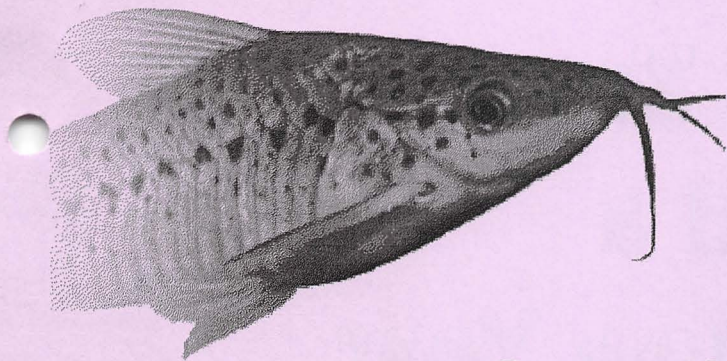


# **CAT CHAT**

**The Journal of the Catfish Study Group (UK)**



## ***IN THIS ISSUE***

**Secondary sexual dimorphism  
in mailed catfishes (Loricariidae)**

By  
Dr ISAÄC ISBRÜCKER



**Details of Fish Collecting  
Expeditions to South America  
Part 1**



**Volume 1 Issue Number 4  
December 2000**

**The Open Show 2000 Results**

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Merry Xmas  
and a  
Happy New Year

Dear Members

This issue completes Volume 1 of Cat Chat. I hope that you have enjoyed it. We have had the honour to publish at least two articles, for the first time, in English .

Please don't think that you have to be a scientist to contribute. All information is welcome, not only by me so I can fill these pages but by other readers. Everyone has a different story to tell. People live in different areas and what works in one area doesn't necessarily work in another but the information will enable people to experiment.

Why not use these pages to warn the others about what you did that either killed your fish or tell them what you did that helped them to survive and breed.

You may think that the article that fills this issue is too long but I make no excuses, I

didn't know where to split it to make Parts 1 and 2 so the obvious answer was to use all of it.

Articles and pictures can be sent by e-mail direct to <bill@catfish.co.uk> or by post to

Bill Hurst  
18 Three Pools  
Crossens  
SOUTHPORT  
PR9 8RA (England)

I would like to take this opportunity to inform you all that **Dr Han Nijssen** has retired. I'm quite sure that many of us from the 70's and 80's will remember the work of Nijssen and Isbrücker in identifying the many new species of Corydoras. On behalf of the CSG I would like to wish him well for the future.

At time of this print we have 109 members.

## ACKNOWLEDGEMENTS

Thanks to everyone who assisted the group in it's first year by submitting articles, supporting us financially, speaking at meetings or just by being there to help or support us.

Front Cover: Designed by Kathy Jinkins.

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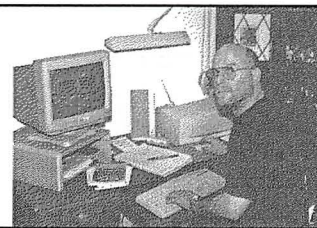
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# From the Chair



Welcome to the final magazine of the first year. A lot of hard work has been done to make it a worthwhile publication. My thanks go to all those people who have helped to make it what it is and by getting it out on time.

**September:** The first Open Show of the 'Catfish Study Group (UK)'. As catfish shows go it was not a huge affair (due probably to the fuel strike), with a little over sixty entries. It was the quality of the fish displayed that really impressed me, which more than made up for the lack of numbers. The auction, while the judging was taking place, was well attended, with many interesting and varied lots going under the hammer, including a couple that yours truly bought after the words 'Corydoras parallelus' came from the auctioneer's lips and distracted me from my judging tasks. All in all it was a most enjoyable day and I should like to take this opportunity to thank everyone for their efforts, including those members from far away places, who must have got up extremely early in the morning to get their fishes to the show before the benching deadline. I now look forward to our 2001 show.

**October:** This meeting was dedicated to Callichthyidae species, other than Corydoras, Brochis and Aspidoras which were shown earlier in the year. Our President Trevor Morris started us off by showing us a pair of *Hoplosternum littorale* (we haven't got used to the new name) and talked about how he kept them and other members of the same family. Trevor

never fails to produce superb specimens for us all to see and discuss. Where he keeps them all, I do not know! After the mid-session break, we were treated to a series of slides by Danny Blundell, showing several of the species from within the Callichthyidae family, including his own shoal of wonderfully marked *Dianema urostriata*. Much discussion was held about the whys and wherefores of keeping these types of fishes.

**November:** This is the month we have our autumn auction which is a standing room only affair, such is the interest and keenness to purchase quality fishes at more than reasonable prices. Our auctioneer Steve Spencer, who I am pleased to say has this wonderful knack of squeezing the maximum out of the bidders, (me included) I lost count of the number of lots but as always there were many bargains to be had making it another very successful day. My thanks go to Roy Barton for his expertise in controlling the whole proceedings, Bill Hurst for keeping a tight grip on the financial side and all those members who did the floor running which kept things moving along very smoothly. I am now looking forward to the December meeting which is a light hearted meeting in which we have a bit of a quiz and partake of the traditional 'Hot Pot' and end our year in style.

It only remains for me to wish you all a very Merry Christmas and a Successful and Happy New Year.

Ian Fuller

## Meeting Agenda

**21 Jan 01**      **AGM**

The first year review, Finance, Committee etc. Any points to be raised should be with the Secretary as soon as possible.

**18 Feb 01**      **Annual Convention**

Erwin Schraml from Germany  
and  
Peru 2000 a fish collecting expedition by members of the CSG

**18 Mar 01**      **Spring Auction**

Fishy things only. Pre-booking is available through Roy Barton on 01942 248130.

## WANTED

The Secretary's post will be vacated at the AGM. We are looking for someone who will be available for the Sunday meetings and who has a knowledge of the hobby and the people in it.

Bill Hurst has been Secretary since 1996 and is now too busy to continue but he will remain as Treasurer (unless someone else is willing to take over that as well).

Collecting articles, DTP etc. for this magazine and gainful employment don't leave much time to do the washing up.

# FISH COLLECTING EXPEDITIONS

## Part 1

Steve Pritchard took a group of CSG members with him on one of these trips to Peru earlier this year. This trip will be the subject of one of the Convention talks in February. If you want to know more, please contact Steve at his e-mail address (inside the front cover) or write to him through our membership list in Cat Chat. Vol1 No3. There are more trips and Part 2 will be in the March 2001 issue.

**20 - 27 January 2001**

### TROPICAL FISH COLLECTION AND STUDY EXPEDITION TO NAPO & TACSHACURARAY RIVER AREAS

TRIP #1 Motor Vessel Delfin or Pamacari Riverboat. From Iquitos, Peru: \$1295.00 per person

Sailing from the Port of Iquitos, Peru with experienced crew and guides. An excellent opportunity to study and collect tropical fish under the direction of **Dr. David Schleser**, internationally-recognized expert on Amazonian fishes, former curator of the Dallas Aquarium, professional nature photographer and author. We will visit a wide variety of aquatic habitats along the Napo River, a major tributary of the Amazon River, including black-water lakes (cochas) and jungle streams and pools, white-water rivers, Napo River sand/mud flats and more. Visits to native villages and to a tropical fish exporting facility in Iquitos. Informal lectures in the field about aquatic biology/fishes and tropical ecosystems. If you aren't very interested in fish, Dr. Schleser is a fount of knowledge about many other aspects of the Amazon!

**27 January - 3 February 2001**

### TROPICAL FISH COLLECTION AND STUDY EXPEDITION TO NAPO & TACSHACURARAY RIVER AREAS

TRIP #2 Motor Vessel Delfin or Pamacari Riverboat. From Iquitos, Peru: \$1295.00 per person

*Please see description of previous trip (above).* A second opportunity to collect tropical fish under the guidance of **Dr. David Schleser**. If you want twice the fun, go on both trips, and have a full weekend to spend exploring Iquitos and the surrounding area! Add \$895.00 to extend from the first week

**3 - 11 February 2001**

### RIO PUTUMAYO DISCUS COLLECTION AND HERPETOLOGY EXPEDITION

De Havilland Twin Otter Float Plane and Skiff/Hotel. From Iquitos, Peru: \$1595.00 per person.

A unique opportunity to collect, study, and photograph fish, amphibians and reptiles on the remote Putumayo River in northern Peru. This area is rarely visited, and is the only river in Peru where discus fish, including a rare red-spotted form, are native. The expedition departs from Iquitos to Estrecho, on the Putumayo River via De Havilland Twin Otter float plane. Base camp is the municipal hotel in Estrecho, a small Peruvian administrative town in the remote and lightly populated Putumayo River region. Daily excursions to collecting sites on the Putumayo River itself, as well as to nearby lakes (cochas) and jungle streams. Overnight camping possibilities on river sandbars. This region has not been well explored scientifically due to its remoteness, and many species of fish and herps doubtlessly remain to be discovered and described. The expedition will be accompanied by Peruvian and American scientists working to fill this void in our knowledge of the Peruvian Amazon. In addition to the highly desired red-spotted discus variety that can be found in this region, many other species of aquarium fish that are rarely, if ever seen in the trade can also be encountered, and wildlife is abundant thanks to the very low human population of the area. Accessing this area by river from Iquitos would require 10 days of travel!

**9 - 16 June 2001**

### JIM LOVINS' GREAT AMAZON FOREST ADVENTURE AND TROPICAL FISH STUDY EXPEDITION

#1 Pamacari Riverboat/Field Stations. From Iquitos, Peru: \$1245.00 per person

An eight-day Amazon River and Rainforest Adventure, Tropical Fish Collection, and Study Expedition! Led by **Mr. Jim Lovins**, Senior Aquarist at the St. Louis Zoo, and a contributing Biologist to Project Amazonas, Inc. Land-based accommodations at Project Amazonas Biological Research sites (Madre Selva Biological Field Station and Paucarillo Forest Preserve) located on the Orosa River. Travel between collecting and study areas via 'pamacari' riverboat. Visits to a variety of white- and black-water lakes, streams and ponds. Jungle trail walks, visits to villages, and much more. If you want to maximize the time spent in the rainforest, this is an excellent expedition that allows you to fully explore two unique field sites

## Secondary sexual dimorphism in mailed catfishes (Loricariidae):

### odontodes, teeth, lips, tentacles, genital papillae and fins

by Isaac J. H. Isbrücker\*

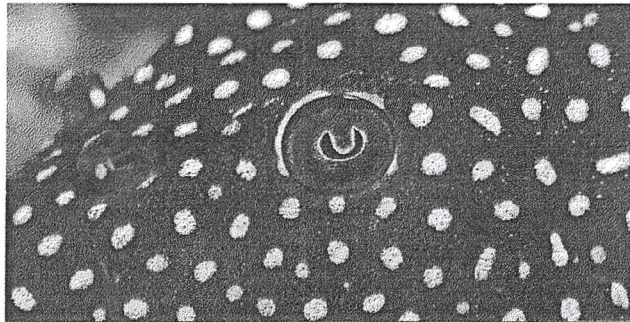
\*) Sectie Vertebraten Ichthyologie, Zoologisch Museum Amsterdam, Universiteit van Amsterdam, Postbus 94766, 1090 GT Amsterdam, Nederland

The family of mailed catfishes, or Loricariidae, constitutes a large group of primary freshwater fishes, which means that there is no or almost no salt tolerance, which prevents their dispersal through marine and brackish water. It is now established that the Loricariidae together with the

families Nematogenyidae, Trichomycteridae, Callichthyidae, Scoloplacidae and Astroblepidae form the suborder Loricarioidei of the order Siluriformes. All species of this suborder are confined to South and Central America.

Several hundreds of species have been described, ranging in standard length (measured from tip of snout to base of caudal fin) from approximately 2 to 60 centimetres. Most of these species are hardly known in our hobby.

Loricariidae have head and body enclosed in a complex of strong, thick dermal ossifications. There are some small areas which are unossified, viz., those which are occupied by the nostrils, eyes, sensory pores, and fins. From head to tail the body is almost entirely covered with scutes, arranged into transverse and longitudinal series, together forming a strong armour (hence the name 'mailed catfish'), which allows an effective flexibility for lateral movements. The abdomen is flat and broad. It may be naked or is covered with scutes of various dimensions, from minute to fairly large. These may reach as far as just posterior to, or extending under, the margin of the lower lip. Touched from tail to head the fishes feel weakly to strongly rough (like the skin of sharks), because of the presence of numerous minute, acute, teeth-like structures, the so-called odontodes which cover all dermal ossifications, and unbranched and branched fin rays. Odontodes occur in catfishes only in the six families constituting the suborder Loricarioidei: there are 27 other families of catfishes all over the world.



Loricariid eye with characteristic (omega shaped) iris (*Leporacanthicus galaxias*) Photo: R. Stawickowski

The mouth is situated ventrally. The jaws of loricariids consist of thin bony, tooth-bearing, cup-like structures. Upper and lower jaws consist of a well separated right and left side. Often each upper jaw can move independently of the other side. The jaws bear a considerably variable number of teeth (teeth are even ab-

sent from the upper jaws of some species), frequently forming an organ to rasp food particles of food films from substrate, often algae or other vegetable food.

Lips surround the oral cavity. The upper lip is usually narrow; the lower lip may be narrow as well but is usually much broader. In some species the lower lip becomes extremely broad in nuptial males, and then functions in protection and perhaps transportation of the eggs. The ventral side of the lips is papillose in most loricariids, whereas in some specialized forms they bear numerous long and slender cirrhi, barbels or tentacles. All mailed catfishes have a so-called rictal barbel, which connects the upper lips with the lower lips. This rictal barbel is from inconspicuously short to quite long, dependent of the species. Usually the upper and lower lips together form an adequate sucking device, with which the fish can attach itself firmly to substrate.

The eye of loricariids has a characteristic small flap of skin along the upper edge, a so-called 'opercular shade,' partly covering the pupil. This operculum expands in bright light and retracts in low light. Its function is the same as that of the structures covering the eye of other typical bottom dwellers, such as some flatfishes (Pleuronectiformes) and it resembles the opercular shade in the eye of skates and rays a lot.

The first ray of each fin is simple, and although neither pungent nor spiny it is often termed 'spine.' The subsequent rays are branched. There are two distinct types of branching: they may be dichotomous (each

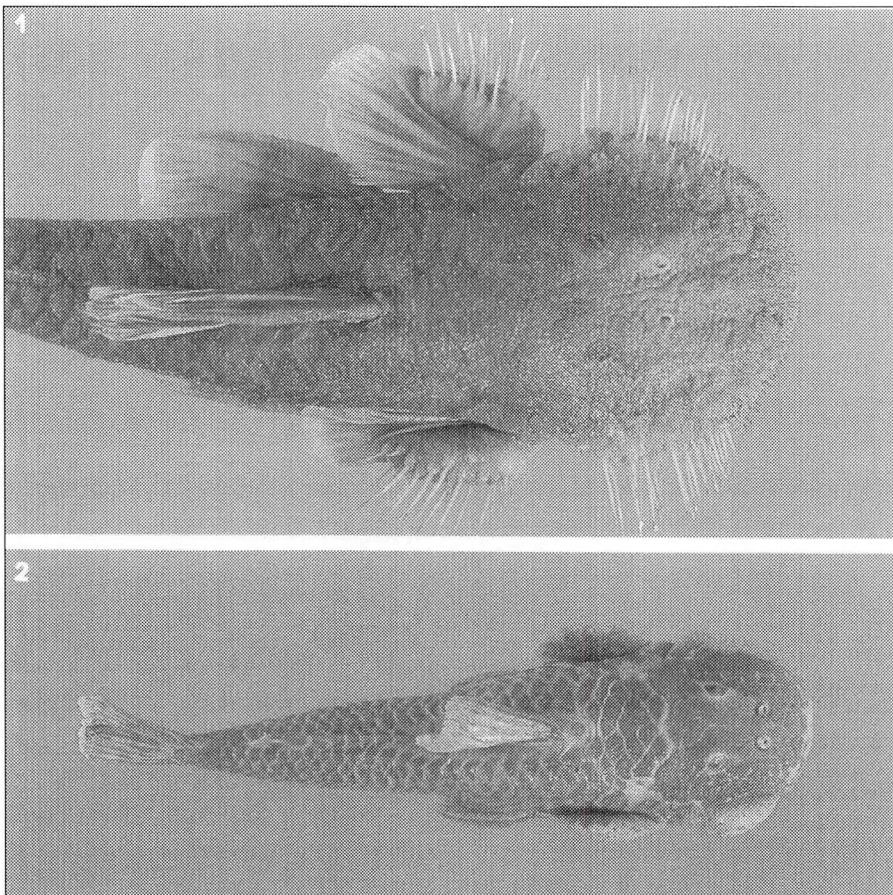
subsequent part splitting into two progressively), whereas there are species in which the subsidiary branches run all from one side off the main branch. Several loricariids possess a 'second dorsal fin' consisting of a so-called adipose fin spine and an adipose fin membrane, which is a small greasy flap covered with skin, devoid of rays and odontodes. The adipose fin spine is derived from a mid-dorsal scutelet.

Loricariidae are poor swimmers, living on substrate: bottom, submerged tree trunks, rocks, and pebbles. Some are known to be able hiding in the sand, or dwelling in the crevices and cavities in rocks; larger species appear to prefer the latter shelters to breed. Some forms are fully or partially nocturnal, others appear to be diurnal. Surprisingly little is known of this aspect of life of loricariids. Loricariidae

show a high degree of specialization towards life in swiftly running streams, as is apparent from the shape of body and head, their flat belly, structure of the fins (especially the paired fins with segmented, rugose tips adequately support to resist stream velocity). Particularly the structure of mouth and lips in many species, forming a more or less circular sucking disk, provided with adhesive tubercles and papillae, suggests an adaptation to streaming water. In spite of all these clear adaptations, several species are found to dwell (seasonally?) also in still waters with muddy bottoms.

**Epidermal breeding tubercles and bony contact organs**

Wiley & Collette (1970) and Collette (1977) studied epidermal breeding tubercles and bony contact organs in fishes. These organs are reminiscent very much of the hypertrophied odontodes in nuptial males of many loricariids; they apparently fulfil the same purpose. These authors published interesting statements, some of which are here quoted: "Breeding tubercles are

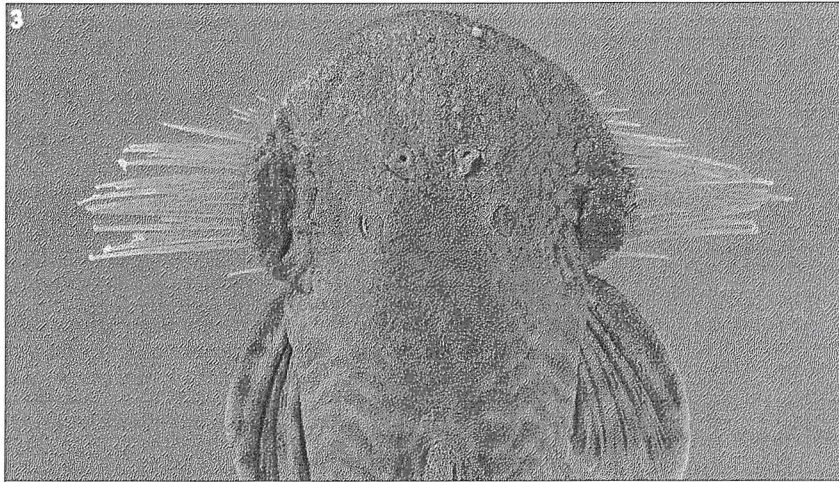


1. *Hemipsilichthys* sp. From the Rio Macahé (Brazil). A male of 109 millimetres standard length.  
 2. *Hemipsilichthys gobio* (Lütken,1874). Locality unknown, holotype. A male of 122 millimeters standard length.

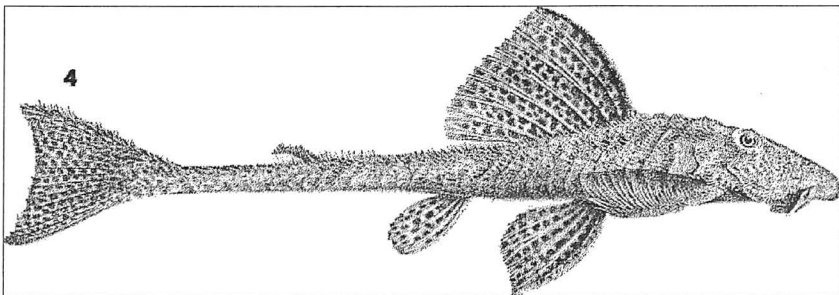
epidermal structures which function primarily in facilitating contact between individual fishes during spawning. Tubercles are present on some species in at least 17 families of bony fishes in five orders: Salmoniformes, Gonorhynchiformes, Cypriniformes, Scorpaeniformes and Perciformes. Analogous dermal structures, contact organs, are present on the scales or fin rays of eight families in three orders: Atheriniformes, Cypriniformes, and Scorpaeniformes." ... "Breeding tubercles or contact organs develop only on freshwater or inshore marine spawning species. These structures probably originally evolved to enable breeding individuals to maintain close contact during spawning to ensure fertilization of the eggs, which is particularly important in fishes that spawn in fast-moving water." ... "In many species of the catfish family Loricariidae, breeding males develop long spines on the sides of the head, the predorsal region, and the upper surface of the pectoral and pelvic fins. It is not yet clear if these spines are analogous to contact organs but the situation merits further study."







3. *Pareiorhaphis* sp. From the Rio Isabel (Brazil). A male of 123 millimetres standard length.



4. *Isorineloricaria festae*. A male from West-Ecuador (Regan 1904, plate 9).

opercle, posterior and ventral edge of interopercle;

c. Callichthyidae - all fin rays including spine in adipose fin; on bony plates covering virtually the entire surface of the body, on external surface of skull bones, including opercular bones;

d. Scoloplacidae - anterior-most rays (or spines) of all fins, dermal bony plates on body and head, some skull bones, including opercular bones, and posterior process of coracoid.

e. Astroblepidae - all fin rays, including spine in adipose;

f. Loricariidae - all fin rays including spine in adipose fin; on bony plates covering virtually the entire surface of the body and head, on external surface of skull bones, including opercular bones.

In *Nematogenys*, most callichthyids, scoloplacids, astroblepids and in loricariids the odontodes are about the same

size and shape (i.e., small, pointed and conical) wherever they occur on the animal. Notable exceptions are the large recurved odontodes on the rostral plate of *Scoloplax* spp. and the large hook-like odontodes anterior to the opercular bone of *Ancistrus*. Trichomycterids often have some of the integumentary teeth larger than others, and recurved. In some callichthyids and in many loricariids, enlargement of odontodes occurs in nuptial males.

**Odontodes**

Among catfishes teeth on the outside surface of the body, not associated with the jaws or any other oro-pharyngeal structures, are found only in nematogenyids, trichomycterids, callichthyids, scoloplacids, astroblepids, and in loricariids (Baskin, 1978). These teeth have been referred to by various workers as dermal teeth, integumentary teeth, denticulations, prickles, barbs, spines and denticles. Such teeth are known as so-called "odontodes." This term expresses the fact that these teeth are in the skin on the external surface of the body, rather than oro-branchial teeth associated with the jaws, palate and other visceral arches.

Odontodes of some loricariids, callichthyids and of *Nematogenys inermis* (Guichenot, 1854) have been studied histologically by Peyer (1922) and Bhatti (1938) and found to be the same as jaw teeth of these and other actinopterygians, i.e., calcified conical structures with a pulp cavity surrounded by dentine capped with enamel, and attached to a bony base by connective tissue (Baskin, 1978). The distribution of odontodes in loricarioid catfishes is as follows (based on Baskin, 1978):

- a. Nematogenyidae - pectoral spine;
- b. Trichomycteridae - posterior-dorsal corner of

**Secondary sexual dimorphism**

The primary sexual difference between females and males is that females produce the eggs and males produce the sperm. We (1988) already wrote in the Datz: "The family Loricariidae consists of over 80 genera. Many of these do not show marked secondary sexual dimorphism. Of some other genera such a dimorphism is not known, and of some species of certain genera it is hitherto not demonstrated. On the other hand we know of course many cases of most diverse forms of secondary sexual dimorphism in loricariids. Fertile males of *Ancistrus* species possess an impressive tuft of soft tentacles on and at the sides of the snout; fertile males of *Farlowella*, *Sturisoma*, *Rineloricaria*, *Pseudancistrus*, *Panaque*, *Spatuloricaria*, *Lithoxus*, *Pseudorinelepis*, *Hemipsilichthys*, *Neblich-*



*thys* and many other genera develop bristle-like odontodes on the snout and/or on the head and/or on the upper side of the pectoral fins; males of some loricariids (for example, *Aphanotorulus* species, some *Peckoltia* species) develop such odontodes on the upper half of the caudal peduncle and on the caudal fin. Another form of secondary sexual dimorphism is known of representatives of the genera *Loricariichthys*, *Pseudoloricaria*, *Limatulichthys* and *Hemiodontichthys*, in which fertile males develop a veil-shaped enlargement of the lower lip, which they use in taking care of the spawn. Less well known is the sexual dimorphism in shape of the different forms of teeth just as in the very small odontodes on the body of some loricariids (for example in *Loricaria*, *Loricariichthys*, some *Rineloricaria* etc.). Secondary sexual dimorphism in colour pattern\* is hitherto not known in the family Loricariidae." (but while the manuscript of this paper was in press for the first time, to be issued in Die Aquarien und Terrarien Zeitschrift, Reis & al. (1990) meanwhile described such dimorphism for *Hypostomus isbrueckeri*, males of which have a rather broad, whitish margin along the caudal fin distally. Females do not have such a margin).

Among the many loricariid species, sexual dimorphism is still often only fragmentarily known. Aquarists can still contribute in recording their observations about sexual differences, including the various manifestations of it described in this paper. For example, shape and size of the genital papilla during spawning are hitherto virtually unrecorded for loricariids. Aquarists might be able to 'catch' their living fishes in photographs at any time, possibly better than others. Most aspects of secondary sexual dimorphism are often stated to occur temporarily. It has never been reported how long temporarily means, and aquarists could provide very useful details in this matter.

Below is a review of the several forms of secondary sexual dimorphism as has been observed in representatives of three of the five subfamilies. Within the subfamilies the genera are arranged alphabetically.

#### **Subfamilies Neoplecostominae and Hypoptopomatinae**

Secondary sexual dimorphism is unrecorded for and most likely not present at all in members of the subfamilies Neoplecostominae (genus *Neoplecostomus*) and Hypoptopomatinae (genera *Acestridium*, *Eurycheilichthys*, *Hypoptopoma*, *Microlepidogaster*, *Otocinclus*, *Otothyris*, *Oxyropsis*, *Parotocinclus*, *Pseudotocinclus*, *Pseudotothyris* and *Schizolecis*). Both these subfamilies are considered by Schaefer (1987) to be more primitive than the Loricariinae, Hypostominae and the Ancistrinae. The absence (or presence) of

secondary sexual differences - in these and maybe in the other subfamilies - may have a phylogenetic significance which has not as yet been given much emphasis.

#### **Subfamily Hypostominae**

Includes the genera: *Aphanotorulus*, *Cochliodon*, *Corymbophanus Delturus*, *Glyptoperichthys*, *Hemipsilichthys*, *Hypostomus*, *Isorineloricaria*, *Kronichthys*, *Liposarcus*, *Pareiorhaphis*, *Pareiorhina*, *Pogonopoma*, *Pogonopomoides*, *Pseudorinelepis*, *Pterygoplichthys*, *Rhinelepis* and *Upsilonodus*.

##### *Aphanotorulus*

Mature males of *Aphanotorulus frankei* Isbrücker & Nijssen, 1983 have the posterior half of the body covered with numerous elongated odontodes emerging from the scutes and from the adipose fin spine and upper part of caudal fin. In the specimens examined so far, these odontodes are acute in shape but feel soft to the touch.

*Aphanotorulus phrixosoma* (Fowler, 1940) was originally described and illustrated from a single mature male, about which Fowler wrote: "All upper scutes, as well as those along sides of body, together with upper surfaces of pectoral spines and most all of caudal, with long curved bristle-like spines."

##### *Cochliodon*

Sexual differences are not documented, but probably not different from *Hypostomus*. Note that the shape of the normal jaw teeth of *Cochliodon* differs from those of *Hypostomus* essentially in the same way as the shape of teeth of males of certain Loricariinae differs from the teeth of females.

##### *Hemipsilichthys*

The species assigned to this genus and to *Pareiorhaphis* (both genera need a thorough systematic revision, since their relationships are still poorly understood) exhibit some of the most spectacular manifestations of sexual differences not only unparalleled among mailed catfishes but also among fishes in general.

##### *Hemipsilichthys gobio* (Lütken, 1874)

The holotype of *Hemipsilichthys gobio* is an adult male with an unusually long genital papilla. Apparently it was collected just after its spawning period: it still has the swollen cheeks and very much hypertrophied pectoral fin 'spines' (actually it is a thick, unbranched ray) which are also present in fully mature males of related species. However, in this specimen the very large odontodes which develop prior to spawning may have regressed almost fully, leaving the presence of some short and thick odontodes only. It is the uniquely



known specimen in the genus (and in the entire family for that matter) which only has a patch of odontodes of normal size in the centre of each body scute; these patches are surrounded by bare skin and it looks like if each scute is isolated from one another. In contrast, females, juveniles and nuptial males of all other known specimens of *Hemipsilichthys* have each scute completely covered with odontodes, as usual in mailed catfishes. All *Hemipsilichthys* specimens that we have seen so far were preserved specimens, which do not allow observations on development and regression of sexually dimorphic characters. Nevertheless, we assume that the partial absence of odontodes on the scutes of the holotype of *Hemipsilichthys gobio* may well have been caused by a shedding of the marginal odontodes simultaneously with the shedding of the odontodes from the margin of the head and on the pectoral fin spine. If this would be true, identification of some other *Hemipsilichthys* males as *Hemipsilichthys gobio* (hitherto a doubtful matter) becomes quite reliable. This would enable also to finally decide about the natural occurrence of the species, since it originally was described without indication of its locality.

#### *Hemipsilichthys vestigipinnis* Pereira & Reis, 1992

Pereira & Reis (1992) noted that mature males of *Hemipsilichthys vestigipinnis* present few, delicate, bristle-like hypertrophied odontodes on the head margin, usually hidden by the extensive fleshy fringes which covers most of the snout. After a revision of the genus *Hemipsilichthys* and related fishes, *Hemipsilichthys vestigipinnis* may prove not to belong in that genus.

#### *Hypostomus*

Secondary sexual dimorphism is unknown for most of the species, although especially the pectoral spine of the male of some species is distinctly more rugose than that of the female. Steindachner wrote in 1911 about "*Plecostomus commersonii* [= *Hypostomus commersonii* Valenciennes, in Cuvier & Valenciennes, 1840]: "In the last couple of years this species was brought frequently to Europe in young individuals, it thrives well in tanks for years and grows rather fast. An individual of hardly 10 cm long which I put in a tank about two years ago is nowadays 36 cm long." These observations are not associated with sexual dimorphism but indicate that Steindachner also was an aquarist!

#### *Isorineloricaria*

*Isorineloricaria spinnosissima* (Steindachner, 1880) and *Isorineloricaria festae* (Boulenger, 1898) differ from all species of *Hypostomus* in the long and slender caudal peduncle, which is almost round in transverse section. Above all, they differ in their peculiar and very

prominent secondary sexual dimorphism, although their long and rounded tail is also very distinctive. Due to their well-developed odontodes, females are already more rugose than the average species of *Hypostomus*, the genus to which they had long been assigned (as "*Plecostomus*", a synonym). In nuptial males many of these odontodes grow still excessively longer. Steindachner (1880, pl. 5 figs. 1-1a) illustrated the male holotype of *Isorineloricaria spinnosissima*; Regan (1904, pl. 9 fig. 1) a male (syntype) from western Ecuador, as *Plecostomus festae* and Eigenmann (1922, pl. 34 figs. 1-2) a female and a male, respectively. Boulenger (1898: 12), in his original description of *Isorineloricaria festae*, remarked: "Because of the spines which occupy the armour and the fins of males, this species surpass even *P. spinnosissimus* to which it is closely related, but from which it differs in the much more considerable enlargement of the tail. It is almost impossible to manipulate specimens preserved in alcohol with bare hands." The largest specimen was recorded by Eigenmann (1922: 69), with a total length of 565 mm. In general body shape, in the abundance of prominent odontodes, and particularly because of its salient sexual differences, *Isorineloricaria spinnosissima* strikingly reminds of several of the larger species of *Rineloricaria*.

Note that, according to Eigenmann (1922: 68-69), "*Plecostomus festae* (Boulenger, 1898), is a junior synonym of *Isorineloricaria spinnosissima*; he stated that the species undergoes marked change in proportions with growth, and that *Isorineloricaria festae* represents one of the phases of this metamorphosis.

#### *Pareiorhaphis*

The relationships between this genus and *Hemipsilichthys* are yet unclear, although probably most species now in *Hemipsilichthys* must be assigned to *Pareiorhaphis*.

#### *Pareiorhaphis calmoni* (Steindachner, 1907)

Steindachner (1907) described the sexual differences as follows: "In all females in our collection the margin and the adjacent region of the snout is naked, whereas in males the margin of the snout and beyond (to the upper side of the head) has small dermal ossifications concealed in thick wrinkled skin, from which numerous small prickles emerge. The lower side of the head shows always (in both sexes) a flabby fold, which in females protrudes only a little bit, while in males it is developed relatively very broad, protruding far over the sides of the head and it is occupied by several rows of slender, small prickles, the tip of which bends down. These prickles reach in females only a scanty length, in males to the contrary they are always considerably well developed. The longest of these slender tooth-like



prickles lay in a row in the middle towards the end of the second third along the fold on cheek. The freely protruding part of these longest prickles in a male of 10.5 cm length is as long as an eye diameter, in two males of almost 13 cm length about twice as long as the eye.

The upper side of the head is very rough to the touch, particularly on the three blunt ridge-like elevations, the external pair of which runs from eye to sides of snout. The middle one, which relatively is developed strongest, runs from between the nostrils in a straight line to the middle of the snout margin. Under the hand lens numerous small prickles are easily discernable, laying on these bump-like blunt ridges, which [prickles] in living individuals possibly may not be as prominently manifest as is the case in specimens preserved in alcohol. In old specimens (males) the dermal ossifications of the dorsum of head disappear in the thickened skin of the head, whereas these are exposed in younger specimens, showing a polygonal shape." ... "The pectoral fin spine is also in young females at least twice as strong as the first dorsal ray, of a weakly curved sable-shape, flattened, covered with hooked odontodes along the outer margin as well as along upper and lower sides. Its length together with its prickliness increases also in females relatively fast with age, so that the tip of the pectoral fin in very young females reaches towards the end of the first third of its length, in older females to 9 cm length usually reaches to or even beyond the middle of the length of the ventral fins.

Very conspicuous strongly developed is this spine in males of 10.6 to 13.2 cm length. It is in such males completely straight, evenly broad to very near the tip, quadrangular in transverse section, and close set with strong spines. Of these the largest spines, being those situated along outer edges and laying on the upper side, protrude from a thick, wart-like swollen cover of skin. The length of the pectoral fin spine is in feminine specimens of 5.4 to 8.5 cm length without exception somewhat shorter than the head, whereas in males of 10.5 to 13 cm length it is longer than in females and contained about thrice in body length."

*Pareiorhaphis steindachneri* (Ribeiro, 1918)

Steindachner (1911) wrote about this species: "The largest of the specimens sent to us, males, are 14 to 16.7 cm long and are distinguished by the conspicuous width of both the strongly depressed knob-like protrusion and the dorsally granular lobes at the sides of the head. These lobes increase somewhat in width near the area of the eyes on the head, and from there to the gill split decrease in width gradually or abruptly, their outer margin is covered with more or less long bristles in two or more rows, the longest of which are

at the broadest part of the lobe and beyond this point rapidly decrease in length. In these large males the head length is slightly less than the head width (measured to the outer margin of the lateral lobe) and is comprised 1 1/6 - 1 1/3 times in the last. In a male of 12.2 cm length, however, the head is only just as long as broad and in just as large females and in younger individuals always notably longer than broad.

In the two largest females in our collection, the total length (including caudal fin) is 12.2 and 12.3 cm. The lateral head lobe is indicated as a delicate warty edge, with very short and delicate bristles around this edge and between the skin warts. In all other, smaller, specimens this is completely absent.

All specimens of this species, which we possess from the Itapocú area, were caught out of the period of reproduction, that is why the body scutes are only normal, very delicately covered with skin, they are rough, below the pectoral fin spine strongly depressed, flexible in the posterior third of its length, curved into a weak sable-shape and not longer than the ventral spine."

Recently, *Pareiorhaphis steindachneri* was again relegated to the synonymy of *Pareiorhaphis calmoni* [as *Hemipsilichthys cameroni*] by Pereira & Reis (1992); this synonymy may prove true but still requires the direct comparison of type specimens of both taxa.

*Pogonopoma wertheimeri* (Steindachner, 1867)

Opercular area with rather short, invertebrate marginal bristle-like odontodes (not close-set, as in *Pseudorinelepis*), evidently a character of the male. *Pogonopoma wertheimeri* is still poorly known.

*Pseudorinelepis*

Males have the opercular area with rather short, close-set, invertebrate marginal bristle-like odontodes.

### Subfamily Ancistrinae

Includes the genera: *Acanthicus*, *Ancistrus*, *Baryancistrus*, *Chaetostoma*, *Cordylancistrus*, *Dekeyseria*, *Dolichancistrus*, *Exastilithoxus*, *Hemiancistrus*, *Hopliancistrus*, *Hypancistrus*, *Lasiancistrus*, *Leporacanthicus*, *Leptoancistrus*, *Lipopterichthys*, *Lithoxancistrus*, *Lithoxus*, *Megalancistrus*, *Neblichthys*, *Oligancistrus*, *Panaque*, *Parancistrus*, *Peckoltia*, *Pseudacanthicus*, *Pseudancistrus*, *Scobinancistrus* and *Spectracanthicus*.

*Ancistrus*

Regan (1904) described the sexual differences in *Ancistrus* adequately in just a few words: "In most species ... the naked margin of the snout is much wider in



males than in females, whilst the latter have a more or less distinct marginal series of tentacles, the former have in addition a Y-shaped group of tentacles, the limbs of the Y starting in front of the nostrils and running forward to meet in the middle line on the upper surface of the snout". *Xenocara* (meaning 'strange head') was the generic name used by Regan; it is currently a synonym of *Ancistrus*.

As far as known, all *Ancistrus* spp. (but species of other genera do not) display an unique secondary sexual dimorphism, the male being provided with long, sometimes quite thick, partly bifurcate or even further subdivided barbel-like soft tentacles on dorsum and along margin of the snout. Females at most have small, short and rather inconspicuous barbel-like extensions along the margin of the snout.

Both sexes possess a tuft of strong, permanently 'enlarged', recurved, evertible odontodes in the interopercular area. In the males of some species, these spines tend to be more prominently developed than in the females. When these fishes are not disturbed, the spines lay pressed against the head in a shallow space where they are not well visible. When, for example, a specimen is being removed from the water by an aquarist, it moves the interopercular spines quickly and strongly forward and backward by a muscular action, in an attempt to defend itself by making additional vigorous lateral movements with the head. One can imagine how effectively this works against potential predators in their natural habitat.

*Chaetostoma*

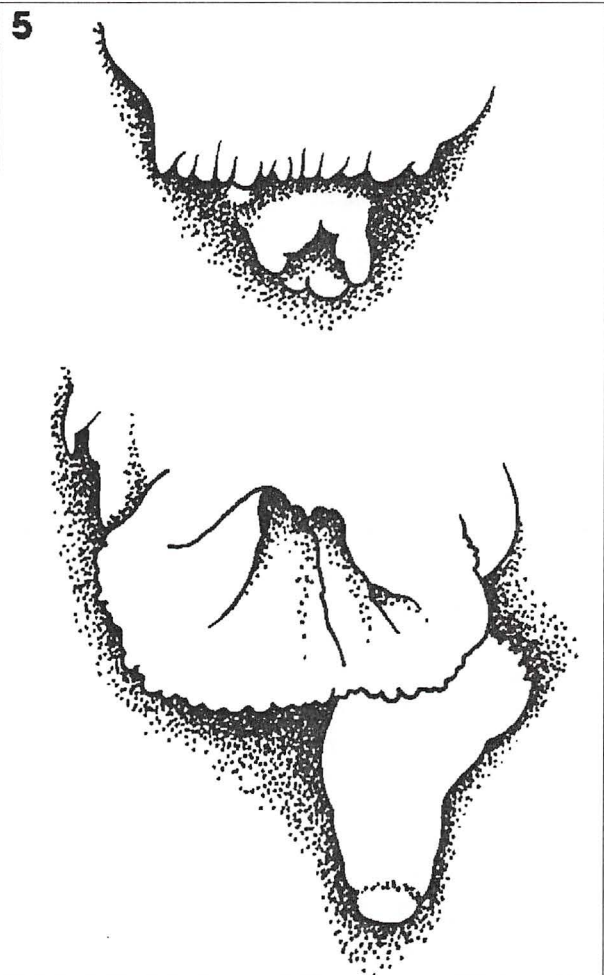
Sexual differences are unknown for most species.

*Chaetostoma guairense* Steindachner, 1882

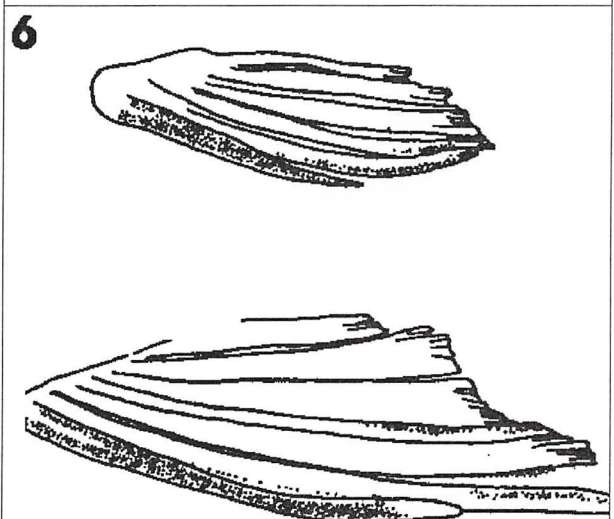
Steindachner stated about this species in the original description: "The height of the anal varies very marked in this species, in some specimens it almost equals only half the length of the snout with or without eye, in other specimens (males?) it is nearly the whole length of snout (to anterior margin of eye)."

*Chaetostoma jegui* Rapp Py-Daniel, 1991

While describing this species, Rapp Py-Daniel (1991) wrote the following: "...a secondary sexual dimorphism unique among Loricariidae: males have greatly expanded simple anal rays and cutaneous folds at the edges of the ventral fins."... "The genital pore of mature males has a cylindrical appearance with a small opening at the extremity. Females have a small opening just behind the anus surrounded by small flaps of skin." ... "Ventral fins, in nuptial males, show a cutaneous fold, seen only dorsally, at the edge of the first ray. This fold can run along the whole ray or not, but it is always thicker than its base. Anal fin rudimentary in



5 Differences in gender in *Chaetostoma jegui* Rapp Py-Daniel, 1991: the genital papilla of the male (below) is cylindrical; that of the female (above) is located just behind the anal fin and is surrounded by small dermal lobes. Drawings: O. Gehring, slightly modified after Rapp Py-Daniel (1991).



6 In fertile males of *C. jegui* the pelvic fins show a fold of skin at the margin of the first ray; moreover, the first two (especially the second) anal fin rays are much longer (below). Drawings: O. Gehring, slightly modified after Rapp Py-Daniel (1991).



males, the first two simple anal rays are much longer, especially first two simple anal rays are much longer, especially the second ray." ... "Fowler (1943) described a new genus and species, *Hypocolpaterus analis*, from Colombia, based on a single specimen 320 mm in standard length, which was characterized by "enlarged paired fins and anal and the presence of cutaneous folds along ventral and anal spines and rays". In *Chaetostoma jegui*, the cutaneous folds are present on the first ventral ray only. As Fowler's specimen is much longer than all specimens of *Chaetostoma jegui* I have examined, it is possible that the number of folds increases with the size of the fish. Having studied 57 specimens of *Chaetostoma jegui* and observed the conspicuous sexual dimorphism in the shape of the ventral and anal fins (large expansion of the two simple anal rays in the males), I conclude that *Hypocolpaterus analis* is a species of *Chaetostoma* (*Chaetostoma anale*) exhibiting the same development of the anal fin. Thus *Hypocolpaterus* has to be considered as a junior synonym of *Chaetostoma* [to be sure, the holotype of *Hypocolpaterus analis* should be reexamined. IJHI].

The enlarged simple anal rays in the maturing male of *Chaetostoma jegui* is the first case of sexual dimorphism of this kind confirmed in Loricariidae. This character is already developed in a maturing specimen of *Chaetostoma jegui* of 77 mm in standard length [largest known specimen: 168 mm in standard length]. The difference between the lengths of the first and the second simple anal ray increases with the size of the fish and with sexual maturity. On the other hand, the small cylindrical structure of the urogenital papilla of the males can be observed even in immature males,

whose anal fin has no expanded simple rays. Steindachner (1882) described *Chaetostoma guairensis*, mentioning differences in the size of the anal fins of specimens he tentatively identified as males; this has not yet been confirmed. The sexual dimorphism expressed in the anal fin of the males might be a temporary character, present only during the periods of reproductive activity; but difference in the urogenital structure is permanent."

Like many genera of Loricariidae, *Chaetostoma* needs a thorough revision. Until then *Hypocolpaterus* may remain included as a synonym.

*Cordylancistrus torbesensis* (Schultz, 1944)

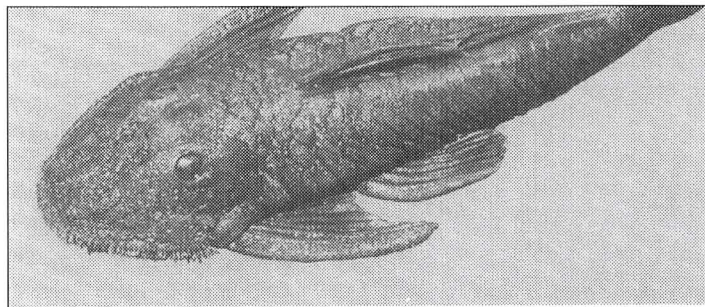
Schultz (1944) noticed: "...rims of orbits a trifle elevated on large males [largest specimens of this species was recorded as 64.6 mm in standard length];" ... "strong spines occur on the upper surfaces of the pectoral spine in mature males;" ... "on the fully mature males, there is along the upper surface of each ray an elongate dermal flap, the one on the pelvic spine widest and a little more than diameter of eye."

*Dolichancistrus*

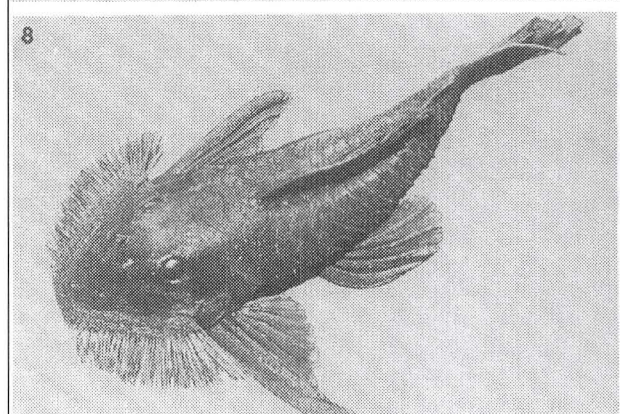
The species of this genus have only few evertible interopercular odontodes, one of which is extremely long, reaching past head; males have the pectoral rays greatly elongated, sometimes extending beyond the pelvic fin rays; snout with bristle-like odontodes in the males.

*Exastilithoxus fimbriatus* (Steindachner, 1915)

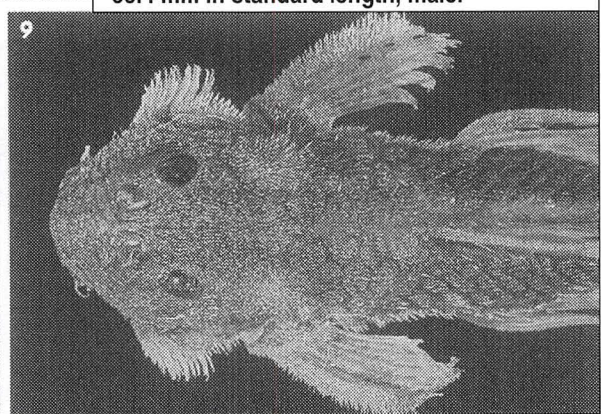
The holotype and only known specimen, after comparison with material of other species, is assumed to be a



7 *Pseudancistrus barbatus* (Valenciennes, in Cuvier & Valenciennes, 1840) from the Suriname River (Surinam), female or infertile male. Photo H. Nijssen.

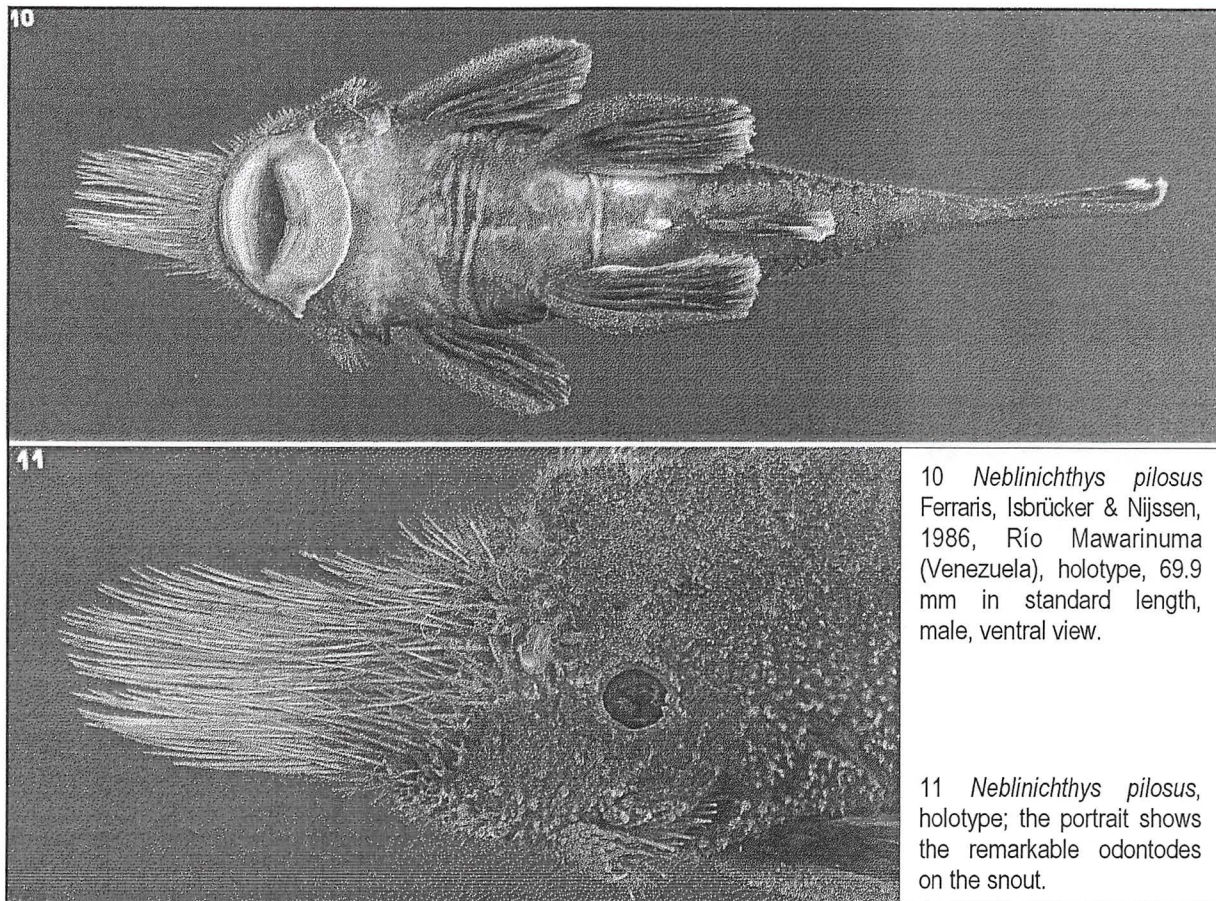


8 *Pseudancistrus barbatus* from the same locality, male, 177 mm in standard length. Photo H. Nijssen.



9 *Exastilithoxus fimbriatus* (Steindachner, 1915), Río Cuquenán (Venezuela), holotype, 53.4 mm in standard length, male.





10 *Neblinichthys pilosus* Ferraris, Isbrücker & Nijssen, 1986, Río Mawarinuma (Venezuela), holotype, 69.9 mm in standard length, male, ventral view.

11 *Neblinichthys pilosus*, holotype; the portrait shows the remarkable odontodes on the snout.

nuptial male. The odontodes on the scutes are prominent, arranged into horizontal ridges stretching from about the height of the dorsal fin origin. The first 6 or 7 lateral body scutes bear very prominent, acute odontodes near to the posterior margin. Head, particularly sides and dorsum of the snout, rough, because of numerous erect and oblique acute odontodes. Ventral margin of operculum with a series of comb-like odontodes. Cleithrum covered with numerous long and slender, slightly antrorse odontodes. They resemble the evertible interopercular odontodes, which, however, are considerably longer. Sides and dorsum of pectoral fin spine close-set with long and slender odontodes with an antrorse tip. Dorsum of first three pectoral fin rays with decreasingly prominent, erect, slender odontodes arranged into a single row on each ray; first two pelvic fin rays with similar, although much shorter odontodes. The adipose fin spine is rough. The pelvic fin spine and ventral part of the pectoral fin spine show rather broad odontodes. Minute odontodes on dorsal and anal fin spine, and on caudal fin. The posterior evertible odontodes are gradually longer than the anterior ones, which merge gradually with the adjacent inevertible odontodes.

*Hypancistrus zebra* Isbrücker & Nijssen, 1991

Nuptial males with more conspicuous odontodes on pectoral fin spine and with somewhat longer evertible

odontodes in interopercular area than present in females.

*Leporacanthicus*

In nuptial males head and snout become particularly rough because of the occurrence of hypertrophied odontodes which are like short, thick needles.

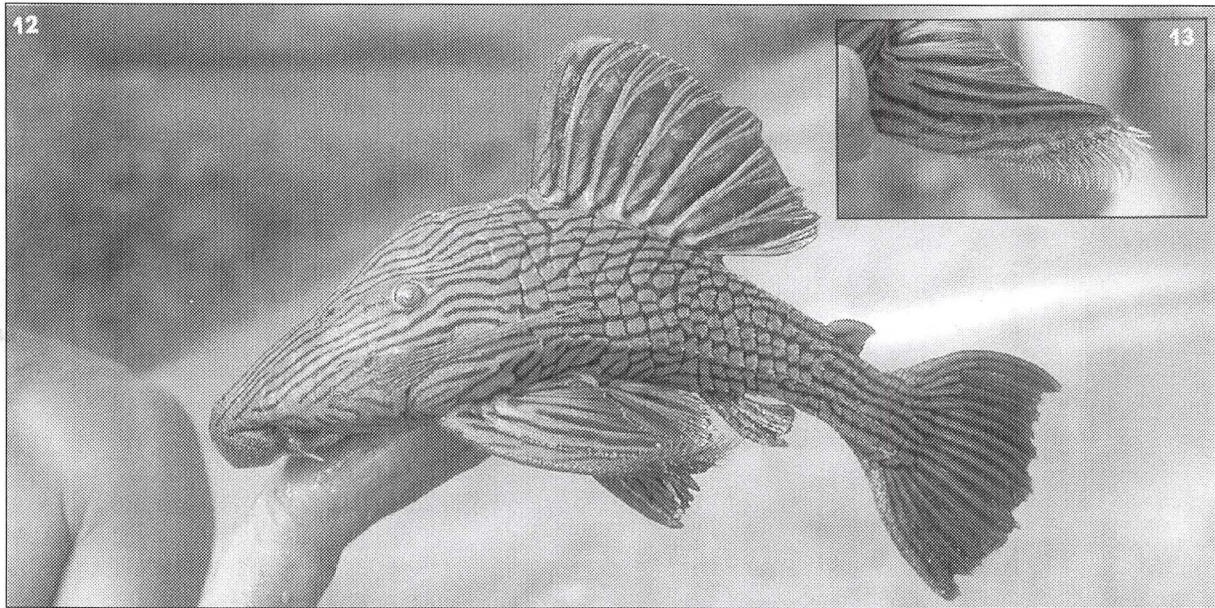
*Lithoxus lithoides* Eigenmann, 1910

This is a much depressed species. Eigenmann recorded his largest specimen, a male, as 86 mm (not standard length, which is less), whereas he found that a "...female 63 mm. long contains eggs about 2 mm. in diameter." Nuptial males have numerous short, needle-like odontodes along the entire outer margin of the pectoral fin spine.

*Lithoxus stocki* Nijssen & Isbrücker, 1990

Nuptial male: odontodes on scutes prominent, arranged in horizontal ridges extending posteriorly from about the vertical line through dorsal fin origin. Ventral margin of operculum with series of quite prominent odontodes. Anterior half of sides and dorsum of pectoral fin spine closely set with long and slender odontodes with an antrorse tip. Adipose fin spine rough. The pelvic fin spine and ventral part of pectoral fin spine bear rather broad odontodes. Minute odontodes on dorsal and anal fin spines, and on caudal fin. Sides and dorsum of snout covered with small, irregular,





**Figs. 12 and 13** *Panaque* cf. *nigrolineatus* (Peters, 1877) from the Rio Tocantins (Brazil); fertile males possess needle-like odontodes on the edge of the pectoral spines and elongated interopercular odontodes.  
Photos: R. Stawikowski

firmly fused, rough scutelets. Posterior evertible interopercular odontodes progressively longer than anterior ones, which merge gradually with adjacent non-evertible odontodes.

*Neblichthys pilosus* Ferraris, Isbrücker & Nijssen, 1986

Males develop a peculiar tuft of stiff, anteriorly directed, hair-like (pilosus means hairy) odontodes on middle dorsum of snout, longest of which are somewhat longer than snout. Much shorter, thin and elongate odontodes occur along sides of head and snout, between head and origin of dorsal fin spine, and on pectoral fin spine. Since the fishes more often than not live with the head directed against the stream, small particles are frequently 'sieved' by the 'forelock' of these males. Before the (preserved) specimen shown in this paper was photographed, we carefully removed the dirt present at the base of the 'hair'; at any rate, the

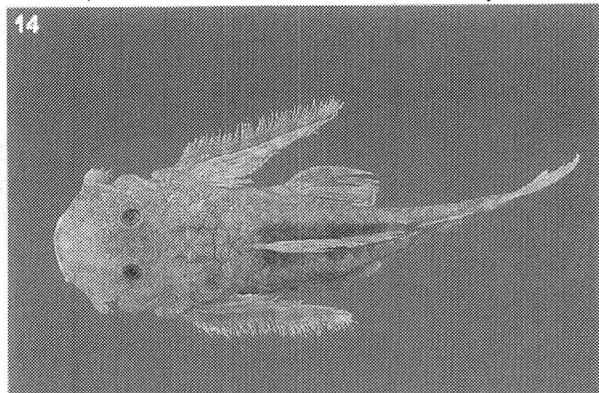
permanent presence of such extremely elongated odontodes would probably be quite disadvantageous for this species ...

*Panaque nigrolineatus* (Peters, 1877)

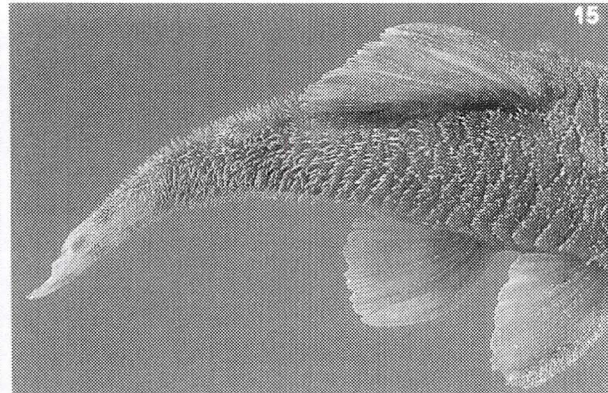
Mature males possess very large needle-like odontodes along part of the margin of the pectoral fin spine. The few posteriormost evertible interopercular odontodes also are much longer in males than in females. Frequently this species is encountered living in solitary pairs in nature.

*Peckoltia*

Similar to the condition in *Aphanotorulus*, mature males of at least various species of the (systematically still poorly known, thus indefinite) *Peckoltia vittata* group have the posterior half of the body covered with numerous peculiar, enlarged odontodes.



**14** *Lithoxus lithoides* Eigenmann, 1910, from the Lower Potaro River at Amatuk (Guyana), holotype, 67.3 mm in standard length, male.



**15** *Peckoltia* sp. aff. *vittata* (Steindachner, 1882), from the Rio Tapajós (Brazil), 94.6 mm in standard length, male with odontodes on posterior part of body.





*Pseudancistrus barbatus* (Valenciennes, in Cuvier & Valenciennes, 1840)

Both sexes possess needle-like odontodes along the margin of the head, those of the male being distinctly longer than those of the female. Sometimes, the bristle-like odontodes of some male can grow extremely long. The male shown here is the only specimen with such long bristles out of a series of 173 specimens collected simultaneously in the Suriname River, Surinam. In this large sample there are only other males which possess much shorter bristles. The phenomenon of extreme development of this sexual dimorphism in a very limited number of specimens (usually only one specimen) within populations has occasionally been observed, for example, also in some *Ancistrus* species (Dr H. R. Axelrod, pers. comm.). One tends to think that such extremely ornamented individuals might play a dominant social rôle among locally associated specimens within these populations. Although we have nothing to document this hypothesis, it may be that after the death of a dominant male another male will start to develop the much longer bristles to replace the deceased dominant male. However, there is also a possibility that excessively long bristles are only temporarily present, for instance during the spawning season. The extremely long odontodes must have some impact on the abilities to move around; almost nothing is known about the life history of so many loricariids!

#### Subfamily Loricariinae

Includes the genera: *Apistoloricaria*, *Aposturisoma*, *Brochiloricaria*, *Crossoloricaria*, *Cteniloricaria*, *Dasyloricaria*, *Dentectus*, *Farlowella*, *Furcodontichthys*, *Harttia*, *Harttiella*, *Hemiodontichthys*, *Ixinandria*, *Lamontichthys*, *Limatulichthys*, *Loricaria*, *Loricariichthys*, *Metaloricaria*, *Paraloricaria*, *Planiloricaria*, *Pseudohemiodon*, *Pseudoloricaria*, *Pterosturisoma*, *Pyxiloricaria*, *Reganella*, *Rhadinoloricaria*, *Ricola*, *Rineloricaria*, *Spatuloricaria*, *Sturisoma* and *Sturisomatichthys*.

Several different patterns of secondary sexual dimorphism have evolved in the Loricariinae. All these changes occur only in the male. These include (a) excessive growth of odontodes in certain areas of the head, on dorsum of the body in front of the dorsal fin origin, and/or on dorsum of the pectoral fin, (b) change in the shape of certain minute odontodes - for example, those on the spines of the pelvic and anal fins - (c) change in the shape of the teeth, and (d) the development of a very long and broad lower lip. The dimorphism mentioned under (a) is restricted to the relatively primitive species, that indicated under (d) is found only in the more specialized species. In addition, sexual differences are unknown in various species and thus still need confirmation.



*Apistoloricaria condei* Isbrücker & Nijssen, 1986

Mature males: the head and predorsal area are slightly longer than in the other adults (although similar to the ratios found in some juveniles). The largest male has the outer barbel along the lower lip shorter than the other adults (it is equally shorter in the juveniles - usually juveniles resemble females rather than males!). The pectoral filaments of males are considerably longer, like the lower caudal fin spine; the latter extends into a filament which is relatively longer than that in the other adults, which accounts for a more deeply forked caudal fin. The snout is slightly longer and the body at dorsal fin origin deeper than in all other specimens.

The inner barbels along the lower lip of the males are shorter than in the other adults. The maxillary barbel of the largest known male reaches to the distal tip of the fifth branched pectoral fin ray only. In other adults this barbel reaches more posteriorly.

The ventral surface of the lower lip of the males has no filaments. Instead, many small, flat papillae, which are minute along the sides, and a few conical papillae cover the lip. At the inner edge of the membrane connecting the maxillary barbel with the lower lip, and along the posterior edge of the lower lip is a series of isolated, flat, wart-like swellings. The tooth crowns are broader than in adults of undetermined sex, consisting of two lobes: the outline of the two lobes together remains, however, spoon-shaped, as in females. The larger (inner) teeth have a deep median incision, whereas the smaller teeth gradually have the incision situated more outward. The smaller teeth have the inner lobe about twice the size of the outer lobe. The second to largest known male has more numerous conical papillae and (very few) quite short filaments on the surface of the lower lip.

*Aposturisoma myriodon* Isbrücker, Britski, Nijssen & Ortega, 1983

Only two specimens are known which show enlarged odontodes along the sides of head and snout, in front of the operculum and especially in front of the maxillary barbels. These specimens are recognized as males.

#### *Cteniloricaria*

Sexual differences like those in *Harttia*.

#### *Dasyloricaria*

Males are characterized by the development of numerous relatively short and thin (close-set) hypertrophied odontodes on the head and nape and on dorsum of the pectoral fin.

#### *Farlowella*

Males of *Farlowella* develop conspicuously enlarged

odontodes (bristles) along the sides of the produced snout. One species, *Farlowella curtirostra* Myers, 1942 has the snout hardly produced. The males of this species have bristles confined to the sides of the head.

Several years ago we met an aquarist who told us that she had successfully bred some *Farlowella* species. According to her, both sexes had developed bristles, however, the male more prominently than the female. Are there really 'transvestites' in this genus and if so, could this occur with other loricariids as well?

*Furcodontichthys novaesi* Rapp Py-Daniel, 1981

This species (the only one in the genus) is known only from three males and two females. Both sexes have a narrow upper lip. In females, the lower lip is very short and has a series of four long barbels at each side of its margin, each with numerous subbarbels. The maxillary barbels are very long and fringed with several long subbarbels at both the inner and the outer side. Each tooth with a bifurcate, acute crown. In mature males, the lower lip is considerably larger (although comparatively much shorter than in *Loricariichthys*, *Pseudoloricaria*, *Limatulichthys* and *Hemiodontichthys*), deeply notched in the middle. The two series of four barbels in nuptial males originate about halfway from the side of the enlarged lip. Each tooth has a bifurcate, rounded crown in the males.

*Harttia*

Mature males possess somewhat enlarged, relatively short, needle-like odontodes along margin of head and snout, on margin of pectoral fin spine as well as on dorsum of pectoral fin spine and rays.

*Harttiella crassicauda* (Boeseman, 1953)

Boeseman (1971) noted that in his two largest specimens, 41.1 and 48.5 mm in standard length, the pectoral spine is "...covered with many, rather long, recurved spines, possibly an indication that these specimens (males?) are adult;" in addition, the body scutes are remarkably spiny, i.e., covered with elongated odontodes.

*Hemiodontichthys acipenserinus* (Kner, 1854)

This genus is also known from a single species. Nuptial males develop large, broad upper and lower lips. Lips on both ventral and dorsal sides covered by numerous small papillae, more distinct in nuptial males, giving a granular appearance to these surfaces. Shape of the teeth differs slightly in both sexes, those of the females and of specimens of undetermined sex being more acute than those of the males. This species shares the peculiar secondary sexual dimorphism with *Loricariichthys*, *Pseudoloricaria* and *Limatulichthys*.

Note the peculiar ridges of the conspicuous odontodes, which especially on dorsum of the head are arranged into wavy lines: this, however, is not a sexual difference.

*Ixinandria*

Mature males have a broad roundish head in dorsal view (looking very different from the rather triangular, much narrower head of females), the sides of head and snout becoming covered with a strip of relatively short though robust odontodes. Similar odontodes appear on dorsum of pectoral fin spine and rays.

*Lamontichthys filamentosus* (La Monte, 1935)

Nuptial males gradually develop large, protuberant bristle-like odontodes on part of the dorsum of the pectoral fin spine. The largest specimen available so far (167.3 mm in standard length) is a male with fully developed "bristles" and the following notes are based on this specimen. The length from the ventroanterior base of the pectoral fin spine to the tip of the first branched ray is 37.3 mm. The anterior odontodes occur at 13.8 mm from the ventroanterior base. The entire denticulate area is 19.2 mm long, whereas the distal end of the pectoral fin spine is naked at a distance of 5.9 mm from the tip of the first branched ray. The bristly area is covered with a layer of thick, slimy tissue forming a rather long shaft enclosing the base of the odontodes. The long odontodes (about 3.3 mm long) look like translucent needles with the tip bending slightly towards the head. The tip of these odontodes is light yellowish in colour.

*Limatulichthys*

Similar to *Loricariichthys*.

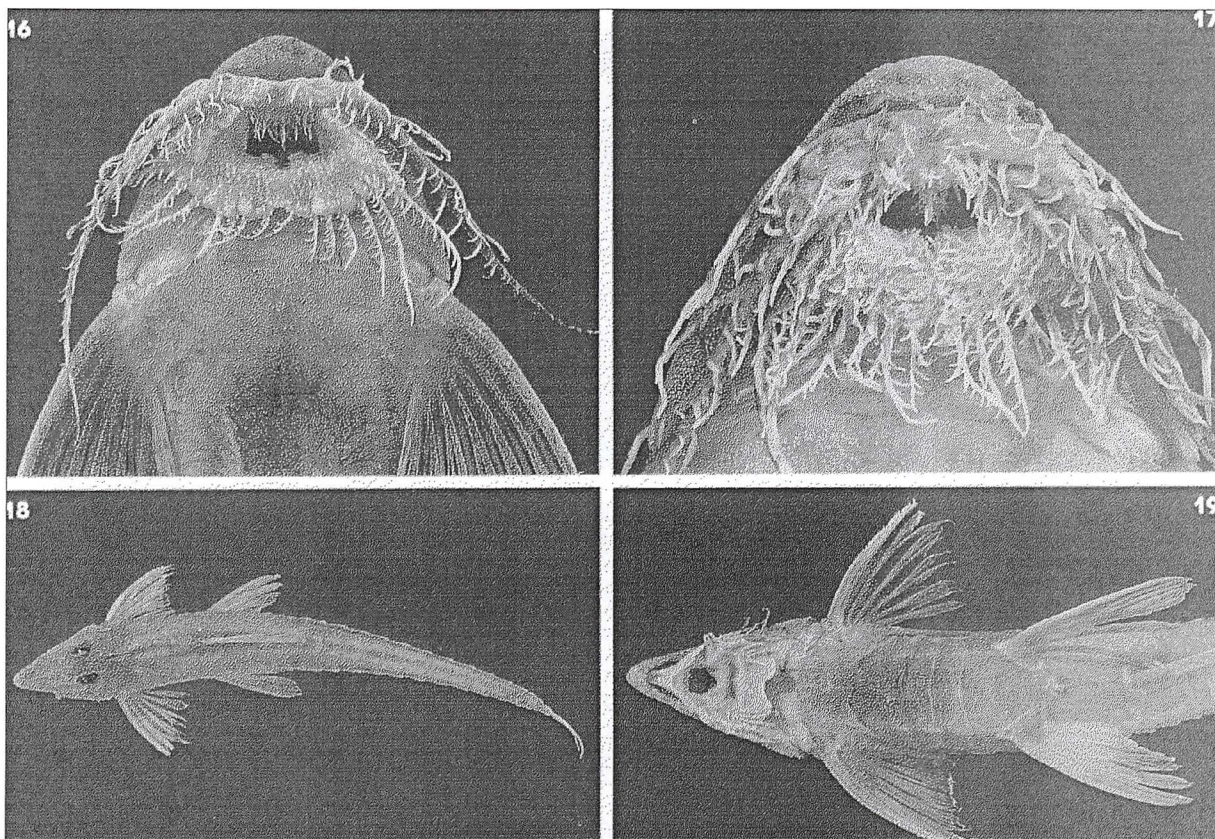
*Loricaria*

Mature males of the *Loricaria cataphracta*-group (which group excludes *Loricaria apeltogaster* Boulenger 1895, *Loricaria prolixa* Isbrücker & Nijssen, 1978, and *Loricaria lentiginosa* Isbrücker, 1979) have hypertrophied pectoral fin spines, blunter odontodes on the pelvic and anal fin spines, and shorter, more rounded tooth lobes than females. Very rarely, males have long and broad lips (e.g., only one known male of *Loricaria clavipinna* Fowler, 1940 has the lower lip shape suggestive of those loricariine fishes which protect their eggs by the enlarged lower lip: *Dasylicaria*, *Limatulichthys*, *Pseudoloricaria*, *Loricariichthys*, *Hemiodontichthys* and *Furcodontichthys*).

*Loricaria cataphracta* Linnaeus, 1758

Eight out of 21 specimens from Brazil, Ilha de Marajo, are males (230-257 mm in standard length; standard





16 *Apistoloricaria condei* Isbrücker & Nijssen, 1986, Rio Aguatico (Ecuador), paratype, 140.6 mm in standard length, male.  
 17 *Apistoloricaria condei*, Rio Tiputini (Ecuador), holotype, 126.2 mm in standard length, female.  
 18 and 19 *Furcodontichthys novaesi* Rapp Py-Daniel, 1981, junction of Rio Negro and Rio Branco (Brazil), 118.4 mm in standard length, male.

length of the females 255-276 mm). Seven of them have the crowns of the teeth shorter and broader than in the females. The greatest contrast between both sexes is in the shape of mandibular teeth, not always in the shape of the teeth in the premaxillae.

*Loricaria nickeriensis* Isbrücker, 1979

This species is characterized, among others, by its small adult size, up to 119.5 mm in standard length. The smallest nuptial male is 97.1 mm in standard length. Males can be recognized easily by a thickening of the pectoral fin spine near the acute distal tip, which differs from the club-like spine shape in males of related species. Tips of the teeth in premaxilla and dentary are shorter and especially blunter in males than in females.

*Loricaria simillima* Regan, 1904

Taylor (1983), comparing the reproductive ecology of three sympatric species of Loricariinae, observed that in *Loricaria simillima* dense concentrations of tentacles, present in adult females, were reduced or completely lacking on the ventral surface of the lower lip in breeding males. In this species the egg mass, an elongate, flattened sheet 2-4 eggs in thickness, was at-

tached along the posterior margin of the male's lower lip, with the remainder of the mass trailing posteriad along the abdomen.

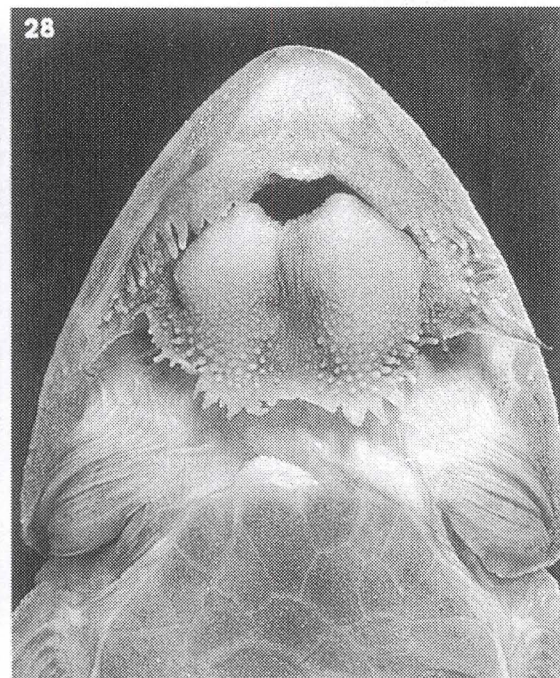
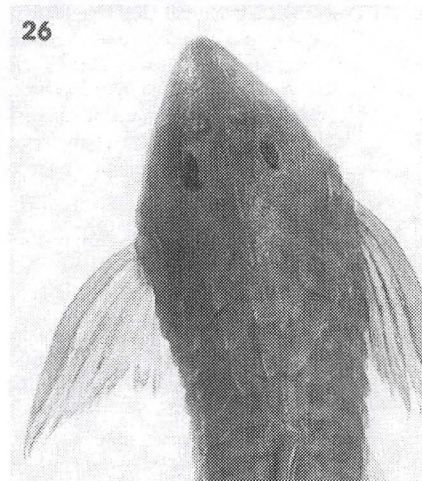
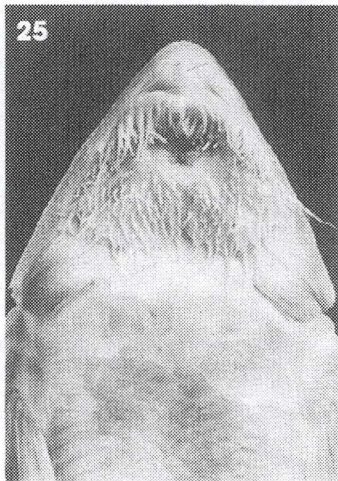
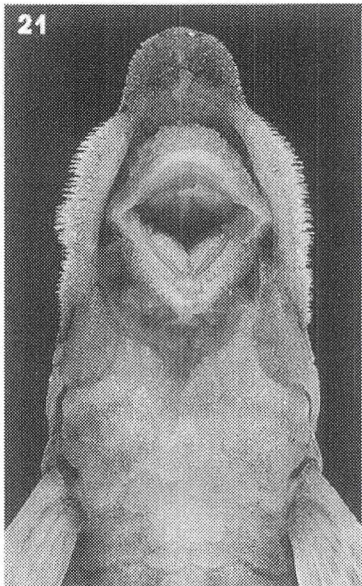
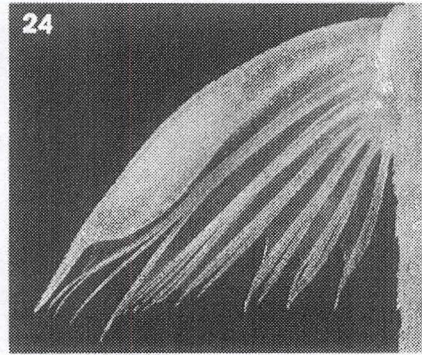
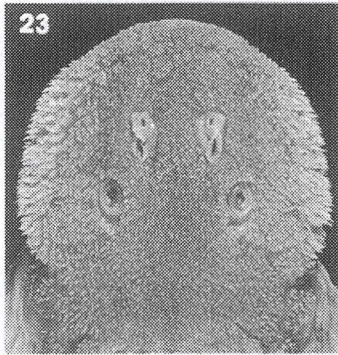
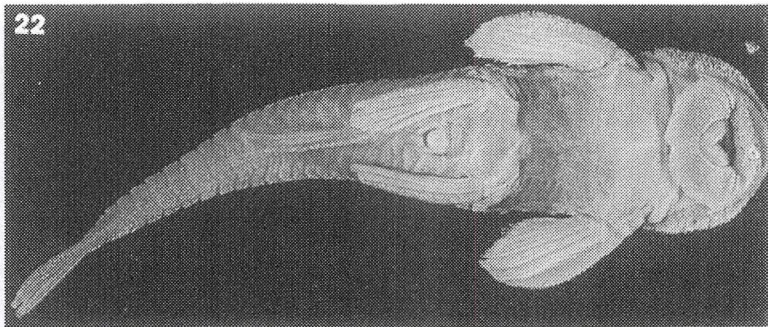
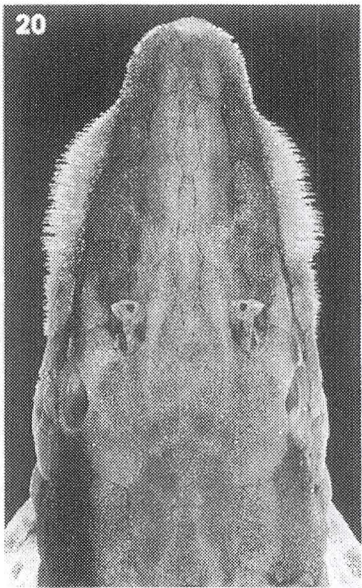
*Loricariichthys*

*Loricariichthys* has a secondary sexual dimorphism totally different from *Rineloricaria*, a genus with which it was previously often confused: neither sex develops enlarged odontodes to become bristly, as in *Rineloricaria*. Males of *Loricariichthys* gradually develop a very long and broad lower lip with which they protect the rather large eggs (and possibly also the early embryos) which are fully covered by the lip. The lips of females remain much shorter and are provided with numerous papillae and with two cushion-like areas. *Loricariichthys* spp. are characterized by their small, poorly developed (often almost rudimentary) teeth, which occur in both the upper and lower jaws. Females have acute crowns of the oral teeth, whereas in males the crowns become more or less cup-shaped.

*Loricariichthys maculatus* (Bloch, 1794)

The lower lip of the males is large, the entire





**20** *Farlowella curtirostra* Myers, 1942, locality unknown, 108.6 mm in standard length, male. In this species the snout is hardly elongated into a conspicuous rostrum; the bristles along sides of head are clearly visible.

**21** *Farlowella curtirostra*, same male as in Fig. 20, ventral side of head.

**22** *Ixinandria steinbachi* (Regan, 1906), lectotype from Salta (Argentina), 87.2 mm in standard length, male, ventral view.

**23** *Ixinandria steinbachi*, lectotype, head in dorsal view; typical for males is the broad, round head; observe also the short but robust odontodes along sides of head and snout.

**24** *Loricaria clavipinna* Fowler, 1940, holotype from Contamana (Peru), 142 mm in standard length, male, the characteristic thickened outer pectoral fin ray is well visible.

**25** *Loricaria cataphracta* Linnaeus, 1758, neotype from the mouth of the Marowijne River near Galibi (Surinam), female, 290 mm in standard length, view at the mouth and at the jaw dentition.

**26** *Loricaria cataphracta*, male from the same locality as in Fig. 25, 270 mm in standard length, also in this specimen the thick pectoral fin spines are clearly visible.

**27** *Loricariichthys maculatus* (Bloch, 1794), topotype from ditches at Cultuurtuin (= Botanical Gardens) in Paramaribo (Surinam), male of 163 mm in standard length; note the extremely elongated lower lip (compare also with the contribution at page 39 of this issue).

**28** *Loricariichthys maculatus* (Bloch, 1794), another topotype; female of 175 mm in standard length; the much shorter lower lip and both pillow-like structures of the mouth are well visible.

surface being covered by minute, regularly sized papillae. There are two fleshy, rectangular flaps, devoid of papillae, in the buccal cavity, just below the upper jaws. The lower lip of the females is much shorter and narrower. Small papillae are present on 'cushions', increasing in size towards the edges, and becoming barbel-like along the edge. At the type locality of *Loricariichthys maculatus* Dr Han Nijssen once collected one male specimen still carrying eggs under the lower lip. The two flaps in the buccal cavity of the female are larger than in the male and have distinct papillae.

*Loricariichthys platymetopon* Isbrücker & Nijssen, 1979  
Secondary sexually dimorphic characters are found as differences in structure and pigmentation of the lips and in shape of the teeth. In the female, the dorsal side of the upper lip consists of smooth skin extending from the ventral tip of the snout to just anterior of the upper jaws, then running laterally along part of the rictal barbels, its edge becoming papillate with about ten to eighteen subbarbels. The ventral side of the upper lip is covered with numerous weakly developed soft striae, and ridges of papillae; larger papillae are situated near the subbarbels just mentioned. The edges on either side of the upper jaw are almost separated from each other by a small, triangular flap of skin originating just anterior to the symphysis of the upper jaws. On the ventral surface of this flap there is a medial ridge of skin, running to a point between the right and left upper jaws.

The upper and lower lips are connected with each other by rictal barbels, together forming a sort of sucking device. The lower lip consists of two thick, cushion-like parts - thickest towards the buccal cavity - with a median separation bridged by thin skin. This surface is covered anteriorly with rather inconspicuous soft striae and ridges of weak papillae, increasing in size towards its edge. A more or less prominent median notch may be present. The edge of the lower lip has small trian-

gular papillae and minute flaps.

In mature males the lower lip and posterior part of the upper lip become gradually longer and broader, to form a huge, thin labial velum. During this process the two cushion-like structures present in females and juveniles and immature males disappears completely. This labial velum has an important function in the protection of the eggs (and possibly of larval stages). A male of 186 mm in standard length has a lower lip length of 36.3 mm and, measured between the points where the rictal barbels project from the lips, a width of about 53 mm; the male was long known to take care of the eggs (Menezes, 1949, published this first for "*Loricaria typus* (Bleeker, 1862)" = *Loricariichthys platymetopon*).

In females and juveniles and immature males the tips of the teeth are slender and acute, in nuptial males the tips become much broader and rounded.

Taylor (1983), compared the reproductive ecology of three sympatric species of Loricariinae in the field in Paraguay (*Loricaria simillima*, *Loricariichthys platymetopon* and *Loricariichthys labialis* (Boulenger, 1895)) and noted that in *Loricariichthys platymetopon* and *Loricariichthys labialis* the lower lips of brooding males were flattened and expanded, extending posteriad as a sheet-like membrane beyond the bases of the pectoral fins, while in adult females the lips were much shorter and more thickened. Subadult males in all three species exhibited a lip morphology indistinguishable from that of conspecific adult females. In contrast to *Loricaria simillima*, in these two species of *Loricariichthys* eggs were aggregated to form large, globular pellets which were enfolded and carried in the male's expansive lower lips.

*Metaloricaria paucidens* Isbrücker, 1975

The holotype (270 mm in standard length) and one of the paratypes (ZMA 112.741, 234.5 mm in standard length) can be recognized as mature males by the development of bristle-like odontodes. These are confined to the posterior two-thirds (approximately) of the



snout margin. The bristles are quite short, up to about 1 mm in the holotype. They are very slender, straight, erect, the yellowish tip pointed. The bristles are originating from a layer of thick, rough skin. In the male paratype the development of bristles is less advanced than in the holotype, the area covered by them being smaller and narrower, and not yet as much affected by the bristle-bearing skin.

There is no indication of bristle development in the predorsal area, neither on the pectoral fin spine and rays of these specimens. The bristle-like odontodes in the holotype and in one paratype do not show their maximum development.

The pectoral fin spines of males are thicker than those of females. The largest odontodes along the side of the head in the specimen, detail of which is illustrated here is about 2.8 mm; the other specimen (245 mm in standard length) has in the same region odontodes up to about 3.8 mm long; the odontodes arise from mucous skin and are difficult to measure accurately.

In males enlarged short odontodes occur in an erect position on the ventral side of the pelvic fin spine; they are very slender except for the thick, round tip, thus reminiscent in shape of minute pins. The odontodes on the pelvic fin spine are blunter than those in females. In males the inner tooth lobe is somewhat shorter and its distal tip is slightly more rounded than in females and juveniles and immature males.

*Pseudohemiodon*

Similar to *Apistoloricaria*.

*Pseudoloricaria*

Similar to *Loricariichthys*.

*Ricola*

The pectoral fin spine is thicker in the male than in the female, just like in males of *Loricaria*. Tooth lobes in mature males become broader and more rounded at the tip than in immature males, females and juveniles, which have acute tips.

*Rineloricaria*

Many years I occasionally selected living *Rineloricaria* specimens belonging to several species, imported for aquarium purposes, among which were bristled individuals (nuptial males) and non-bristled individuals (either juveniles, females or immature males). After a while these mature males lost their bristles and then could hardly be told apart from the females. Subsequently the bristles appeared again in some of the individuals.

*Rineloricaria lanceolata* (Günther, 1868)

Only three out of thirty-four specimens examined had developed immovable bristle-like odontodes, a secondary sexual character of males. These three specimens have standard lengths of 115, 103, and 97.6 mm, respectively, and are the largest specimens of our material, the next to largest being 91.3 mm in standard length. The smallest known mature male is 84.7 mm in standard length. There are three areas where bristle-like odontodes are developed:

1) interorbital through predorsal area. The bristle-like odontodes are slender, long, nearly straight, and lay just over the body. The base of the spines in this area is covered with a thin dermal layer. Length of these bristle-like odontodes up to about 5 mm in the specimen illustrated (103.2 mm in standard length).

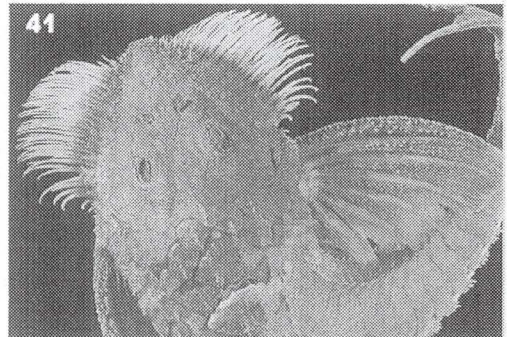
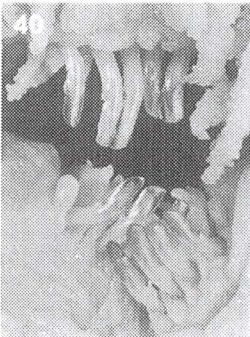
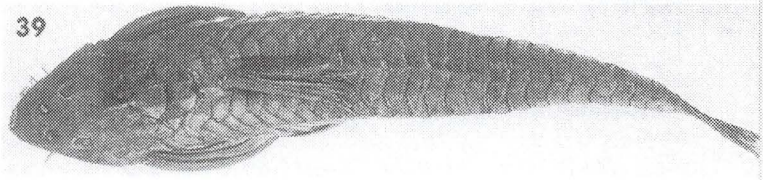
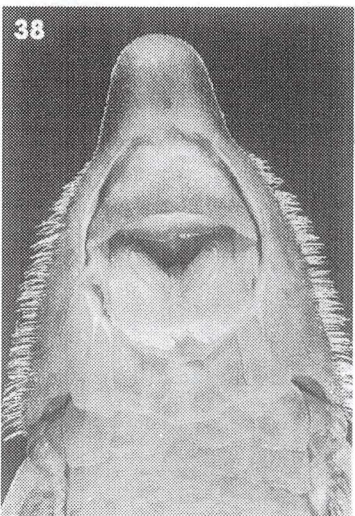
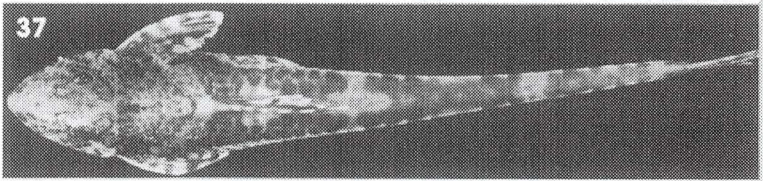
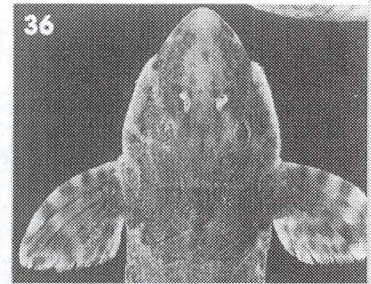
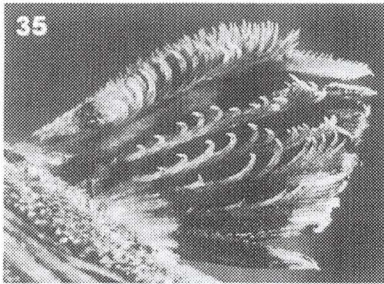
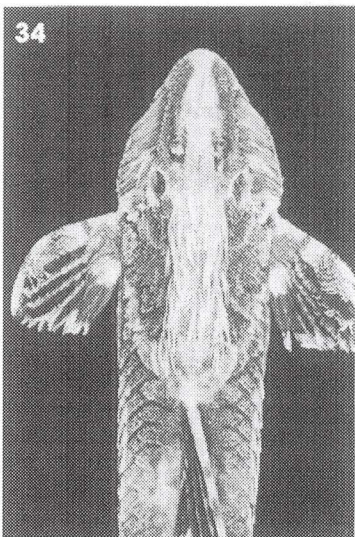
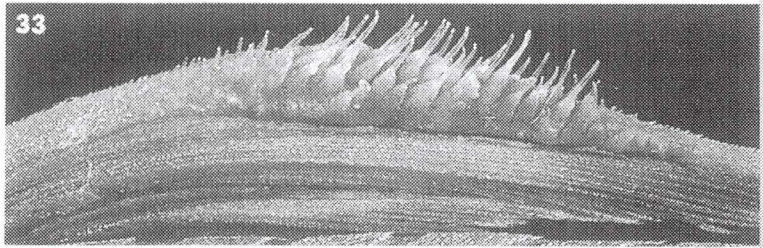
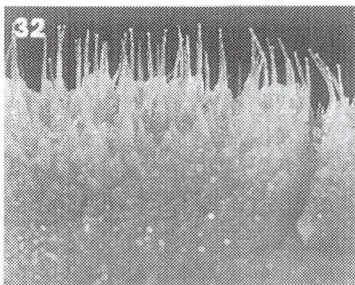
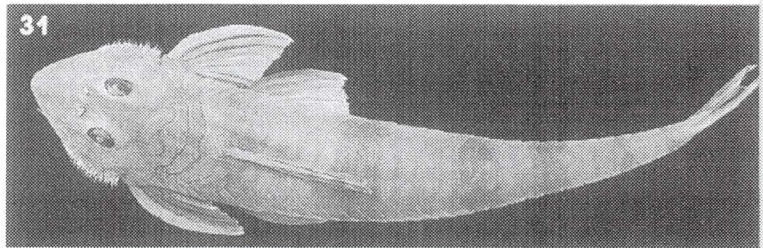
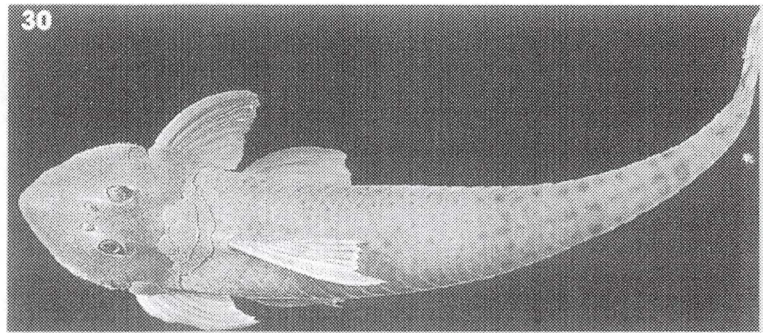
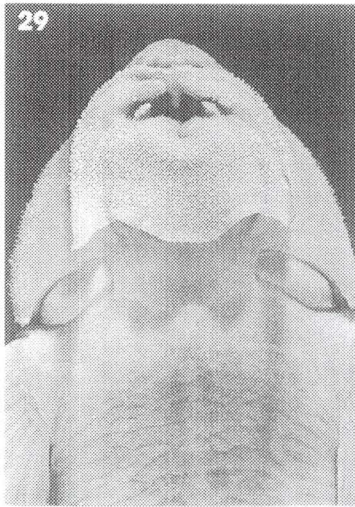
2) suborbital through opercular area. A close-set tuft of bristle-like odontodes, somewhat more slender than those in the interorbital/predorsal area and like these long and nearly straight, except for the tip, which points downward. Length up to about 5.5 mm in the specimen illustrated (103.2 mm in standard length).

Ventral to these numerous slender bristle-like odontodes, is a row of about 15 curved, spine-like odontodes at the edge of the operculum. These latter are about three times thicker and four times shorter than the other bristle-like odontodes in this area. The tip of the thick spine-like bristles points towards the branchiostegal membrane.

3) the pectoral fin. The pectoral fin spine in males is much thicker than in females, and provided with numerous erect, recurved, spine-like bristle-like odontodes, up to about 3 mm high (the outer ones the smallest) in the specimen illustrated. An area of about 2.5 mm at the base of the spine is without bristle-like odontodes. The spine terminates in a slender, flexible tip without bristle-like odontodes, but with a row of relatively large denticles. The first four rays bear bristle-like odontodes similar to those on the spine, decreasing in size towards the body.

The pectoral bristles are developed in this way so that their effect upon restricting fin movements is negligible. However, well-equipped, preserved males of this and other *Rineloricaria* species are frequently found with spread fins, whereas females and juveniles - including immature males without bristle-like odontodes - have the pectoral fins in various degrees of spreading. As Boulenger (1887: 277-288) stated, the pectoral fin spine is relatively smaller in males than in females. In the three mature males available to me, the ratio of pectoral fin spine length is 6.1 to 7.2 as expressed in standard length, and 1.4 to 1.6 as expressed in head length. In the females and immature males it is 5.3 to 6.3 in standard length and 1.1 to 1.3 in head length.





**29** *Metaloricaria paucidens paucidens* Isbrücker, 1975, holotype from a creek at right bank of Ouaiqui River (French Guiana), 270 mm in standard length, male; view of mouth and dentition.

**30** *Metaloricaria paucidens paucidens*, holotype in dorsal view.

**31** *Metaloricaria paucidens nijsseni* (Boeseman, 1976), a male from the Suriname River (Surinam), 245 mm in standard length.

**32** *Metaloricaria paucidens nijsseni*, detail of the odontodes along sides of head of a male from creek at right bank of Gran Rio (Surinam), 256.1 mm in standard length.

**33** *Lamontichthys filamentosus* (La Monte, 1935), odontodes along outer part of pectoral fin ray of a male from Río Bobonaza (Ecuador), 167.3 mm in standard length.

**34** *Rineloricaria lanceolata* (Günther, 1868), a male from the Río Payamimo (Ecuador), 103.2 mm in standard length.

**35** *Rineloricaria lanceolata*, detail of curved hook-shaped

odontodes on the pectoral fin rays in the same male as in Fig. 34.

**36** *Rineloricaria heteroptera* Isbrücker & Nijssen, 1976, holotype from near Manaus (Brazil), male, 120.4 mm in standard length.

**37** *Rineloricaria heteroptera*, paratype from near Manaus, female, 97.5 mm in standard length.

**38** *Sturisoma frenatum* (Boulenger, 1900), lectotype from near Salidero (Ecuador) [inadvertently erroneously recorded in caption of Fig. 38 in Isbrücker & Nijssen, 1992 as from "near Salta (Argentina)"], male, 236 mm in standard length.

**39** *Spatuloricaria lagoichthys* (Schultz, 1944), holotype from the Río Palmar (Venezuela), female, 310 mm in standard length.

**40** *Spatuloricaria lagoichthys* (holotype) dentition: note the oblong crowns.

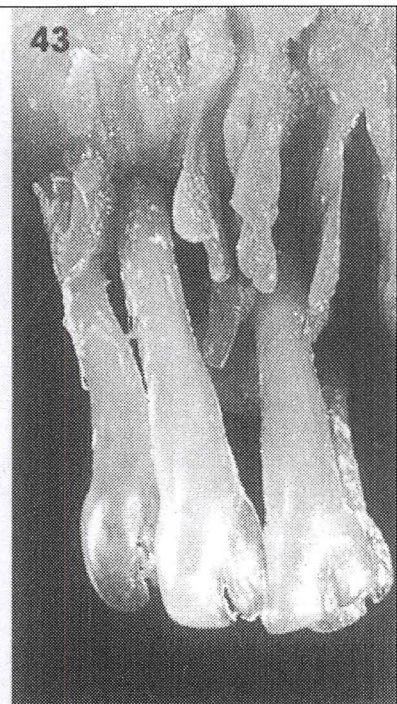
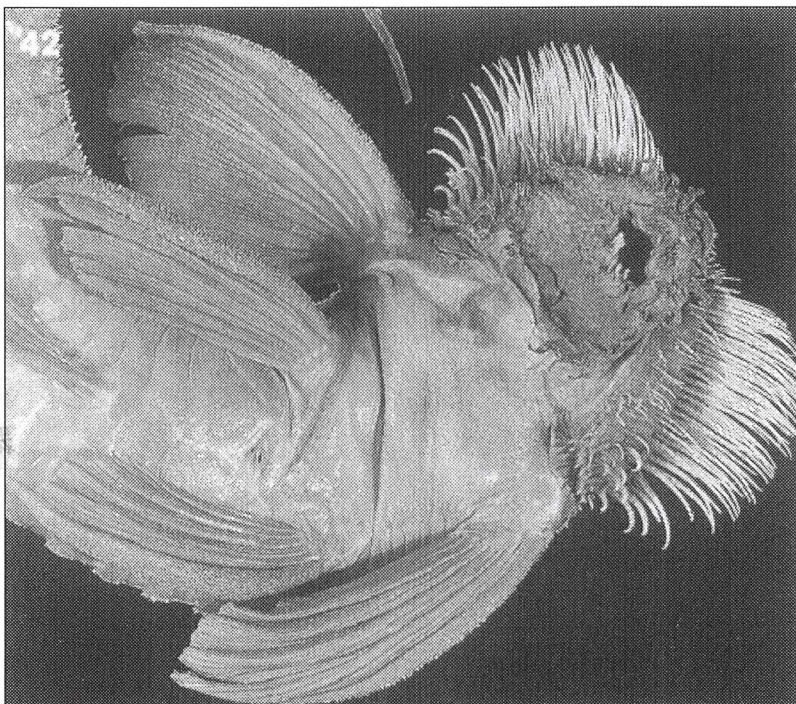
**41** and **42** *Spatuloricaria euacanthagenys* Isbrücker, 1979, holotype from the Río Caqueta drainage (Colombia), male, 330 mm in standard length.

*Rineloricaria heteroptera* Isbrücker & Nijssen, 1976  
Secondary sexual dimorphism affects the development of bristle-like odontodes in males, the shape of some dermal denticles, and the shape of the teeth. These bristle-like odontodes occur in three areas:

- 1) a long snout margin, from halfway between the tip of snout and nostrils to, and including opercle, and extending entirely on the ventrally ossified parts of the head. This is a close-set tuft of long, slender bristle-like odontodes, the tips curved caudally. In the largest nuptial male (133.2 mm in standard length) this area covers 14.3 mm of the head longitudinally and is up to 4.5 mm deep. The tuft has the appearance of a brush.
- 2) from interorbital through predorsal area, including cleithrum and first lateral scute. Numerous short, rela-

tively widely dispersed bristle-like odontodes - all more or less strongly curved in caudal direction - give this area a quite coarse surface. The interorbital area does not extend as far as the dorsalmost part of the orbital rim.

- 3) on dorsum of pectoral fin spine and first five rays, On the fin spine there are relatively short bristle-like odontodes, which are longest on the inner side of the spine. As usual, the pectoral fin spine is thicker and relatively somewhat shorter than in females. On the rays occur somewhat longer bristle-like odontodes arranged in rows covering the greater part of the rays and their branches, except for the very tips and the base of the rays. All bristle-like odontodes on the pectoral fin curve towards the snout when the fin is fully



**43** *Spatuloricaria euacanthagenys* (holotype), dentition: note the rounded crowns. Photos (unless credited otherwise): L. A. van der Laan



spread. There is a thick, naked 'cushion' at the base of the fin, more prominently developed in males than in females.

The bristle-like odontodes originate from a thick layer of soft epidermal tissue. The dermal ossifications in females are covered by supernumerous, uniform, sharp, minute odontodes, whereas those same areas in the males are covered by bristle-like odontodes. The odontodes on the dorsal and anal spines, and particularly those on the pelvic fin spines are broader and in mature males have a blunt tip, instead of the sharp odontodes present on those spines in the females. The teeth (especially those in the upper jaws) have shorter and rounder tips in males. *Rineloricaria heteroptera* was the first species of the genus in which such sexual dimorphism has been found. Tooth modification occurs together with the development of the male's bristle-like odontodes and the change of the shape of the odontodes on some of the fin spines.

*Rineloricaria fallax* (Steindachner, 1915)

This species has a characteristic colour pattern. It can be recognized at once by its conspicuous dark spot with a light ring on middorsum of the nape, posterior to the supraoccipital process, just in front of the base of the dorsal fin spine. Moreover, the males develop a peculiar pattern of enlarged, bristle-like odontodes, which are arranged in an elongate median, V-shaped series in front of the predorsal scute; they are in an erect position. The bristle-like odontodes along the sides of the head and on dorsum of the pectoral fin resemble those present in males of *Rineloricaria lanceolata*. The largest specimen we examined, a male, has a standard length of 157.2 mm.

Eigenmann (1912) recorded his largest specimen being 183 mm, but this size does not indicate the standard length. About *Rineloricaria fallax* the well-known fish collector John D. Haseman wrote in a hitherto unpublished manuscript about a collecting expedition to South America in 1913: "Along the way we caught a queer bearded *Loricaria*, which was probably the male of *Loricaria brunneus* [that is a species of *Loricariichthys*; the specimen Haseman collected in fact was a male of *Rineloricaria fallax*], in a puddle of a dried up stream flowing to Rio Parime."

*Spatuloricaria*

Mature males have numerous (Schultz, 1944 counted 125 on each side), stiff, setiform, bristle-like odontodes of different lengths, although most of these are very long (longer than interorbital width); the shorter spines occur along a low margin of head. Pectoral fin spine and rays with thorn-like odontodes. Teeth with a 'spoon-shaped' crown in the males, whereas the teeth of females have an oblong crown. In all, sexual differences in *Spatuloricaria* are reminiscent of those in *Rin-*

*eloricaria*, although in a much more conspicuous way.

*Sturisoma*

Adult males develop many conspicuously elongated, needle-like odontodes along sides of head and snout.

*Sturisomatichthys*

Similar to *Sturisoma*.

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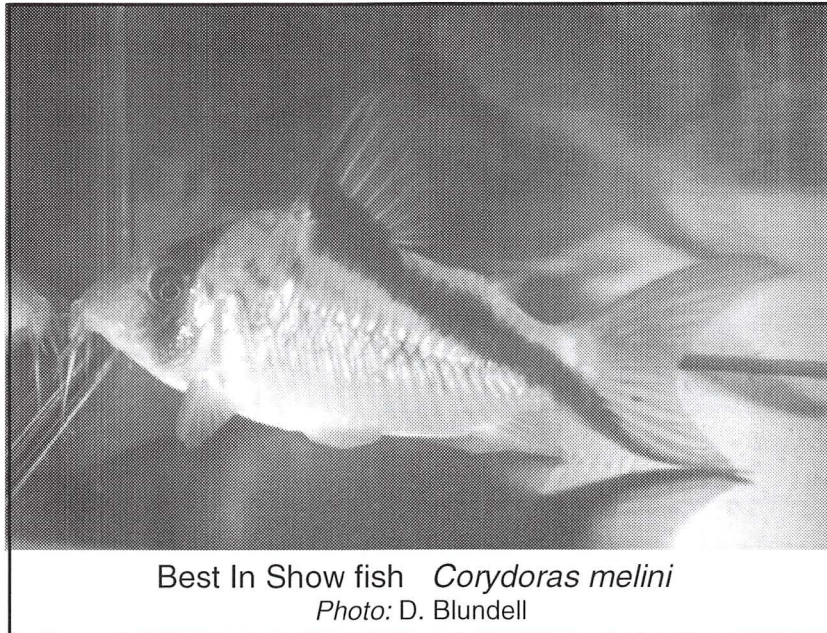


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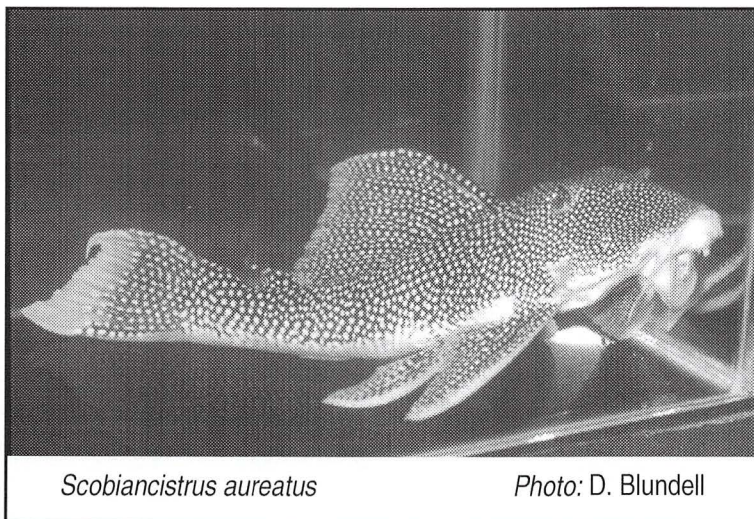
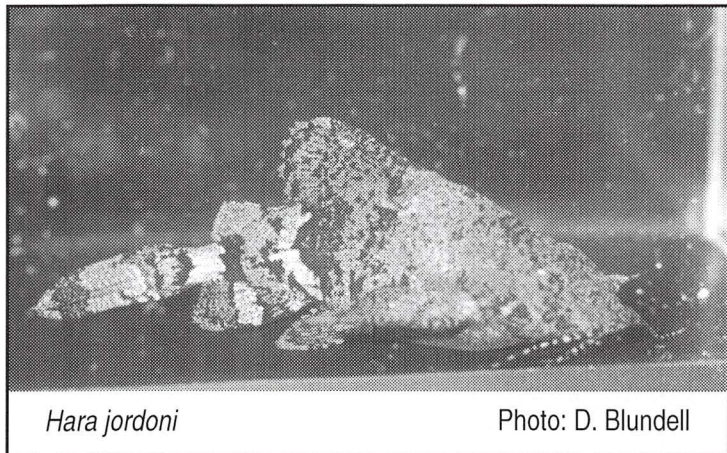
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## CATFISH STUDY GROUP (UK)

### Open Show 2000



The first Open Show of the Catfish Study Group (UK) was held on 10 September 2000. The entries numbers were lower than was expected (due to the fuel strike) but this was compensated by the excellent quality of the exhibits. The Best Fish in Show award went to a *Corydoras melini* owned by the group Membership Secretary, Dave Speed. Fish of note were excellent specimens of *Hara jordoni* and *Scobiancistrus aureatus* as well as an elegant *Pseudoturisoma microps* and several well predated breeders teams.



The Auction that was held in conjunction with the show was a great success and there were many bargains to be had. This helped to keep everyone occupied while the judging was in progress. All in all it was a great day and I look forward to next years show, on 16<sup>th</sup> September 2001.

Ian Fuller  
Chairman CSG (UK)

## CSG (UK) OPEN SHOW RESULTS 2000

1		ASPIDORAS		ENTRIES 1		Pts
1	D & L SPEED	CSG	Aspidoras raimundi			84
2		BROCHIS		ENTRIES 1		
1	D & L SPEED	CSG	Brochis splendens			78
3		Corydoras "A" up to 57mm		ENTRIES 5		
1	D & L SPEED	CSG	Corydoras melini			87
2	D & L SPEED	CSG	Corydoras arcuatus			85
3	D & L SPEED	CSG	Corydoras napoensis			83
4	A TAYLOR	CSG	Corydoras napoensis			78
4		Corydoras "B" over 57mm		ENTRIES 8		
1	A SUTTON	CSG	Corydoras gossei			84
2	A SUTTON	CSG	Corydoras gossei			83
3	D & L SPEED	CSG	Corydoras gossei			81.5
4	A SUTTON	CSG	Corydoras gossei			79.5
5		Corydoras TYPES		ENTRIES 1		
1	A TAYLOR	CSG	Corydoras species C5			81
6		A.O.V. CALLICHTHYIDAE		ENTRIES 1		
1	J T MORRIS	CSG	Callichthys callichthys			70
7		ASPREIDINIDAE		ENTRIES 6		
1	J T MORRIS	CSG	Dysichthys rugosus			85
2	J T MORRIS	CSG	Dysichthys rugosus			82
3	J T MORRIS	CSG	Dysichthys knerii			81
4	J T MORRIS	CSG	Dysichthys rugosus			78.5
8		AUCHENIPTERIDAE		ENTRIES 1		
1	A JAMES	CSG	Tatia aulopygia			82
9		BAGRIDAE		ENTRIES 1		
1	P FOWLES	CSG	Leiocassis siamensis			72
10		CHILOGLANIS/AMPHILIIDAE		ENTRIES 0		
11		LORICARIIDAE up to 130mm		ENTRIES 2		
1	D & L SPEED	CSG	Leoporacanthicus galaxias			
2	D & L SPEED	CSG	Peckoltia oligospila			

12	LORICARIIDAE over 130mm		ENTRIES 4	
1	D & L SPEED	CSG	Pseudacanthicus spinosus	86
2	R & K KIRKUP	RAINBOW	Cochliodon cochliodon	83
3	R & K KIRKUP	RAINBOW	Pterosturisoma microps	73
4	G BARLOW	CSG	Ancistrus sp	65

13	LORICARIIDAE L & LDA No's up to 130mm		ENTRIES 7	
1	D & L SPEED	CSG	L072 Yellow prince tiger	88
2	R & K KIRKUP	RAINBOW	L121	85
3	D & L SPEED	CSG	L163 Big Spot Peckoltia	82
4	R & K KIRKUP	RAINBOW	L128	81

14	LORICARIIDAE L & LDA No's over 130mm		ENTRIES 5	
1	G BARLOW	CSG	Scobiancistrus aureatus	84
2	R WARNE	CSG	L200 Yellow Spot Hypostomus	83
3	A BIBBY	DARWEN	Pseudacanthicus leopardus	81
4	R & K KIRKUP	RAINBOW	Pseudacanthicus leopardus	79

15	MOCHOKIDAE up to 130mm		ENTRIES 0	
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16	MOCHOKIDAE over 130mm		ENTRIES 2	
1	R & K KIRKUP	RAINBOW	Synodontis alberti	82
2	A JAMES	CSG	Synodontis afrofisheri	81

17	PIMELODIDAE up to 100mm		ENTRIES 2	
1	R & K KIRKUP	RAINBOW	Brachyramdia meesi	76
2	D & L SPEED	CSG	Microglanis iheringi	81

18	PIMELODIDAE over 100mm		ENTRIES 1	
1	D & BLUNDELL	CSG	Pseudopim. zungaru bufonias	84

19	COLDWATER CATFISH		ENTRIES 0	
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20	SPECIAL - UNIDENTIFIED		ENTRIES 1	
1	D & L SPEED	CSG		74

21	A.O.V. CATFISH		ENTRIES 3	
1	A TAYLOR	CSG	Hara jordoni	85
2	D & L SPEED	CSG	Hara hara	83
3	P FOWLES	CSG	Hara hara	75

22	PAIRS - ASP/BROCHIS/CORYS		ENTRIES 5	
1	A JAMES	CSG	Corydoras sipaliwini	78
2	D HALL	PRESTON	Corydoras ornatus	73.5
3	D & L SPEED	CSG	Corydoras gossei	73
4	A SUTTON	CSG	Corydoras gossei	72.5

23	PAIRS - AOV CATFISH		ENTRIES 1	
1	J T MORRIS	CSG	Aspredo cotylephorus	82.5

24	BREEDERS - ASP/BROCHIS/CORYS		ENTRIES 8	
1	D HALL	PRESTON	Corydoras ornatus	83
2	A SUTTON	CSG	Corydoras gossei	77.5
3	A JAMES	CSG	Corydoras sipaliwini	76.5
4	A SUTTON	CSG	Corydoras panda	76

25	BREEDERS - A.O.V. CATFISH		ENTRIES 0	
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26	FAMILY CLASS – Pair & Breeders Team		ENTRIES 2	
1	D HALL	PRESTON	Corydoras ornatus	78
2	A SUTTON	CSG	Corydoras gossei	75

27	BREEDERS – MASTER CLASS		ENTRIES 1	
1	A SUTTON	CSG		75

### **Special Award Winners 2000**

**Best Fish in the Show. The TetraMin Award**

D & L Speed - CSG - *Corydoras melini*

**Best Breeders, The Linnaeus Award donated by TetraMin**

D Hall - Preston for his team of *Corydoras ornatus*

**Best Overall Synodontis Species, donated by LMB Aquatics**

R & K Kirkup - CSG - *Synodontis alberti*

**Secretary's Choice, donated by A & D Hodges**

A Taylor - CSG - *Hara filamentosa*

**Show Secretary's Choice, donated by Mr & Mrs Baldwin**

D & L Speed - CSG - Class 20 winner – unidentified

**Social Sec's Choice, donated by B Baldwin**

D & A Blundell - CSG - *Pseudopimelodus zungaro bufonias*

**Chairman's Choice, donated by George Waterhouse**

R & K Kirkup - CSG - *Pseudosturisoma microps*

**Editor's Choice, donated by A M Taylor**

Charlotte Barlow (Jnr) - CSG - *Pseudacanthicus leopardus*

**Zoukai Choice, donated by A & L Morris**

D & A Blundell - CSG - *Pseudopimelodus zungaro bufonias*

**Highest Pointed Exhibit (Not a single fish) – Clint Cup? Masterstaff Cup?**

A James - CSG - a pair of *Corydoras sipaliwini*

**Junior Trophy – Amanda Junior Cup**

F Taylor - CSG - *Corydoras virginiae*

**President's Choice, Masterstaff Trophy**

D & L Speed - CSG - *Pseudocanthiscus spinosus*





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