

A systematic revision of the African catfish genus *Parauchenoglanis* (Siluriformes: Claroteidae)

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The African catfish genus *Parauchenoglanis* has been reviewed. Sixty-seven morphometric features, as well as several meristic and descriptive characters have been studied on 252 specimens, including all type specimens. Of the 18 species previously recognized, only nine are recognized as valid in this analysis. These are: *P. balayi*, *P. guttatus*, *P. punctatus*, *P. altipinnis*, *P. ngamensis*, *P. longiceps*, *P. buettikoferi*, *P. pantherinus* and *P. ahli*. All valid species are redescribed, the area of distribution is determined and an identification key for the species is provided.

KEYWORDS: Taxonomy, Claroteidae, *Parauchenoglanis*, species-revision, Africa.

Introduction

The family of the Claroteidae, which has been separated from the Bagridae by Mo (1991), is endemic to Africa. It is defined by eight derived characters, including the presence of a prominent anterolateral laminar sheath of the palate. Other characteristics are a moderately elongate body, usually four pairs of barbels, an adipose fin, and strong pectoral and dorsal fin spines. Mo (1991) divided the family in two subfamilies: the Claroteinae, with seven genera, diagnosed on seven derived characters, including the presence of an accessory toothplate on the palate; and the Auchenoglanidinae, with six genera, including *Parauchenoglanis* Boulenger, defined on the basis of 15 derived characters, including the location of the anterior nostrils on the anteroventral side of the upper lip, the rounded caudal fin and the location of the mandibular barbels at the outer margin of the lower jaw bones.

The taxonomic history of *Parauchenoglanis* and some closely related genera is

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rather complex. The oldest three nominal species in the genus were originally described in *Pimelodus* Lacépède, which, at the time, was reported from Africa, Asia and South America (Sauvage, 1879). Boulenger (1901), who reviewed *Pimelodus*, transferred these species (*Pimelodus balayi* Sauvage, *P. guirali* Thominot and *P. guttatus* Lönnberg) to *Auchenoglanis* Günther. Later he proposed a key for the species of this genus (Boulenger, 1902b), in which he provided an erroneous description for one of these species (*A. guttatus*). The specimen he examined actually represented a new, undescribed species, subsequently described as *A. macrostoma* by Pellegrin (1909) (see below). It should be noted that he, surprisingly, completely neglected the original description of *Pimelodus guttatus* by Lönnberg (1895).

Boulenger (1911) noted the difference of both *A. guttatus* (*sensu* Boulenger, not Lönnberg) and *A. macrostoma*, relative to other *Auchenoglanis* species, and erected *Parauchenoglanis* for these two species. The description of this new genus was largely based on specimens belonging to his erroneous description of *A. guttatus*.

Subsequent decades saw the assignment of numerous species to the genus *Auchenoglanis*. The first author to doubt the monophyly of the genus was Jayaram (1955), who noted that ‘...certain species such as *A. balayi* (Sauvage), etc., are different from *Auchenoglanis sensu stricto*. The latter category appears to be intermediate between *Auchenoglanis* and *Parauchenoglanis*’.

Teugels *et al.* (1991) investigated this issue thoroughly, and concluded that the specimen Boulenger (1902b) used in his re-description of *A. guttatus*, and those he examined for the description of the new genus *Parauchenoglanis* (Boulenger, 1911), actually belong to *A. macrostoma*. The authors reinstated the original description of *Pimelodus guttatus* (Lönnberg, 1895). *Parauchenoglanis macrostoma*, together with a few other species, had to be placed in a new genus which Teugels *et al.* (1991) named *Anaspidoglanis*. Mbega and Teugels (1998) reduced the number of *Anaspidoglanis* species to two: *A. macrostoma*, the type species, and *A. boutchangai* (Thys van den Audenaerde).

Teugels *et al.* (1991) divided *Auchenoglanis* into two genera, as previously proposed by Jayaram (1955). *Auchenoglanis s.s.* contained only two species: *A. biscutatus* (Geoffroy Saint-Hilaire) and *A. occidentalis* (Valenciennes). *Pimelodus guttatus* was placed in *Parauchenoglanis*, given that Jordan (1920) had designated this species as the type species of *Parauchenoglanis*. Eighteen other species, formerly included in *Auchenoglanis*, were also placed in *Parauchenoglanis*. One of these, *P. akiri* (Risch), was subsequently transferred to *Anaspidoglanis* (Geerinckx *et al.*, in press).

As a consequence, 18 nominal species were retained in *Parauchenoglanis*. They are: *P. balayi* [including the variety *P. ballayi* var. *gravoti* (Pellegrin)], *P. guirali*, *P. guttatus* (Lönnberg), *P. pulcher* (Boulenger), *P. punctatus* (Boulenger), *P. ubangensis* (Boulenger), *P. monkei* (Keilhack), *P. altipinnis* (Boulenger), *P. iturii* (Steindachner), *P. ngamensis* (Boulenger), *P. buettikoferi* (Popta), *P. longiceps* (Boulenger), *P. pietschmanni* (Holly), *P. maculosus* (Holly), *P. pantherinus* (Pellegrin), *P. ahli* (Holly), *P. grandis* (Fowler) and *P. fasciatus* (Gras).

The range of the genus *Parauchenoglanis* stretches from the coastal lowlands of Benin and Nigeria to the Okavango and upper Zambezi River systems in Botswana and Zambia. This range covers most of the Lower Guinea and Congo ichthyofaunal provinces and a part of the Zambezi ichthyofaunal province (definitions according to Roberts, 1975).

The validity of some nominal *Parauchenoglanis* species is questionable, since they cannot properly be distinguished from each other. This uncertainty is primarily due

to the often very short and vague original descriptions of the oldest species, the often very small and badly preserved type specimens, and, of course, the incorrect redescription of *P. guttatus* and of the whole genus (Boulenger, 1902b, 1911).

An in-depth systematic revision was consequently carried out to verify the validity of each species, and to determine which ones should be placed in synonymy.

Materials and methods

In this study 252 specimens have been examined, including the type specimens of all nominal species belonging to *Parauchenoglanis*. Examined specimens are in the Musée Royal de l'Afrique Centrale (MRAC; Africa Museum, Tervuren), the Institut Royal des Sciences Naturelles de Belgique (ISNB, Brussels), Muséum National d'Histoire Naturelle (MNHN, Paris), Natural History Museum (NHM, London), Naturhistorisches Museum Wien (NMW, Vienna), Nationaal Natuurhistorisch Museum (NNM, Leiden), Zoologisches Museum der Humboldt-Universität (ZMHU, Berlin) and Zoological Museum of the Uppsala University (ZMU, Uppsala). Images of the holotype of *P. grandis* were provided by the Academy of Natural Sciences (ANSP, Philadelphia).

On each specimen 45 measurements (figure 1; table 1), seven counts and 15 descriptive characters were taken. Counts included dorsal, pectoral, pelvic, anal and caudal fin ray counts, as well as counts of the serrae on the posterior and (distal) anterior margin of the pectoral fin spine. Descriptive characteristics were: shape of the premaxillary toothplate, position of the tip of the three barbels stretched along the body, presence or absence of a rudimentary nasal barbel, position and morphology of the eyes, serration of the anterior margin of the pectoral fin spine, position of the pectoral fin in relation to the pelvic fin, and of the pelvic fin in relation to the anal and dorsal fin, shape and position of the adipose fin, and outline of the caudal fin.

The method used for data processing was the non-dimensional species analysis (Mayr, 1970). In a first step the specimens from a specific, ecologically uniform, natural region were compared. Such regions were river basins, or parts of a large basin. On the basis of the various morphological features it became possible to discern the natural groups (if present). This procedure was repeated for the total range of *Parauchenoglanis*. In the second step neighbouring regions, which included the same groups, were taken together. Doing this repeatedly gave an idea of the distribution of all groups that could be discriminated. The third step involved the location of the type specimens in these groups, thus linking natural groups to species and thereby discerning the concurrence of more than one species.

The biometric data were submitted to a principal components analysis (PCA). Meristic data did not prove to be useful for this analysis, since the variables were constant (fin ray counts) or variation was random or size dependent (serrae on pectoral fin spine). For similar reasons, three morphometric variables were excluded from the PCA: adipose fin length, dorsal fin–adipose fin interdistance and supraoccipital process–nuchal plate interdistance. All PCA results in this paper are thus based on 42 morphometric variables.

The morphometric data were log-transformed to reduce the effects of non-normality. Factor loadings showed that the first principal component reflected the overall body size of the different specimens; their shape differences (independent of size) were expressed on the next principal components (Bookstein *et al.*, 1985). The most relevant reflection of size-independent variation in shape was obtained by plotting the second principal component against the third one.

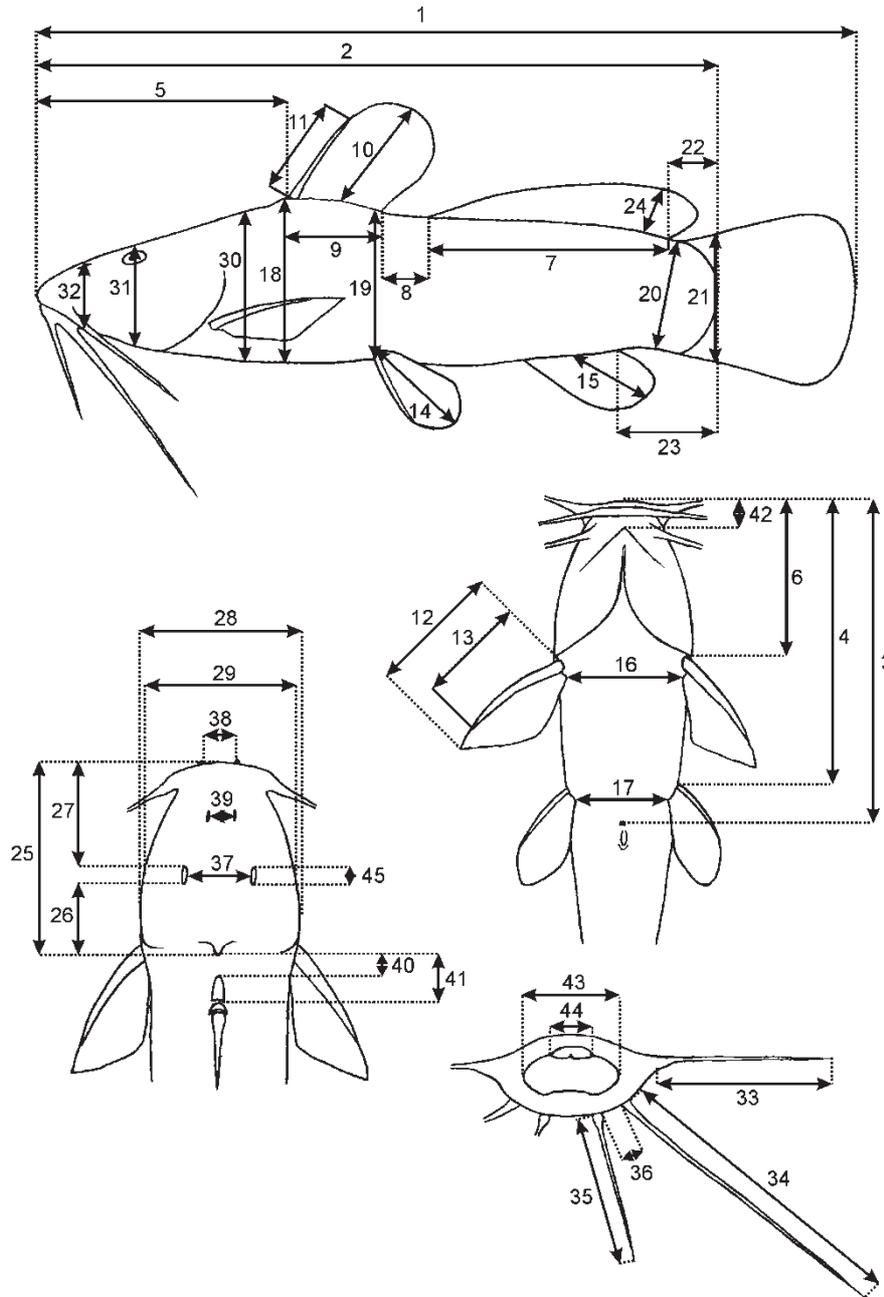


FIG. 1. Schematic illustration of measurements taken on the *Parauchenoglanis* specimens. See table 1 for the explanation of the different numbers.

In case natural groups were discerned, a Mann-Whitney U-test was applied to verify which morphometric and meristic features showed significant differences between those groups (Sokal and Rohlf, 1997).

Table 1. Abbreviations and definitions of measurements corresponding with the numbers in figure 1.

No.	Abbreviation	Full name
1	TL	Total length
2	SL	Standard length
3	PAnL	Preanal length
4	PPvL	Prepelvic length
5	PDL	Predorsal length
6	PPeL	Prepectoral length
7	AdFL	Adipose fin length
8	IDAdD	Interdorsal-adipose distance
9	DFBL	Dorsal fin base length
10	DFL	Dorsal fin length
11	DSL	Dorsal fin spine length
12	PcFL	Pectoral fin length
13	PcSL	Pectoral fin spine length
14	PvFL	Pelvic fin length
15	AFL	Anal fin length
16	IPcD	Interpectoral distance
17	IPvD	Interpelvic distance
18	MxBH	Maximum body height
19	PvBH	Pelvic body height
20	MnCPH	Minimum caudal peduncle height
21	MxCPH	Maximum caudal peduncle height
22	AdCID	Adipose fin–caudal fin interdistance
23	AnCID	Anal fin–caudal fin interdistance
24	AdFH	Adipose fin height
25	HL	Head length
26	POL	Postorbital head length
27	PrOL	Preorbital head length
28	HW	Head width
29	OHW	Orbital head width
30	HH	Head height
31	OHH	Orbital head height
32	SnH	Snout height
33	MxBL	Maxillary barbel length
34	EMdBL	External mandibular barbel length
35	IMdBL	Internal mandibular barbel length
36	MdBlD	Mandibular barbels interdistance
37	IOD	Interorbital distance
38	ANID	Anterior nostrils interdistance
39	PNID	Posterior nostrils interdistance
40	SPNPID	Supraoccipital process–nuchal plate interdistance
41	SPDFID	Supraoccipital process–dorsal fin interdistance
42	PHL	Prehyoid length
43	MW	Mouth width
44	PmxTW	Premaxillary toothplate width
45	OD	Orbital diameter

Results

It has proven to be impossible to recognize any groups when considering the total range of *Parauchenoglanis*. Therefore, using non-dimensional species analysis, the specimens from different regions of the total range of the genus are discussed as separate units.

(a) Southern part of Lower Guinea

Three groups can be recognized in the southern part of the Lower Guinea ichthyofaunal province (Cameroon, Equatorial Guinea, Gabon and Congo-Brazzaville), particularly in the basins of the Nyong, Ntem, San Benito, Ogowe and Kouilou Rivers. One of these groups is characterized by a relatively short snout, so that the relation between the preorbital head length (PrOL) and the maximal head height (HH) ranges from 64.5 to about 101% (figure 2). Within this group the types of *P. balayi*, *P. ballayi* var. *gravoti* and *P. guirali* are found. The two other groups are characterized by a prolonged snout, with PrOL/HH between 108 and 127%. The specimens also show a typical coloration, with numerous small spots all over the body and fins, whereas the first group has a colour pattern with larger, often confluent spots.

The second and third groups are separated from each other by the interorbital distance (IOD) in relation to the head length (HL): for the second group, in which the types of *P. pantherinus* are found, the IOD/HL varies from 21.5 to 25.4%; the third group, including the types of *P. longiceps* and *P. maculosus*, has values from 27.8 to 29.9%.

The second and third groups are not further divisible. In the third group, *P. maculosus* is the junior synonym, and thus it is no longer regarded as a valid species. Outside the river basins mentioned above, no specimens belonging to either *P. longiceps* or *P. pantherinus* are found. Therefore both species are considered valid, and endemic to the Nyong and Ntem River basins, respectively. The group that

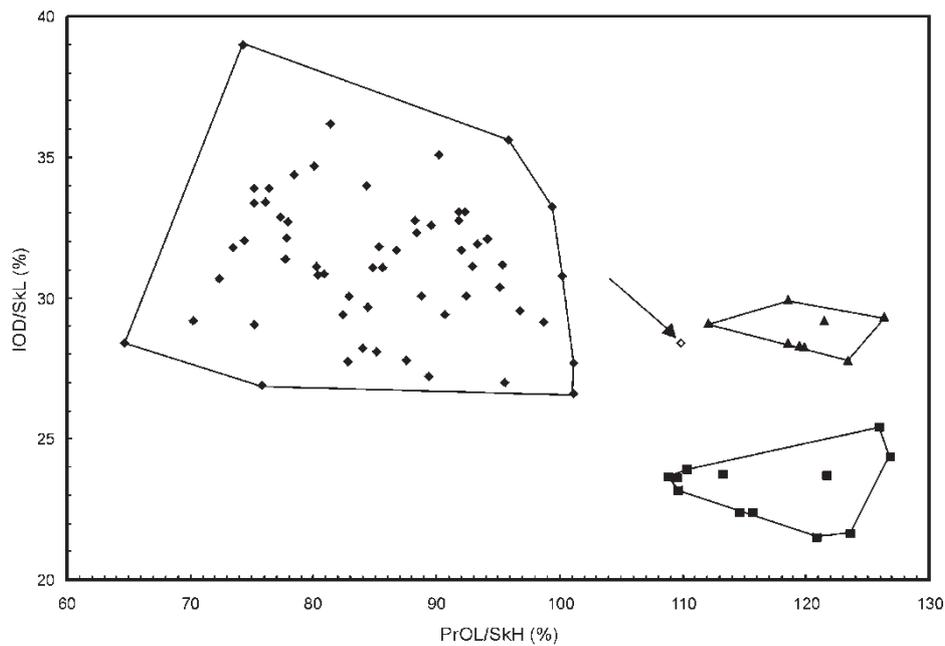


FIG. 2. Scatter diagram of the preorbital head length (PrOL) as a percentage of the head height (HH) against the interorbital distance (IOD) as percentage of the head length (HL) for the specimens from the Nyong, Ntem, San Benito, Ogowe and Kouilou basins. (◆) Group with type specimens of *P. balayi*, *P. ballayi* var. *gravoti* and *P. guirali*; (■) *P. pantherinus*; (▲) *P. longiceps*; (◇) long-snouted Ivindo specimen (see text for details).

includes the types of *P. balayi*, *P. ballayi* var. *gravoti* and *P. guirali* will be further discussed in Section (d) of the Results, since similar specimens are present in other regions.

It should be noted that one specimen from the Ivindo River (Ogowe River basin) has its snout as long as in some *P. pantherinus* specimens (figure 2, indicated with arrow), while it displays a nearly solid grey coloration with one (faint) large spot below the dorsal fin, which is present in most specimens of the first group (with *P. balayi* etc.). Its interorbital distance, however, would fit within the parameters of *P. longiceps*, rather than *P. pantherinus* (IOD/HL = 28.4%). Thus it is impossible to allocate this specimen unambiguously to one of these two groups. In light of its coloration and overall appearance, it should be regarded as belonging to the *P. balayi* group. Finally, it is possible that it is a hybrid specimen, although the Ivindo River is not close to either the Ntem or Nyong rivers.

(b) North-west part of Lower Guinea

In the north-west part of the Lower Guinea ichthyofaunal province (i.e. Benin, Nigeria and West Cameroon) two natural, distinguishable groups exist. The most important characteristics to support this subdivision are the shape of the caudal peduncle (figure 3) and the degree of serration of the anterior margin of the pectoral fin spine (serrations both proximally and distally; see figure 4). It should be noted that neither the number of these anterior serrae nor the characteristics of the posterior margin, which is always coarsely serrated, serve to separate the groups.

The first group, including the type specimens of *P. guttatus*, *P. monkei* and

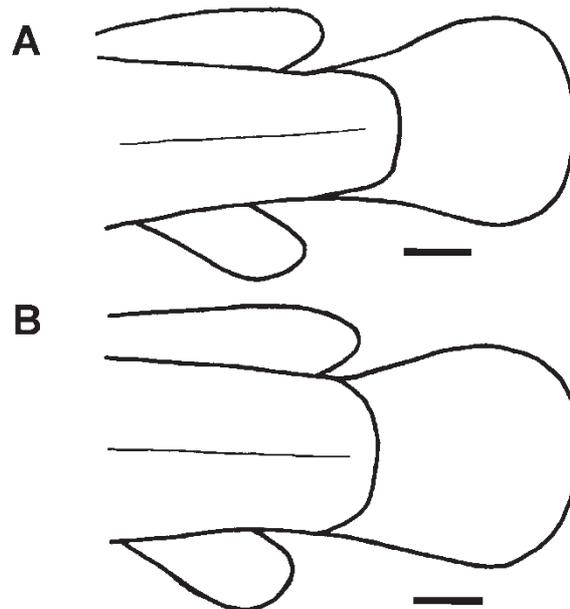


FIG. 3. Posterior body region of *Parauchenoglanis* species. (a) Typical low and long caudal peduncle, with its minimal height (MnCPH) comparable to the horizontal distance between the bases of the adipose and caudal fin (AdCID); (b) typical high and short caudal peduncle, with the MnCPH significantly greater than the AdCID (scale = 10 mm).

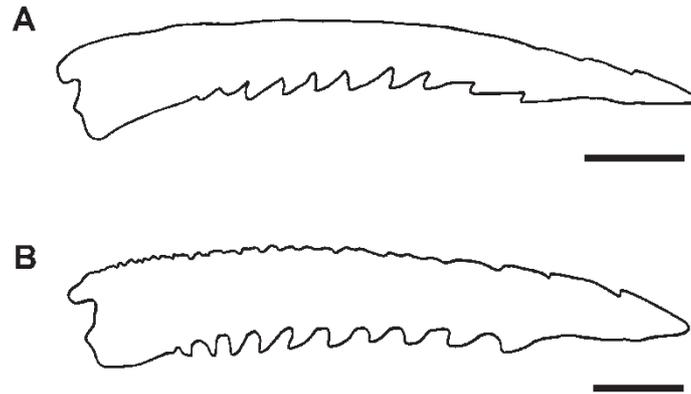


FIG. 4. Dorsal view of the right pectoral fin spine. (a) Pectoral fin spine with a smooth anterior margin, as present in adults of *P. balayi*, *P. altipinnis*, *P. longiceps* and *P. pantherinus*, and (usually) *P. ahli*; (b) pectoral fin spine with a coarsely serrated anterior margin, as present in adults of *P. guttatus*, *P. punctatus*, *P. ngamensis* and *P. buettikoferi* (scale = 2 mm).

P. fasciatus, shows the following characteristics: pectoral fin spines serrated along the entire anterior margin, a caudal peduncle being much shorter than high [AdCID/MnCPH on average 45% (min–max 28–61%)]; six or seven (rarely eight) pectoral fin rays, and a colour pattern primarily consisting of vertical bands. The second group, including the type specimens of *P. ahli* and *P. pietschmanni*, has the anterior margin of the pectoral fin spines serrated only distally, except for some juvenile specimens, which also have some small serrae proximally. The caudal peduncle is relatively long [AdCID/MnCPH on average 73% (54–98%)]; the number of pectoral fin rays is eight (rarely seven); the colour pattern consists of spots, often of various sizes, which sometimes form horizontal and/or vertical rows, or merge.

The range of the first group stretches from the Ouémé River in Benin to the lower Sanaga River in West Cameroon. Nominal species in this group are *P. guttatus*, *P. monkei* and *P. fasciatus*. No features were found to split this group into subgroups, thus suggesting that these three nominal species are synonyms. One paratype of *P. monkei* has relatively long barbels, but the barbel lengths of the other paratype and of the holotype are more or less equal to those of the other specimens in this group. No comparable specimens are known to have originated outside the discussed region, which enables us to conclude that this group should be recognized as one valid species, *P. guttatus*.

Specimens from the second group originated from the upper Cross River and the central to upper Sanaga River basin. A PCA on this group reveals one large group, including the syntypes of *P. pietschmanni*, and one small group, consisting of the five syntypes of *P. ahli*, the only specimens from the upper Cross River basin in this study (figure 5). The dominant variables with high factor loadings for the second axis are the barbel lengths (these have high values for the *P. ahli* types), but also some features that characterize the head and body proportions (table 2). The *P. ahli* syntypes are not so well preserved; it is possible that some head and body measurements are inexact due to a past dehydration of these specimens. Furthermore, the already notable lengths of the barbels could be greater than measured, but in that case the difference with the other group would be even more pronounced. Apart

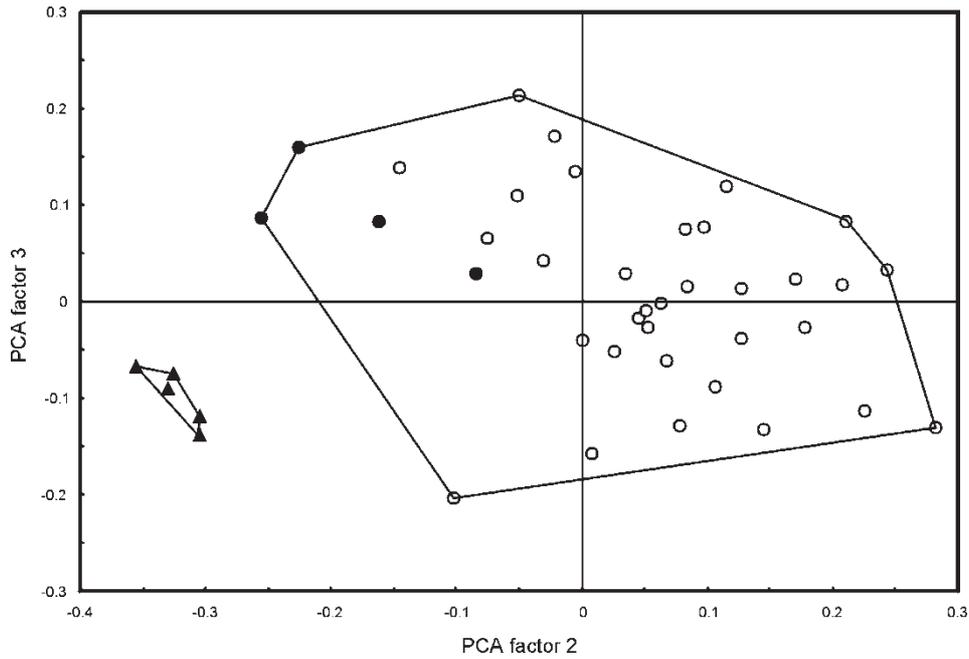


FIG. 5. Plot of the second versus the third principal component taken from a principal components analysis of 42 log-transformed biometric data for 42 specimens from the upper Cross River and central to upper Sanaga River basin. (○) *P. balayi*; (●) syntypes of *P. pietschmanni* (junior synonym of *P. balayi*); (▲) syntypes of *P. ahli*.

Table 2. Variables with the highest factor loadings for the PCA using 42 log-transformed morphometric variables for 42 specimens from the upper Cross River and central to upper Sanaga River basin.

Factor 2		Factor 3	
MxBL	-0.5870	AdFH	0.6168
ImdB�	-0.4712	AdCID	-0.2983
EmdB�	-0.3858	PMxTW	-0.2426
PHL	0.1643	MxBL	0.2279
MW	-0.1517	IPvD	-0.2277
MxBH	0.1425	HH	0.2199

For abbreviations see table 1.

from these morphometric dissimilarities, there are differences in the pectoral fin spines that have the anterior margin slightly serrated along its entire length, although some of the syntypes are not juveniles. Finally, the coloration of these types also differs: the whole body and all fins are dotted with small dark speckles (comparable to those in *P. longiceps*), whereas the other specimens display larger, often confluent spots on the flank that form horizontal and/or vertical rows. The recognition of the two groups is supported by the fact that the *P. ahli* syntypes originated from the upper Cross River basin, an area of high endemism (Teugels *et al.*, 1992). Given that no comparable specimens were examined which originated elsewhere, *P. ahli* is recognized as a valid species, while the group that includes the syntypes of

P. pietschmanni will be further discussed below, along with similar specimens in adjacent southern river basins.

In the centre of the distribution area of *P. guttatus* one specimen does not fit the description of either of the already-discussed groups: the holotype of *P. buettikoferi* that originated in the Warri River in Central South Nigeria. It has the anterior margin of its pectoral fin spines coarsely serrated (as in *P. guttatus*), but its caudal peduncle is relatively long (as in *P. ahli* and *P. pietschmanni*). Furthermore, the shape of the body and the head is more slender than that of all other specimens of the region. Its aberrant nature is clear from figure 6 and table 3, which result from a PCA on all *Parauchenoglanis* specimens originating from west of the Sanaga River

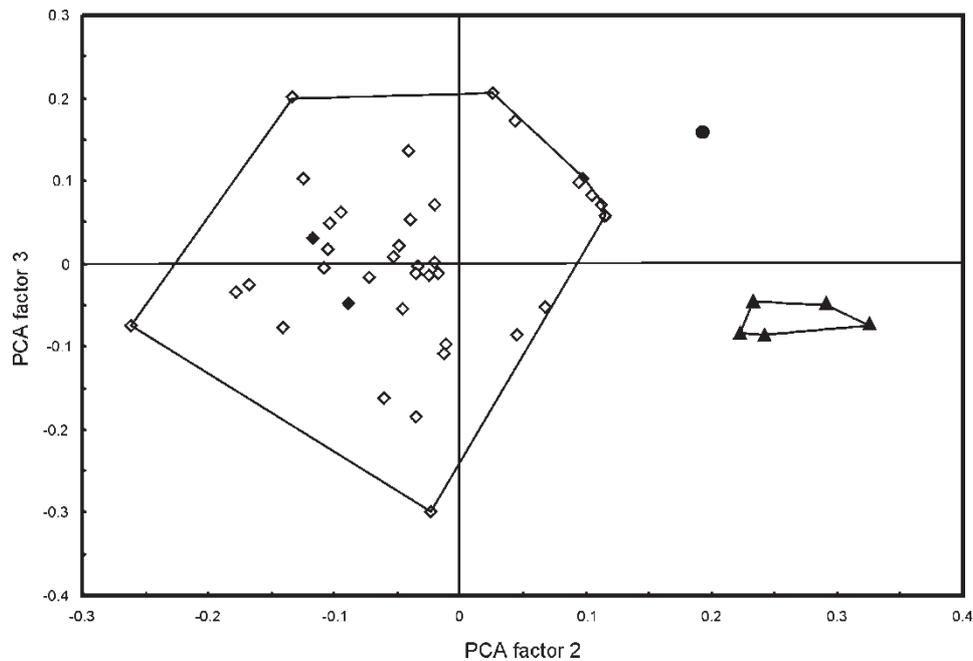


FIG. 6. Plot of the second versus the third principal component taken from a principal components analysis of 42 log-transformed biometric data for 44 specimens from the area between the Ouémé River (Benin) and the Wouri River (West Cameroon). (\diamond) *P. guttatus*; (\blacklozenge) syntypes of *P. guttatus*; (\blacktriangle) syntypes of *P. ahli*; (\bullet) holotype of *P. buettikoferi*.

Table 3. Variables with the highest factor loadings for the PCA using 42 log-transformed morphometric variables for 44 specimens from the area between the Ouémé River (Benin) and the Wouri River (West Cameroon).

Factor 2		Factor 3	
AdCID	0.5022	MxBL	-0.5291
AdFH	-0.3922	ImdBL	-0.4719
SnH	-0.3406	OD	0.3167
PvBH	-0.2885	EMdBL	-0.2637
DSL	0.2629	PHL	0.2181
AnCID	0.2245	MdBID	0.2090

For abbreviations see table 1.

basin in Cameroon. No other similar specimens are known (Risch, 1986). Perhaps this holotype is a teratologic specimen, and thus does not represent a valid species, though it appears unjustified to simply reject it. It seems more correct to recognize *P. buettikoferi* as a taxon on its own, awaiting the collection of more material.

(c) *Southernmost distribution area*

In the southernmost part of the range of *Parauchenoglanis* a natural, well-distinguishable group exists with a typically shaped humeral process, which is the posterior process of the cleithrum and is relatively distinctly visible through the skin just behind the opercle. Most *Parauchenoglanis* specimens have a narrow, rather pointed humeral process, with its length being much greater than its width at the base (figure 7). However, this group, that includes the holotype of *P. ngamensis*, has its humeral process much more robust, with the length being not much longer than the width of the process at the base, and with the upper margin somewhat serrated in most specimens.

Two properties of the *P. ngamensis*-group are more or less shared with *P. guttatus*: the anterior margin of the pectoral fin spine is completely serrated and the caudal peduncle is comparably short. The shape of the humeral process and the different colour patterns (spots instead of bands), moreover, make discrimination unambiguous. Furthermore, the distribution areas are widely separated, with *P. guttatus* present only in the northern part of the Lower Guinea ichthyofaunal province, whereas the *P. ngamensis*-group originates from the Kasai River system (a southern

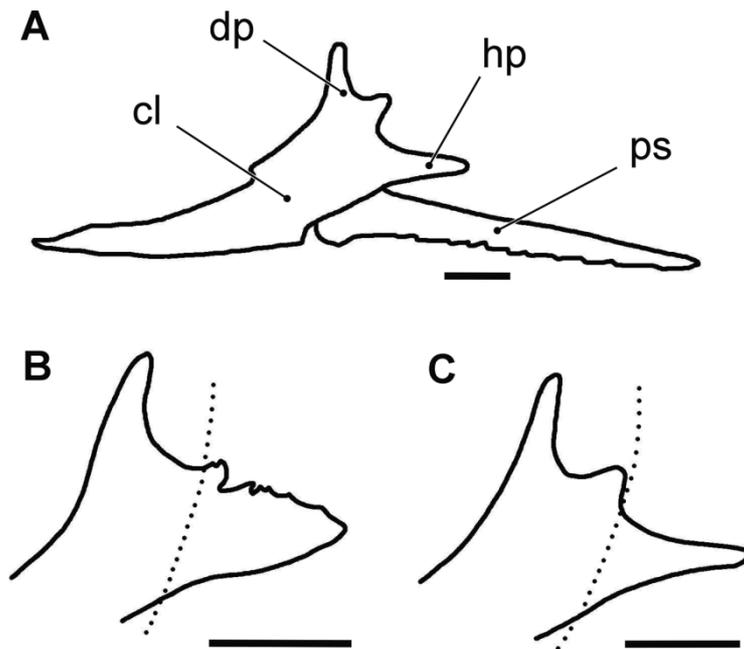


FIG. 7. Lateral view of the right cleithrum and pectoral fin spine (a); detail: humeral process of *P. ngamensis* (b) and of other *Parauchenoglanis* species (c). Only the humeral process is visible through the skin; with the rest of the cleithrum hidden by the opercle (at the left side of the dotted line) (scale = 5 mm). cl, cleithrum; dp, dorsal process; hp, humeral or posterior process; ps, pectoral fin spine.

tributary of the Congo) and the Okavango and upper Zambezi River basins. This group is thus considered as a valid species, *P. ngamensis*.

(d) Congo River basin and southern part of Lower Guinea

After separation of *P. ngamensis*, the remainder of the Congo River basin can now be further examined. Comparison between this basin and some neighbouring river basins of the Lower Guinea ichthyofaunal province reveals that in most cases the same features are responsible for the division into distinguishable groups. For this reason we re-analysed together all the basins of the following rivers: Nyong, Ntem, San Benito, Ogowe, Kouilou, Chiloango and Congo. As a result three groups can be discerned, each of which contains the type specimens of one or more nominal species.

A first group contains the type specimens of *P. punctatus*, *P. iturii* and *P. grandis*. This group can be readily recognized by the very long barbels (as in *P. ahli*), the pectoral fin spines with a strongly serrated anterior margin (as in *P. guttatus* and *P. ngamensis*), a colour pattern consisting of 6–10 (rarely 11) vertical rows of small black dots, smaller than the eye diameter and not confluent, a robust, distinctly elevated adipose fin, and a short, relatively high caudal peduncle (as in *P. guttatus*).

The second group, which is opposite to the first group in all these features, contains the type specimens of *P. balayi*, *P. ballayi* var. *gravoti*, *P. pulcher*, *P. guirali* and *P. ubangensis*. The barbels are shorter, with the external mandibular barbel, which is the longest, never reaching further than the tip of the pectoral fin spine, whereas in the first group it always reaches far beyond that spine. Only very small specimens have numerous serrae on the anterior margin of the pectoral fin spine, which is a feature shared with the third group; the colour pattern on the body is more variable than in the first group, with generally larger dots that often merge; the adipose fin is small and low (see figure 8), and the caudal peduncle is relatively long. Note that this last feature is not fully discriminating, since different stages of intermediate shapes are present in both groups.

The third group contains the holotype of *P. altipinnis*. It shares some features with each of the other groups. The barbels are short, as in group 2; the pectoral fin spines are unserrated along their entire anterior margin, as in group 2; the adipose fin is high and elevated in most cases, as in group 1, and the caudal peduncle is always relatively long and low, as in group 2. The colour pattern is a faded version of that of the second group and is always very vague. One trait, however, is unique for this group. In most specimens the dorsal fin is very long, often longer than the head, as opposed to the condition in all other *Parauchenoglanis* specimens. Four of 13 specimens, however, have a shorter dorsal fin, but otherwise fit the parameters of this third group and the description of *P. altipinnis* in all other features. A PCA was unable to separate the three groups completely.

The first group cannot be divided into subgroups, and should, therefore, be considered as one valid species, named after the oldest nominal species, *P. punctatus*.

One could consider the differences between the second and third groups less clear than the differences between the first group and these two groups. The most significant characteristics to discriminate them are the size of the dorsal and adipose fins, which are larger in the group with the holotype of *P. altipinnis*. Other features to distinguish the third group from the second group are the greater body height (on average), the slightly narrower premaxillary toothplate and the much more obscure to absent coloration. None of these features, however, can be used

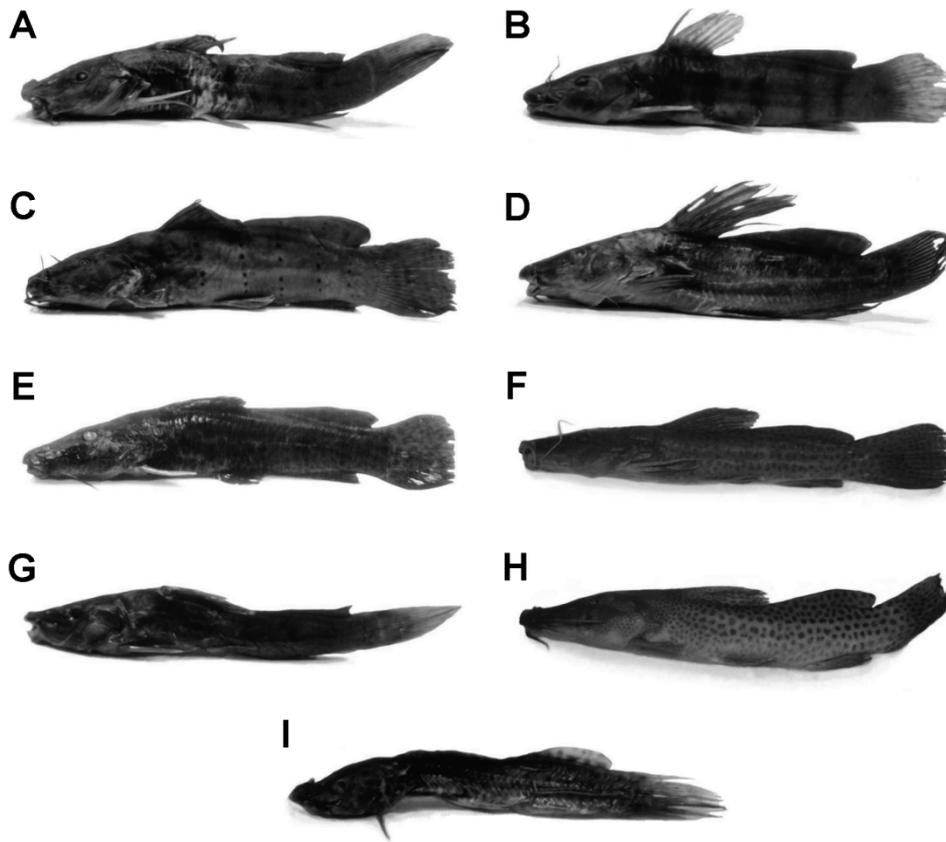


FIG. 8. (a) *Parauchenoglanis balayi*, holotype of *P. guirali*, MNHN 1885-427, 141 mm SL; (b) *P. guttatus*, syntype of *P. fasciatus*, MNHN 1960-392, 113 mm SL; (c) *P. punctatus*, syntype of *P. iturii*, NMW 47475, 188 mm SL; (d) *P. altipinnis*, holotype, NHM 1911.5.30:30, 170 mm SL; (e) *P. ngamensis*, holotype, NHM 1910.5.31:35, 186 mm SL; (f) *P. longiceps*, MRAC 73-29-P-1455, 189 mm SL; (g) *P. buettikoferi*, holotype, NNM 8860, 84 mm SL; (h) *P. pantherinus*, MRAC 95-81-P-50, 240 mm SL; (i) *P. ahli*, syntype, NMW 13898, 59 mm SL.

individually to identify a specimen correctly. Nonetheless, the third group is recognized as a valid species, *P. altipinnis*, based on several considerations. First of all, the distinction of *P. altipinnis* and all valid species (already discussed above) is obvious. Second, the holotype of *P. altipinnis* differs significantly from the second group in all mentioned characteristics; thus merging the groups would be unjustified. Third, only a few specimens of the group fail to display some of the typical features, or do so to a lesser degree. These specimens could possibly be hybrids between *P. altipinnis* and the second group: both groups are sympatric. Finally, the separation is not a function of sexual dimorphism, since each group includes males as well as females.

The second group includes several nominal species. Comparing this group with the already-discussed group that includes the syntypes of *P. pietschmanni* reveals a strong resemblance. Given that the groups have adjacent areas of distribution, they are now considered together. Included nominal species are *P. balayi*, *P. ballayi* var. *gravoti*, *P. pulcher*, *P. guirali*, *P. ubangensis* and *P. pietschmanni* that inhabit the

area from the Sanaga River basin in Western Cameroon to the upper Congo River in Eastern Congo.

These specimens form a homogeneous group with the following characteristics: short barbels, pectoral fin spines with a largely smooth anterior margin (figure 4a; except for juvenile specimens, such as the holotype of *P. balayi*), a moderately developed adipose fin, and a relatively long caudal peduncle (figure 3a). The colour pattern always has quite large spots, more or less arranged in horizontal and/or vertical rows, and showing the tendency to fuse, especially on the anterior part of the flank, where they often merge into one large, shapeless spot. The colour of the spots ranges from pitch-black to rather pale and greyish.

After elaborate examination of all specimens in this group, no features, or combinations of features, were found to be able to split this group into subgroups. As a result, this whole group is to be considered as one species, *P. balayi*.

Table 4 summarizes some important measurements for all nine *Parauchenoglanis* species.

Parauchenoglanis Boulenger, 1911

Diagnosis. Head moderately depressed. Eyes 9–17% of head length, not covered with skin and placed dorsolaterally approximately mid-way along rostrocaudal axis of head. Premaxillary toothplate consisting of two small, slightly elongate patches with a combined width of less than 20% of head length. Posterior cranial bones hardly or not visible through skin; supraoccipital process narrow and often significantly reduced; process may or may not contact the inconspicuous and rudimentary first nuchal plate. Branchiostegal membranes completely fused. Branchiostegal rays 8–10. Dorsal fin rays II.7, pectoral fin rays I.6–8, pelvic fin rays i.5, anal fin rays iii–iv.6–9 and caudal fin rays 16–18.

The results of this revision indicate that nine species are valid, distinguished as in the following key.

Key to *Parauchenoglanis* species

- 1 Humeral process broadly triangular and usually slightly serrated on the upper margin (figure 7b); spotted pattern on the body always obvious *P. ngamensis*
- Humeral process pointed (much longer than broad), not serrated on upper margin (figure 7c); spotted pattern on flanks may or may not be obvious 2
- 2 Pectoral fin spine coarsely serrated on complete anterior margin 3
- Pectoral fin spine only partially and slightly, or not at all, serrated on anterior margin 5
- 3 Caudal peduncle almost as long as high (figure 3a) *P. buettikoferi*
- Caudal peduncle much shorter than high (figure 3b) 4
- 4 Barbels long (external mandibular barbel reaching beyond tip of pectoral fin spine); adipose fin always high and stiff; typical colour pattern consisting of 6–10 (rarely 11) vertical rows of black dots *P. punctatus*
- Barbels short (external mandibular barbel usually not reaching beyond tip of pectoral fin spine); colour pattern different (usually with five to seven vertical bands) *P. guttatus*
- 5 Preorbital head length greater than maximal head height (at supraoccipital process); numerous small dots present on body and fins 6
- Preorbital head length smaller than maximal head height (at supraoccipital process); pigmentation pattern variable 7
- 6 Interorbital distance 28–30% of head length; orbital diameter more than twice interorbital distance; dots on head and flanks of same size *P. longiceps*

Table 4. Some measurements of the nine *Parauchenoglanis* species. For all measurements, the mean and standard deviation are given (the mean for *P. buettikoferi*, of which only the holotype is known).

	<i>P. balayi</i> (n=107)	<i>P. guttatus</i> (n=39)	<i>P. punctatus</i> (n=47)	<i>P. altipinnis</i> (n=13)	<i>P. ngamensis</i> (n=20)	<i>P. longiceps</i> (n=8)	<i>P. buettikoferi</i> (n=1)	<i>P. pantherinus</i> (n=12)	<i>P. ahli</i> (n=5)
% MxBH/SL	18.47 ± 1.51	19.93 ± 1.84	20.19 ± 1.88	20.45 ± 1.94	19.57 ± 1.13	15.46 ± 0.45	18.11	16.35 ± 0.96	15.84 ± 0.35
% PvBH/SL	16.58 ± 1.47	18.27 ± 2.37	18.21 ± 2.58	19.16 ± 1.68	16.82 ± 2.02	14.35 ± 0.86	13.93	14.84 ± 1.00	13.67 ± 0.53
% DFL/SL	19.58 ± 2.28	19.08 ± 1.78	19.03 ± 1.61	24.85 ± 3.65	19.46 ± 2.05	21.02 ± 2.65	19.97	19.99 ± 3.27	19.25 ± 0.70
% AdFH/SL	4.98 ± 0.89	6.20 ± 1.18	6.70 ± 1.41	6.72 ± 0.85	6.14 ± 0.83	4.82 ± 0.49	4.57	5.01 ± 0.73	4.10 ± 0.53
% IPcD/SL	17.37 ± 1.26	19.16 ± 1.25	18.39 ± 1.21	16.98 ± 0.83	18.02 ± 1.03	14.96 ± 1.08	16.19	16.57 ± 0.55	18.26 ± 0.71
% MnCPH/SL	12.53 ± 0.84	14.89 ± 0.91	13.99 ± 1.46	12.47 ± 0.82	13.35 ± 1.13	10.77 ± 0.50	13.36	11.14 ± 0.47	13.60 ± 0.26
% MxCPH/SL	15.08 ± 1.15	17.46 ± 1.35	16.33 ± 1.80	14.84 ± 1.18	15.57 ± 1.12	13.21 ± 0.90	15.45	13.17 ± 1.26	14.66 ± 0.36
% AdCID/SL	8.59 ± 1.47	6.64 ± 0.87	6.30 ± 1.06	7.82 ± 1.24	6.77 ± 0.81	8.09 ± 0.76	8.01	7.20 ± 0.69	8.62 ± 0.32
% AdCID/MnCPH	69.01 ± 13.36	44.93 ± 7.44	45.39 ± 8.46	62.58 ± 8.23	51.07 ± 7.42	75.29 ± 7.46	59.93	64.73 ± 6.67	63.39 ± 2.11
% HH/HL	54.32 ± 4.53	55.96 ± 5.29	57.49 ± 6.46	60.66 ± 4.85	54.66 ± 3.51	45.48 ± 2.12	47.97	45.99 ± 3.43	48.15 ± 1.32
% SnH/HL	25.12 ± 3.70	26.30 ± 3.93	23.84 ± 3.88	25.60 ± 2.27	22.79 ± 2.32	20.04 ± 3.21	16.60	19.37 ± 1.62	19.54 ± 1.21
% HW/HL	72.01 ± 3.69	77.41 ± 4.13	74.83 ± 3.84	68.74 ± 3.64	69.41 ± 2.94	62.19 ± 3.09	68.53	64.54 ± 2.59	73.83 ± 2.00
% OHW/HL	63.01 ± 3.50	68.36 ± 5.28	66.36 ± 4.10	61.77 ± 2.65	62.22 ± 3.62	54.60 ± 3.88	62.91	56.29 ± 3.31	65.48 ± 3.63
% PrOL/HL	45.81 ± 3.53	45.07 ± 2.12	46.01 ± 2.42	48.66 ± 2.31	45.87 ± 1.80	54.52 ± 2.19	46.11	53.49 ± 1.39	45.94 ± 2.19
% POL/HL	43.11 ± 3.37	42.64 ± 2.61	41.59 ± 1.86	40.91 ± 2.87	41.28 ± 2.42	34.95 ± 1.23	42.53	35.93 ± 1.74	40.92 ± 1.34
% EMdBL/HL	88.39 ± 18.20	99.95 ± 12.77	138.74 ± 23.59	88.97 ± 10.75	98.36 ± 19.69	82.41 ± 5.39	70.59	91.26 ± 15.74	110.24 ± 9.86
% PHL/HL	22.32 ± 2.52	20.94 ± 2.61	20.65 ± 2.13	23.91 ± 2.10	21.81 ± 2.24	26.68 ± 1.31	15.89	26.62 ± 2.69	18.60 ± 1.50
% PMxTW/HL	12.76 ± 1.88	14.42 ± 1.63	11.30 ± 1.17	9.39 ± 1.10	11.92 ± 2.08	8.65 ± 1.01	13.35	11.07 ± 0.95	16.19 ± 1.17
% IOD/HL	31.57 ± 2.05	30.95 ± 2.14	27.95 ± 1.89	30.83 ± 1.52	26.49 ± 1.56	28.78 ± 0.71	26.64	23.28 ± 1.14	30.78 ± 0.86
% OD/HL	12.60 ± 1.50	12.96 ± 1.56	13.19 ± 1.20	11.01 ± 1.06	13.75 ± 1.79	11.77 ± 0.67	13.15	13.40 ± 1.15	13.78 ± 1.39
% OD/IOD	40.10 ± 5.56	42.04 ± 5.57	47.44 ± 5.56	35.88 ± 4.60	52.06 ± 7.41	40.96 ± 3.11	49.37	57.68 ± 5.91	44.73 ± 3.62

Abbreviations are listed in table 1.

- Interorbital distance 22–25% of head length; orbital diameter not more than twice interorbital distance; dots on head usually smaller than those on flank *P. pantherinus*
- 7 Colour pattern on flank faint and not distinct: often one horizontal row of large round spots; adipose fin generally very well developed (5–8% of standard length); dorsal fin usually very high (19–30% of standard length); head high (head height 79–97% of head width) *P. altipinnis*
- Pattern on flank very well visible; adipose fin less developed (3–7% of standard length); dorsal fin lower [15–25(28)% of standard length]; head not as high (head height 56–88% of head width) 8
- 8 Barbels very long (external mandibular barbel minimum 1.3 head length); whole body covered with equally sized dots *P. ahli*
- Barbels short (external mandibular barbel shorter than 1.3 head length); colour pattern consisting of dots of variable size, arranged in horizontal and/or vertical rows, and often confluent. *P. balayi*

***Parauchenoglanis balayi* (Sauvage, 1879)**

(figure 8a)

Pimelodus balayi Sauvage, 1879.

Pimelodus guirali Thominot, 1886 (**new synonymy**).

Auchenoglanis pulcher Boulenger, 1902a (see Pellegrin, 1907; Boulenger, 1911).

Auchenoglanis ubangensis Boulenger, 1902b (**new synonymy**).

Auchenoglanis ballayi var. *gravoti* Pellegrin, 1907 (**new synonymy**).

Auchenoglanis pietschmanni Holly, 1926 (**new synonymy**).

Parauchenoglanis balayi: Teugels *et al.*, 1991.

Diagnosis. Head height usually greater than, or rarely as great as, preorbital head length. Barbels rather short, with maxillary barbel usually just reaching base of pectoral fin spine, external mandibular barbel never reaching beyond tip of pectoral fin spine. Anterior part of pectoral fin spine mostly smooth. Minimal height of caudal peduncle as great as horizontal distance between bases of adipose and caudal fin, or slightly greater, but never twice as great.

Description. Based on 107 specimens including holotype (see below). See also table 4. General shape of body and head somewhat elongate. Posterior margin of pectoral fin spine serrated; anterior margin smooth, except for few serrae distally. Very juvenile specimens may bear small serrae on proximal portion of spine too, but always with central portion smooth. Humeral process narrow and pointed, with width at base smaller than length of process. Pectoral fin rays seven to eight.

Overall coloration brown or greyish, with head slightly darker than rest of body. Flanks with rather large dots, usually at least size of eyes, arranged in horizontal or vertical rows, that often merge. Pigmentation of spots may vary to some extent. Colour pattern is more pronounced on anterior portion of flank; often the anterior dots completely merge into one large, irregular spot. Head and fins spotted or not. Belly whitish.

Note on the synonyms. The very small size and the poor preservation of the holotype of *P. balayi* is likely the primary cause of the frequent redescriptions of the species. In addition, the original description of *P. balayi* by Sauvage (1879, 1880) is very brief and is of little use when comparing different *Parauchenoglanis* species.

Parauchenoglanis guirali was described soon thereafter by Thominot (1886) who probably was unaware of the existence of *P. balayi*. The synonymy of *P. guirali* was soon ascertained by Poche (1901—*vide* Boulenger, 1901). For yet unknown reasons

Daget (1984) rejected this synonymy, but, as demonstrated in this paper, there does not appear to be any basis for that action.

Parauchenoglanis pulcher was originally distinguished from *P. balayi* by the purportedly smaller premaxillary toothplate and the longer barbels (Boulenger, 1902a). Pellegrin (1907), however, found that the two species could not be distinguished from each other. In his survey Boulenger (1911) confirmed the synonymy, which is corroborated by the results of this paper.

In the description of *P. ubangensis*, Boulenger (1902b) stated that the maxillary barbel was slightly longer than that in *P. balayi*, and noted that the *P. ubangensis* holotype lacked a spotted colour pattern. The results of the present paper reveal that the first difference is negligible, and no other potentially discriminating characters were found. Contrary to the illustration accompanying the original description of *P. ubangensis*, the holotype does possess some vaguely obvious pigmented spots on the flanks.

In the description of the variety *P. ballayi* var. *gravoti*, Pellegrin (1907) failed to mention any significant differences of the variety with *P. balayi balayi*. Pappenheim (1911) reported that, apart from its slightly lower body height, the only difference would be the smaller average size of the spots on the flanks in *P. ballayi* var. *gravoti*. The present study indicates that neither the colour pattern nor the body height discriminates the two forms.

Holly (1926) described *P. pietschmanni* as being closely related to *P. balayi*, but having different body proportions, fewer and larger spots on the flanks, and a more anterior position of the pelvic fins. All these features, however, are subject to some variation, and the pelvic fin position appears to differ even among the four syntypes of *P. pietschmanni*. Probably because of these reasons Pellegrin (1929a, 1929b) proposed that *P. pietschmanni* was a subspecies or variety of *P. balayi*.

Note on the spelling. Boulenger (1902b, 1911) wrongly spelled the name *P. balayi*, doubling the *l*. This spelling was copied by other authors, leading to the erroneous variety name *P. ballayi* var. *gravoti* (Pellegrin, 1907). Jayaram (1966) restored the original species name.

Distribution (figure 9). This species has a wide distribution. It is found in most rivers from the Sanaga up to the Congo River basin (Cameroon, Gabon, Central African Republic, Congo Brazzaville, Democratic Republic of the Congo).

Maximum size recorded. The maximum size recorded is 383 mm standard length (SL).

Material examined. One hundred and seven specimens. MNHN A. 898 (holotype): Lopé River (Ogowe basin, Gabon); 45 mm SL. MNHN 1907-158-160 (syntypes of *P. ballayi* var. *gravoti*): Ntem River (Cameroon); three specimens (spm), 88–118 mm SL. MNHN 1885-427 (holotype of *P. guirali*): San Benito River (Equatorial Guinea); 141 mm SL. NHM 1902.4.14:19–20 (syntypes of *P. pulcher*): Lindi River (Congo basin, Democratic Republic of Congo); two spm, 52–72 mm SL. ISNB 10 (syntype of *P. pulcher*): Lindi River (Congo basin, Democratic Republic of Congo); 83 mm SL. MRAC P.1215 (holotype of *P. ubangensis*): Banzyville (=Mobaye), Ubangi River (Congo basin, Central African Republic); 4°18'N, 21°11'E; 142 mm SL. NMW 7802, 7804–7806 (syntypes of *P. pietschmanni*): Mbam River (Sanaga basin, Cameroon); four spm, 252–317 mm SL. MRAC P.7776–7777: Mambaka (Cameroon); two spm, 103–131 mm SL. MRAC P.20200: upper Ogowe River (Gabon); 80 mm SL. MRAC P.20407: Alima River (Congo basin, Congo Brazzaville); 68 mm SL. MRAC P.68578–68579: Yangambi, Baonde River (Congo

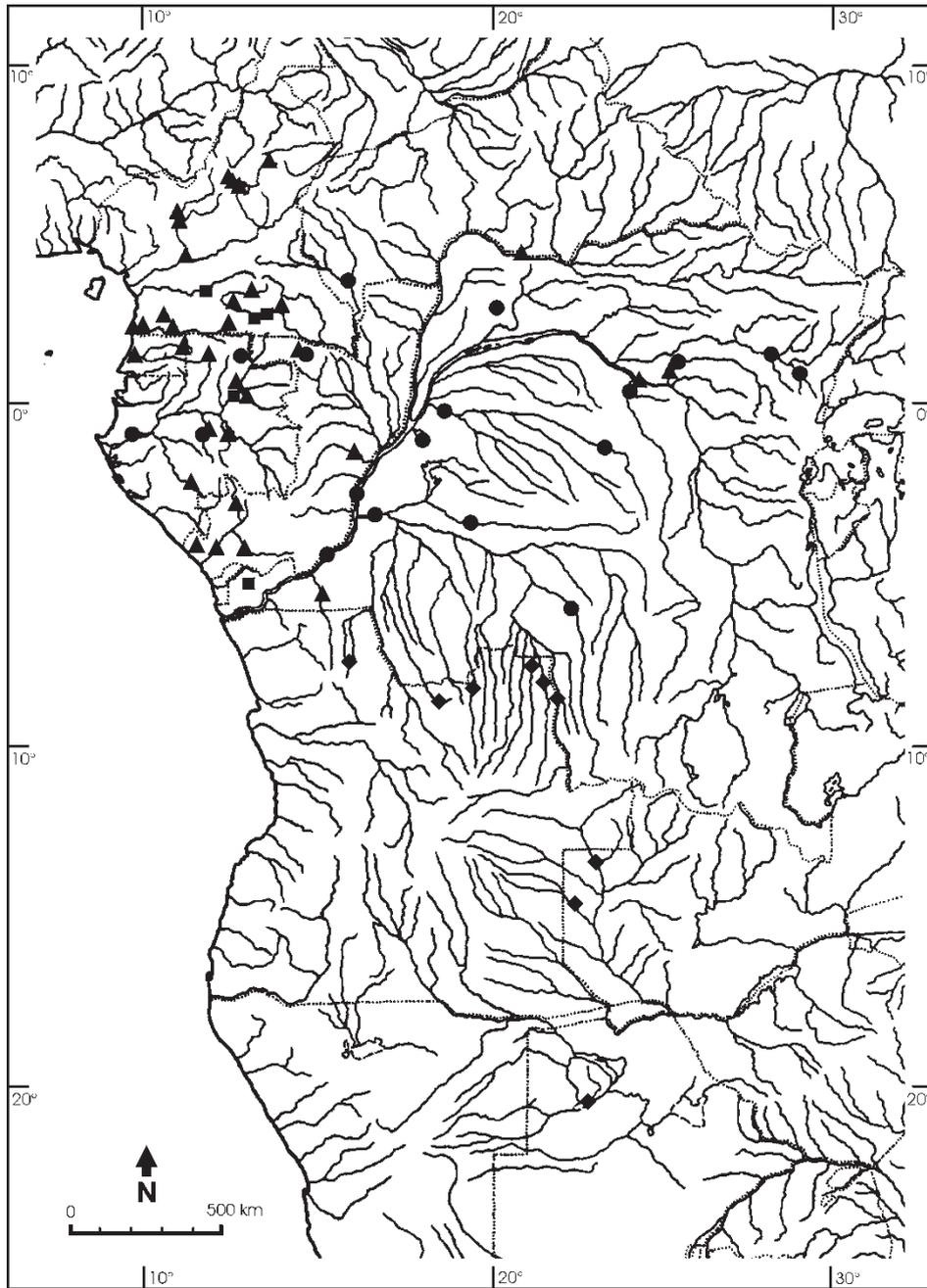


FIG. 9. Geographic distribution of *Parauchenoglanis balayi* (▲), *P. altipinnis* (■), *P. punctatus* (●) and *P. ngamensis* (◆).

basin, Democratic Republic of Congo); two spm, 57–69 mm SL. MRAC P.173138–173141: Kié River, at border with Gabon (Ntem basin, Equatorial Guinea); four spm, 36–76 mm SL. MRAC 73-2-P-1794: Ivindo River at Makokou (Ogowe basin, Gabon); 0°34'N, 12°52'E; 76 mm SL. MRAC 73-2-P-1798: Akoumdoum,

Muvila River (Ntem basin, Cameroon); 2°35'N, 11°17'E; 206 mm SL. MRAC 73-18-P-2242–2243: Djerem River (Sanaga basin, Cameroon); 6°21'N, 12°32'E; two spm, 43–55 mm SL. MRAC 73-64-P-31–33: Woleu River (San Benito basin, Gabon); three spm, 42–51 mm SL. MRAC 74-1-P-18-25: Noun River, near Bamendjin dam (Sanaga basin, Cameroon); 5°41'N, 10°30'E; eight spm, 53–135 mm SL. MRAC 76-60-P-3–4: PK 25 Makokou—Lastoursville (tributary of Ivindo River, Ogowe basin, Gabon); 0°27'N, 13°03'E; two spm, 41–47 mm SL. MRAC 76-60-P-5: Ivindo River near Makokou (Ogowe basin, Gabon); 0°34'N, 12°52'E; 49 mm SL. MRAC 76-60-P-6–11: small stream between Makokou and Loaloa (tributary of Ivindo River, Ogowe basin, Gabon); six spm, 24–91 mm SL. MRAC 78-22-P-1022–1025: Niolo River at Mayala (Kouilou basin, Congo Brazzaville); 2°59'S 12°46'E; four spm, 40–138 mm SL. MRAC 80-51-P-26: small stream roughly 40 km WSW of Booué (Ogowe basin, Gabon); 123 mm SL. MRAC 80-51-P-88: rapids of Louetsié River near Lebamba (Ogowe basin, Gabon); 33 mm SL. MRAC 85-19-P-9: Inkisi River (Congo basin, Democratic Republic of Congo); 5°08'S, 15°04'E; 161 mm SL. MRAC 90-57-P-1002–1005: Loundji River near Béna I (Kouilou basin, Congo Brazzaville); 4°03'S, 11°49'E; four spm, 199–214 mm SL. MRAC 90-57-P-1015–1019: Mami River (Kouilou basin, Congo Brazzaville); 4°08'S, 12°05'E; five spm, 74–147 mm SL. MRAC 93-41-P-1264: Lou River (Sanaga basin, Cameroon); 6°14'N, 12°32'E; 33 mm SL. MRAC 93-41-P-1266: Mengueme River (Sanaga basin, Cameroon); 6°21'N, 12°33'E; 40 mm SL. MRAC 93-41-P-1254–1256, 1262: Medjamba, Djerem River (Sanaga basin, Cameroon); 6°20'N, 12°32'E; four spm, 109–185 mm SL. MRAC 93-41-P-1265: River Manbarla, near Manbarla, near Mayo Fourou (Sanaga basin, Cameroon); 36 mm SL. MRAC 93-83-P-12–13: Cameroon; two spm, 72–81 mm SL. MRAC 93-108-P-382–383: tributary of Ntem River, near Akoabass (Cameroon); 2°19'N, 12°06'E; two spm; 38–59 mm SL. MRAC 93-108-P-395–396: river situated between Aboulou and Mebang (Ntem basin, Cameroon); 2°19'N, 12°04'E; two spm, 53–54 mm SL. MRAC 94-49-P-453–454: tributary of Kim River near Ngambe Tikar (Sanaga basin, Cameroon); 5°46'N, 11°30'E; two spm, 39–42 mm SL. MRAC 94-49-P-455: Wegwa River at Balikumbot (Sanaga basin, Cameroon); 5°54'N, 11°34'E; 85 mm SL. MRAC 94-49-P-456: Nké River at Ngambe Tikar (Sanaga basin, Cameroon); 5°48'N, 11°28'E; 98 mm SL. MRAC 94-74-P-1307–1308: Babungo, River Noun (Sanaga basin, Cameroon); 6°04'N, 10°28'E; two spm, 50–94 mm SL. MRAC 94-74-P-1309–1315: Mukié River at Bamali (Sanaga basin, Cameroon); 5°55'N, 10°25'E; seven spm, 38–176 mm SL. MRAC 94-74-P-1316–1317: Kilan River at Bali Gashu (Sanaga basin, Cameroon); 5°43'N, 10°16'E; two spm, 61–63 mm SL. MRAC 95-30-P-1159: Metyii River between Djop and Mvan Essakoé (Ntem basin, Cameroon); 2°51'N, 11°10'E; 26 mm SL. MRAC 95-30-P-1163: tributary of Bongola River, at Île Dipikar (Ntem basin, Cameroon); 2°16'N, 9°56'E; 70 mm SL. MRAC 95-42-P-742: River Dja at Bi (Congo basin, Cameroon); 2°47'N, 13°21'E; 217 mm SL. MRAC 95-42-P-750: Avebe, Momo River (tributary of Dja River, Congo basin, Cameroon); 2°41'N, 12°55'E; 202 mm SL. MRAC 95-42-P-754–755: Maleng V, Mpoo River (tributary of Dja River, Congo basin, Cameroon); 3°29'N, 13°04'E; two spm, 249–279 mm SL. MRAC 95-42-P-757–762: Mpam II River, 27 km south of Djolimpoum (tributary of Dja River, Congo basin, Cameroon); 3°06'N, 12°54'E; six spm, 96–123 mm SL. MRAC 96-44-P-268: small stream 3 km E of Souanké (tributary of Dja River, Congo basin, Congo Brazzaville); 2°05'N, 14°11'E; 22 mm SL. MRAC 99-56-P-205: Ebeigne (Oyem), Woleu River (San Benito basin, Gabon); 1°28'N, 11°35'E; 206 mm SL.

MRAC A0-49-P-208: Loua Loua, Makokou, Ivindo River (Ogowé basin, Gabon); 0°31'N, 12°49'E; 190 mm SL. MRAC A0-49-P-209: Ivindo River at Nkiété, near Makokou (Ogowé basin, Gabon); 0°27'N, 13°01'E; 228 mm SL.

Parauchenoglanis guttatus (Lönnberg, 1895)
(figure 8b)

Pimelodus guttatus Lönnberg, 1895.

Auchenoglanis monkei Keilhack, 1910 (new synonymy).

Parauchenoglanis guttatus: Boulenger, 1911.

Parauchenoglanis loennbergi Fowler, 1958 (invalid name change; see Risch, 1986).

Auchenoglanis fasciatus Gras, 1960 (new synonymy).

Diagnosis. Preorbital head length not greater than head height. Barbels relatively short, with maxillary barbel not reaching beyond base of pectoral fin spine; external mandibular barbel normally not reaching beyond tip of pectoral fin spine. Barbel lengths of some juveniles (e.g. one *P. monkei* paratype) can slightly exceed this general condition. Pectoral fin spine serrated on both margins. Caudal peduncle high, with minimal height of peduncle usually twice as great as horizontal distance between adipose fin and caudal fin bases, or sometimes even greater.

Description. Based on 39 specimens including syntypes (see below). See also table 4. Body and head relatively high (though generally not as high as in *P. punctatus* and *P. altipinnis*). Anterior margin of pectoral fin spine always coarsely serrated from base to tip, with serrae being smaller but usually more numerous than those on posterior margin. Humeral process narrow and pointed (as in *P. balayi*). Six to seven (exceptionally eight) pectoral fin rays.

Overall coloration light brown to greyish brown with five or six (exceptionally four or seven) dark vertical bands on flanks, that sometimes appear to consist of very large, merging spots. Small spots may be present between these bands, as well as on head and fins. As in most *Parauchenoglanis* species, the degree of pigmentation may vary between individual specimens.

Note on the synonyms. *P. monkei* was probably originally considered to be distinct as a consequence of the fact that the original species concept of *P. guttatus* (Lönnberg, 1895) was altered when Boulenger (1902b) published his *Auchenoglanis* key (see 'Introduction' for details). Keilhack (1910) presumably had not consulted Lönnberg's description when he described *P. monkei*. Except for the longer barbels of one paratype, the type series of *P. monkei* strongly resembles the *P. guttatus* syntypes.

Gras (1960) similarly did not mention Lönnberg's original description when describing *P. fasciatus*. *P. fasciatus* supposedly differs from *P. monkei* in the shorter barbels and the presence of five transverse bands on the flank, instead of the seven to nine he reported for *P. monkei*. Since the *P. guttatus* syntypes have five or six bands, and have barbel lengths comparable to those of *P. fasciatus*, it is obvious that *P. guttatus* and *P. fasciatus* are synonyms. No distinguishing features to discriminate the species were found in our study.

Distribution (figure 10). This species is present from the Ouémé River in Benin to the Sanaga River in Cameroon. It is never found far inland (maximal distance from coast approximately 120 km).

Maximum size recorded. The maximum size recorded is 151 mm SL.

Material examined. Thirty-nine specimens. ZMU 567 (two syntypes): N'Dian River (West Cameroon); 4°52'N, 8°46'E; 49–53 mm SL. ZMHU 17.771 (holotype

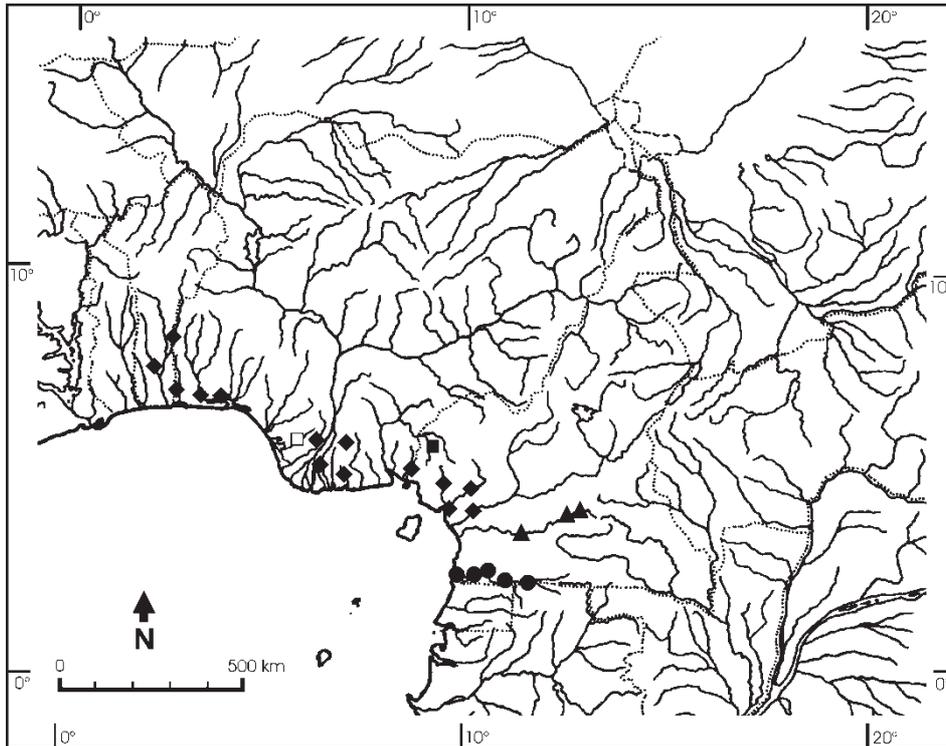


FIG. 10. Geographic distribution of *Parauchenoglanis guttatus* (◆), *P. buettikoferi* (□), *P. ahli* (■), *P. longiceps* (▲) and *P. pantherinus* (●).

of *P. monkei*): Logobaba (Wouri River, Cameroon); 4°08'N, 9°45'E; 84 mm SL. ZMHU 21.318 (paratypes of *P. monkei*): Logobaba (Wouri River, Cameroon); 4°08'N, 9°45'E; two spm, 42–66 mm SL. MNHN 1960-392 (syntypes of *P. fasciatus*): Bokoutou (Iguidi River, Benin); 6°44'N, 2°43'E; two spm, 113–117 mm SL. MRAC P.20005: Yabassi, Wouri River (Cameroon); 4°28'N, 9°58'E; 151 mm SL. MRAC 73-29-P-1451: Yabassi, Wouri River (Cameroon); 4°28'N, 9°58'E; 124 mm SL. MRAC 73-29-P-1452: Bekoko River (Cameroon); 68 mm SL. MRAC 76-6-P-278–283: Majidun Creek near Lagos (Nigeria); 6°27'N, 3°28'E; six spm, 74–94 mm SL. MRAC 76-32-P-900: Yewa River at Meko (Nigeria); 7°27'N, 2°51'E; 34 mm SL. MRAC 76-32-P-948: 30 miles N of Buea towards Kumba (Cameroon); approx. 4°33'N, 9°28'E; 45 mm SL. MRAC 76-32-P-955: 27 miles E of Abomey (Ouémé basin, Benin); approx. 7°10'N, 2°25'E; 41 mm SL. MRAC 76-32-P-956: Yewa River near Mellem and Ilara (Nigeria); approx. 7°25'N, 2°48'E; 68 mm SL. MRAC 80-18-P-1–3: Majidun Creek (Nigeria); 6°27'N, 3°28'E; three spm, 75–127 mm SL. MRAC 84-15-P-1–2: Umuayara Mba, Etche, Rivers State (Bonny River, Nigeria); approx. 4°52'N, 7°02'E; two spm, 97–107 mm SL. MRAC 88-3-P-32–33: Ikpa River at Uyo (Cross basin, Nigeria); 5°03'N, 7°57'E; two spm, 92–101 mm SL. MRAC 89-32-P-17: River Biwole, 18 km from Edea to Kribi (Sanaga basin, Cameroon); 3°39'N, 10°07'E; 69 mm SL. MRAC 91-1-P-254: Odieke, Orashi River (Niger Delta, Nigeria); 5°01'N, 6°27'E; 104 mm SL. MRAC 91-67-P-162–163: meander swamp near Ahooda (Sombreiro River, Nigeria); 5°06'N, 6°41'E; two spm, 117–135 mm SL. MRAC 91-67-P-164–169: Okoso Creek (Niger Delta, Nigeria);

5°08'N, 6°18'E; six spm, 63–101 mm SL. MRAC 91-100-P-27–28: Okoso Creek (Niger Delta, Nigeria); 5°08'N, 6°18'E; two spm, 76–100 mm SL.

Parauchenoglanis punctatus (Boulenger, 1902)

(figure 8c)

Auchenoglanis punctatus Boulenger, 1902a.

Auchenoglanis iturii Steindachner, 1911 (**new synonymy**).

Auchenoglanis grandis Fowler, 1936 (**new synonymy**).

Parauchenoglanis punctatus: Teugels *et al.*, 1991.

Diagnosis. Head height greater than, rarely as great as, preorbital head length. Barbels extremely long, with maxillary barbel usually reaching beyond base of pectoral fin spine; external mandibular barbel always reaching beyond tip of pectoral fin spine. Both margins of pectoral fin spine coarsely serrated. High caudal peduncle, with minimal height of peduncle usually twice horizontal distance between adipose fin and caudal fin bases, or even greater.

Description. Based on 47 specimens including holotype (see below). See also table 4. Body and head relatively elevated. Anterior margin of pectoral fin spine always coarsely serrated from base to tip, with serrae being smaller but usually more numerous than those on posterior margin. Humeral process narrow and pointed. Eight (rarely seven) pectoral fin rays. Adipose fin thick and remarkably higher than in most *Parauchenoglanis* species, except for *P. altipinnis*.

Head dark brown, typically darker than flanks, sometimes with indistinct, large, dark marks. Flanks brown, occasionally with a purple hue, and 6–10 (rarely 11) vertical rows of very dark to black separate dots, each smaller than eye. In younger specimens dark vertical bands may be barely apparent. Belly pale brown to whitish. Fins spotted or not.

Note on the synonyms. Neither Steindachner (1911) nor Fowler (1936) mentioned the existence of *P. punctatus* when describing *P. iturii* and *P. grandis*, respectively. Possibly they were unaware of the description of *P. punctatus* by Boulenger (1902a). The holotype of *P. punctatus* is a small, juvenile specimen, in which some of the distinguishing traits for the species are not yet fully apparent. This may account for the failure of Steindachner and Fowler to recognize that their species were conspecific with it. Both authors distinguished their species from *P. ngamensis* by the longer external mandibular barbel. *Parauchenoglanis ngamensis* can be discerned from *P. punctatus* by its shorter barbels, as mentioned in the original description of the species by Boulenger (1911). The results of this paper unequivocally indicate that both *P. iturii* and *P. grandis* should be considered synonyms of *P. punctatus*.

Distribution (figure 9). *Parauchenoglanis punctatus* has a wide distribution. It is present in the lower and central Congo River basin up to Kisangani; it also inhabits the San Benito and Ogowe River basins. It is the most widespread of all *Parauchenoglanis* species (Gabon, Central African Republic, Congo Brazzaville, Democratic Republic of the Congo).

Maximum size recorded. The maximum size recorded is 410 mm SL.

Material examined. Forty-seven specimens. ISNB 9 (holotype): Lindi River (north-eastern Congo basin, Democratic Republic of Congo); 65 mm SL. NMW 47475–47476 (syntypes of *P. iturii*): Ituri River (tributary of Aruwimi River, Congo basin, Democratic Republic of Congo); two spm, 186–188 mm SL. ANSP 66.125 (holotype of *P. grandis*): Sangha River at Nola (Congo basin, Central African Republic); 3°31'N, 16°03'E; 120 mm SL. MRAC P.1322: Mawambi, Ituri River

(Congo basin, Democratic Republic of Congo); 1°04'N, 28°34'E; 185 mm SL. MRAC P.3164: Oshwe, Lac Léopold II, Lukenie River (Congo basin, Democratic Republic of Congo); 3°23'S, 19°30'E; 100 mm SL. MRAC P.14624: Uelé River (tributary of Ubangi River, Congo basin, Democratic Republic of Congo); 73 mm SL. MRAC P.17461: Basongo (tributary of Kasai River, Congo basin, Democratic Republic of Congo); approx. 4°20'S, 20°22'E; 83 mm SL. MRAC P.19605: Luluabourg (=Kananga), Lulua River (Congo basin, Democratic Republic of Congo); 5°55'S, 22°19'E; 103 mm SL. MRAC P.20426–20427: Sémbé River (tributary of Koudou River, Congo basin, Congo Brazzaville); approx. 1°38'N, 14°34'E; two spm, 92–97 mm SL. MRAC P.29641: Kunungu (Congo basin, Democratic Republic of Congo); 2°10'S, 16°14'E; 57 mm SL. MRAC P.29708: Lomami River (Congo basin, Democratic Republic of Congo); approx. 0°41'N, 24°12'E; 120 mm SL. MRAC P.38067–38069, 38072: Kunungu (Congo basin, Democratic Republic of Congo); 2°10'S, 16°14'E; three spm, 94–138 mm SL. MRAC P.38326: Kunungu (Congo basin, Democratic Republic of Congo); 2°10'S, 16°14'E; 62 mm SL. MRAC P.42908: Budjala, tributary of Moeko River (Congo basin, Democratic Republic of Congo); 2°39'N, 19°42'E; 81 mm SL. MRAC P.57197, 57200: Nolva, Kunungu (Congo basin, Democratic Republic of Congo); 2°10'S, 16°14'E; two spm, 68–103 mm SL. MRAC P.68811–68814: Mushie (tributary of Kasai River, Congo basin, Democratic Republic of Congo); approx. 3°02'S, 16°56'E; four spm, 96–185 mm SL. MRAC P.72562–72563: Flandria, Momboyo River (Congo basin, Democratic Republic of Congo); 0°03'S, 18°28'E; two spm, 113–119 mm SL. MRAC P.117627: Stanley Pool (=Malebo Pool) (Congo River; Democratic Republic of Congo); 4°10'S, 15°23'E; 93 mm SL. MRAC P.131264–131271: Lake Tumba (Congo basin, Democratic Republic of Congo); 0°46'S, 18°02'E; eight spm, 48–76 mm SL. MRAC P.131272: Ikela, Botiti River (tributary of Tshuapa River, Congo basin, Democratic Republic of Congo); 1°11'S, 23°15'E; 50 mm SL. MRAC P.135369–135374: Yaekama, tributary of Lopori River (Congo basin, Democratic Republic of Congo); 0°47'N, 23°17'E; five spm, 73–178 mm SL. MRAC 75-56-P-1433–1435: Mang, Boumba River (Congo basin, Democratic Republic of Congo); 3°20'N, 14°05'E; three spm, 106–190 mm SL. MRAC A0-48-P-1328: Mvoul River (tributary of Lake Ezanga, Ivindo River, Ogowe basin, Gabon); 1°54'N, 12°37'E; 290 mm SL. MRAC A0-48-P-1329: Mabora River (tributary of Lake Nkonié, Ogowe basin, Gabon); 0°32'S, 9°55'E; 410 mm SL. MRAC A0-49-P-210: pont de Lebombi, Békoyo, near Franceville (Ogowe basin, Gabon); 1°38'N, 13°24'E; 194 mm SL.

Parauchenoglanis altipinnis (Boulenger, 1911)

(figure 8d)

Auchenoglanis altipinnis Boulenger, 1911.

Parauchenoglanis altipinnis: Teugels *et al.*, 1991.

Diagnosis. Head height greater than, rarely as great as, preorbital head length. Barbels relatively short, with maxillary barbel at most reaching base of pectoral fin spine; external mandibular barbel never reaching beyond tip of pectoral fin spine. Anterior margin of pectoral fin spine largely smooth. Caudal peduncle mostly as in *P. balayi*, with minimal height of caudal peduncle as great as horizontal distance between bases of adipose and caudal fin, or slightly greater (though in two examined specimens it was almost twice as great).

Description. Based on 13 specimens including holotype (see below). See also

table 4. Body and head relatively high. Central (and usually proximal) portion of anterior margin of pectoral fin spine smooth; with few serrae present distally (as in all *Parauchenoglanis* species). Humeral process largely narrow and pointed; process more sturdy in very large specimens, resulting in more broadly triangular shape, as typically present in *P. ngamensis*, but always with smooth upper margin. Dorsal fin long to extremely long compared to that of other *Parauchenoglanis* species, often even longer than head length. Seven or eight pectoral fin rays. Adipose fin very well developed in most specimens, becoming very sturdy and notably high, and comparable to that in *P. punctatus*.

Overall pigmentation ranges from greyish to very dark brown. Barely obvious pigmentation pattern on flank generally consisting of one horizontal row of one to six large round spots, becoming more and more faint posteriorly. Belly brown to whitish. Dorsal portion of body, as well as adipose and caudal fins sometimes have some faint reticulate pattern apparent. Other fins uniformly coloured.

Distribution (figure 9). This species is present in parts of Cameroon, Gabon and Congo Brazzaville: it has been found in the basins of the Congo (Dja tributary), Nyong, Ogowe and Chiloango Rivers.

Maximum size recorded. The maximum size recorded is 255 mm SL.

Material examined. Thirteen specimens. NHM 1911.5.30:30 (holotype): Dja River at Esamesa (tributary of Sangha River, Congo basin, Cameroon); 170 mm SL. MRAC P.78801: Lukula River (Chiloango basin, Congo Brazzaville); approx. 5°23'S, 12°56'E; 159 mm SL. MRAC 73-2-1801-1804: Makokou, Ivindo River (Ogowe basin, Gabon); 0°34'N, 12°52'E; four spm, 150-255 mm SL. MRAC 73-29-P-1453-1454: Ebogo, Nyong River (Cameroon); 3°24'N, 11°28'E; two spm, 205-221 mm SL. MRAC 75-56-P-900-901: Ayos, Nyong River (Cameroon); 3°53'N, 12°32'E; two spm, 230-232 mm SL. MRAC 95-42-P-791-793: Dja River at Bi (Cameroon); 2°47'N, 13°21'E; three spm, 150-189 mm SL.

***Parauchenoglanis ngamensis* (Boulenger, 1911)**
(figure 8e)

Auchenoglanis ngamensis Boulenger, 1911.

Parauchenoglanis ngamensis: Teugels *et al.*, 1991.

Diagnosis. Humeral process of cleithrum, which is visible through the skin, bluntly triangular, with its width at base nearly as great as its length, with width being at least as great as orbital diameter. In adult specimens its upper margin usually becomes somewhat serrated. Head height greater than, rarely as great as, preorbital head length. Barbels relatively short, with external mandibular barbel never reaching beyond tip of pectoral fin spine. Caudal peduncle significantly higher than long, with minimal height much greater than horizontal distance between bases of adipose and caudal fins.

Description. Based on 20 specimens including holotype (see below). See also table 4. General shape of body and head moderately elongate. Pectoral fin spine coarsely serrated on both margins, anterior margin being slightly less rough than in *P. punctatus*. Seven or eight pectoral fin rays.

The overall colour of this species varies considerably from bright to virtually blackish brown. Purple hue occasionally present. Belly brown to whitish. Zambezi and Okavango specimens are characterized by five to seven vertical rows of blackish

spots on background of lighter spots all over body. Kasai specimens typically lack background pattern, though intermediate forms may be found.

Distribution (figure 9). *Parauchenoglanis ngamensis* has been found in the tributaries of the Kasai River, as well as in the upper Zambezi River basin and in the Okavango Delta (Angola, Zambia, Botswana).

Maximum size recorded. The maximum size recorded is 207 mm SL.

Material examined. Twenty specimens. NHM 1910.5.31:35 (holotype): Okavango River near Lake Ngami, Botswana; 20°45'S, 22°55'E; 186 mm SL. MRAC P.142057: tributary of upper Zambezi River at Chavuma (Zambia); 13°06'S, 22°42'E; 141 mm SL. MRAC P.142072: tributary of upper Zambezi River at Monga (Zambia); 14°05'S, 22°24'E; 104 mm SL. MRAC P.161663, 161665: tributary of Luachimo River (Kasai basin, Angola); 7°23'S, 20°50'E; two spm, 106–154 mm SL. MRAC P.161707: Cavuemba River (Angola); 87 mm SL. MRAC P. 161712–161714: Lake Calundo (Zambezi basin, Angola); 11°43'S, 20°48'E; three spm, 103–208 mm SL. MRAC P.161718: Luita River at Cuilo Xà-Ua (Kasai basin, Angola); 8°02'S, 19°25'E; 74 mm SL. MRAC P.161719: Uamba River near Mabete (Kasai basin, Angola); 8°07'S, 18°09'E; 125 mm SL. MRAC P.161725–161727: Mololo River (tributary of Chiumbe River, Kasai basin, Angola); 7°49'S, 21°05'E; three spm, 98–145 mm SL. MRAC P.161765–161766: Luenda River (Angola); two spm, 51–66 mm SL. MRAC 78-6-P-875: Lomboma, Luembe River (Kasai basin, Angola); 7°53'S, 21°24'E; 175 mm SL. MRAC 78-6-P-876–878: Cafunfo, Cuango River (Kasai basin, Angola); 7°37'S, 15°43'E; three spm, 48–60 mm SL.

Parauchenoglanis longiceps (Boulenger, 1913)

(figure 8f)

Auchenoglanis longiceps Boulenger, 1913.

Auchenoglanis maculosus Holly, 1927 (**new synonymy**).

Parauchenoglanis longiceps: Teugels *et al.*, 1991.

Diagnosis. Head height smaller than preorbital head length. Interorbital distance more than twice horizontal orbital diameter. Barbels short, with maxillary barbel never reaching base of pectoral fin spine, external mandibular barbel at most reaching halfway along pectoral fin spine. Anterior margin of pectoral fin spine largely smooth (not serrated). Minimal height of caudal peduncle slightly greater than horizontal distance between bases of adipose and caudal fin, but never twice as great.

Description. Based on eight specimens including holotype (see below). See also table 4. Body low and slender. Snout relatively long, giving head elongate appearance. Posterior margin of pectoral fin spine serrated; anterior margin smooth except for few serrae distally. Humeral process narrow and pointed, with width at base being smaller than length of process. Eight pectoral fin rays.

Overall coloration brown or reddish, with head as dark as, or slightly darker than rest of body. Head and body covered with numerous small dark dots, those on head being as large as those on body. Dorsal, caudal and adipose fins densely spotted as well. Other fins usually uniformly brown or grey. Belly pale, without any dots.

Note on the synonym. Holly (1927) stated that *P. maculosus* could be distinguished from *P. longiceps* by means of the 'mightier' head, the shorter external mandibular barbel, the smaller eye, the larger number of anal fin rays and the more numerous gill rakers. Both syntypes of *P. maculosus* are very large, compared to the holotype

of *P. longiceps*, and so the first two cited differences may be due to allometry. The numbers of anal fin rays and gill rakers vary considerably even between individuals that originated at the same location. None of these four cited characteristics, nor any other, can be used to discriminate the nominal species, which are thus considered synonyms.

Distribution (figure 10). This species is restricted to the basin of the Nyong River (Central to South Cameroon).

Maximum size recorded. The maximum size recorded is 411 mm SL.

Material examined. Eight specimens. NHM 1913.10.29:12 (holotype): Nyong River at Akonolinga (Cameroon); 3°46'N, 12°15'E; 160 mm SL. NMW 7800–7801 (syntypes of *P. maculosus*): Cameroon; two spm, 318–411 mm SL. MRAC 73-2-P-1797: Nyong River near Ebogo (Cameroon); approx. 3°24'N, 11°28'E; 182 mm SL. MRAC 73-18-P-2244: Ebogo, Nyong River (Cameroon); 3°24'N, 11°28'E; 285 mm SL. MRAC 73-29-P-1455–1457: Ebogo, Nyong River (Cameroon); 3°24'N, 11°28'E; three spm, 163–265 mm SL.

***Parauchenoglanis buettikoferi* (Popta, 1913)**

(figure 8g)

Auchenoglanis buettikoferi Popta, 1913.

Parauchenoglanis buettikoferi: Teugels *et al.*, 1991.

Diagnosis. Head height greater than preorbital head length. Barbels rather short, with maxillary barbel just reaching base of pectoral fin spine, external mandibular barbel not reaching beyond tip of pectoral fin spine. Anterior margin of pectoral fin spine coarsely serrated over its whole length. Caudal peduncle long (as in *P. balayi*), with its minimum height slightly greater than horizontal distance between bases of adipose and caudal fin.

Description. Based on holotype. See also table 4. Body relatively low and slender. Both margins of pectoral fin spine coarsely serrated. Humeral process narrow and pointed, with width at base being much smaller than length of process. Seven pectoral fin rays.

The coloration of the holotype of *P. buettikoferi* was described by Popta (1913) when it had already been preserved in alcohol for some time. She described the colour as violet brown. Afterwards the specimen was stained for bone, such that it is now impossible to perceive many details of the colour pattern. An examination of the specimen reveals the apparent presence of about four large spots on the flank.

Distribution (figure 10). The holotype of *Parauchenoglanis buettikoferi* was collected in the Warri River in the Western Niger Delta (Nigeria). No other specimens seem to have been subsequently collected.

Maximum size recorded. The maximum size recorded is 84 mm SL (only specimen).

Material examined. One specimen. NNM 8860 (holotype): Warri River (Niger Delta, Nigeria); 5°34'N, 5°55'E; 84 mm SL.

***Parauchenoglanis pantherinus* (Pellegrin, 1929)**

(figure 8h)

Auchenoglanis pantherinus Pellegrin, 1929a.

Parauchenoglanis pantherinus: Teugels *et al.*, 1991.

Diagnosis. Head height smaller than preorbital head length. Maximum interorbital distance twice horizontal orbital diameter. Barbels short, with maxillary barbel

never reaching base of pectoral fin spine, external mandibular barbel at most reaching halfway along pectoral fin spine. Anterior margin of pectoral fin spine largely smooth. Minimum height of caudal peduncle slightly greater than horizontal distance between bases of adipose and caudal fin, but never twice as great.

Description. Based on 12 specimens including syntypes (see below). See also table 4. Body low and slender. Snout relatively long, giving head elongate appearance. Posterior margin of pectoral fin spine serrated; anterior margin smooth except for few serrae distally. Humeral process narrow and pointed, with width at base being smaller than length of process. Eight (rarely seven) pectoral fin rays.

Head and body brown (often purplish on lower portion of flanks), speckled with numerous small dark dots, those on head usually being smaller than those on body. Belly pale, without dots. All fins densely speckled, although pattern may sometimes be faint and inconspicuous on anal and pelvic fins.

Distribution (figure 10). This species has been found only in the basin of the Ntem River (South Cameroon), where it appears to be endemic.

Maximum size recorded. The maximum size recorded is 248 mm SL.

Material examined. Twelve specimens. MNHN 1929-29, 30, 31 (three syntypes): Nyabessan, Ntem River (Cameroon); 2°25'N, 10°23'E; 23–130 mm SL. MRAC 73-18-P-2289–2290: Alen, Ntem River (Cameroon); 2°21'N, 10°34'E; two spm, 248–292 mm SL. MRAC 73-18-P-2295–2296: Ngoazik, Ntem River (Cameroon); 2°18'N, 11°20'E; two spm, 172–201 mm SL. MRAC 93-82-P-385: Ntem River near Nyabessan (Cameroon); 2°24'N, 10°24'E; 156 mm SL. MRAC 93-82-P-399-401: Ntem River near Ma'an (Cameroon); 2°20'N, 10°36'E; three spm, 176–201 mm SL. MRAC 95-81-P-50: Bongola River (Ntem basin, Cameroon); 2°18'N, 10°05'E; 240 mm SL.

Parauchenoglanis ahli (Holly, 1930)

(figure 8i)

Auchenoglanis ahli Holly, 1930.

Parauchenoglanis ahli: Teugels *et al.*, 1991.

Diagnosis. Head height greater than, rarely as great as, preorbital head length. Barbels very long, with maxillary barbel always reaching base of pectoral fin spine or even further, external mandibular barbel always reaching beyond tip of pectoral fin spine. Anterior margin of pectoral fin spine slightly, or not, serrated. Minimal height of caudal peduncle about 1.5 times horizontal distance between bases of adipose and caudal fin.

Description. Based on the five syntypes. See also table 4. Body low and slender. Posterior margin of pectoral fin spine serrated; anterior margin smooth, or slightly serrated. Humeral process narrow and pointed, with width at base being smaller than length of process. Eight pectoral fin rays.

Overall coloration purplish brown, with head as dark as, or slightly darker than, rest of body. Head and body, as well as adipose, dorsal and caudal fins speckled with numerous small dark dots, those on flank sometimes organized in rows. All other fins uniformly brown. Belly pale and nearly without dots.

Distribution (figure 10). The syntypes of *Parauchenoglanis ahli* were collected in the upper Cross River basin (West Cameroon).

Maximum size recorded. The maximum size recorded is 84 mm SL.

Material examined. Five specimens. NMW 13895–13899 (five syntypes): Bakoko, Cross River basin (Cameroon); 5°28'N, 9°18'E; 54–84 mm SL.

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