

BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

ZOOLOGICAL MUSEUM OF THE UNIVERSITY OF AMSTERDAM

No. 203

Volume 15

May 17, 1968

Dedicated to Professor Dr. H. Engel

Gymnotus carapo and *G. anguillaris* (syn.: *G. coropinae*), two often confused species of gymnotid fishes
(Pisces, Cypriniformes)

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ABSTRACT

The species *Gymnotus anguillaris* Hoedeman, 1962 has been collected all over Surinam. The authors suggest the possibility that *G. anguillaris* is widely distributed in South America, because it is hitherto confused with the closely related *G. carapo* Linnaeus, 1758. Besides it is proved that *G. coropinae* Hoedeman, 1962 has to be regarded as a synonym of *G. anguillaris*.

During an expedition to Surinam (Dutch Guiana), April 1966—July 1967¹⁾, the senior author collected thousands of gymnotid fishes in the systems of the Marowijne, Suriname, Saramacca, Coppename and Nickerie rivers. Of all collected species, *Gymnotus carapo* Linnaeus, 1758, was the most abundant [called by the bushnegroes “bobo” (Aucan dialect) or “lobo-lobo” (Saramaccan dialect)].

From the literature it is known that this species is widely distributed in fresh water in Central and South America from Guatemale southward to the Rio de la Plata and westward to the Andes; it is found on Trinidad too.

The colour pattern of *G. carapo* shows a variation as mentioned by Ellis (in Eigenmann, 1912 : 427): “a series of transverse white stripes crossing the body in young individuals, which stripes widen and become yellow with age, ...” and (1913 : 120): “The general marking of the species varies considerably, specimens from clear water being darker and more striped than those from muddy water. Some specimens from Guatemaala and from Upper Paraguay are almost without markings”.

The senior author saw a sample of partly striped specimens collected by C. H. Eigenmann in British Guiana in 1908, now in the collection of the California Academy of Science, San Francisco (ex Indiana State University,

¹⁾ An expedition sponsored by the Netherlands Foundation for the Advancement of Tropical Research (WOTRO) and the University of Amsterdam.

I.U.M. 12627). These specimens lack the oblique light-coloured stripes across the sides on the front part of their bodies and are identical with material collected in Surinam.

Hoedeman (1962a : 55) described a new species as *Gymnotus anguillaris* based on two specimens (holotype 228 mm t.l., ZMA 100.338 and paratype 236 mm t.l., ZMA 100.338a) and gave as locality: Surinam, Coropina creek. He based his species principally on the depth of the body, stating: "This new species is quite different from ordinary *carapo*, especially in the depth of the body, which is about 14 times in the standard length (8 to 10 times in *carapo*)" and "... particularly the cross-section, at about the middle of the body (cf. fig. 1), shows the eel-like configuration". Hoedeman also mentions

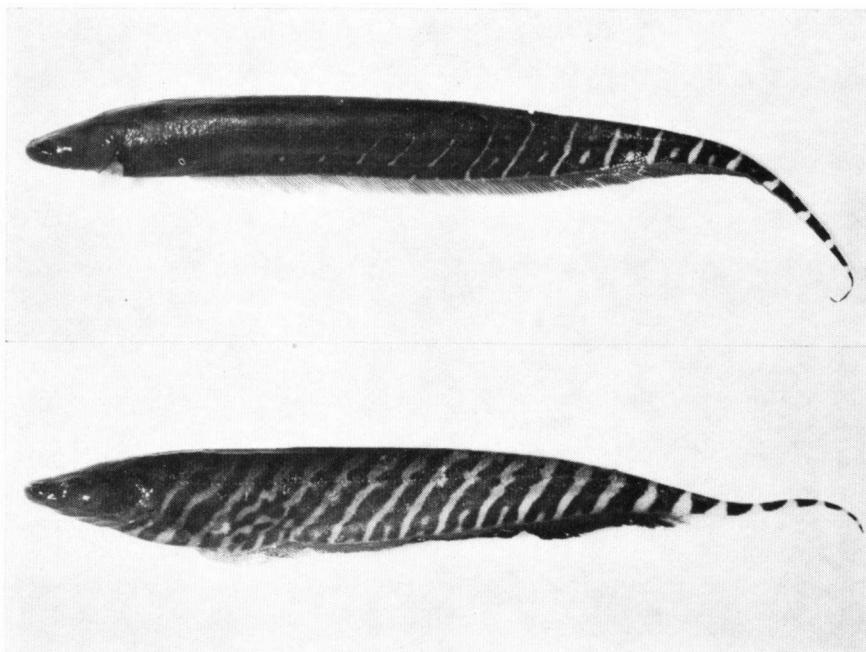


FIG. 1. *Gymnotus anguillaris* 125 mm t.l., ZMA 105.904 (above) and *G. carapo* 115 mm t.l., ZMA 105.317 (below).

for his species: "Coloration (in life and alcohol) uniform bluish grey, the haemal region lighter, and the greater part of the occiput black. Five broad black bars traverse the end of the tail". Moreover, he gives proportions (in his table I) of the smaller head length and the smaller interorbital distance in comparison with *G. carapo*. In his "Key to the Gymnotoid fishes of Guiana" (1962b : 102) he states for *G. anguillaris* among others: "depth of body at origin of anal fin about 15 times in total length; head about 10 times in total length; body and tail dead black to bluish-brown, with 10 or less narrow black vertical bars on the tail only".

These characteristics are — with the exception of the black colour — all present in those specimens of "*G. carapo*", lacking the oblique light coloured

bars across the sides on the foremost part of their bodies. Such specimens, all over Surinam always collected together with completely striped individuals of *G. carapo* can indeed be easily distinguished by their rounder bodies, smaller heads and colour pattern on body and anal fin (fig. 1 and table I).

After comparison of hundreds of specimens of both forms, we are of the opinion that Hoedeman was right in describing *G. anguillaris* as a new species. It seems to occur abundantly in the Guianas and is probably more widely distributed; according to Ellis (1913 : 120): "Some specimens from Guatemala and from Upper Paraguay are almost without markings". However, we also found many completely striped specimens of *G. anguillaris*. These specimens are always longer than about 150 mm t.l. and can also be distinguished from

TABLE I: Head length, body depth (measured at the origin of the anal fin) and certain ratios of *Gymnotus carapo* and *G. anguillaris*

	total length in mm	head length in mm	body depth in mm	head length in t.l.	body depth in t.l.
<i>G. carapo</i>					
ZMA 105.924 :	300	39.5	31.9	7.6	9.4
	271	35.7	27.5	7.6	9.9
	261	34.0	27.8	7.7	9.4
	254	34.2	26.1	7.4	9.7
	234	33.4	23.0	7.0	10.2
ZMA 105.317 :	134	18.7	14.2	7.2	9.4
	128	17.1	13.8	7.5	9.3
	125	16.6	12.9	7.5	9.7
	125	16.4	14.1	7.6	8.9
	123	16.2	13.0	7.6	9.5
	118	16.2	14.8	7.3	8.0
	118	15.9	11.5	7.4	10.3
	117	16.5	12.5	7.1	9.4
(see fig. 1)	115	15.7	12.3	7.3	9.4
	106	14.4	11.9	7.4	8.9
<i>G. anguillaris</i>					
ZMA 105.930 :	302	25.6	20.8	11.8	14.5
	299	27.4	26.9	10.9	11.1
	291	26.5	19.6	11.0	14.8
	281	27.4	27.4	10.3	10.3
	255	23.9	23.0	10.7	11.1
ZMA 105.904 :	145	13.8	11.4	10.5	12.7
	130	12.4	10.9	10.5	11.9
	125	12.1	9.5	10.3	13.2
(see fig. 1)	125	12.2	9.5	10.3	13.2
	124	12.6	10.3	9.8	12.0
	122	11.9	9.0	10.3	13.6
	120	12.2	9.8	9.8	12.2
	116	11.8	8.7	9.8	13.3
	114	11.6	9.6	9.8	11.9
	111	11.2	8.5	9.9	13.1

G. carapo by their smaller heads, rounder bodies (table I) and the lack of a deep blue pigmentation on the anal fin, such as present in *G. carapo* from about the 80th to the 140th ray, even in very small specimens.

Hoedeman (1962a : 55) also described from Surinam as a new gymnotid species *Gymnotus coropinae* (ZMA 100.185) based on a single small specimen found among a sample of *G. carapo* from the Coropina creek (ZMA 101.968). He founded this new species principally on the smaller number of anal rays: "142 against more than 240 in *carapo*" (in 1962b: 102, he mentions 132 rays, but we counted 136 anal rays), and stated: "... the tip of the tail is broken off, but the specimen seems to be complete as to the total anal fin" and "... since the available synonyms of *carapo* all relate to forms with a far greater number of anal rays, I want to provisionally describe it as a new species". Hoedeman also mentioned for this new species a quite distinct colour pattern in comparison with *G. carapo*: "there are only 10 faint, narrow yellowish streaks on the posterior part of the tail, otherwise the fish is dark tan (in alcohol)".

In the same river system (Para river, into which debouch creeks with limpid, dark brown — coca-cola coloured —, acid water, where *G. coropinae* was found, the senior author collected 110 specimens of *G. carapo* (ZMA 105.317) and 95 specimens of *G. anguillaris* (ZMA 105.904) both from the Carolina creek).

Back in Amsterdam we compared the holotype of *G. coropinae* with freshly preserved material from Surinam and found that Hoedeman's specimen of *G. coropinae* had the same appearance as young damaged, dried out specimens of *G. anguillaris*.

The principal difference, the fewer anal rays, on which Hoedeman based his new species, was caused by the loss of the posterior part of the anal fin, which had been broken off together with the tip of the tail. The differences in some body measurements may be caused by the way Hoedeman measured his animal, because he expressed his proportions in the length of the damaged fish; naturally this cannot be the total length. Moreover, we measured the length from snout to fracture as 56.8 mm, while Hoedeman gave 49.3 mm. Hoedeman also mentioned for *G. coropinae* (1962a : 55): "There are two rows of small, sharp teeth in both jaws", while stating for *G. carapo* (1962b : 102): "a double row of teeth in the jaws of juveniles up to about 50 mm length". This juvenile characteristic is also present in *G. anguillaris*.

Considering all these facts, it seems justified to regard *G. coropinae* not as a valid species, but as a synonym of *G. anguillaris*.

Material of the genus *Gymnotus* collected by the senior author:

SURINAM

District Brokopondo :

Marshall creek, East of the road Paranam-Afobaka, 1.5 km North of the village Marchal (= Eendracht); 8.XII.1966:

129 ex. <i>Gymnotus carapo</i>	108—253 mm t.l. (ZMA 105.299)
88 ex. <i>Gymnotus anguillaris</i>	58—148 mm t.l. (ZMA 105.908)

Tapoeripa creek (northern branch), 3 km North of Brokopondo; 13.XI.1966:
1 ex. *Gymnotus carapo* 117 mm t.l. (ZMA 105.517)

Tapoeripa creek near Hermansdorp, 1 km North of Brokopondo; 25.VIII.1966:

57 ex. *Gymnotus carapo* 48—191 mm t.l. (ZMA 105.163)
8 ex. *Gymnotus anguillaris* 65—138 mm t.l. (ZMA 105.912)

Tapoeripa creek (southern branch) near Brokopondo; 15.IX.1966:

38 ex. *Gymnotus carapo* 25—258 mm t.l. (ZMA 105.158)
18 ex. *Gymnotus anguillaris* 43—132 mm t.l. (ZMA 105.159)

Pasa (= Dateke) creek, 1.5 km South of Brokopondo near the Suriname river, 1.IX.1966:

1 ex. *Gymnotus carapo* 185 mm t.l. (ZMA 105.916)
1 ex. *Gymnotus anguillaris* 120 mm t.l. (ZMA 105.901)

Dabikwen (= Baling) creek at Brokobaka, 5 km North of Afobaka; 19.IX.1966:

26 ex. *Gymnotus carapo* 164—290 mm t.l. (ZMA 105.157)
81 ex. *Gymnotus carapo* 55—150 mm t.l. (ZMA 105.164)
19 ex. *Gymnotus anguillaris* 54—149 mm t.l. (ZMA 105.917)

Makami (= Makambi) creek, 8 km South of Brownsweg; 13.IX.1966:

3 ex. *Gymnotus carapo* 98—345 mm t.l. (ZMA 105.177)

Blommenstein lake, 3.5 km S.E. of Brownsweg; 13.V.1966:

2 ex. *Gymnotus carapo* 282—312 mm t.l. (ZMA 105.914)

Witte creek, 12 km South of Brownsweg; 23.XI.1966:

2 ex. *Gymnotus carapo* 135—234 mm t.l. (ZMA 105.261)

Toebaka creek on the left shore of the Saramacca river, 5 km North of the junction with the Pikien Saramacca; 2.III.1967:

4 ex. *Gymnotus carapo* 77—159 mm t.l. (ZMA 105.645)

Creek on the right shore of the Pikien Saramacca river, 11 km E.S.E. of the junction with the Saramacca river; 27.II.1967:

28 ex. *Gymnotus carapo* 44—221 mm t.l. (ZMA 105.628)

Creek on the left shore of the Pikien Saramacca river, 13 km E.S.E. of the junction with the Saramacca river; 28.II.1967:

9 ex. *Gymnotus carapo* 87—218 mm t.l. (ZMA 105.638)

Marowijne (= Gran) creek, at collecting date inundated by Blommenstein lake; 19.X.1966:

50.5 km South of the dam at Afobaka:

1 ex. *Gymnotus carapo* 277 mm t.l. (ZMA 105.225)

27.V.1966:

51 km South of the dam at Afobaka:

3 ex. *Gymnotus carapo* 55—82 mm t.l. (ZMA 105.345)

25.V.1966:

53.5 km South of the dam at Afobaka:

33 ex. *Gymnotus carapo* 228—420 mm t.l. (ZMA 105.907)

24.V.1966:

55 km South of the dam at Afobaka:

7 ex. *Gymnotus carapo* 237—362 mm t.l. (ZMA 105.170)

9.VI.1966:

58 km South of the dam at Afobaka:

3 ex. *Gymnotus carapo* 96—249 mm t.l. (ZMA 105.899)

8.VI.1966:

60 km South of the dam at Afobaka:

6 ex. *Gymnotus carapo* 86—285 mm t.l. (ZMA 105.915)

Marowijne (= Gran) creek, 63 km South of the dam at Afobaka, 3 km South of southernmost shore of the lake; 20.X.1966:

31 ex. *Gymnotus carapo* 61—195 mm t.l. (ZMA 105.920)

2 ex. *Gymnotus anguillaris* 61— 62 mm t.l. (ZMA 105.921)

Sara creek, 31 km South of the village Dam; 12.X.1966:

3 ex. *Gymnotus carapo* 120—161 mm t.l. (ZMA 105.230)

Creek on the right shore of the Sara creek, 31 km South of Dam; 12.X.1966:

27 ex. *Gymnotus carapo* 84—223 mm t.l. (ZMA 105.231)

2 ex. *Gymnotus anguillaris* 78— 84 mm t.l. (ZMA 105.918)

Sara creek, 27 km South of Dam; 14.X.1966:

75 ex. *Gymnotus carapo* 64—249 mm t.l. (ZMA 105.906)

2 ex. *Gymnotus anguillaris* 69— 81 mm t.l. (ZMA 105.905)

Creek on the left shore of the Sara creek, 19 km South of Dam; 13.X.1966:

1 ex. *Gymnotus carapo* 193 mm t.l. (ZMA 105.248)

Jenjee creek on the right shore of the Suriname river, 7.5 km North of Boto-pasi; 21.III.1967:

25 ex. *Gymnotus carapo* 42—167 mm t.l. (ZMA 105.689)

3 ex. *Gymnotus anguillaris* 118—126 mm t.l. (ZMA 105.900)

Parwapa (= Paba) creek on the left shore of the Suriname river, 2.5 km North of Boto-pasi near Foetoenakaba (= Voetokaba); 20.III.1967:

16 ex. *Gymnotus carapo* 46—229 mm t.l. (ZMA 105.922)

2 ex. *Gymnotus anguillaris* 112—121 mm t.l. (ZMA 105.923)

Kwati Watra creek on the left shore of the Suriname river, 0.5 km South of Boto-pasi; 19.III.1967:

6 ex. *Gymnotus carapo* 165—258 mm t.l. (ZMA 105.677)

2 ex. *Gymnotus anguillaris* 192 mm t.l. (ZMA 105.913)

Creek on the left shore of the Gran Rio, 3 km N.E. of the northeastern part of the Awa (= Awara) falls; 1.II.1967:

4 ex. <i>Gymnotus carapo</i>	70—163 mm t.l. (ZMA 105.433)
11 ex. <i>Gymnotus anguillaris</i>	108—206 mm t.l. (ZMA 105.909)

Creek on the right shore of the Gran Rio, 2.5 km N.E. of the northeastern part of the Awa (= Awara) falls; 28.I.1967:

9 ex. <i>Gymnotus carapo</i>	76—190 mm t.l. (ZMA 105.442)
2 ex. <i>Gymnotus anguillaris</i>	143—190 mm t.l. (ZMA 105.919)

District Marowijne:

Soea kisi creek on the left shore of the Tapanahony river, 12 km S.W. of the centre of Stoelmanseiland; 22.IV.1967:

6 ex. <i>Gymnotus carapo</i>	148—260 mm t.l. (ZMA 105.896)
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Creek on the left shore of the Marowijne river, West of the Manbarie fall, 6 km North of Stoelmanseiland; 20.IV.1967:

14 ex. <i>Gymnotus carapo</i>	147—233 mm t.l. (ZMA 105.927)
9 ex. <i>Gymnotus anguillaris</i>	148—271 mm t.l. (ZMA 105.928)

Maka creek on the left shore of the Lawa river, 10 km South of the centre of Stoelmanseiland; 21.IV.1967:

4 ex. <i>Gymnotus carapo</i>	66—234 mm t.l. (ZMA 105.929)
37 ex. <i>Gymnotus anguillaris</i>	41—302 mm t.l. (ZMA 105.930)

District Nickerie:

Creek on the right shore of the Nickerie river, 12 km W.S.W. of the Stondansie fall; 5.IV.1967:

14 ex. <i>Gymnotus carapo</i>	66—272 mm t.l. (ZMA 105.903)
9 ex. <i>Gymnotus anguillaris</i>	95—146 mm t.l. (ZMA 105.902)

District Para (formerly district Suriname):

Carolina (= Malasie) creek, 10 km S.E. of the airfield Zanderij near road Zanderij - Kraka; 14.XII.1966:

110 ex. <i>Gymnotus carapo</i>	79—354 mm t.l. (ZMA 105.317)
95 ex. <i>Gymnotus anguillaris</i>	59—145 mm t.l. (ZMA 105.904)

District Saramacca:

Creek on the left shore of the Linker Coppename river ($03^{\circ} 54' N$, $56^{\circ} 46' W$); 9.V.1967:

21 ex. <i>Gymnotus carapo</i>	58—236 mm t.l. (ZMA 105.910)
5 ex. <i>Gymnotus anguillaris</i>	68—109 mm t.l. (ZMA 105.911)

Creek on the right shore of the Linker Coppename river ($03^{\circ} 51' N$, $56^{\circ} 45' W$); 10.V.1967:

1 ex. <i>Gymnotus carapo</i>	206 mm t.l. (ZMA 105.926)
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Creek on the right shore of the Coppename river ($03^{\circ} 52'30''$ N, $56^{\circ} 53'$ W);
19.V.1967:

41 ex. <i>Gymnotus carapo</i>	57—304 mm t.l. (ZMA 105.894)
5 ex. <i>Gymnotus anguillaris</i>	72—108 mm t.l. (ZMA 105.895)

Creek on the left shore of the Coppename river ($03^{\circ} 52'$ N, $56^{\circ} 55'$ W);
18.V.1967:

37 ex. <i>Gymnotus carapo</i>	46—290 mm t.l. (ZMA 105.931)
17 ex. <i>Gymnotus anguillaris</i>	80—108 mm t.l. (ZMA 105.932)

FRENCH-GUIANA

Kamaloea (= Saloea) creek on the right shore of the Marowijne river, 9 km
S.E. of the mouth of the Gran creek (Surinam); 24.IV.1967:

11 ex. <i>Gymnotus carapo</i>	66—278 mm t.l. (ZMA 105.897)
25 ex. <i>Gymnotus anguillaris</i>	73—303 mm t.l. (ZMA 105.898)

Creek on the right shore of the Marowijne river, East of Mooisanti tabbetje
(36 km North of Stoelmanseiland); 19.IV.1967:

15 ex. <i>Gymnotus carapo</i>	60—300 mm t.l. (ZMA 105.924)
31 ex. <i>Gymnotus anguillaris</i>	48—183 mm t.l. (ZMA 105.925)

REFERENCES

EIGENMANN, C. H.

1912 The freshwater fishes of British Guiana, including a study of the ecological grouping of species and the relation of the fauna of the plateau to that of the lowlands. — Mem. Carnegie Mus., 5 : 1—578, pls. i—ciii, figs. 1—39.

ELLIS, M. M.

1913 The gymnotid eels of tropical America. — Mem. Carnegie Mus., 6-3 : 109—195, pls. xv—xxiii, figs. 1—33.

HOEDEMAN, J. J.

1962a Notes on the ichthyology of Surinam and other Guianas, 9. New records of gymnotid fishes. — Bull. Aquatic Biol., 3-26 : 53—60, figs. 1—7.

1962b Notes on the ichthyology of Surinam and other Guianas, 11. New gymnotoid fishes from Surinam and French Guiana, with additional records and a key to the groups and species from Guiana. — Bull. Aquatic Biol., 3-30 : 97—107, figs. 1—5.

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