

ON THE LUCIOPIMELODINÆ, A NEW SUBFAMILY OF THE SOUTH AMERICAN SILURIDÆ.¹

(PLATES II AND III.)

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In the Nematognathi or catfishes and their relatives the anterior vertebræ are coalesced and form with the auditory ossicles the so-called Weberian apparatus. This structure has been studied by various authors notably Sagemehl,² R. Ramsay Wright³ and Bridges and Haddon.⁴ A brief summary is also given by Boulenger in his "Fishes of the Congo" and in other papers on systematic ichthyology by Regan, Eigenmann, et al. Usually the centra of the first three vertebræ are coalesced into one piece without evident sutures. The centra of the fourth, fifth and sixth vertebræ are frequently coalesced with the anterior three, but the sutures between the third and fourth as well as between the fourth and fifth are frequently quite evident, especially in the young.

The coalesced first to third vertebræ are without lateral processes. The fourth and fifth have various processes.

As in all other members of the Nematognathi, the centra of the anterior vertebræ of the species of the Pimelodinæ, a subfamily of South American catfishes, are coalesced. The lateral processes of the fourth, fifth and sometimes the sixth vertebræ are expanded, sometimes largely separated from each other, more frequently joined to each other to form an osseous shield or roof over the anterior part of the abdominal cavity.

In *Rhamdia* of the *Pimelodinæ* there are three processes distinct

¹ Contribution from the Zoölogical Laboratory of Indiana University, No. 166.

² *Morpholog. Jahrb.*, Bd. X.

³ *Trans. Roy. Soc. Canada*, 1885.

⁴ *Phil. Trans. Roy. Soc.*, B, 1893.

from each other for more than their distal halves (Plate II, *B*, 9, 10, 5). The first one articulates distally with the clavicle and process of the post-temporal, the second and third are free at the ends. The first and second (9 and 10) belong to the fourth vertebra,⁵ the third process belonging to the fifth vertebra. In *Pseudoplatystoma fasciatum* there are four expanded transverse processes, all of them separated from each other toward their distal ends. In small specimens of this species the interlocking sutures of the centra of the coalesced vertebræ are quite distinct. In this species it is quite evident that the first and second processes belong to the second distinguishable vertebra, in reality to the fourth. The fourth process belongs to a supernumerary modified vertebra, the sixth, one usually normal in other species. Its processes bear ribs. In *Pimelodus clarias* the lateral processes are united to form a solid plate without even marginal notches to indicate the boundaries between successive processes.

In the genera *Pimelodina*, *Pseudopimolodus*, *Rhamdia*, *Pimelodus*, etc., of the Pimelodinæ the air-bladder⁶ is well developed and lies free in the abdominal cavity. It is simple and more or less oblong in shape and extends posteriorly to the eighth or tenth vertebra.

In *Sorubim* (Fig. 1, *A*) and *Hemisorubim* the air-bladder is drawn out more than in any of the other genera, and extends back past the tenth vertebra. It is larger proportionally than in any of the other genera. In *Pseudoplatystoma* and *Brachyplatystoma* it is very much as in *Sorubim* and *Hemisorubim* but slightly shorter, extending only past the ninth vertebra.

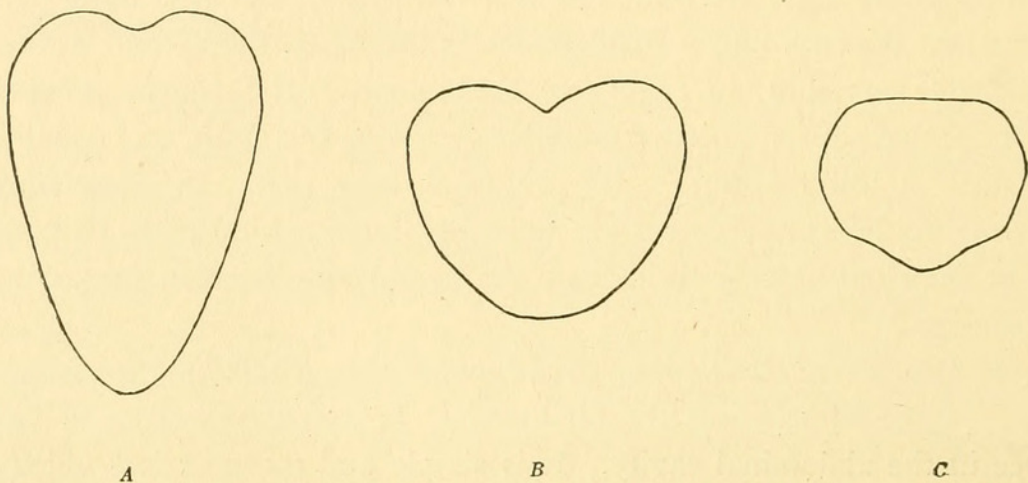
In *Rhamdia* (Fig. 1, *B*), *Pimelodella* and *Pimelodus* (Fig. 1, *C*) the air-bladder is very different from that found in *Sorubim*, *Hemisorubim*, *Pseudoplatystoma* and *Brachyplatystoma*. In these genera it is wider than long. The width averaging from one to three mm.

⁵ Bridges and Haddon, *Phil. Trans.*, Vol. B, 1893.

⁶ The air-bladder of one specimen of *Ageneiosus caucanus* has been examined to determine its relation to the Pimelodinæ, and to the genera *Megalonema* and *Luciopimelodus*. This specimen was 280 mm. long and its air-bladder was 23 mm. long and 23 mm. wide. It tapers at the posterior end, causing it to be heart-shaped. It lies free in the abdominal cavity and is not enclosed in a bony capsule. It thus resembles the condition found in the Pimelodinæ.

in excess of the length. In *Rhamdia* it extends to the ninth vertebra while in *Pimelodella* and *Pimelodus* it extends only to the eighth.

As stated, the lateral processes of the first five vertebræ in the Pimelodinæ are coalesced and form a more or less smooth roof beneath which the air-bladder lies. In *Rhamdia* (Plate II, Fig. B) the transverse processes are quite distinct, and are separated from each other; the coalescing is more complete in *Sorubium*, *Hemisorubim*, *Pimelodella* and reaches the climax in *Pimelodus*.



TEXT-FIG. 1. A, Air-bladder of *Sorubium lima*; B, Air-bladder of *Rhamdia cinarescens*; C, Air-bladder of *Pimelodus clarias*. Outlines as seen from below.

The air-bladder of *Pimelodus* is small. The coalescing of the vertebræ is more complete in this genus than in others. The outer edge of the shield formed by the coalesced process has a tendency to become arched antero-posteriorly.

The air-bladder in all these genera comes in close contact with the skin which serves as a tympanic membrane. This can be seen especially well in young specimens.

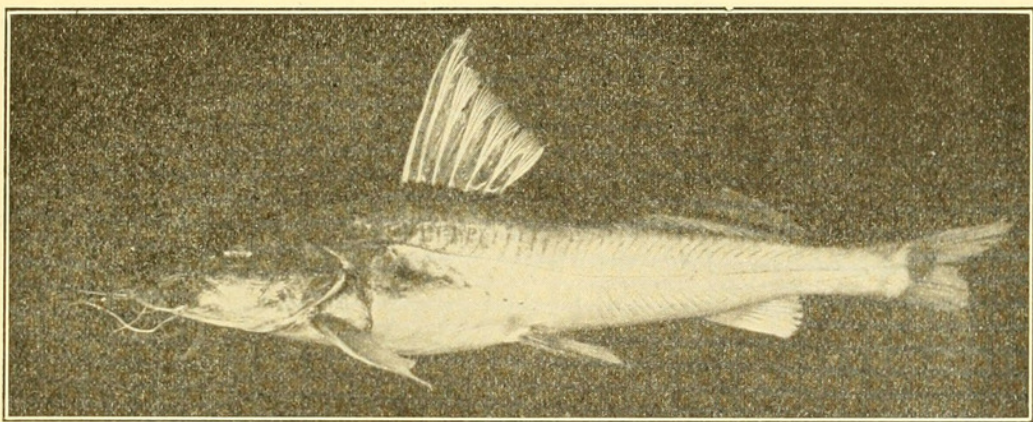
Perugia (Plate II, A, C, D, E), which had hitherto been placed in the Pimelodinæ, has the air-bladder very much reduced in size, constricted longitudinally with one lobe on each side of the centra of the coalesced vertebræ. Each lobe is surrounded by a partial capsule, made up of the coalesced vertebræ above and behind, the scapula and the process connecting the scapula with the basioccipital in front. The floor of the capsule is membranous.

The two lobes of the air-bladder are very small. In a fish 200 mm. long they are 2.5 mm. in diameter and the distance between the outer margins of the two capsules measures 12 mm. They are pear-shaped, tapering to a small canal connecting the two capsules.

Luciopimelodus and *Megalonema* are certainly closely related to *Perugia*. This becomes quite evident when we examine the air-bladder and the anterior vertebræ associated with it. An examination of these structures also demonstrates that *Luciopimelodus* and *Megalonema* are not related to the Pimelodinæ with which they have been associated.

The air-bladders in these two genera are not in direct contact with the skin. They extend outward to near the skin, being separated from it by a thin layer of fat.

As in the structure of the air-bladder and the Weberian apparatus *Perugia*, *Luciopimelodus* and *Megalonema* differ greatly from all the genera of the Pimelodinæ, they may well be separated into a new subfamily, the *Luciopimelodinæ*.



TEXT-FIG. 2. *Megalonema platanum* Günther. Photograph by Sñr. Valette, Jefe de la Oficina Fomento de Pesca. Buenos Aires.

In Cuvier and Valenciennes, "Hist. Nat. Poissons," XV, 1840, p. 176, Valenciennes described a new species which he called *Pimelodus pati* basing his description on a specimen 30 inches long collected by d'Orbigny, a very small specimen which he received from the museum at Lisbon, and on a drawing in the MS. of Father Feuillee, in Hugard's library. Later in d'Orbigny's "Voyage dans l'Amerique Meridionale," V, 2c Partie; Poissons, 1847, p. 7, plate I., Fig. 7-9, Valenciennes figured the species.

D'Orbigny reported that the species is taken in the Paraná from latitude 26 degrees South to Buenos Aires. He reported it to be a permanent resident at Corrientes, but at Buenos Aires it is migratory, arriving in September and departing in March.

Günther in his Catalogue also placed it in the old genus *Pimelodus* which includes a number of different generic types. In a short article on the Fish-fauna of Rio de la Plata,⁷ Günther briefly describes *Pimelodus platanus*. This species is without spots and it is quite possible that it was included in the species *pati* concerning which Valenciennes says (p. 178):

M. d'Orbigny nous dit que les taches varient à l'infini, et disparaissent quelquefois entièrement.

Eigenmann and Eigenmann⁸ created the genus *Luciopimelodus* for *pati* and *platanus* placing the genus in the Pimelodinæ. They distinguished the genus by the flexible, non-spinous first dorsal and first pectoral rays, the elongate, spatulate, depressed head, the narrow, short occipital process, and the fontanel confined to the frontal portion of the head.

Steindacher⁹ described *Pirinampus agassizii*. The relationship of this species with *pati* was not recognized by Steindachner or Eigenmann and Eigenmann, the latter placing it in a hypothetical distinct but unnamed genus numbered XXII in their monograph on the Nematognathi. This was later placed in a new genus, *Perugia*, by Eigenmann and Norris. Steindachner described this species as having a pungent dorsal spine, but Fisher¹⁰ shows that in a specimen in the Carnegie Museum (No. 7251) there is evidence that the pungency is due to the fact that the tip of the first dorsal ray is broken off.

In his monograph on the Freshwater Fishes of British Guiana¹¹ Eigenmann describes the new genus and species *Megalonema platycephalum* from the lower Potaro River of British Guiana. The genus *Megalonema* differs from *Luciopimelodus* in the shape of the

⁷ *Ann. and Mag. Nat. Hist.*, Vol. VI., July, 1880, p. 10.

⁸ *Proc. Calif. Acad. Sci.* (2), I., 1888, p. 122, and *Occasional Papers Calif. Acad. Sci.*, I., 1890, p. 106.

⁹ *S. B. Ak. Wien.*, LXXIV, 1876, *Ichthyol. Beitr.*, IV, Pl. 12.

¹⁰ *Ann. Carnegie Mus.*, XI, 1917, p. 407.

¹¹ *Mem. Carnegie Mus.*, V, 1912, p. 150.

band of premaxillary teeth. The band is rounded at the outer end instead of prolonged into a sharp angle as in *pati*.

Still later Eigenmann¹² described *Megalonema xanthum* from the upper Magdalena River of Columbia.¹³

KEY TO THE GENERA AND SPECIES OF LUCIOPIMELODINÆ.

- a. Mouth terminal, the lower jaw pointed, its tip extending to the tip of the upper jaw; premaxillary band of teeth with a long, backward projecting angle; adipose fin beginning at tip of last dorsal ray, its length little more than three in the length; snout greatly depressed; depth of head three in its length; post-mental barbels extending past base of the anal, A. 12; eye 10 in head, 4.5 in snout, 2.33 in interorbital. (Based on a specimen 230 mm. to base of caudal.) (*Luciopimelodus*.) *pati*.
- aa. Jaws subequal, premaxillary band of teeth without a backward projecting angle.
 - b. Space between adipose and base of last dorsal ray considerably greater than base of dorsal (*Megalonema*.)
 - c. Head 4; depth 6; adipose 4 in length; dorsal I, 6; A. 12; eye 2.5 in snout, 5 in head *platanum*.
 - cc. Head 3.66 in the length; depth 5.5; adipose 4 in the length; dorsal I, 6; A. 11; eye 2 in the snout, 5 in head *platycephalum*.
 - ccc. Head 4; depth 5.33; A. 9; adipose 4.95 in the length; eye 4 in the head, .75 in the interorbital; snout depressed, width of head at the rictus 2 in the length of the head; maxillary barbel reaching middle or beyond tip of pectoral; teeth in a very narrow band; fontanel reaching base of occipital crest which is minute; the first dorsal ray slender, a little longer than the head. (Based on a specimen 38 mm. in length.)
pauciradiatum.
 - bb. Space between adipose and base of last dorsal ray much shorter than the base of the dorsal, post-mental barbel not far behind the mental (*Perugia*.)
 - d. Lower jaw but a little shorter than the upper, premaxillary band of teeth terminal, partly exposed when mouth is closed; fontanel increasing in width backward to behind the eye; a small fontanel at the base of the occipital process; head 5 in the length; depth 6; dorsal I, 6; A. 11 *agassizii*.
 - dd. Snout much projecting, the mouth inferior; the premaxillary band of teeth very narrow; maxillary barbel extending past base of anal; adipose 2.5 in the length; fontanel wider behind than in front, extending to the posterior edge of eye; small fontanel at the base of the occipital process; A. 11 *xanthus*.

¹² *Ind. Univ. Studies*, No. 16, Dec., 1912, p. 16.

¹³ The species of *Megalonema* described by Meek from the Tuyra River belong to the genus *Pimelodus*.

The species of *Luciopimelodinæ* have so far been recorded from the La Plata Basin, from the Rio Jauri at the headwaters of the River Paraguay to the mouth of the La Plata at Buenos Aires, from the Amazon between Calderon and Para, from the Essequibo Basin in Guiana and from the Magdalena Basin in transandean Colombia. Their distribution is very wide which may indicate that they have been established in South America since before the days of the formation of the eastern Andes of Colombia.

SYNONYMY AND BIBLIOGRAPHY.

LUCIOPIMELODUS PATI (Valenciennes).

Pimelodus pati Valenciennes, Voy. d'Orbigny, pl. 1, figs. 7-9, 1847; Cuv. & Val., Hist. Nat. Poiss., XV, 176, 1840 (Parana; La Plata; Corrientes; Buenos Ayres); Kner, *Sb. Ak. Wien*, XXVI, 1857, 416 (Forte de S. Joaquim, Rio Branco); Günther, *Cat. Fish. Brit. Mus.*, V, 128, 1846 (copied).

Luciopimelodus pati Eigenm. & Eigenm., *Proc. Calif. Acad.*, 2d Ser., Vol. 1, 122 (Buenos Ayres); Eigenmann, *Repts. Princeton Univ. Exped. Patagonia*, III, 1910, p. 383 (name only); Fisher, *Ann. Carnegie Mus.*, XI, 1917, p. 407 (Buenos Aires).

Habitat: Rio Plata; Rio Branco near British Guiana.

MEGALONEMA PLATANUM (Günther).

Pimelodus platanus Günther, *Ann. Nat. Hist.* (5), VI, 10, 1880 (Parana, Rio Plata).

Luciopimelodus platanus Eigenm. & Eigenm., *Occasional Papers Calif. Acad. Sci.*, I, p. 108, 1890; Eigenmann, *Repts. Princeton Univ. Exped. Patagonia*, III, 1910, p. 383 (name only); Fisher, *Ann. Carnegie Mus.*, XI, 1917, p. 408 (Rio Jauru, Asuncion).

Habitat: Rio Plata; Piracicaba; Paraguay Basin.

MEGALONEMA PLATYCEPHALUM (Eigenmann).

Megalonema platycephalum Eigenmann, *Repts. Princeton Univ. Exped. Patagonia*, III, 1910, p. 383 (name only); Eigenmann, *Mem. Carnegie Mus.*, V, 1912, p. 150, Pl. X, fig. 2.

Habitat: Essequibo Basin.

MEGALONEMA PAUCIRADIATUM Eigenmann, spec. nov.

15029, I. U. M., four, the largest the type, 28–38 mm. Villa Rica.
Anisits.

Head 4; depth 5.33; A. 9; adipose 4.75 in the length; eye 4 in the head, .75 in the interorbital; maxillary barbel reaching middle or tip of dorsal, postmental a little beyond tip of pectoral; teeth in very narrow bands; snout depressed, width of head at the rictus 2 in the length; depth of head nearly two-thirds its length; fontanel reaching base of occipital crest which is minute, reaching only about one-sixth of the way to the dorsal fin; distance between snout and dorsal 2–2.66 in the length; first dorsal ray slender, a little longer than the head, extending beyond all the rest when depressed; ventrals and base of third dorsal ray about equidistant from snout; first pectoral ray slender, reaching the ventrals, the latter not to the anal; caudal peduncle 5 in the length.

Air-bladder transverse, about three times as wide as long.

Pale, without any conspicuous markings.

The type is a female with mature eggs nearly a millimeter in diameter. While the specimens at hand have probably not reached full size, the largest is sexually mature.

This species differs from *Megalonema platanum* and *Luciopimelodus pati* of the Plata basin in having but nine anal rays while they have twelve.

PERUGIA AGASSIZII (Steindachner).

Pirinampus agassizii Steindachner, *Sb. Ak. Wien*, LXXIV, 1876; *Ichthyol. Beitr.*, IV, 57, pl. 12 (Para); Vaillant, *Bull. Soc. Philom.*, series 7, IV, 153, 1880 (Calderon).

? *agassizii* Eigenm. & Eigenm., *Occasional Papers Calif. Acad. Sci.*, I, p. 183, 1890 (Amazons).

Perugia gen. nov. Eigenmann & Norris, *Revista Museu Paulista*, IV, p. 355, 1900.

Luciopimelodus agassizii Eigenmann, *Repts. Princeton Univ. Exped. Patagonia*, III, 1910, p. 383 (name only). Fisher, *Ann. Carnegie Mus.*, XI, 1917, p. 407 (Pará).

Habitat: Amazons.

PERUGIA XANTHUS (Eigenmann).

Megalonema xanthum Eigenmann, *Indiana University Studies*,
No. 16, p. 16, 1912.

Habitat: Girardot; Apulo.



Driver, C S. 1919. "On the Luciopimelodinae, a new subfamily of the South American Siluridae." *Proceedings of the American Philosophical Society held at Philadelphia for promoting useful knowledge* 58, 448–456.

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