



A REVIEW OF THE
CYPRINODONT FAUNA

OF THE
COASTAL PLAIN IN RIO MUNI,
GABON, CONGO, CABINDA AND ZAIRE

With taxonomic Shifts in
Aphyosemion, *Epiplatys*
and
West African Procatopodins

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SYNOPSIS

Having presented the biogeography, ecology and hydrography of the studied area, the author reviews its cyprinodont fauna, presented by phylogenetic groups.

Systematic moves are proposed:

Rivulins

- *Aphyosemion simulans* is a junior synonym of *A. microphthalmum*
- *Panchax escherichi* is checked to be a junior synonym of *striatum* after the study of the types.
- *A. marginatum* is proposed as having full species status, but further studies are demanded.
- *Epiplatys macrostigma*, *ansorgii* and *ornatus* are all junior synonyms of *Ep. singa*

Procatopodins

- A different taxonomy is presented, giving Clausen's characters a descriptive interest
- *Aplocheilichthys* is proposed to be restricted to the coastal Western Africa fish: *spidauchen*, as *Pantanodon*, to the Eastern African coast.
 - *Micropanchx* becomes the basic genus for non *Procatopus*-like species
 - *Laciris* new genus is proposed for *pelagious* as *Lamprichthys* for *tanganicus*
 - *Aply. tchiloangensis* is a junior synonym of *spidauchen* after the study of the types
 - *M. (Poropanchax) keilhacki* may be a senior synonym of *macrophthalmus* for morphological and geographical reasons.
 - *Plataplochilus* is a junior synonym of *Procatopus* but the sub-genus level might be maintained
 - *Proc. chalcopyrus* and *mimus* are junior synonyms of *ngaensis*
 - *Proc. pulcher* is a junior synonym of *millotaenia*
 - *Proc. loemensis* and *micrurus* are junior synonyms of *cabinda*.
 - In a subsequent paper it is shown that *Microp. strictopleuron* is a senior synonym of *silvestris*.

A. INTRODUCTION

The Cyprinodontfauna of the coastal plain in Rio Muni*, Gabon, Congo, Cabinda and Zaire is studied here mainly for 3 reasons:-

1. No comprehensive work has been published so far
2. Instead, a lot of collecting trips have been organised
3. Our field of knowledge is reasonably complete, but the published work is scattered.

10 recent collecting trips have occurred in the last 18 years from Rio Muni to Zaire -Roman (1966,68) and Scheel (1969) in Rio Muni; Lambert (1962,64), Huber and Radda (1976), Huber (1979) and Pap (1980) in Gabon; Stauch (1963) Lambert(1964) Buytaert and Wachters (1978) Huber (1978) Agnese (1980) in Congo, Cabinda. Personally I have visited Congo and Gabon and reviewed some of the preserved material of Paris, Tervuren, London and Berlin Museums and I wish to thank the authorities for their help, especially Prof. Daget, Prof. Van der Audenaerde, Dr. Chambers and Dr. Paepke. In addition, I give my friendly thanks to Ruud Wilderkamp for his drawings and for having read the manuscript, together with Lothar Seegers.

The studied area is very interesting because the four main groups of non annual west african Cyprinodonts are present; 7 lines of evolution are represented in the genera

*Officially Mbini or Equatorial Guinea.

Aphyosemion, *Epilatys*, *Procatopus* and *Micropanchax*. This area is also very interesting because its fauna is specific: if the northern part of Rio Muni is excluded, i.e. North of the Benito River, then the whole fauna, living therein, is not found elsewhere; in other words, despite the absence of geographical barriers, the influence of the Cameroon coastal fauna and Congo basin fauna is poor, and that of Angola is probably nil.

B. BIOGEOGRAPHICAL CONDITIONS

The studied area is very homogeneous from a geographic point of view:

- West it is limited by the Atlantic Ocean
- East it is bordered by the sharp rise of the Inland plateau
- North of the Rio Benito, no geographical barrier exists but the fauna is different and, according to Scheel, the cyprinodont fauna becomes rare until the Kribi latitude, for some unknown reason
- South it is bordered by the large Zaire River near its estuary, and by the Angolian hills.

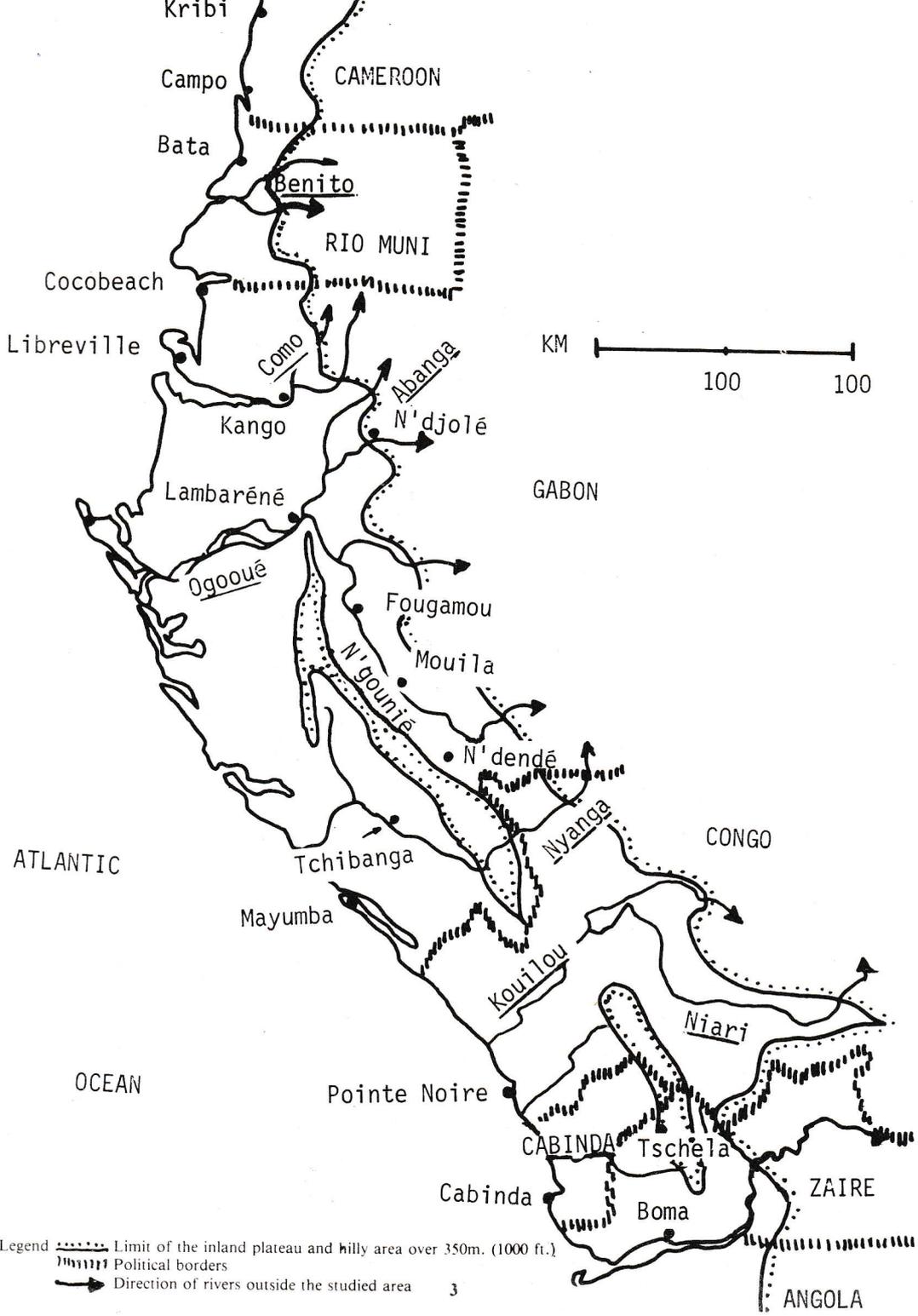
There are two exceptions in this scheme: the possible penetration of the inland fauna in Rio Muni (*A. cameronense*) and in the Niari-Zaire Valleys (*A. elegans* group, *Ep. multifasciatus* group).

The studied area forms a "corridor" 1000 Km long and 80-150 Km wide. Soils are sediments near many river systems; North to South are reported the Rio Benito, Komo, Ogooue, Ngounie-Nyanga, Kouilou and Zaire systems. Soils are also from the basement complex in the Mayombe hills in Southern Gabon and Congo. Primary forest covers more than 80% of the area, the rest being occupied by a band of arbustive savannah between the Mayombe hills and the Inland plateau. Therefore, the area is also homogeneous from a biological point of view and three species live in the whole range: *A. australe* Ep. *Singa* and *Aply. spilauchen*. Frontiers between species exist however and the reasons for their occurrence are unknown to us.

C. REVIEW OF THE CYPRINODONT FAUNA

This review is presented in a uniform format to help a systematic reading. Species are grouped in superspecies, then in genera, beginning with the first described in each superspecies.

The following items are discussed in order: species name, reference, origin of types and their collector if different from describer, meaning of the name, usual synonyms, list of recent collecting places in the studied area followed by (K) if the population has been maintained in Aquarium, description of the key features compared to other members of the superspecies, ecology, distribution, and remarks concerning its validity and the future studies needed.



Legend

-  Limit of the inland plateau and hilly area over 350m. (1000 ft.)
-  Political borders
-  Direction of rivers outside the studied area

1. THE RIVULINS

Rivulins are the most important and the most widely represented group of Cyprinodont. In West Africa, they are represented by two main groups *Epiplatys* and *Aphyosemion* and by some relict groups such as *Diapteron* or *Adamas*. Those fishes have an elongate body, not or little compressed laterally, a small size and a strong sexual dichromism. The morphological variability is weak within a species, except in annuals, and little allometry is observed during growth. Fins are brilliantly coloured in males and the pectorals are inserted in the inferior part of the body. Micromorphological criteria such as ctenoidy, frontal neuromasts, and head pores are useful at the species level, not to define evolutive groups. Instead, Karyotypes, geographical origin, morphometry (D, A, D/A), and egg membrane structure are critical to build superspecies.

The above list is not intended to define thoroughly the Rivulins but to differentiate them from the Procatopodins.

1.1 The Genus — *Aphyosemion* Myers, 1924

The genus *Aphyosemion* is well represented in the studied area: the fishes are always very abundant, but the number of superspecies concerned is small.

Only one endemic superspecies covers the whole range: *striatum* and two others which are in a recessive position: the subgenus *chromaphyosemion* that has not managed to cross the Komo estuary and *australe/ahli* are restricted to a narrow littoral band. There is no trace of annual species though some biotopes appear suitable for them. The speciation is limited to the *striatum* superspecies and thus ranks far behind that of Cameroon or Nigeria. However, the occurrence of a dense primary forest, of a sharp cut between the coastal plain and the inland plateau, and the equatorial climate, has provided us with a strong occupation density of the biotopes: *Aphyosemion* is always abundant in brooks in contrast to *Epiplatys* species, Procatopodins and other fishes.

Because of the absence of ecological barriers the three superspecies are found sympatric in their common range, i.e. Southern Rio Muni and Northern Gabon. It appears interesting to note that in that case those *Aphyosemion* develop distinctive patterns in the choice of the niche (as suggested by Scheel 1974) in behaviour and most probably in feeding habits (as shown by Brosset in the Ivindo Plateau area): *splendopleure* and *microphthalmum* prefer crystal clear waters whereas *striatum* demands stagnant leafy waters and *australe* very stagnant raffia swamps. (Cap Estérias fauna). More surprising — and exceptions to the rule * — are the sympatric occurrence of two elements of the same superspecies and the discovery of the inland species *cameronense* in the Rio Muni plain (see further).

Finally, and probably most important, this area is an excellent example of the distribution and evolution of *Aphyosemion*. Superspecies distributions are parallel to the coast, even in the inland plateau (Huber, 1980)

* It may be reminded the key rule in *Aphyosemion*: sympatric occurrence of elements belonging to different superspecies (heteromorphs) and allopatric occurrence of elements of the same superspecies (isomorphs).

The various elements of a superspecies tend to be allopatric, replacing each other from the North to the South: e.g. *striatum*, *marginatum*, *gabunense*, *exigoideum*, *primigenium*, with the exception of *microphthalmum*. Ecological or geographical barriers are not present to explain this situation.

The case of "Frontier Species" is typical here: the concept of what I call "Frontier species or phenotype" (Huber 1980) seems a key in the evolution of the genus. A frontier species is a biospecies with a restricted distribution, living at the border or at the periphery of its superspecies and thus facing the competitive pressures of the neighbouring superspecies. Many examples can be identified: *rectogoense* and *ogoense* (with, in addition, colour convergence) - the frontier phenotypes of the *elegans* and *ogoense* superspecies *mimbon* and *maculatum* - frontier phenotypes of the Southern *cameronense* superspecies, *abacinum* and *seegersi*, - frontier phenotypes of the *Diapteron* superspecies, again with colour convergence, with the neighbouring *exiguum* superspecies etc. If the specification of the ecological niche is admitted (see above Scheel, 1974) then the probability of development of one or two species seems much higher when the two neighbouring superspecies tend to prefer the same ecological niche. The examples above are typical. In the studied area, another similar case occurs: the frontier phenotype, within the same superspecies (see further); however, we must then determine the status level of those special phenotypes.

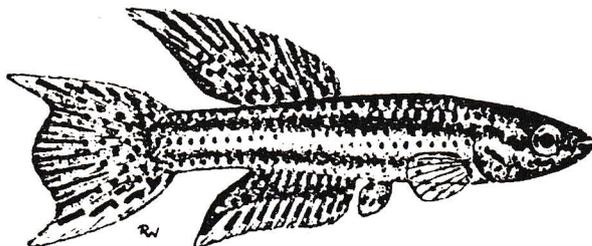
1.1.1 The Subgenus *Chromaphyosemion* Radda: viz. the *bivittatum* group.

The subgenus *Chromaphyosemion* is poorly represented in the studied area. Two species, whose status is rather obscure, are identified: *Loennbergii* and *splendopleure*. In Northern Gabon, the representative, namely "*splendopleure*" is quite rare.

In aquarium conditions these fish from the studied area are difficult to maintain and breed: non annual 2 - 3 weeks incubation time in water.

A. (Chrom.) loennbergii (Boulenger, 1903) 1 LOE

Fundulus loennbergii Boulenger: Ann Mag. Nat. Hist. (7) 12. Types from the Kienke river, near Kribi, southern coastal Cameroon - collected by Bates



A. (Chrom.) loennbergii (Boulenger, 1903) Kribi strain

Meaning of the Name: dedicated to Loenberg.

Main Synonyms: *Fundulus papenheimi* Ahl, 1924 Bipindi Cameroon.

A. (Fundulopanchax) unistrigatus Ahl, 1935 Bipindi (!!)
Cameroon

List of Recent Localities:

1. Lower Benito, South, Rio Muni, Collected J.J. Scheel, 1968 (K)
2. Upper Ecucu, 36 Km east of Bata, Rio Muni, Collected J.J. Scheel 1968 (K)

Key Features

♂ Flames in unpaired fins. Two black bands poorly visible.

Karyotype: n = 15; A = 25 to n = 17; A = 25

Meristics: D = 12, A = 12, D/A = +1

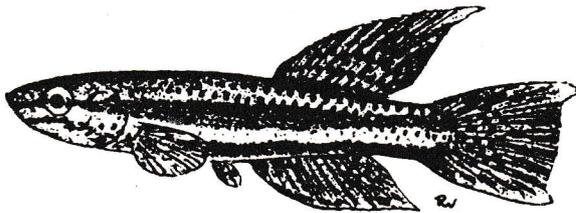
Size: T.L. ♂ 50 mm, ♀ 40 mm

Ecology: no experience see *splendopleure*

Distribution and Systematics: According to Scheel (1974) modified by Radda (1975) *loennbergii* is restricted to the basement complex, South of Nyong River and *splendopleure* to the sediments. The sedimental band of N. Cameroon (type area for *splendopleure*) is however interrupted in South Cameroon and starts again in Rio Muni and Gabon: Drawings of specimens from these two areas seem very different; further studies are required. On the other hand the phenotype in Rio Muni (*loennbergii sensu* Scheel) and Gabon (*splendopleure sensu* Radda) are quite similar so that the distinction of the species based on the type of soils of this area might be a purely intellectual construction.

A. (Chrom.) splendopleure (Meinken, 1930) 2 SPP

Fundulo panchax splendopleuris Meinken: Wochenschr Aquarien und Terrarien Kunde 27, p 17. Types from Tiko, Cameroon collected by Griem.



A. (Chrom.) splendopleure (Meinken, 1930) Gabon

Meaning of name: with very beautiful sides (Greek).

Main Synonym: *A. bivittatus* Roman, 1971.

List of Recent Localities.

1. (Tentative) 19Km and 35Km East of Bata, Central Rio Muni; coll Roman 1968.
2. (Tentative) Between Eban and Macora Central Rio Muni; coll Roman 1968.
3. Cap Esterias, near Libreville Northern Gabon; coll Herzog 1975 (K)

Key features:

♂ Unpaired fins dotted. Two black bands sharply visible on the body.

Karyotype: n = 17, A = 25 to n = 13; A = 22

Meristics: D = 11; A = 13; D/A = +1

Size: T.L. ♂ 50 mm, ♀ 40 mm

Ecology: likes crystal clear, very gently moving water and hides under **Anubias**, roots or rocks in very shallow parts, Sympatric with *striatum* near Owando (pers. comm.) Northern Gabon.

Distribution: see *loennbergii* (*splendopleure* should be restricted to sediments)
Roman's specimens are tentatively reported here, because they have been collected near the coast, presumably in a sedimental area.

1.1.2 The *striatum* coastal superspecies

The *striatum* superspecies is the most important in the studied area; it is composed of two elements which may be sympatric

- *striatum* and allied: *marginatum*, *gabunense*, *boehmi*, *exigoideum*, and *primigenium*, from the North to the South
- *microphthalmum* present all over the range especially in hilly areas Mayumbe (Gabon - Congo) and Crystal Mountains.

In aquaria, these species are easy, non annual: 2-3 weeks incubation time in water.

Aphyosemion simulans is a junior synonym of *A. microphthalmum*

Two basic elements supported the creation of the taxon *simulans* in 1976 by Radda and myself: (1) - 800 Kms separated the two known nearest localities of *microphthalmum* and *simulans*, the area in between being occupied by *primigenium* and *exigoideum*.

(2) - colour pattern of fishes; females: very dotted in Gabon, little dotted in Congo: Males: regularly striated in Gabon, mosaic striated in Congo. These elements have lost significance since I have discovered new populations in Southern Gabon (loc 204-206) and Central Gabon (loc 216) in 1979 when females were variably dotted and a population with a mosaic in males in Northern Gabon (loc 221).

Moreover, the karyotypes of the two taxa are not sufficiently different to ascertain cross sterility and truly (Seegers, pers. comm) the two fishes easily interbreed. One must point out one's mistakes: *simulans* is without doubt the same species as *microphthalmum*.

A. gabunense and *A. exigoideum*, examples of the occurrence of frontier species.

When one considers the phenotypes of the *striatum* superspecies it is interesting to look at *striatum* and *primigenium* : same body pattern, analogies in fin pattern; only *primigenium* show a closed pattern in the caudal; few or no spots inside the red contour; ctenoid scales on males body and D/A rays number larger. To prevent conflicts, it seems that two frontier phenotypes have developed on one side and the other: north *gabunense* s.l., south *exigoideum*. *Gabunense* would then be the frontier phenotype issued of *striatum* and *exigoideum* from *primigenium*; morphology and colour pattern support this idea and colour patterns of *gabunense* and *exigoideum* are very variable.

When one considers the karyotypes of these forms, the basis is confirmed: *exigoideum* & *primigenium* show similar karyotypes, very different to the karyotype of *striatum* and *gabunense* which are also similar. These similarities raise the problem of the status of those taxa and obviously crossing experiments are needed.

The exceptional case of two sympatric members of the same superspecies:
A. striatum and *A. microphthalmum*.

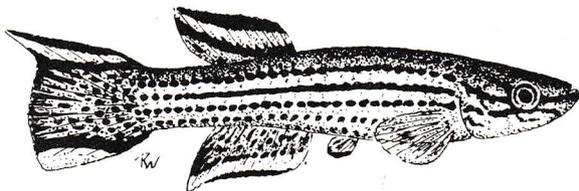
The sympatric occurrence of fishes belonging to several different superspecies is the rule in *Aphyosemion* (Huber, 1978): isomorphic elements are allopatric (cryptic species of one superspecies), heteromorphic elements are sympatric. Only two exceptions are known so far all along the range: (1) The sympatric existence of the *Diapteron* elements in the Invido Basin (*cyanostictum*) and *georgiae* for example) and (2) the sympatric existence of *microphthalmum* and *striatum* in Northern Gabon (loc. 57, 58, 221). But to obey to the natural rule of minimisation of competition between relatives, they have chosen different types of biotypes: when sympatric, *microphthalmum* is always found in clear open waters, flowing over sands or stone, and *striatum* in "cloudy" standing waters quietly flowing over dead leaves and mud.

A. striatum, (Boulenger, 1911)

3 STR

Haphlochilus striatus Boulenger: Ann Mag. Nat. Hist. 8 (8)

Types from the Abanga River, affluent of Ogooué, Northern Gabon collected by Ansorge.



A. striatum (Boulenger, 1911)

Meaning of the name: striated (latin)

Main Synonyms: *Panchax escherichi* Ahl, 1924
Epiplatys striatus Poll, 1952
Aphyosemion lujae La Corte, 1961
Aphyosemion striatum ogoense Roman, 1972

List of Recent Localities:

1. Lambaréné, near the airfield, Northern Gabon, coll Lambert, 1962
2. Cabo San Juan, Southern Rio Muni, coll Roman, 1968
3. 14 Kms down the road from Rio Benito to Bitica, coll Roman, 1968
4. 5 Km Northeast of Libreville Northern Gabon, coll Herzog and Bochtler, 1972 (K)
5. Cap Esterias, Northern Gabon, coll Herzog and Bochtler 1972 (K)
6. 5 Kms North of Lambaréné towards Kango, Northern Gabon, Loc 33, coll Huber and Radda 1976
7. Near Gricole, 118 Km North of Lambarine Northern Gabon, Loc 35, coll Huber and Radda 1976
8. 6 Km South of Kouamé, Northern Gabon, Loc 56/57, coll Huber, 1976.
9. 2 Kms after Kinguéle crossroads, Northern Gabon, Loc 58, coll Huber, 1976 (K)
10. 2 Km West of Ntoum, Northern Gabon, Loc 59, coll Huber, 1976.
11. 1 Km West of Ndjolé, Northern Gabon, Loc 218, coll Huber, 1979
12. Near Andem, between Libreville and Kango Northern Gabon, Loc 219, coll Huber, 1979 (K)
13. 40 Km North of Ntoum, on the road to Cocobeach Northern Gabon, Loc 231, coll Huber, 1979

14. 10 Km East of Lambaréné, Northern Gabon, coll Pap, 1980

Key Features:

♂ Five rows of longitudinal red lines on blue-green body (sometimes broken, loc 58)
Double red band in D, C and A (typical), interior C dotted
Upper filament in C of old male.

The samples reported by Roman (1972) have been reviewed, they belong to *striatum*. This is also the case for the types of *escherichi*, kindly lent to me by the Berliner Museum authorities.

This species is often found sympatric with *microptalmum*: youngsters are difficult to separate, females of the latter are somewhat more massive and fin-dotted.

Karyotype: $n = 20$ $A = 35$

Meristics: $D = 11$; $A = 13$; $D/A = +6$

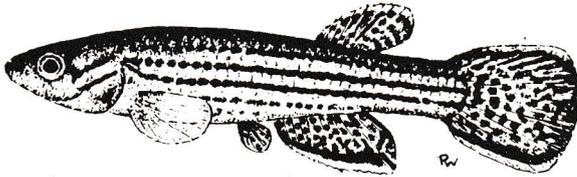
Size: TL = 55mm

Ecology: Prefers stagnant waters, even poorly clear (difference with *microptalmum*)

Distribution: South of Rio Muni and Northern Gabon, seems absent South of Ogooué, where it is replaced by its close relatives *exigoideum* and *primigenium*. Easterly, climbs the first steps of the plateau (Crystal Mountains, Ndjolé) but fails to invade it.

***A. microptalmum* Lambert and Géry, 1967 4 MIP**

Aphyosemion striatum microptalmum Lambert and Géry: Biol Gabonica 3(4) 251-315. Types from 85 Kms east of Pointe Noire towards Sounda, Southern Congo.



A. microptalmum Lambert and Gery, 1967, Cap Esterias, Gabon

Meaning of the Name: small eye (Greek)

Main Synonym: *A. simulans* Radda and Huber, 1976

List of Recent Localities:

1. Type locality, Southern Congo, coll Lambert, 1962.
2. Road of Sounda, subsidiary of Kouilou River Southern Congo, coll Stauch, 1963
3. Road of Sounda at Tombo, Southern Congo, coll Stauch, 1963
4. River Loémé at Las Sarras, Southern Congo, coll Stauch, 1963
5. South of Tshela, Lower Congo, Zaire, coll Lambert, 1970
6. River Tiaba, tributary of Lubuzi Southern Zaire, coll Lambert, 1970 (K)
7. Chiloango, near the Cabinda - Congo border, coll Lambert, 1970
8. Between Atogafina and Mala, Crystal Mountains, Northern Congo, coll Herzog, 1973 (K)
9. Cap Estérias, Loc 1/36, Northern Gabon, coll Huber and Radda. 1976

10. 6 Km East of Kouamé, Crystal Mountains North Gabon, Loc 57, coll Huber, 1976
11. Road towards Kinguéle, Crystal Mountains, North Gabon, Loc 58, coll Huber, 1976
12. Between Loudima and Loubomo, Southern Congo (RPC 3), coll Buytaert and Wachters, 1978
13. Forestry Camp near Ngoungi, Southern Congo, Loc 180, coll Huber, 1978.
14. Near Mayumba, Southern Gabon, Loc 204-206, coll Huber, 1979
15. 50 Km West of Mandji, Central Gabon, Loc 216, coll Huber, 1979
16. Near Ntoum, 30Km East of Libreville Northern Gabon, Loc 221, coll Huber, 1979
17. 19 Km North of Ntoum towards Cocobeach, Northern Gabon, Loc 232, coll Huber, 1979

Key Features:

♂ Body blue with 4 - 5 red longitudinally which can be broken or mosaic Symmetrical pattern in C, even closed sometimes - No filament in C.

White margin in D, C, A. **No double band** in D or A.

♀ Many spots in Northern Gabon, few or no spots in Congo.

Karyotype: n = 19; A = 38 (type area), n = 20; A = 35 (*simulans*)

Meristics: D = 11; A = 14; D/A = +6

Size: TL ♂ 75-80mm; ♀ 70-75mm Largest of the group with *primigenium*.

Ecology: prefers crystal clear waters which may be quick flowing, such as hilly brooks. Rarely found among dead leaves as *striatum*. Very robust and adaptive species.

Distribution: very wide; an exception in *Aphyosemion*: Northern Gabon (perhaps Rio Muni) to Zaïre. Climbs easily the first steps of the inland Plateau in Crystal Mountains and coastal hills such as the Mayombe, but surprisingly does not live in the adjacent part of Congo Plateau, where it is replaced by the *ogoense* superspecies: the *thysi* element.

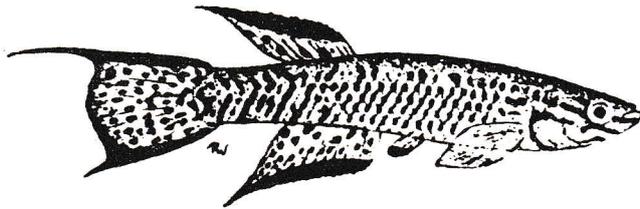
Note: Those specimens collected by Stauch in Southern Congo were tentatively identified as *cameronense* in MNHN (Paris Museum) prior to the description of *microphthalmum*.

***A. gabunense* Radda, 1975**

5 GAB

Aphyosemion gabunense Radda: BKA Separatum : 1-20

Types from south of Lambaréné Northern Gabon, collected by Herzog



A. gabunense Radda, 1975, type locality

Meaning of the Name: from Gabon (German spelling)

Main synonyms: none

List of recent localities:

1. 30 Km Southeast of Lambaréné, Northern Gabon, coll Herzog, 1973 (K)
2. 43 Km North of Fougamou, Loc 32, Northern Gabon, coll Huber and Radda, 1976 (K)

Key Features:

♂ Blue phase, south of the Ogooué River, closed pattern in C, no yellow or white submarginal band in D, C, A as in *marginatum*. Broad dark red margin in D, C, A. Filaments in Caudal, longer upper than lower.

Karyotype: n = 20

Meristics: D = 11, A = 13, D/A = +6

Size: total length = 55 mm

Ecology: fairly typical of primary forest *Aphyosemion*.

Distribution: restricted area between Lambaréné and Fougamou, northern Gabon, just west of the inland Plateau. Frontier species competing with *A. exigoides*.

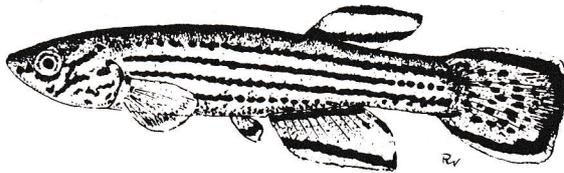
Systematic note: two subspecies have been described by Radda and Huber (1977): *marginatum* should deserve full status, *boehmi* further study.

***A. primigenium* Rada and Huber 1977 6 PRI**

Aphyosemion primigenium Radda and Huber — Cyprinodontiden

Studied in Gabon V: Das Tiefland West — Gabuns und die

Mayumbé — Berg, Aquaria 24: 138-146. Types from the Douano Subsystem of Nyanga near Banyanga, Southern Gabon.



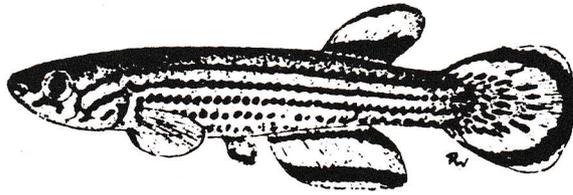
A. primigenium Radda and Huber, 1977, type locality

Meaning of the Name : primitive (latin)

Main Synonym: none

List of Recent Localities:

1. 20 Kms North of Lémamba, Loc 23, southern Gabon, coll Huber & Rada, 1976
2. In Lébamba, Loc 24, coll Huber and Radda, 1976 (K)
3. In Makaboa, road from N'dendé to Tchibanga, Loc 25, coll Huber & Radda, 1976 (K)
4. Near Banyanga, same road, Loc 27, coll Huber and Radda, 1976 (K)
5. Near Mouila (?), Loc 29, coll Huber and Radda, 1976 (K)
6. Near Ndendé, Loc 202, coll Huber, 1979
8. 7 Km East of Lébamba, Southern Gabon, coll Pap, 1980



A. primigenium Radda and Huber, 1977, Lebamba, Gabon

Key Features:

♂ Body pattern as in *striatum*. Double red band in D and A. Closed pattern in C. Few or even no spots in base part of fins. No filament in C.

A little larger than *striatum*.

Ctenoid scales in old specimen.

Karyotype: n = 11; A = 21.

Meristics: D = 12, A = 14, D/A = +5.

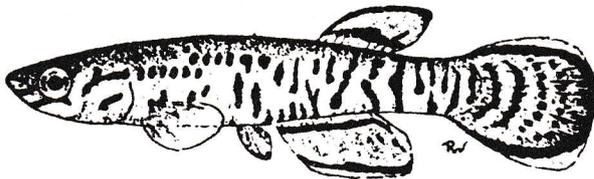
Size: total length 65-70 mm.

Ecology: inhabits two types of biotope: the drying brooks or ponds of the savannah areas around Ndendé and Tchibanga and the quick running forest brooks flowing down the Mayumbé hills.

Distribution: wide: south of Fougamou and probably in Northern Congo, too — does not seem to reach the coast where it is replaced by *microphthalmum*. Easterly climbs the first steps of the inland plateau, near Lébamba but is replaced by *A. joergenscheeli* at 250 m height.

***A. exigoideum* Radda and Huber, 1977 7 EXO**

Aphyosemion exigoideum Radda and Huber = Cyprinodontiden
 Studien in Gabon V; Das Tiefland West Gabuns and die Mayumbé-Berge, Aquaria
 24: 141-143. Types from near Fougamou, Northern Gabon Loc 31.



A. exigoideum Radda and Huber, 1977, Mandilau, G31/76

Meaning of the Name: little, trifling (latin)

Main Synonym: none

List of Recent Localities:

1. Near Ngoudoufola, Loc 30, Northern Gabon, coll Huber and Radda, 1976 (K)
2. Near Mandilou, Loc 31, Northern Gabon, coll Huber and Radda, 1976 (K)

Key Features:

♂ Marbled body. Closed caudal, Interior of C: blotches
Double bands in D and A
No filament in C
Karyotype: n = 11; A = 21
Meristics: D = 10; A = 14; D/A = +6
Size: total length 65-70 mm

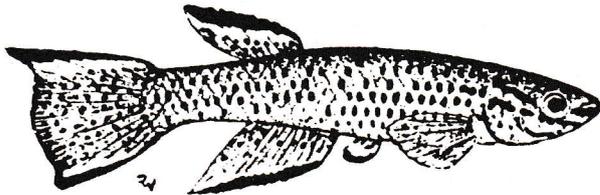
Ecology: Not well known (the two localities, rivers 10-20 m wide, are not typical of *Aphyosemion*) Presumably the same as *gabunense*.

Distribution: restricted area south of Fougamou; frontier species competing with *A. gabunense*; replaced by *A. primigenium* southerly.

Systematic note: its Karyotype is very near that of *primigenium*. For this reason might be an off-shoot. Further studies (collecting, crossing) are needed to estimate the level of separation.

A. marginatum Radda and Huber, 1977 8 MRG

Aphyosemion gabunense marginatum: Rada and Huber: Cyprinodontiden Studien in Gabon V: Das Tiefland West Gabun and die Mayumbé — Berge Aquaria 24 = 143-145. Types from a brook 9 Km southwest of Bifoun, Northern Gabon.



A. marginatum Radda and Huber, 1977, type locality

Meaning of the Name: ornated by marginal bands (latin)

List of Recent Localities:

1. 9 Km southwest Bifoun, north of the Ogooué river, Loc 34, coll Huber and Rada, 1976 (K) and Pap, 1980 (K)

Key Features:

♂ Marginal black bands in D, C, A; Yellow phase
Open Caudal. Short filaments in C.
Karyotype: n = 18; A = 38
Meristics: D = 11; A = 14; D/A = +6
Size: total length 55 mm

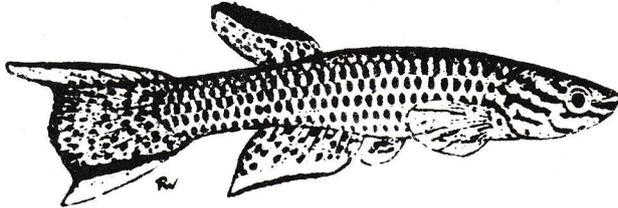
Ecology: in this area of secondary forest, brooks are nearly dried up at the end of the dry season. The type locality was not protected from the sun: water temperature 24.8°C, conductivity 120 us 20.

Distribution: unknown: probably small although no barrier seems to exist; *marginatum* faces the competition of *striatum*, well distributed.

Systematic Note: although *marginatum* seems strongly related to *gabunense* it differs by karyotype, colour pattern and its occurrence north of the Ogooué river, which, by its width in this area, may be a full barrier; thus it should deserve a full status when crossing experiments are undertaken.

A. gabunense boehmi Radda and Huber, 1977 9 BOE

A. gabunense boehmi Radda and Huber: Cyprinodontiden
Studien in Gabon V: Das Tiefland West Gabuns und die Mayumbé-Berge, Aquaria
24: 145-147. Types from a brook down the road from Bigouénia to Mora, northern
Gabon.



A. boehmi Radda and Huber, 1977, type locality

Meaning of the Name: dedicated to Otto Böhm, Vienna

Main Synonym: none

List of Recent Localities:

1. Road Bigouénia to Mora, north of Fougamou, Northern Gabon, coll Bochtler and Gaspers, 1976 (K)

Key Features:

♂ Asymmetrical pattern in caudal bands, rows of red points regularly disposed on body. Long filament in upper C.

Karyotype: unknown, presently

Meristics: D = 11, A = 14; D/A = +6

Size: total length 55-60 mm

Ecology: fairly typical of *Aphyosemion*.

Distribution: restricted to a small area north of Fougamou, probably competing with *exigiodeum*.

Systematic Note: if the asymmetrical pattern is found stable in a certain geographic area and no intermediates with *gabunense* reported, then *boehmi* may deserve its subspecies status. New collecting places are strongly needed. A key element may be the sympatric occurrence of *Ep. berkenkampii* whereas some kilometers to the north *A. gabunense*, typical form, is found sympatric with *Ep. sexfasciatus*, Loc 32.

1.1.3 The *Calliurum* superspecies

The *calliurum* superspecies is represented by two species in the studied area: *ahli* in Rio Muni, *australe* in Gabon and southern. Their distinction has been established by Scheel (1974) on the basis of their karyotype. Up to now, *ahli* was considered to be the fasciated component of the superspecies but the Mayumba *australe* also shows this type of pattern.

In Aquaria these fish vary from very easy to difficult, according to the population; F1 and F2 seem more resistant and co-operative; non-annual 2-3 weeks incubation time in water.

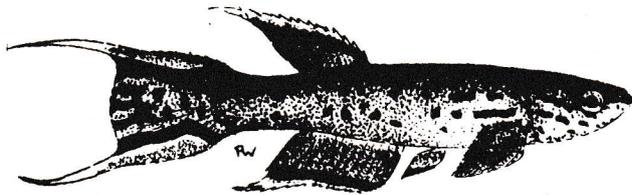
In 1978, I reported the occurrence of *australe* in Cap Lopez, which was considered the first reported spot of that species in 1913 but had never been proved. Now, with the review of the Stauch collections in M.N.H.N. (Paris Museum) and the recent reports from Congo, it appears that the distribution of *australe* extends far to the south until the Zaire river. It is remarkable to note how the distributions of *australe* and *microphthalmum* match: several times they have been reported sympatric, but *microphthalmum* may occupy the whole plain whereas *australe* is restricted to the littoral band without a rational reason. Finally, it would be informative to know if the two forms have managed to cross the Zaire river and invade the north of Angola.

A. australe (Rachow, 1921)

10 AUS

Haplochilus calliurus australis Rachow

Bibl. Aquar. Terr. Fr. (16). Types presumably from "Kap Lopez" i.e. Port Gentil, northern Gabon.



A. australe Aquarium strain

Meaning of the Name: southern

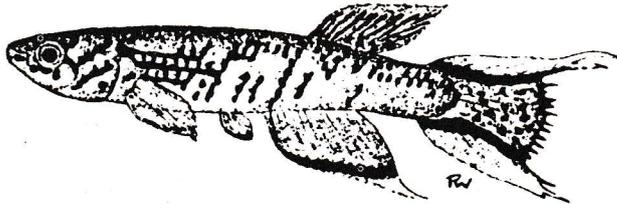
Main Synonyms: *Panchax polychromus* Ahl, 1924

A. australe "hjerresensi" Meinken, 1953 (golden variety, nomen nudum)

List of Recent Localities:

1. Djembo, southern Congo, coll Stauch, 1962
2. Yangala, southern Congo, coll Stauch, 1962
3. Lake Youbi, southern Congo, Coll Stauch, 1962
4. Labanzi, southern Congo, coll Stauch, 1963
5. Yanga, southern Congo, coll Stauch, 1963
6. Sandra, southern Congo, coll Stauch, 1963
7. Libreville, Cap Estérias northern Gabon, coll Arnoult and Sabatier, 1973, coll Herzog, 1973 and (Loc. 2, 36) coll Huber and Radda 1976 (K)

8. Near Port Gentil, Cap Lopez, coll Mathieu, 1977
9. 10 Kms east of Pointe Noire (RPC 2) south Congo, coll Buytaert and Wachters, 1978
10. Near Mayumba, southern Gabon, coll Huber, 1979 (K)
11. Between BasKouilou and Madingo-Kayes, southern Congo, coll Agnese, 1980.



A. australe (Rachow, 1921) Mayumba, Gabon

Key Features:

♂ Body pattern variable: irregular spots (type), irregular lines (Cap Estérias), vertical blotches (Mayumba) long filaments in C. Yellow margin in C but not in D/A. Red submargin.

Karyotype: from $n = 17 A = 19$ to $n = 15 A = 19$

Meristics: $D = 10; A = 15; D/A = +7$

Size: ♂ 60 mm ♀ 55 mm

Ecology: prefers small stagnant ponds rather than brooks; only pure soft water; hides among dead leaves or raffias; when collected show typical behaviour of jumping out everywhere.

Distribution: very wide: from northern Gabon to southern Congo and most probably until the northern bank of the Zaire river. However, *australe* is restricted to the marshy areas near the coast: the distribution breadth should not exceed 20 Kms; it does not occur easterly, in contrast the the sympatric *striatum superspecies*.

Note: those specimens collected by Stauch in southern Congo, were labelled as *cameronense* in M.N.H.N. (Paris Museum).

***A. ahli* Myers, 1933**

11 AHL

Aphyosemion calliurum ahli Myers: Copeia (Nom nov)

First description: *Panchax (aphyosemion) calliurus* var *coeruleae* Meinken Kalender Aqu. und Terr Frde: 66 types from "Tropical West Africa" re-described by Scheel (1968) from an East Cameroon area between Mbongé and Kribi.

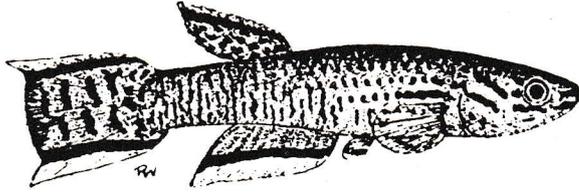
Meaning of the Name: dedicated to E. Ahl

Main Synonyms: *Panchax (Aphyosemion) calliurus* var *coeruleae* Meinken, 1932 pre occupied name.

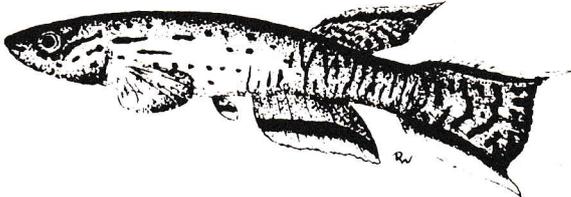
List of Recent Localities:

1. Bata, northern Rio Muni, coll Roman, 1966

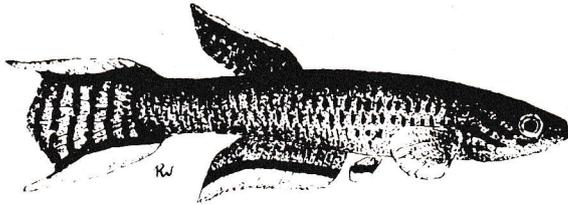
2. 19 Km off Bata towards Machinda, northern Rio Muni, coll Roman, 1966
3. Between Ebam and Macora, Rio Muni, coll Roman, 1968
4. Between Senye and Izaguirre, Rio Muni, coll Roman, 1968.



A. ahli Myers, 1933



A. ahli Myers, 1933, Kribi



A. ahli Myers, 1933, Mbumbulu River

Key Features:

♂ Body; irregular bars, mainly in the rear part. Yellow margin in D, C, A. Red sub-margin bars or dots in the inner part of C. D larger and higher than *australe*.

Karyotype: from $n = 20$ $A = 31$ to $n = 10$ $A = 20$.

Meristics: $D = 10$; $A = 15$; $D/A = +6$

Size ♂ 60 mm ♀ 55 mm.

Ecology: no personal experience, probably the same as *australe*.

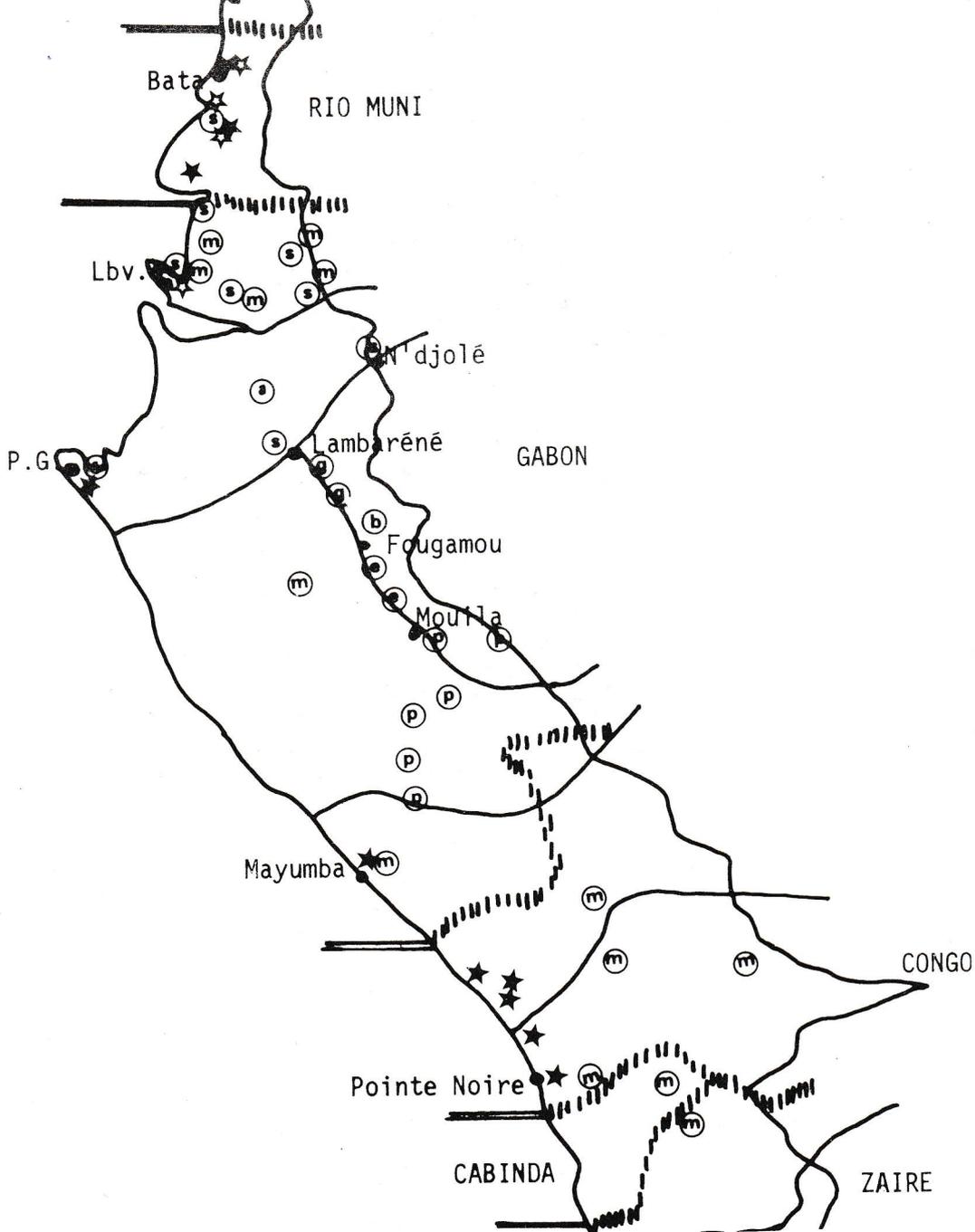
Distribution: South Cameroon and Rio Muni. It is replaced by *calliurum* northerly and *australe* southerly.

Note: Further study is strongly needed to determine the status of *pascheni ahli*, to better define *ahli* and its karyotypical limits which are now too large.

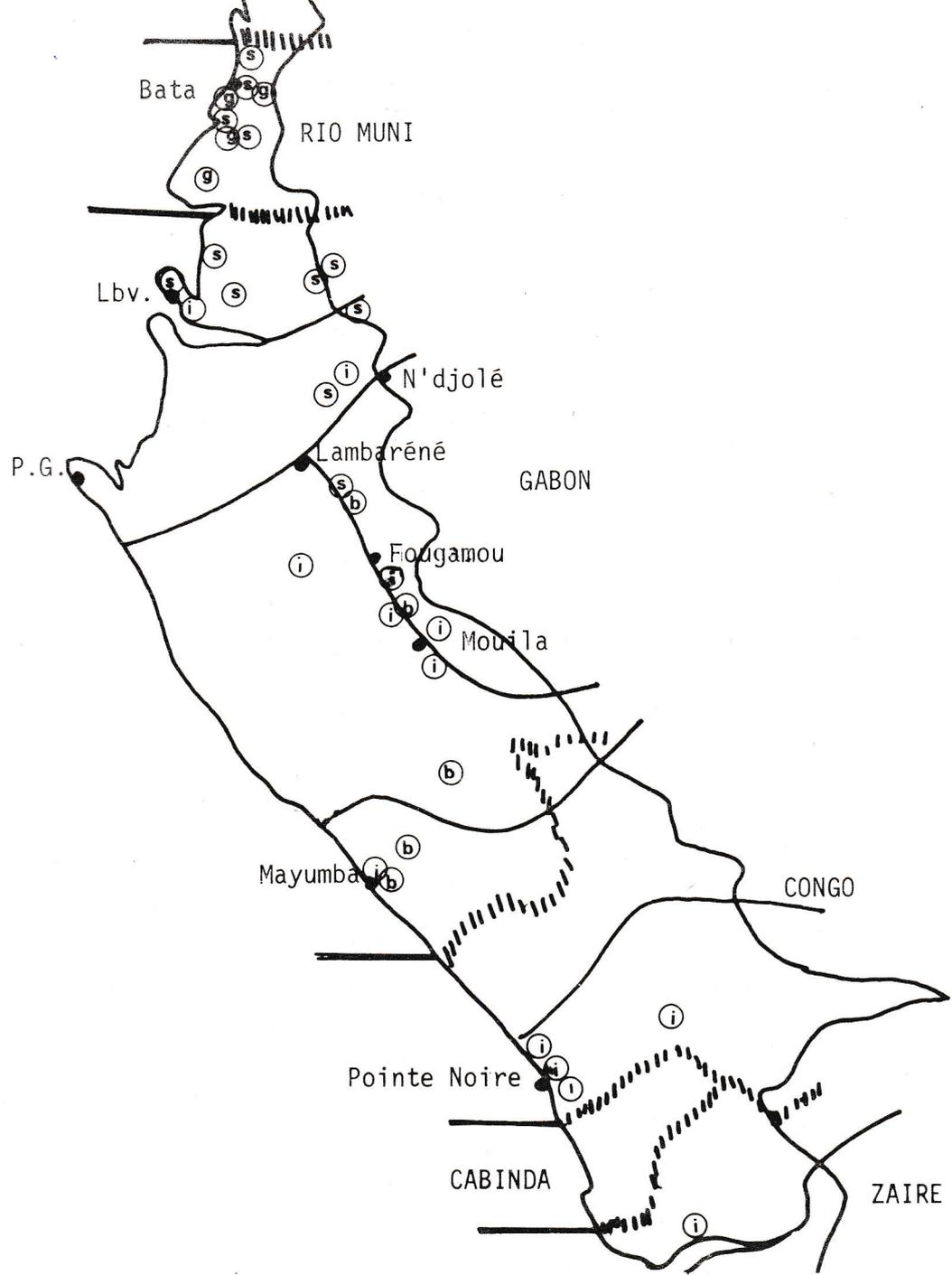
1.1.4 Exceptional Fauna

Aphyosemion cameronense (Boulenger, 1903) 12 CAM

This species lives mostly in the inland plateau. It has been reported, on rare occasions, in plains near the foothills of the plateau in Cameroon and Rio Muni. (See Scheel, 1974).



The *Aphyosemion* distribution in the studied area:
 ★ *A. ahli*, in Rio Muni and *A. australe*, south of it
 ☆ *A. loennbergi* and *splendopleure* (see the text)
 ★ *A. striatum* group; s = *striatum*; m = *microphthalmum*;
 p = *primigenium*; g = *gabunense*; a = *marginatum*; b = *boehmi*



The *Epiplatys* distribution in the studied area:
 s = *Ep. sexfasciatus*; b = *Ep. berkenkampi*; i = *Ep. singa*; g = *Ep. grahami*

1.2 The Genus *Epiplatys* Gill, 1892

The genus *Epiplatys* is well represented in the studied area since two groups are sympatric throughout but it is always less abundant than the fishes belonging to *Aphyosemion*.

Sexfasciatus is the first described member of the genus which is characterized by: a pike-like form; a mobile, well visible maxillary; a short dorsal and a strong black chromatism.

The two *Epiplatys* groups have a very wide distribution in coastal West Africa and may be also in the Congo, Zaire basin.

1. The fasciated group is living in the coastal plain and in the inland plateau: it is best defined by the six or more large black bars on the body of these large fishes. It is rare and represented by *sexfasciatus* and *berkenkampi*.
2. The *grahami* group seems to live only in the coastal part but species from the plateau may be related — it is best defined by a black pattern like "chevrons", on the body of these small fishes which can, exceptionally, be large — it is common and very often sympatric with the other *Epiplatys*, *Aphyosemion* and *Procatopodines*.

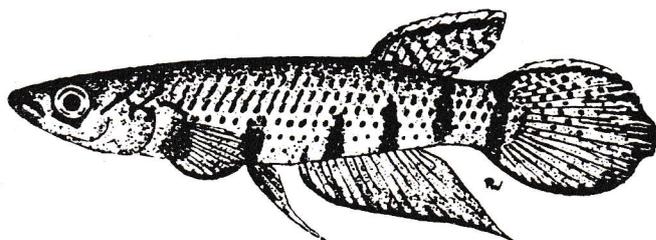
Not only are the two groups sympatric, but the juveniles are found schooling together, in the middle sunny calm parts of the brook. Instead, the adults take shelter in the herbaceous banks: they are rare compared to the youngsters, probably because the golden spot that they show above the head is conspicuous to predators.

1.2.2 The fasciated *Epiplatys*

The fasciated *Epiplatys* — i.e. *sexfasciatus* and *berkenkampi* do not form an evolutionary line if Clausen's point of view is followed: he placed the two fishes in different subgenera, namely *Epiplatys* and *Parepiplatys* according to the frontal neuromast pattern. In fact, those two fishes are isomorphic, show a similar colour pattern and a similar karyotype. Neuman (1978) partly based this description on the fact that *berkenkampi* resembles *multifasciatus* by having intermediate bars on the sides: there are indeed populations of *sexfasciatus* which show the intermediate barred pattern and on the other hand, *mesogramma*, the northern member of *multifasciatus* in the Central African Republic has none — moreover the separations in Gabon, approximately at the level of Fougamou have to be discussed. Fishes from Loc 30, 31 and 32 have been very difficult to name. Finally, the status of this species remains obscure, if valid.

The fasciated *Epiplatys* are often sympatric with the *singa* superspecies. They like warm stagnant waters but are also collected in the rapid brooks at the first steps of the inland plateau, e.g. Ndjolé and Kingulé in the Crystal Mountains for *sexfasciatus*. In aquaria they are not easy to maintain, quarrelsome and non-annual: 2 weeks incubation time in water.

Epiplatys sexfasciatus Gill: Proc. Acad. Nat. Sci. Philadelphia, page 136 footnote. Types from "Gabon". Redescribed by Boulenger (1915) from the Abanga River, northern Gabon.



E. sexfasciatus Gill, 1862, type locality No. 18

Meaning of the Name: six-barréd (latin)

Main Synonyms: *Haplochilus infra fasciatus* Günther, 1866

Aplocheilus sexfasciatus Scheel, 1974

Three subspecies have been names, some seem very doubtful at least *sexfasciatus baroi* Berkenkamp, 1975.

List of Recent Localities:

1. 15 Km off Bala towards Machinda, northern Rio Muni, coll Roman, 1966
2. Rio Ekuko, northern Rio Muni, coll Roman, 1967
3. Between Seyne and Rio Benito, central Rio Muni, coll Roman, 1968
4. Subsidiary of the Ayé, near Cabo San Juan, southern Rio Muni, coll Roman, 1968
5. Bonobono, Cogomar, Rio Benito, southern Rio Muni, coll Roman, 1968
6. Lower Benito, central Rio Muni (?), coll Scheel, 1969
7. Libreville Airport, northern Gabon, coll Hergog and Bochtler, 1973 (K)
8. Cap Estérias, northern Gabon, Loc 1-36, coll Huber and Radda, 1976 (K)
9. 18 Km east of Ndjolé, Loc 6, northern Gabon, coll Huber and Radda, 1976
10. (?) Near Mandilou, Loc 31, central Gabon, coll Huber and Radda, 1976
11. (?) 43 Km north of Fougamou, Loc 32, central Gabon, coll Huber and Radda, 1976
12. 9 Km south west of Bifoun, Loc 34, northern Gabon, coll Huber and Radda, 1976
13. 6 Km south of Kouamé, Loc 57, northern Gabon, coll Huber, 1976
14. 2 Km after the crossroad towards Kinguélé, Loc 58, northern Gabon, coll Huber, 1976
15. Near Jdjolé, Loc 217, northern Gabon, coll Huber, 1979
16. 40 Km north of Ntoum, near Cocobeach, Loc 231, northern Gabon, coll Huber, 1979
17. 19 Km north of Ntoum, Loc 232, northern Gabon, coll Huber, 1979
18. 29 Km east of Libreville, Loc 220, northern Gabon, coll Huber, 1979 (K)
19. 10 Km east of Lambaréné, northern Gabon, coll Pap, 1980 (K)

Key Features:

♂ Yellow phase many red dots regularly in series, on the sides and D, upper C. Yellow V and A. Six vertical bars. Well delimited on a green (up) and blue (down) body.

♂ Six bars on light brown body. Brown red dots.

Karyotype: n = 24; A = 25 Loc 220

Meristics: D = 11; A = 16-17

Size: ♂ 80 mm ♀ 60 mm

Ecology: same as *singa* but prefers clear waters, *sexfasciatus* is rarer than *singa* in Gabon.

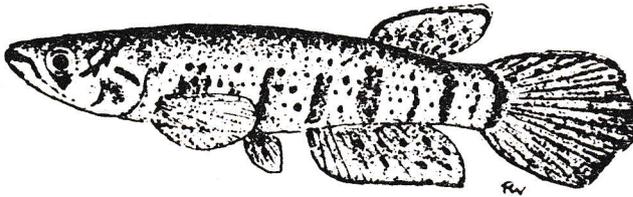
Distribution: very wide: from Togo to northern Gabon; in the studied area: Rio Muni, northern Gabon until approximately the latitude line of Fougamou. Southerly it is replaced by *berkenkampi*.

Note: the close study of the fauna around the Fougamou, border line would be of great interest.

Ep. berkenkampi Neumann, 1978 14 BER

Epiplatys berkenkampi Neumann, Aquarien Terrariend 25 (4)

125 - 127. Types from 30 Km South of Lambaréné, central western Gabon, coll by Bochtler



E. berkenkampi Neumann, 1978, type locality

Meaning of the Name: Dedicated to H.O. Berkenkamp

Main Synonyms: *Ep. cff. multifasciatus* Radda and Huber, 1977

Ep. cff. multifasciatus Huber, 1978

List of Recent Localities

1. 30 Kms south of Lambaréné towards Bigouéniá/Mora, Central Gabon, coll Bochtler, 1976 (K)
2. Near Banyanga, Mayumbé Hills, Southern Gabon, Loc 27, coll Huber and Radda, 1976
3. Near Ngoudoufola, central Gabon, Loc 30, coll Huber and Radda, 1976
4. 10 Km east of Mayumba, southern Gabon, Loc 205, coll Huber, 1979
5. 28 Km east of Mayumba, southern Gabon, Loc 206, coll Huber, 1979
6. (?) 46 Km south-east of Lambaréné, towards Mouila, coll Pap, 1980

Key Features:

♂ Irregular barred pattern; six main bars and additional intermediate ones less visible. Fin basic color blue green, red dotted with blue black margin. Closed neuromast pattern contrary to *sexfasciatus* but seems related.

Karyotype: n = 24; A = 25 (Scheel, pers. com.)

Meristics: D = 9-10; A = 14-16; LL = 29-30 + 2 (my data from loc 27)

Size: ♂ 80 mm ♀ 60 mm

Ecology: same as *sexfasciatus*. Sympatric with *singa* all over the range. Prefers clear water biotopes and is rarer than *singa*.

Distribution: coastal plain in central and south Gabon, Congo and most probably Cabinda; replaces *sexfasciatus* approximately South of the latitude line of Fougamou.

Note: still a doubtful species (see above). It would be interesting to study closely the living phenotypes of Cabinda (see the specimens of Lundo, Mali River, coastal Cabinda, British Museum). If they are matched, a connection would be possible with the Congo Basin *multifasciatus* group (cf. Huber, 1980).

1.2.2 The *singa* superspecies

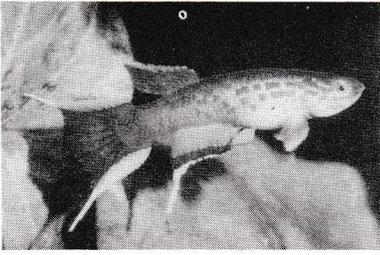
The *singa* superspecies is the most important *Epiplatys* in the studied area: it is variable in terms of colour pattern and morphology during growth. It is composed of two elements: *grahami* and, mainly *singa* whose separations may be situated in the Southern Part of Rio Muni without a biogeographically evident base. In Aquaria these fish are easy to maintain, quiet and non annual — incubation time = 2 weeks in water.

Epiplatys macrostigma, *ansorgii*, and *ornatus*, are all junior synonyms of *Ep.singa*, Boulenger.

The *Epiplatys* species collected south of the Rio Muni have faced many nomenclatural changes during their history, mainly for three reasons.

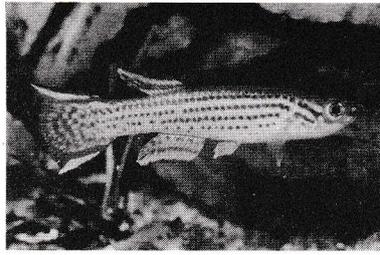
1. *Macrostigma* and *ansorgii* have been described in the same paper by Boulenger and it was rather surprising that Boulenger did not compare them. The type localities were approx 1000 kilometres apart, respectively Cabinda and Masoma River, near the Crystal Mountains in northern Gabon. Moreover the types of *ansorgii* are large indeed (7 to 8 cms) I have reviewed them from the British Museum and they are identical by morphological data and color pattern to *macrostigma*.
2. *Ornatus* has been described by Ahl without type locality. It is not separable from *ansorgii* and *macrostigma*. For historical reasons, *ornatus* may come only from northern Gabon or southern Congo (Scheel, 1968); it is then a simple synonym of either.
3. *Singa* has been described from Boma, lower Congo, Cabinda. But Boulenger, 1915, identified fishes from Boma as *macrostigma* and reported *singa* from Stanleyville, central Congo Basin. This mislabelling is the source of many confusions; *singa* placed in *Aphyosemion*, a strain of "*schoutendeni*" being identified as *singa* in the fifties by Aquarists. The types I have reviewed clearly belong to *Epiplatys* and cannot be separated from the three above.

One separation has been proposed by Scheel (1974) based on the colour pattern of juveniles: northern subphenotype with bars in juveniles, southern subphenotype without. After having seen live specimens, young and adult, from the 13 listed locations and older Museum material, I confirm that variability is higher within a population than between northern and southern populations and do not hesitate to retain only one taxon as valid: *Ep. singa*.



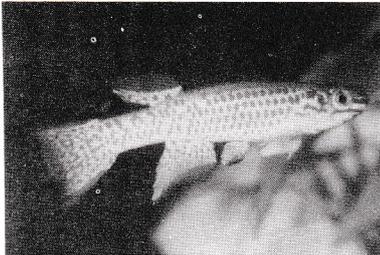
A. australe

Photo Addicott



A. striatum

Photo Chauche



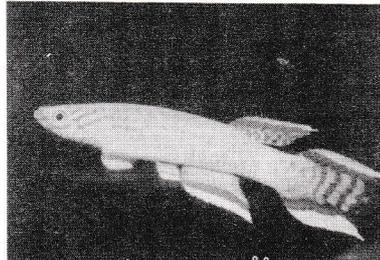
A. gabunense

Photo Pürzl



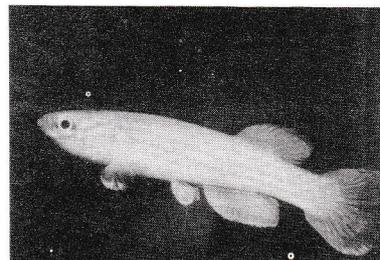
A. gabunense Marginatum

Photo Chauche



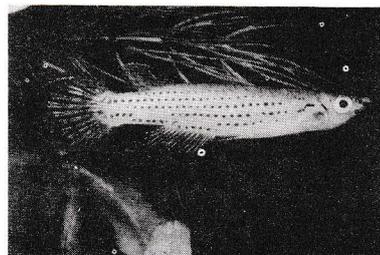
A. ahli Kribi

Photo Pür



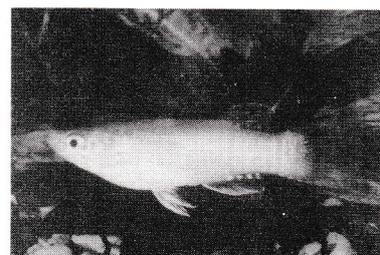
primigenium

Photo Pürzl



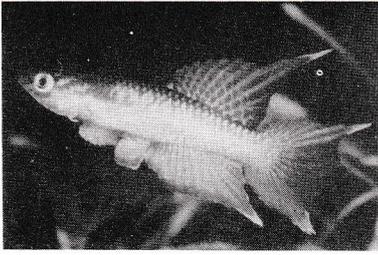
E. singa Mayumba

Photo Chauche



Apl. spilauchen

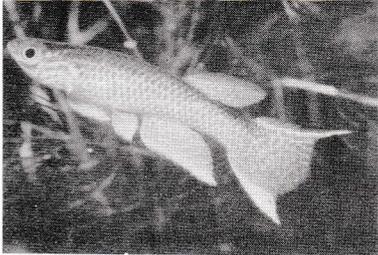
Photo Heap



A. (Chrom.) spendopleure Photo Pürzl



E. sexfasciatus Ntoun Photo Chauche



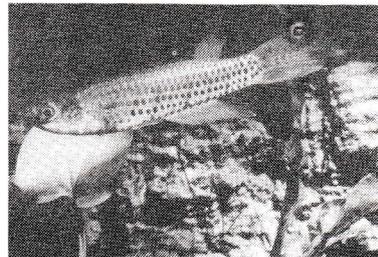
A. gabunense boehmi Photo Addicott



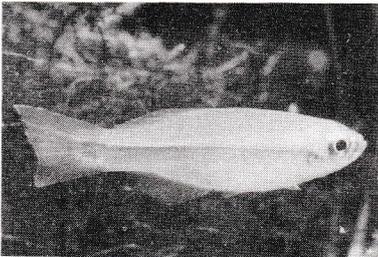
A. microphthalmum Photo Pürzl



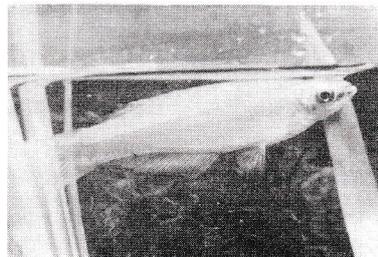
A. exigoides G.30 Photo Chauche



E. grahmi Photo Vandersmissen



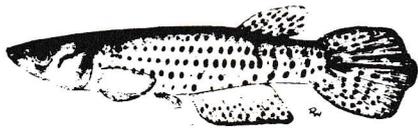
Proc. miltotaenia Photo Böhm



Proc. ingaensis Photo Böhm

Haplochilus singa Boulenger

Ann. Mus. Congo Zool, i p113 PI XLVII fig. 1. Types from Boma, Lower Congo, South Western Zaire; coll Ansorge



E. singa (Boulenger, 1899)

Meaning of Name: vernacular (according to Boulenger)

Main Synonyms: *Haplochilus macrostigma* Boulenger, 1911

Haplochilus ansorgii Boulenger, 1911 (frequently mis-spelt "ansorgei" since Pellegrin, 1930)

Panchax ornatus Ahl, 1928

Aplocheilus singa Scheel, 1974

List of Recent Localities:

1. Libreville Airport, northern Gabon, coll Bochtler and Herzog, 1972 (K)
2. Cap Estérias, northern Gabon Loc 3, coll Huber and Radda, 1976 (K)
3. 17 Km east of Bifoun, northern Gabon Loc 5, coll Huber and Radda, 1976 (K)
4. 59 Km North of Ndendé, southern Gabon, Loc 28, coll Huber and Radda, 1976
5. Ngoudoufola, northern Gabon, Loc 30, coll Huber and Radda, 1976
6. Mandilou, near Fougamou, northern Gabon, Loc 31, coll Huber and Radda, 1976
7. Between Matida and Boma, lower Congo, southern Zaire, coll Wood, 1977
8. 5 Km east of Bas Kouilou, southern Congo (RPC 1), coll Buytaert and Wachters, 1978
9. 10 Km east of Pointe Noire, southern Congo (RPC 2), coll Buytaert and Wachters, 1978
10. Near Mouila, southern Gabon, Loc 21, coll Huber, 1979
11. Near Mayumba, southern Gabon, Loc 204, 205, coll Huber, 1979 (K)
12. Near Mandji, northern Gabon, Loc 216, coll Huber, 1979
13. Near Andem, east of Ntoum, northern Gabon, Loc 219, coll Huber, 1979
14. Near Soumboukassess, on the road Pointe Noire-Brazza, southern Congo, coll Agnese, 1980
15. Between Bas Kouilou and Mandingo Kayes, southern Congo, coll Agnese, 1980
16. 10 Km East of Lambaréné, northern Gabon, coll Pap, 1980.

Key Features:

♂ Body pattern variable within a population, less than within the range: 6 -7 irregular series of red brown dots; the lower series follows the line of the body and is oblique. Black bars in "chevrons" only in juveniles (not always). All fins dotted.

♀ No or very few dots in fins.

Karyotype: unknown

Meristics: D = 8; A = 14; LL = 27-28

Size: ♂ 70 mm; ♀ 60-65 mm; exceptionally 80-90 mm in nature

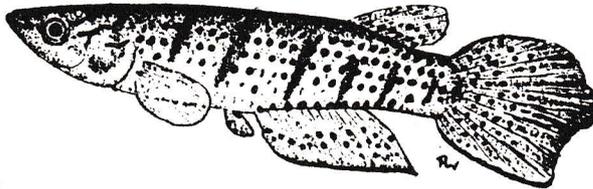
Ecology: very opportunistic; seems to stand dirty waters in contrast to *sexfasciatus* and *berkenkampii*

Distribution: very wide: from northern Gabon to Zaire and maybe further Southward. Climbs exceptionally the first steps of the inland plateau, then disappears without being replaced by another *Epiplatys* species.

Ep. grahami (Boulenger, 1911)

16 GRA

Haplochilus grahami Boul. Ann. Mag. Nat. Hist. 8 (8). Types from swamps near Lagos, southern Nigeria, collected by Graham.



E. grahami (Boulenger, 1911)

Meaning of name: dedicated to W.H. Graham

Main Synonyms: *Epiplatys nigromarginatus* Schultz, 1937 (?)
Aplocheilus grahami Scheel, 1974

List of Recent Localities:

1. Six Kms south of Bata toward Rio Benito, northern Rio Muni, coll Roman, 1968
2. 35 Kms off Bata, subsidiary of Ué river, northern Rio Muni, coll Roman, 1968
3. Between Senye and Rio Benito, northern Rio Muni, coll Roman, 1968
4. Subsidiary of Aye River, southern Rio Muni, coll Roman, 1968
5. Between Ebam and Macora, coll Roman, 1968

Key features:

♂ Body pattern similar to *singa* but **black crossbars in juveniles and adults**. More colourful; yellow or green unpaired fins, metallic brilliance on body. Red dots in fins.

♀ No or few red dots in fins.

Karyotype: n = 24; A = 25

Meristics: D = 7-11; A = 15-17; LL = 26-30

Size ♂ 60 mm, ♀ 45 mm

Ecology: marshy areas; juvenile specimens, in Nigeria, are reported to shoal with juveniles of *sexfasciatus* and closely resemble these (Scheel, 1974)

Distribution: in the studied area, restricted to northern and central Rio Muni; more southerly, it is replaced by *singa*, although no ecological barrier seems to exist. It may be that *singa* and *A. striatum* start at the same level.

2. THE PROCATOPODINS

2.1 Definitions and remarks on Clausen systematics

2.1.1 The value of the micromorphological characters

Procatopodins are a large group of Cyprinodonts but they occupy the African continent only. Their abundance is inversely related to that of the Rivulins. In western coastal Africa, they are represented by only two groups whereas in the Congo Basin, Angola and eastern Africa numerous groups are present with a high variability. Procatopodins have either a deep body (*Procatopus* — like forms) or an elongated one (*Micropanchax*— like forms) with obvious intermediates; the height of the body depends on the stage of growth, strong allometries occur. They exhibit small sizes (except two special lacustrine fishes), a compressed body, a weak sexual dichromism (except *Propanchax* subgen). Fins are poorly coloured except for a blue sheen, and the eyes show blue yellow reflections (i.e. the "lamp eyes").

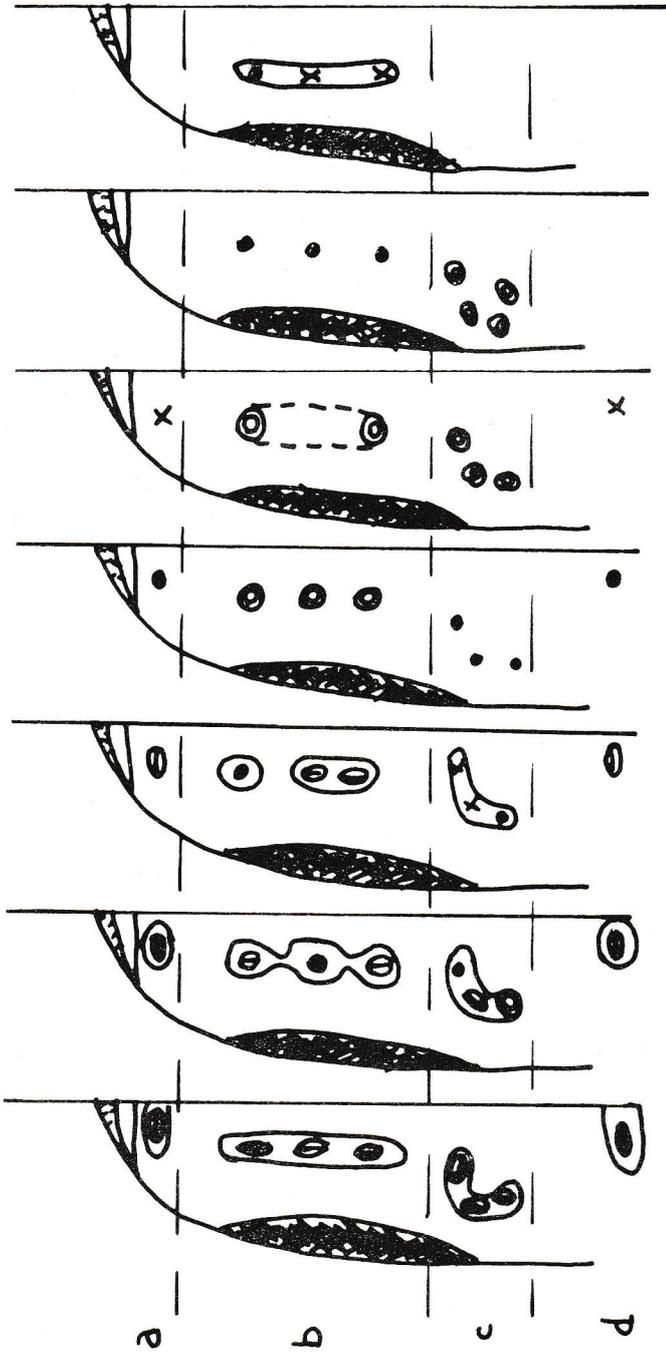
Until recently the best definition of procatopodin was the high set pectorals, the body pattern and morphology and the ecological niche: shoaling fishes in flowing streams. Several genera had been described, most of them poorly, on the base of branchiostegal rays, teeth type, level of pelvic fins, predorsal area and caudal peduncle (Myers, 1938).

In 1967, Clausen (op cit) described several micromorphological characters for Rivulins and Procatopodins. Unfortunately his work was, from his own words — "not mature enough" — to establish a stable systematic but he tried to assemble some groups of genera.

1. Ctenoidy, and
 2. Frontal neuromast pattern, especially for taxonomy.
- During 1979-80, Procatopodins have been my primary study and, though the results are still preliminary, I feel it necessary to publish some of them as they modify what has been our understanding since Clausen: As it was the case for the Rivulins (Huber 1978), ctenoidy and neuromast systems appear to have no or little taxonomical value, but a descriptive interest for the Procatopodins.
1. **Ctenoidy appears to have no statistical value.** It is a characteristic of old age if it is exhibited. Two contradictory examples; first - There are exceptionally ctenoid spinules on the sides of old *Procatopus* males from Southern Cameroon - Ctenoid scales are frequently present in the Congolese and Gabonese *Procatopus* (Clausen's *Plataplochilus*) but not all the time and many adult individuals lack them, especially in the "dwarf" populations (see Stauch's *cabindae* collection).

More generally ctenoid scales are reported or not from different species which seem related by morphological and geographical stand-points: *nimbaensis* (by Clausen, not by me) *schioetzi* (by me) *lamberti* (some only, by me).

Within a single species the occurrence or not of ctenoidy is reported (e.g. in *silvestris* (syn. of *stictopleuron* Tervuren collections). Depending on the population and, according to Clausen, in *Micropanchax*, "it is distinctive on the species level", only. Finally and it seems the most important, scale ctenoidy is indeed a common character but its degree of development varies greatly from the small minute



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Schematized drawing of the frontal neuromast pattern of Procatopodini and some of its possible variations (from fully open, exposed pattern to the closed, invisible one; a, b, c, d, can be independent)

Legend ● Sensitive button ○ pore ○ groove // canal ⊖ neuromast fully exposed ✕ nothing

“buttons” as in *moeruensis* to the strong hairy structure as in *Lamprichthys* or the new species *terveri*, with all the possible intermediates.

2. The frontal neuromast pattern appears even more a descriptive character.

Basically, the same number of sensitive sites are observed in Procatopodins, only the pattern of superior skin is different: 1 primary anterior pair, 3 middle pairs, 3 posterior pairs behind the eye, 1 posterior pair far behind. Three extreme schemes can happen, in my own observation

1. The middle neuromasts are hidden at bottom of pores or openly exhibited
2. The middle neuromasts are situated in longitudinal grooves or isolated (especially the anterior pair from the 2 other neighbouring ones).
3. The primary pair (and the last one) is exposed as in *Aphyosemion* or *Epiplatys* or reduced to a small hardly visible “button”.

If these 3 variables are combined and the possibility of intermediates assumed, then there is a multitude of neuromast patterns. This is what happens; with variability within a species and within a superspecies.

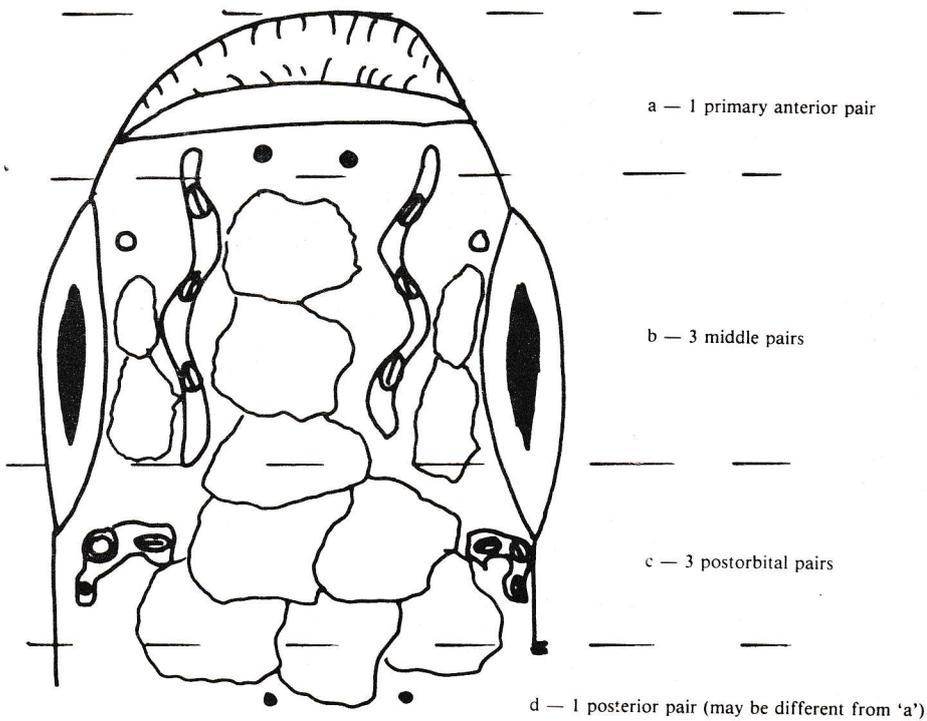
A good example might be *camerunensis* Radda. The neuromast pattern of the middle pairs is fully exposed but not well visible and the first pair is isolated; the pattern of the anterior pair and the last one is nearly invisible (small buttons) whereas the 3 posterior ones are normal. The overall neuromast pattern is unique and surely would deserve a special place following Clausen. However if one studies the “isomorphic” species of the Inland Plateau of Tchad, Gabon, Congo and Zaire, the pattern of *camerunensis* appears to be just an element of a continuous variation; the northern *normanni* shows a fine tubular system (as in *Poropanchax*) and the southern *stictopleuron* from the Ivindo to the Zaire basin shows fully exposed systems, even the last posterior pair.

Therefore, I prefer to consider micromorphological characters as descriptive rather than taxonomic.

2.1.2 Proposal for a new Procatopodin systematic.

The Procatopodin systematic should be based on biogeography, karyotypes, egg membrane, colour patterns and general morphology, in the future, in order to form evolutionary groups or superspecies.

Regarding morphology, such “old” characters as the compressed, or not, type of body, the level of pectorals, caudal peduncle breadth, and D/A rays counts and position may be useful but one should be careful of the height of body because of a possible allometry during growth. Micromorphological structures might be useful to separate species, **a posteriori**.



holotype of *M. nimbaensis* DAGET

2.1.3 Preliminary grouping of procatopodin species.

Though our knowledge is still fragmentary, there are some immediate facts that can be forwarded:

- Some elements can be separated from the bulk group of "mean" species; They are studied thereafter.
- *Cynopanchax* Ahl, 1928, (type: *bukobanus*, Ahl 1978) is a simple synonym of *Lacustricola* Myers, 1924 (type: *pumilus* Boulenger 1906, senior synonym of the former, according to Wildekamp, 1977)
- the status of *Congopanchax*, *Hylopanchax* (the *normani* group??) and *Lacustricola* is not clear to me, but, if valid, they should not deserve more than subgeneric status.
- *Platpanchax* Ahl, 1928 is a very doubtful genus: nomen nudum or simple synonym as its type species *modestus* has an obscure status: *Hyp-sopanchax?* *Micropanchax?*

Aplocheilichtlys, a monotypic genus.

The first attempt to delineate the Procatopodine line is to separate one species, *spilauchen*, which is the type for *Aplocheilichthys*. Its biology is unique in western Africa and can be compared to the eastern *Pantanodon*, but its morphology is different. It is the most widespread monotypic line in Africa from Senegal to Zaire and this distribution has been achieved though the brackish water adaptation. Besides, *spilauchen* combines low set pectorals a deep caudal peduncle, a deep body, little compressed form, and an original fasciated colour pattern. Therefore it is separated from the major group of Procatopodins that was named *Aplocheilichthys* in the past and *Micropanchax* here. It is less separated from *Procatopus* by general morphology but the head and the insertion of pectorals are completely different.

In summary, *Aplocheilichthys* Bleeker 1863 is now defined by a single species, inhabiting the West African brackish lagoons or mangroves and rarely found in soft water. It has a massive appearance, a marked sexual dichromism, rounded fins, low set pectoral, long ventrals and shows an alternance of narrow brilliant yellow and brown vertical bars. Its neuromast cephalic pattern is complete and open; scaletenoidy may be observed.

Micropanchax, the basic genus for non *Procatopus* like species.

The remaining bulk of species, having a non *Procatopus* like morphology is assigned to a heterogeneous genus *sensu* *Micropanchax* Myers, 1924 because it is the senior taxon (*Lacusticola* Myers, 1924 was described one page after) and because its type species *schoelleri* (= *loati* Boulenger) is a fairly average one. *Micropanchax* is composed of several superspecies, some of them being perhaps separated in the future:

- the eastern group (*Micropanchax* typical), savannah dwelling, the rift valley lakes group being included or not.
- the western group which better known to the author.

The western groups belonging to *Micropanchax*

In Western Africa, 4 groups can be disclosed which are phylogenetically related species:

- The *Poropanchax* group of slender coastal species from Ivory Coast to Rio Muni (see the review)
- The corresponding slender species of the inland plateau from (Guinea?) Liberia to Zaire: *normani*, *camerunensis*, *stictopleuron*, that might deserve the *Hylopanchax* name (subgenus).
- The deep bodied western group of the inland plateau from Guinea to Benin: *kabae*, *lamberti*, *monicae*, *nimbaensis*, *schioetzi*, without an actual name
- The deep bodied southern group of the plateau and the Congo Basin; named at the genus level *Hypsopanchax*, *platysternus*, *deprimozzi*, *jubbi*, *jobaerti* and *zebra*. The genus status may be valid but deserves better studies, specially compared to *Procatopus*.

There remains three species I have not seen and cannot place, *pfaffi*, *bandoni*, *hutereaui* and also the Angolian species that seems probably related to the Eastern form by the means of the Shaba Province in South eastern Zaire.

2.1.4 *Lamprichthys* Regan, 1911 and *Laciris* new genus, two relict pelagic monotypic genera.

During my studies in Tervuren, I have checked Clausen's excellent observations for *Lamprichthys tanganicus* a true but isolated Procatopodin and was very surprised to discover another relict species that deserves a separate genus status too: *pelagicus* (Worthington, 1932) from Lake Edward (5 specimens No. 142820-814). Curiously these two fishes show common characters:

- They are purely lacustrine species, living in the deep waters, endemic to two rift valley lakes: Tanganyika and Edward.
- They are large, at least twice the size of the common procatopodin.

But they are very different and I do not hesitate to propose a separate naming for *pelagicus*: *Laciris* n. gen.

A large rather elongate species that have a very low insertion of pectorals and show a very vestigial neuromast Cephalic pattern: only two curved narrow grooves are exhibited without pores or sensory "buttons". The preserved fishes present only the fine black line on the sides and a broad black vertical margin in the caudal.

* *Mohanga* Boulenger, 1911, is a junior synonym (Myers, 1924)

2.1.5 Key elements to be disclosed.

Our knowledge of Procatopodin is still in its infancy.

1. At the species level, it is necessary to obtain living material and prepare redescriptions according to colour pattern, Karyotypes and crossings. We must admit that today the separation of species is based on morphologic proportions and meristics. But these data are not very informative (and even value-less in the case of *Procatopus*) because of the variability of these species and because of the allometry in growth.
2. At the group level, it is necessary to study in detail their allopatric and sympatric occurrence and to prepare precise distributions. The Procatopodins are not so different from the Rivulins: except in the basic choice of biological niche and behaviour, and their much wider distributions, they should display a parallel system of evolution. The existence of intermediate fishes such as *Adamas* and perhaps *Diapteron* would favour this idea.

The major objective is then to obtain living material.

2.2 The Genus *Aplocheilichthys* Bleeker, 1867

The genus *Aplocheilichthys* is represented by its only species in the whole studied area: it is restricted to a narrow band parallel to the coast.

It is very abundant in the brackish water biotopes and more and more rare, gradually as one penetrates the country in soft water. Exceptionally, it can swim far up the river course if the influence of the tide is felt.

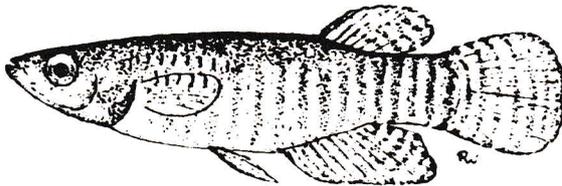
In Aquaria, *spilauchen* is an easy fish provided it is maintained in large tanks with moving brackish waters. Breed among the schooling group but may eat youngsters if the density is high: non-annual - 2 weeks incubation time in water, slow growth.

***Aplocheilichthys tschiloangensis* Ahl, 1928 is a junior synonym of *spilauchen*.**

The origin of the types of *tschiloangensis* is Landana, near the estuary of the Tschiloango, Cabinda. By morphology this taxon is not separated from *spilauchen*; by biotope, neither (Ahl states a mangrove), by colour pattern neither; by distribution, neither (*spilauchen* has been reported until the Zaire River); a final check of the preserved specimens confirms the identity of the two names.

***Aply. spilauchen* (Duméril, 1859) 17 SPI**

Poecilia spilauchena Dumeril: Arch Mus 10 : p258 fig 5.
Types from the lower Senegal, western Africa.



Aply. spilauchen (Duméril, 1859) Rio Muni

Meaning of the Name: spotted neck (Greek)

Main synonyms: *Aplocheilichthys typus* Bleeker, 1863
Haplochilus spilauchen Boulenger, 1915
Aplocheilichthys tschiloangensis Ahl, 1928
Epiplatys Daget, 1950
Aplocheilichthys spilauchena Roman, 1971 (frequently mis-spelt)

List of Recent Localities

1. Rio Utonde, 12 Km from the launching stage, Rio Muni, coll Roman, 1966
2. Between Senye and Rio Benito, southern Rio Muni, coll Roman, 1968
3. Cap Estérias, northern Gabon, coll Arnoult, 1973
4. Mayumba, 28 Km towards Tchibango, Loc 206, southern Gabon, coll Huber, 1979
5. Between Cocobeach and Milembié, Loc 231, northern Gabon, coll Huber, 1979

Key Features

♂ Heavily bodied Procatopodins less flattened than *Procatopus*. Fully developed open neuromast system, indistinct light black-brown bars on a metallic yellow body and fins. White thin margin in D, C, A (not always): Upper insertion of Pectorals.
Karyotype: n = 24; A = 47
Meristics: D = 6-8; A = 11-14; LL = 26-28
Size: ♂ 60 mm; ♀ 55 mm (large)

Ecology: opportunistic; prefers mangrove and swampy brackish waters where it is sympatric with *Periophthalmus* sp. Also in soft water brooks together with *Aphyosemion Epiplatys* and other Procatopodins.

Likes a brighter light and higher temperature than other Procatopodins. Good swimmer. Not always schooling.

Distribution: the largest in Africa: from the Senegal River to the Zaire River - not recorded by Poll in Angola. Restricted to the littoral band, narrower than 20 Km. In that sense may be matched with *A. australe*, which however is not found in brackish water.

2.3 The genus *Micropanchax* Subgenus *Poropanchax*

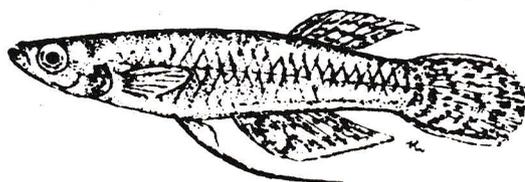
The subgenus *Poropanchax*, Clausen, 1967, is the best defined of the Procatopodine by phylogenetic standards: it should be composed of the *macrophthalmus* group, i.e. *macrophthalmus* Meinken 1932 (eastern Benin, south western Nigeria, north western Cameroon) *rancureli*, Daget, 1964 (southern Ivory Coast); *hannerzi*, Scheel 1967. (Biafra); *scheeli*, Roman 1971, (south western Cameroon, Rio Muni) and probably un-named phenotypes from west of Ivory Coast.

In my opinion, *normani* Ahl belongs rather to the Inland Plateau group. *Poropanchax* is characterized by a group of exclusively coastal forest fishes, shoaling in soft or brackish waters. Morphology: elongate body, no preorbital scale, no branchiostegal appendage, posterior position of Pectoral fins. Cephalic medium neuromasts pattern: three independant pores; strong sexual dimorphism.

Poropanchax is poorly represented in the studied area: *scheeli* inhabits the northern coastal part of Rio Muni.

M. (Poropanchax) scheeli (Roman, 1971) 18 SCE

Aplocheilichthys macrophthalmus scheelie Roman: Fundaciion La Salle de Ciencias Naturales, Barcelona: 178-181, fig 79. Types from Rio Utonde, northern Rio Muni, raised to the species status by Scheel in Daget 1979.



M. (Poropanchax) scheeli (Roman, 1971) type locality

Meaning of the Name: dedicated to J.J. Scheel.

Main Synonym: none

List of Recent Localities:

1. Rio Utonde, 12 Km from landing stage, Rio Muni, coll Roman 1966
2. Rio Ekuko, 9 Km from Bata northern Rio Muni, coll Roman 1968

Key Features

♂ Orange red markings on a blue metallic body (forming reticulation?)
Red dots or blotches in D, C, A. Long filaments in Ventrals (not in O), prolonging to the end of the anal base. Metallic green large band on sides.
Karyotype: n = 24; A = 24 for *macrophthalmus*
Meristics: D = 6-7; A = 12-13
Size: ♂ 40 mm; ♀ 35 mm

Ecology: shallow running waters with dense vegetation - shoaling species.

Distribution: From the Lobé/Kienké drainage in south western Cameroon to Rio Benito River in Central Rio Muni. Surprisingly, it is not replaced by another component in Gabon and Congo.

Note: The species status should need a closer study. Besides, there is a possibility that *Aply. keihacki* Ahl 1928 could be a senior synonym of *macrophthalmus* because of morphology and origin (coastal Togo). If so, the placement as **nomen oblitum** is advisable (types lost, no mention since 1928, poor description).

2.4 The genus *Procatopus* Boulenger

Procatopus is a mainly coastal forest Procatopodin genus. The body is deep, highly compressed. Fins are long, often filamented in males, Pelvic fins are placed anteriorly, sometimes connected by a membrane. Deep caudal peduncle. The exposed section of the side scales are regular hexagons, twice as deep as long.

Procatopus inhabits the clear quick running brooks from Nigeria to Zaire. In the northern part (*Procatopus* in the old sense) only three species out of 11 are recognised: All Clausen's species are considered as synonyms, so is his subgenus *Andreasenius*.

2.4.1 *Plataplochilus* Ahl is a junior synonym of *Procatopus*

The genus *Plataplochilus* has been redefined by Lambert and Clausen in 1967. Since then, no systematic paper has been published on these fish. It appears to me that *Plataplochilus* and *Procatopus* should not be separated for these reasons:

1. They represent a single line of evolution, well defined in Procatopodins
2. They replace each other geographically and ecologically.
3. They show the same massive phenotype with very high set pectorals.

Lambert and Clausen's micromorphological characters may be valuable at the descriptive level but they are found in other procatopodins without a rational pattern and they are not specific, i.e. gradual transitions are observed (see 2.1.1). Those three micromorphological characters are discussed hereafter:

1. The tubular system criterion: In *Plataplochilus* as in *Poropanchax* and *Lamprichthys*, it is made of "independant" pores, according to Lambert and Clausen - and is open in grooves in *Procatopus*. However a close study of the system shows that an underlying canal is linking the pores in *Plataplochilus* and that the two systems are

basically the same, the overlapping fleshy lobes of *Procatopus* being fused in *Plataplochilus* to form pores.

Moreover a significant percentage of specimens from northern Gabon show an irregular cephalic pattern with partial or interrupted grooves. In contrast in the most southerly populations (Congo) the last of the middle-line pores becomes completely independent and vestigial.

2. The Ctenoid scales criterion: Lambert and Clausen (op cit.) "speak merely of ctenoid scales in the supra orbital region and on the sides of the head and nuchal region . . . and not of strongly ctenoid scales". Again it depends on the population: *terveri* n.sp shows a very strong ctenoidy; *ngaensis* is a very variable and, as stated above, there are some ctenoid structures on the sides of Northern *Procatopus*. This character is very irregular.
3. The branchiostegal appendages criterion: it is not specific of Northern *Procatopus* as it was observed by Lambert and Clausen in *cabindae*, *mimus*, *pulcher* and an "undescribed" species from Abanja River (= *ngaensis*?). I have checked this character in my populations of *ngaensis*.
4. Other characters are also presented by these authors but they differ only slightly in *Procatopus* according to them; lacrimal pore size, the pelvic position, the number of expanded haemal arches.

Finally there appears to be a gradation between *Procatopus* and *Plataplochilus* sensu Lambert and Clausen from the North to the South of the range and the distinction into two genera does not seem justified. There is a possibility that both stemmed from a common recent ancestor. But for the sake of conservation and geography some ichthyologists may maintain *Plataplochilus* at the sub-genus level, depending on their splitting/lumping attitude.

2.4.2 The Southern Coastal *Procatopus* Species

The genus *Procatopus* is well represented in the studied area where it can be very abundant. It is the only Cyprinodont in quick running brooks at the first steps of the Inland Plateau, e.g. in the western part of the Crystal Mountains. Three species are found here: *ngaensis*, *mitotaenia* and *cabindae*.

In Aquaria, these fish are easy to maintain in large, well aerated and filtered tanks; they spawn in holes or in slits, not in plants (a sponge is a good artificial substrate). Incubation times: 2-3 weeks in soft water. A schooling group of 50 specimens is magnificent.

***Procatopus* are very variable fish by morphology and meristics**

Important morphological variation was first observed by Scheel (1974) on the Northern *Procatopus* he collected.

The same phenomenon takes place with the *Procatopus* of the studied area: (my studies of Stauch's and personal collections).

Fin rays are quite stable within a population, but vary considerably between populations, even from nearby locations. A four rays difference is frequent.

Body form is even more variable because the depth increases as the fish grows (allometry). Since the maximum size is different from population to population, the figures computed from the predorsal, preanal and height lengths as percentage of the standard length are very irregular; a 12% difference is not rare. From all the samples of the area, only one morphospecies can be defined. Then, if body proportions and fin data are not considered, the separation of phenotypes may be based on colour patterns only. This major conclusion is the base of the following synonymies.

Chalcopyrus* and *mimus* are junior synonyms of *ngaensis

I have seen one syntype of *ngaensis* in the Paris Museum and compared to my collections of the same area, of around Ntoum (*mimus*) and of around Lambaréné (*chalcopyrus*). Their colour pattern is similar, only minor differences are observed (extension of shining zone, unpaired fins) that are at the population level. No difference in maximal size is observed. Lambert had separated two forms on the basis of more or less elongated body and the level of insertion of the dorsal (60%-64% of standard length for *mimus* and 66%-71% for *chalcopyrus*). Reports of *ngaensis* in southern Gabon are highly probable in the future.

***Pulcher* is a junior synonym of *miltotaenia*.**

Pulcher is just another case, even simpler: those two fishes show the same characteristic red median band and the two type localities are separated by 100 kilometres approximately. Another feature is the upper filament in the caudal of *pulcher*, old males. I have not collected *miltotaenia*, south of Lambaréné, but in some populations of *ngaensis* the filament was present, not in others.

***Loemensis* and *micrurus* (?) are junior synonyms of *cabindae* which may be a good species.**

The status of the Congo species is more difficult to evaluate. I have studied preserved material only. The colour pattern of *cabindae* has been reviewed by Lambert (1967), and if this is verified, it seems sufficiently distinct from the other two species: however, it is hardly understandable that another — *cabindae* — may appear south of *miltotaenia* without any geographical barrier.

Loemensis from Southern Congo is a clear synonym of *cabindae*: the two descriptions are similar except for the fin data, but the variability of Stauch's collections fuses the two descriptions. I have checked *loemensis* types.

Micrurus may be a synonym of *cabindae*:

- the two type localities are closed
- in the Kouilou estuary, only two Procatopodins are present: *cabindae* and *Aply. spilauchen*. It seems hardly possible that *micrurus* be *spilauchen* because *tschiloangensis* (= *spilauchen*) is described in the same paper and from the same area and because the *micrurus* drawing shows a *Procatopus*-like form
- the two morphologies are similar $D = 6; A = 12$

- *micrurus* presents a median band on the sides. However a final check on the types in Berlin is desirable, if they are not lost.

2.4.3 The *Procatopus* species from Savannah Inland Plateau

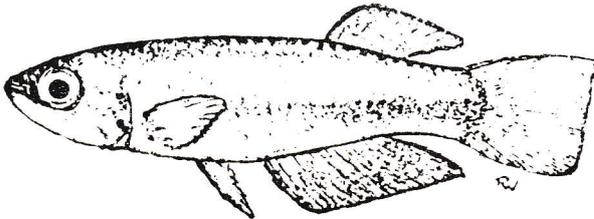
Description of *Proc. terveri* n.sp.

The thorough study of the *Procatopus* material collected by Baudon, Stach, Lambert and Huber and Radda has inclined to reconsider the identification of the *Procatopus* from South eastern Gabon, in the savannah or gallery forest Inland Plateau.

Its case is not unique, as in the Zanaga forest area, is living *Hypsopanchax Zebra* which is very isolated from its relatives from the eastern Zaire basin:

Hypso. platysternus, deprimozi, jubbi, jobaerti. It appears then that this specific areamight have played an important role in the phylogeny of Cyprinodonts, 2 relict Procatopodins, more than 12 different *Aphysoemion* species.

Procatopus terveri is dedicated to may good friend Dr Denis Terver, Director of Nancy Museum, and Aquarium, France, who has helped and heavily supported me for all these years including during the preparation of my thesis.



Procatopus terveri n.sp.

Procatopus terveri n. sp.

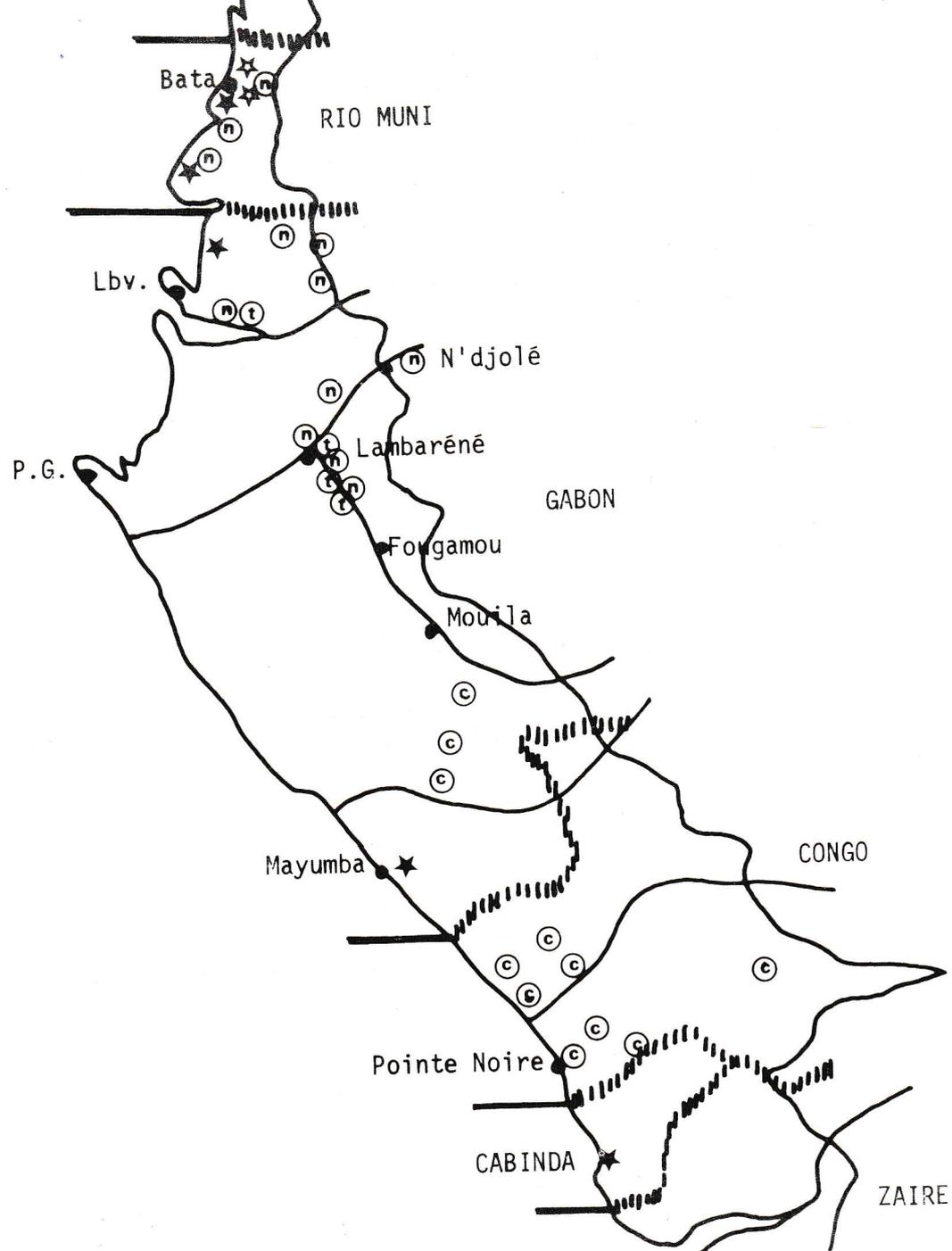
Holotype: (MNHN 1930-50), 33.3 mm standard length; 42.5. mm total length. From the Mpassa River (Paris Museum No 162-2-29-2), Upper Ogooué drainage, south eastern Gabon. Identified by Pellegrin as *Haplochilus loemensis* M. Baudon **leg.**

Paratypes: (MNHN 1930-51) 8 specimens from the Leyou River, southwest of Moanda, upper Ogooué drainage (Paris No. 11-2-29-2) M. Baudon **leg.**

Paratypes: (RGMRA: 20203-204), 2 specimens from the same locality as Holotype (Tervuren Museum in Lambert 1967 "*Plataplochilus cabindae*").

Paratypes: 5 specimens from 7 km from Franceville towards Onkona, southeastern Gabon, coll J. Lambert, 26th October 1964.

Additional Material: 13 Km NW of Moanda towards Mounana, south eastern Gabon (loc 15 - type locality of *A. coeleste*) coll J.H. Huber and A.C. Radda.



The Procatopod distribution in the studied area:

★ = *Aply. spilauchen*; ★ = *Micropanchax (por.) scheeli*; n = *Proc. ngaensis*; t = *Proc. miltonaenia*; c = *Proc. cabindae*

Morphology: Large *Procatopus*, with high D and A data. Strong Ctenoidy on sides, front, fins and face. Three rows of small scales are reported below the eye - Irregular scalation on head - Neuromast cephalic pattern with 8 pairs of pores sometimes communicating below. Two sensory organs are visible on the far rear part of the head as in *M. stictopleuron* (syn. *silvestris*, Huber in preparation, 1 pore out of 3 scales on lateral line. Other characters enter within the diagnosis of the group. (See table 1 for data of the types)

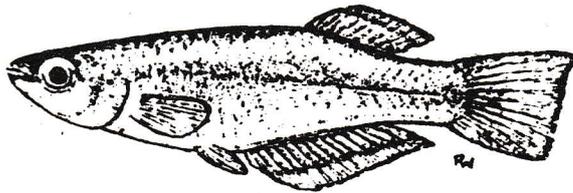
Colour Pattern: After preservation, uniform light brown with the common fine black median line. Living - see the identification key.

Conclusion: *Proc. terveri* n. sp. is best defined by its isolated origin, its colour pattern, its massive morphology, its large number of rays, and maybe the three rows of scales on the face.

***Proc. ngaensis* (Ahl, 1924)**

19 NGA

Haplochilichthys ngaensis Ahl - Zool Anz, 61: 135-145. Types from a subsidiary of the Nga River near Attogondema, north western Gabon, coll Escherich.



Proc. nyaensis (Ahl, 1924)

Meaning of the Name: derived from the type-locality name: "Nga Zuflüsse"

Main Synonym: *Plataplochilus ngaensis* Lambert and Clausen 1967
(type localities *Plataplochilus chalcopyrus* Lambert, 1963 (No. 1,2,3)
in parenthesis) miss pelt *chalcopyrus* Roman, 1971 (No. 6)
Plataplochilus mimus Lambert, 1967 (No. 4)
Plataplochilus cabindae Roman, 1971 (No. 5)

List of Recent Localities:

1. 50 Km south of Lambaréné towards Mouila, central Gabon, coll Lambert 1962.
2. 6 and 8 Km north of Lambaéné, northern Gabon, coll Lambert 1962.
3. 9, 20 and 38 Km south of Lambaréné, central Gabon, coll Lambert 1962.
4. 28 Km east of Libreville towards Kango, northern Gabon, coll Lambert 1964.
5. 30 and 35 Km east of Bata towards Nbia, northern Rio Muni, coll Roman 1968.
6. Between Bisum and Auenam, Rio Muni, coll Roman 1968.
7. Subsidiary of the Aye, San Juan, southern Rio Muni, coll Roman 1968.
8. Asuala, between Cogo and Rio Benito, Central Rio Muni, coll Roman 1968.
9. Bonobono, between Cogo and Rio Benito, Central Rio Muni, coll Roman 1968.
10. 20 Km south of Lambaréné, central Gabon, coll Bochtler and Herzog 1972.

11. Road to Médouneu, Crystal Mountains, northern Gabon, coll Herzog 1973.
12. 18 Km east of N'djolé (loc 6) northern Gabon, coll Huber and Radda 1976.
13. 9 Km south west of Bifoun (loc 34) northern Gabon, coll Huber and Radda 1976.
14. 6 Km north of Méla at Song (loc 55) northern Gabon, coll Huber 1979.
15. 29 Km east of Libreville (loc 220) northern Gabon, coll Huber 1979.
16. Near Ntoum (loc 221) northern Gabon, coll Huber 1979.

Key Features:

♂ Blue body with green-brown shining especially in the upper part. Behind D and A, on body yellow copper bands (not always) - D, C, A, V yellowish with orange margin (not always). No median band, except the common fine black line.

Karyotype: Unknown

Meristics: D = 8-12; A = 14-18; LL = 28-34

Size: ♂ 50 mm; ♀ 45 mm

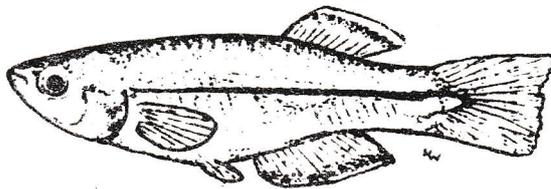
Ecology: quick running brooks with crystal clear water on stones. Are found in the middle of the streams, always shoaling. Difficult to catch without damaging (more than 80% die within 2 hours). Also in *Aphyosemion* biotopes where they usually seem more easily taken. Sympatric with all the northern Rivulin but also with *Proc. miltotaenia* (no. 10, Bochtler and Gaspers, also with *gabunense*.)

Distribution: Rio Muni to Central Gabon - probably the same as *miltotaenia*, reaches the first steps of the Inland Plateau in northern Gabon, more easterly it is replaced by *Micropanchax* sp (*camerunensis* and the Ivindo *Micropanchax*).

***Proc miltotaenia* (Lambert, 1963)**

20 MIL

Plataplochilus miltotaenia Lambert - Rev. Zool Bot. Afr. 68, 3-4: 314-319. Types from 19 Km south of Lambaréné towards Mouila, central-west Gabon.



Proc. miltotaenia (Lambert, 1963) type locality

Meaning of the Name: carmine band (Greek)

Main Synonym: *Plataplochilus pulcher* Lambert, 1967 (No. 3).

List of Recent Localities:

1. 19 km south of Lambaréné towards Mouila, central Gabon, coll Lambert 1962
2. 8, 18, 29, 30 Km south of Lambaréné towards Mouila, central Gabon, coll Lambert 1962
3. 40 Km east of Libreville towards Kango, northern Gabon, coll Lambert 1964
4. 20 Km south of Lambaréné, central Gabon, coll Bochtler and Herzog 1972
5. Surroundings of Lambaréné, northern Gabon, coll Herzog 1973 (K)
6. 10 Kms east of Lambaréné, northern Gabon, coll Pap 1980

Key Features:

♂ Red median band prolonged in median rays of C. Golden line over the red band. Olive brown body with blue shining. After preservation, these differences with *ngaensis* quickly become non-existent.

Karyotype: Unknown

Meristics: D = 10-14; A = 14-17; LL = 28-30

Size: ♂ 50 mm; ♀ 45 mm

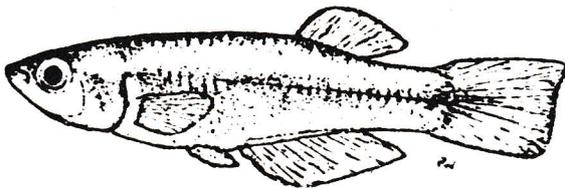
Ecology: see *Proc. ngaensis*

Distribution: known only from Northern and Central Gabon, probably also in Rio Muni.

***Proc. cabindae* (Boulenger, 1911)**

21 CAB

Haplochilus cabindae — Boulenger, Ann. Mag. Nat. Hist. 8 (8): 264-265, Types from Cabinda "Portugese Congo", coll Ansorge.



Proc. cabindae (Boulenger, 1911) RPC3, East of Loubomo

Meaning of the Name: from the type locality name.

Main Synonyms: *Plataplochilus cabinda* Lambert, 1967
Haplochilus loemensis Pellegrin, 1924
Aphocleilichthys micrurus Ahl, 1928

List of Recent Localities:

1. 85 Km north east of Pointe Noire towards Sounda, southern Congo, coll Lambert, 1962
2. 45 Km east of Point Noire towards Loubomo, southern Congo, coll Lambert, 1962
3. Djembo, southern Congo, coll Stauch, 1962
4. Zibati subsidiary of the Kouilou, southern Congo, coll Stauch, 1963
5. Yangala, Youbi, southern Congo, coll Stauch, 1963
6. Tchitobo near Sintu southern Congo, coll Stauch, 1963
7. Tombo road towards Sounda, southern Congo, coll Stauch, 1963
8. Subsidiary of the Loémé, Mayombé Hills, southern Congo, coll Stauch, 1963
9. Subsidiary of the Likouéné road towards Sounda, coll Stauch, 1964
10. 20 Km North of Lébamba (loc 23) southern Gabon, coll Huber and Radda, 1976
11. 5 Km east of Ndendé southern Gabon, coll Huber and Radda, 1976
12. Near Banyanga (loc 27) southern Gabon, coll Huber and Radda, 1976

13. Between Loubomo and Loudima (RPC 3) southern Congo, coll Buytaert and Wachters, 1978
14. (?) 12 Kms east of Tchibanga (loc 203) southern Gabon, coll Huber, 1979

Key Features:

♂ Broad orange brown, band on sides. Orange band in inner part of D, A Yellow V.
 Orange margin up and Down in C
 Karyotype: Unknown
 Meristics: D = 9-10; A = 15-17; LL = 30-32
 Size: ♂ 50 mm; ♀ 45 mm

Approximately 200 specimens seen from the Stauch's collection (MNHN, Paris).
 The living colour pattern of the male from the type area is not known to me, thus the specimens from southern Gabon are tentatively placed here.

Ecology: same as other Procatopodins, sympatric with the southern Rivulins: *A. primigenium*, *microphthalmum*, *australe*, *Ep.singa*, *berkenkampii*.

Distribution: Mayombé Hills in southern Gabon, Congo and Cabinda, north of the Zaire River. No barrier seems to exist between the ranges of *miltotaenia*, *ngaensis* and *cabindae* and further studies are needed to determine its validity.

KEY TO THE SOUTHERN PROCATOPUS SPECIES

1. No median band on side, except the fine black line.

1.1 Blue with two green copper shining zone posterior to D/A -
 Coastal plain. Pale yellow D/A with fine orange margin.

..... *ngaensis* Ahl. D = 9-10; A = 16-17

(syn = *mimus*. D = 10-12; A = 15-16)

(syn = *chalcopyrus* D = 6-10; A = 14-18) Upper filaments in C of some males.

1 2 orange to yellow body, little blue shining. Yellow to orange blotches in D/A In-
 land plateau.

..... *Terveri* Huber D = 11-12; A = 18-19

2. Broad median band on side

2.1 Fine golden line above the red median band. D, A, V pale yellow with a fine
 orange margin.

Coastal plain - *miltotaenia* Lambert D = 12-15; A = 14-17

(syn. *pulcher* D = 10-12; A = 14-15, upper filament in C of some old males)

2.2 Olive brown median band, fins yellow greyish - Inner part of D/A orange band.

Coastal plain -

..... *cabindae* Boulenger D = 9-15; A = 15

(syn *loemensis* D = 11-12; A = 14)

MORPHOMETRIC AND MERISTIC DATAS OF TYPES OF *PROC TERVERI* n.sp.

TABLE 1

n°	S.L.(mm)	T.L.%	P.D.%	P.A.%	P.V.%	Head%	Height%	D	A	L.L.
Holotype										
30.50	33.0	129	61	55	43	26	31	12?	18?	27 +3
30.51-1	34.4	132	61	58	42	26	33	11?	19	28
-2	34.1	132	62	56	39	26	35	12?	18	28? +4
-3	29.2	127	62	58	39	28	29	11	18	27? +2

D. CONCLUSION

This paper is intended to review our knowledge of the Southern Coastal Cyprinodonts from the Rio Benito to the Zaire River, and to propose clear systematics.

However the task is far from finished: most species need a better definition and new collecting places. Above all, the understanding of species separation without the occurrence of a known barrier is critical: e.g. separation of *gabunense* - *exigoideum* - *primigenium* in *Aphyosemion*, *sexfasciatus* and *berkenkampii* in *Epiplatys*, *mito-taenia* and *cabindae* in *Procatopus*.

Field studies in the bordering regions concerned are of primary interest for the knowledge of the Cyprinodonts evolution.

Paris, October, 1980

Line drawings by R.H. Wildekamp

BIBLIOGRAPHY

- Ahl, E. 1928. Beiträge zur Systematik der Afrikanischen Zahnkarpfen. Zool. Anz. 79: 113-123.
- Bochtler, F. and P. Heinrich, 1977. Gabunische *Aphyosemion*. DKG Journal 9 (5): 65-82
- Clausen, H.S. 1967. Tropical Old World Cyprinodonts. Akademish Forlag Kobenhavn: 1-64.
- Huber, J.H. 1978. Caractères Taxonomiques et Tentative de Groupement des espèces du genre *Aphyosemion*. Rev.fr. Aquariol. 5 (1): 1-32.
- Huber, J.H. 1980. Rapport sur la deuxième expédition au Gabon (Août 79): étude des Cyprinodontidés récoltés. Rev. fr. Aquariol. 7 (2): 37-42.
- Lambert, J. 1976. The *Aphyosemion striatum* complex: A Case Report. JAKA-KN 9 (4): 97-109.
- Lambert, J. and H.S. Clausen, 1967. The genus *Plataplochilus* redefined. Rev. Zool. Bot. Afr. 76: 3-4.
- Neumann, W. 1978. Ein neuer *Epiplatys* aus Gabon, *Epiplatys berkenkampi* spec. nov. Aquarien Terrarien 25 (4): 125-127.
- Myers, G.S. 1938. *Aplocheilichthys* and its relatives in Africa (XIV). Copeia (3): 136-143
- Radda, A.C. 1975. The subgenus *Chromaphyosemion*. BKA Separatum.
- Radda, A.C. and J.H. Huber, 1977. Cyprinodontiden Studien in Gabon V: Das Tiefland West Gabuns und die Mayumbé Berge. Aquaria 24: 137-150
- Roman, B. 1971. Peces de Rio Muni, Guinea Equatorial Fundacion La Salle de Ciencias Naturales, Barcelon: 236pp.
- Scheel, J.J. 1968. Rivulins of the Old World. TFH Publications: 480pp.
- Scheel, J.J. 1974. Rivuline studies. Ann. Mus. Royal Afrique Centrale, Tervuren, ser IN-8-Sc.Zool. 211: 150pp.
- Wildekamp, R.H. 1977. Beschreibung von zwei neuen leuchtaugenfischen aus Tanzania, Der Aquarien Freund. (6): 130-116, fig. 1-18.

