Calif. Acad. Sci. (2) **1**: 172 (no locality); Gosline, 1941, Stanford Ichth. Bull. **2**: 87 (Surinam); Gosline, 1945, Bol. Mus. Nac. Zool. **33**: 30 (Surinam); van der Stigchel, 1946, S. Amer. Nematognathi: 41 (Surinam); van der Stigchel, 1947, Zool. Meded. **27**: 41 (Surinam); Boeseman, 1953, Zool. Meded. **32**: 5 (no locality).

Acentronichthys surinamensis; Eigenmann & Eigenmann, 1890, Occ. Pap. Calif. Acad. Sci. **1**: 146 (Surinam); Eigenmann & Eigenmann, 1891, Proc. U.S. Nat. Mus. **14**: 29 (Surinam); Eigenmann, 1910, Rep. Princeton Univ. Exp. Patagonia **3**: 385 (Surinam); Eigenmann, 1912, Mem. Carnegie Mus **5**: 64, also 131 (Dutch Guiana).

Chasmocranus surinamensis; Inger, 1956, Fieldiana, Zool. **34**: 428 (no locality).

Characters. — More slender than the preceding species; anal fin with 17-19 rays; caudal fin usually shallowly forked with two rounded lobes, but sometimes almost rounded; adipose fin long, but not continuous with the membrane of the caudal fin.

Description. — D 7, A 17-19, P 8-9, V 6, C about 22, excluding the numerous rudiments; number of vertebrae (two specimens) 46; gillrakers on the outer branchial arch 7-8, well-spaced, the longest not over half the diameter of the eye; branchiostegals 7; teeth in the upper jaw in a broad evenly rounded band, without clear backward projections laterally, in the lower jaw in a crescent shaped band (fig. 1c); eyes moderate, their greatest diameter 2 to 2.5 in snout, 1.2 to 1.7 in interorbital, and 7 to 8 in head. The maxillary barbels reach from not quite to just beyond the base of P, the outer pair of mental barbels is half their length or a little more, and the inner pair is about two-thirds the length of the outer pair.

Head 5.1 to 5.9 in standard length, greatest width of body 7.0 to 8.0 in standard length, depth of body 12.7 to 14.5 in standard length, distance from tip of snout to origin of D, 2.7 to 2.9 in standard length.

Dorsal fin with one simple and six divided rays, its base 9.8 to 11.0 in standard length, longest dorsal ray about equal to head without snout. Anal fin with seventeen to nineteen rays, the first two or three simple, the others divided; distance of origin of A to tip of snout about 1.5 times its distance to base of caudal. Pectorals rounded, with one simple and eight divided rays, their third ray longest; length of P slightly shorter or almost equal to postorbital part of head. Ventrals rounded, with one simple and five divided rays, their origin slightly in advance of origin of D; ventrals about one-

fourth longer than pectorals. Adipose fin originating opposite the fourth to sixth ray of anal fin, its height about three times in the depth of the body below it, its height is even over most of its length; it is continued backwards on the caudal peduncle, but clearly separated from the caudal fin; length 3.6 to 4.0 in standard length. Caudal fin somewhat variable; in small specimens lanceolate, in larger individuals usually lobed, with rounded lobes, but in one specimen the lobes are more or less pointed, and in another the fin is more or less rounded; there are about 22 well-developed rays, flanked by numerous smaller and rudimentary ones.

Colour. Dull brown without markings, the ventral surface paler, along the side-line slightly darker. The species is somewhat lighter in colour than *H. longior* and *H. tapanahoniensis*. Even without enlargement it can be seen that the colour is made up of a light brown underground, with many large well-spaced, blackish brown melanophores.

Material. — Seventeen specimens as follows. Type of the species, undated (between 1824 and 1836), Suriname, without exact locality but presumably not far from Paramaribo (H. H. Dieperink, no. 2984), standard length 109 mm. One specimen, January 1964, Aloesoebanja Falls, Suriname River above Affobakka, now drowned in the Brokopondo Lake (P. Leentvaar, no. 25552), standard length 97 mm. One specimen, 6 March 1964, Gran Creek, a tributary of the Suriname River, now drowned in the Brokopondo Lake (M. Boeseman, no. 25553), standard length 68 mm. One specimen, 31 July 1964, Gran Creek (M. Boeseman, no. 25554), standard length 99 mm. Four specimens, 17 July 1965, Awaradam, Gran Rio (Mees, no. 25555), standard length 76, 97, 100, 121 mm. Five specimens, same data (no. 25556), standard length 26, 28, 28, 33, 49 mm. Two specimens, 18 July 1965, Gran Dam, Gran Rio (Mees, no. 25557), standard length 61 and 76 mm. Two specimens, 13 August 1965, Mamadam, Suriname River (Mees, no. 25558), standard length 50 and 77 mm.

Habitat. — All specimens (except the type of which the provenance is not exactly known) were taken in rapids of the Suriname River and its major tributaries.

Discussion. — Inger placed *H. surinamensis* in *Chasmocranus* because of having the adipose fin "about 4 in length instead of 2-3", but it appears now that in *H. surinamensis* it is 3.6 to 4 and in *H. bleekeri* 2.9 to 3.7, so that there is overlap which further weakens the case for regarding the length of the adipose fin as of generic value.

The fact that the type, which has remained unique for over a century until the material here recorded had been collected, has a damaged caudal fin, has troubled the few ichthyologists who have discussed the species (van

der Stigchel, 1946; Boeseman, 1953). This problem has now been solved with the new material, though the individual variation evident in my small sample shows clearly that the value of tail-shape as a generic character has been overestimated.

Heptapterus bleekeri Boeseman

Heptapterus bleekeri Boeseman, 1953, Zool. Meded. **32**: 3, fig. 1a — Marowini Basin, Nassau Mountains.

Characters. — Similar in appearance to *H. surinamensis*, and about equally slender, but the anal fin is even longer, with 20-22 rays; the adipose fin is broadly connected with the membrane of the caudal fin, and the caudal fin is either lanceolate, or with unequally developed lobes.

Description. — D 7, A 20-22, P 8, V 6, C with about 20 to 22 divided rays, and numerous smaller simple ones; number of vertebrae (one specimen) 49; gillrakers on the outer branchial arc 6-7, well-spaced, slender, their greatest length a little more than half the diameter of the eye, the lower two or three, however, progressively smaller; branchiostegals 8; teeth in the upper jaw in a fairly broad evenly rounded band, without clear backward projections laterally, in the lower jaw in a crescent shaped band (fig. 1d); eyes small, their greatest diameter about 3 in snout, about 2 in interorbital, and about 9 in head. The maxillary barbels reach to well beyond the base of P; the outer pair of mental barbels is about three-fifths of their length, and the inner pair is about two-thirds of the length of the outer pair.

Head 5.3 to 6.0 in standard length; greatest width 7.4, 8.4-9.6 in standard length, greatest depth of body 9, 10-13.8 in standard length; distance from tip of snout to origin of D, 2.5 to 2.8 in standard length.

Dorsal fin with one undivided and six divided rays, its base 11.5 to 12.5 in standard length, longest dorsal ray equal to postorbital part of head, or slightly longer. Anal fin with 20-22 rays, the first three or four simple, the others divided; distance of origin of A to tip of snout 1.5 times distance of origin of A to caudal base. Pectorals rounded, with one simple and seven divided rays, their third ray longest, its length a bit less than postorbital part of head. Ventrals with one simple and five divided rays, their origin slightly but distinctly in advance of origin of D; ventrals about one-fourth longer than pectorals. Adipose fin originating opposite the fourth to eighth anal ray, its origin not always easy to ascertain as its anterior part may be low; apart from this low spur, the adipose fin is of fairly even height over most of its length, its height 2.5 to 3 times in the depth of the body below it; adipose continuous with the membrane of the caudal fin, the place of connection only marked by a very shallow notch; length 2.9 to 3.7 in standard

length. Caudal fin lanceolate, with the central rays longest, or unevenly lobed, as in the figured specimen, with about 22 well-developed and divided rays, besides numerous smaller and rudimentary, simple ones.

Colour. Earth brown without markings, slightly darker than *H. surinamensis*, and with the melanophores smaller but closer together; the ventral surface paler; the fins dusky hyaline, with their bases slightly more pigmented.

Material. — Ten specimens as follows. Two specimens, type and paratype of the species, 21 February 1949, creek in the Nassau Mountains (D. C. Geijskes & P. Creutzberg, no. 19421), standard length 43 (paratype) and 83 mm (type). Seven specimens, paratypes, 25 February 1949, same locality (D. C. Geijskes & P. Creutzberg, no. 19420), standard length 52 to 88 mm. One specimen, 8 March 1966, Tapoeripa Creek near Brokopondo (Mees, no. 25559), standard length 66 mm.

Habitat. — The type material came from a small forest creek, and the single specimen obtained by me was from a similar habitat.

Discussion. — The measurements given by Boeseman (1953) are slightly larger than those taken by me of the same material; probably this is mainly due to differences in method of measuring: the base of the caudal fin is difficult to find, and moreover slight changes may have occurred during preservation.

The specimen which is so considerably less slender than the others (see description), is the one collected by me and depicted in figure 4. It is the only recently collected and firm individual; the older material is soft. This is probably the main cause of these differences. It will be evident that I have not much confidence in ichthyologists who give proportions of soft-bodied small fishes in thousandths of standard length.

NOTES ABOUT DISTRIBUTION, HABITAT AND ABUNDANCE

The available collections, though greatly increasing knowledge, are not nearly sufficient to base conclusions on, but they give some valuable indications.

Of the five species, one, *H. brevior*, is not known to me in the field, so that I can say nothing about it; even so it is remarkable that a species described from British Guiana and collected in the Nassau Mountains, was not found anywhere by us. The scant evidence hitherto available from Suriname suggests that this is an inhabitant of forest creeks, but the type material, from Amatuk and Waratuk, appears to have been taken from a fairly large river. *H. longior* appeared abundant in the rapids of the Suriname River, in the Sipaliwini, and scarce in smaller creeks (tributaries of the Suriname River downstream of Brokopondo); its optimal habitat are

doubtless the rapids of the great rivers. The fact that this is the only species that since its description has been recorded repeatedly and from various localities, indicates that it is common over a wide area. *H. tapanahoniensis* replaces *H. longior* in the Tapanahoni River, where it is equally common; it may well be widely distributed, but its range remains to be defined. *H. surinamensis* is at present known from the Suriname River and its major tributaries only, where it is found in the rapids exactly as *H. longior*, but is less common. In the Suriname River basin, 13 specimens of *H. surinamensis* were taken by me, as against 147 *H. longior*, which suggests a relative abundance of less than 1: 10. The fact that it was nowhere found away from the rapids of the major rivers, suggests that it is even more dependent on fast-flowing water than is *H. longior*. The small specimens taken at the Awaradam, in the wet season when there was a big flow of water, indicate that reproduction takes place under such conditions. As far as now known, *H. bleekeri* is an inhabitant of small forest creeks, but even so it is remarkable that I obtained but a single specimen (extending the known range from the Marowijne basin to the Suriname River basin), as many creeks in this same area were fished; therefore it might be considered a rare species, had not Geijskes and Creutzberg obtained nine specimens.

The distribution in Suriname as known at present can be summarized as follows. Marowijne: *H. brevior*, *H. tapanahoniensis*, *H. bleekeri*. Suriname River: *H. longior*, *H. surinamensis*, *H. bleekeri*. Corantijn (Kabalebo, Sipaliwini): *H. longior*.

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