

Typhlachirus lipophthalmus, a rare eye-less sole from Borneo (Teleostei: Soleidae)

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An example of the eye-less sole, *Typhlachirus lipophthalmus*, was collected from a tidal section of the Sadong River in Sarawak, Malaysian Borneo, in January 2018. It is apparently the second known record of this species since its description in 1882. A description based on selected meristic and morphometric data gathered from the specimen, supported by radiographs and photographs of it, as well as notes on its capture and habitat, are presented.

Introduction

The poorly-known eye-less soles of the genus *Typhlachirus* were recently revised by Evseenko & Bolshakov (2018). Three species are presently recognized: *Synaptura lipophthalma* Károli (1882: 176) described from Sarawak, Borneo; *Typhlachirus caecus* Hardenberg (1931b: 415) described from the Bagan Si Api Api at the mouth of Rokan River, Sumatra; and *Typhlachirus elongatus* Pellegrin & Chevey (1940: 155), described from the Mekong delta in Vietnam. The type species is *Typhlachirus caecus* Hardenberg (1931b: 415); but it first appeared as *Cryptops coeca* (new genus and species) in Hardenberg (1931a: 125). Believing that *Cryptops* was pre-occupied, Hardenberg (1931b) proposed a new genus-name *Typhlachirus*, and changed the combination to *Typhlachirus caecus*. However, a replacement was not necessary because both *Cryptops* Hardenberg 1931a

and *Cryptops coeca* Hardenberg 1931a are nomina nuda, and therefore unavailable names. Thereafter, the genus-name *Typhlachirus* Hardenberg 1931b and the species-name *Typhlachirus caecus* are not replacement names.

Synaptura lipophthalma was placed in the genus *Typhlachirus* by Chabanaud (1948) who illustrated it with lithographs and anatomical and osteological drawings, and regarded both *T. caecus* and *T. elongatus* as its junior synonyms. Subsequently, this name seemed to have been overlooked. In a compilation of fishes recorded from the South China Sea, which includes the entire coast of Sarawak, Munroe (2000: 645–646) recognized *T. elongatus* as a species of *Brachirus*, but did not list the occurrence of *T. lipophthalmus*. Later, Kottelat (2013: 464–465) listed only *T. caecus*, and also regarded *T. elongatus* as a species of *Brachirus*. Most likely, he had recognized *T. caecus* as distinct from *T. lipophthalmus*, but did

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Fig. 1. Live coloration of *Typhlachirus lipophthalmus* (ca. 15 cm total length) from Sungai Kuap (Sarawak River basin), showing both right (pigmented) and left side of the fish [copyright Chien Lee, first published in Atack (2006)].

not mention the latter possibly because the scope of his checklist was limited to taxa recorded from inland waters. *Typhlachirus lipophthalmus* was, after all, described from a specimen collected ‘in mari’ [= in the sea] (Károli, 1882: 176).

It is in the latest revision of *Typhlachirus* by Evseenko & Bolshakov (2018) that *T. lipophthalmus* was again mentioned. These authors also reported two smaller specimens of *T. lipophthalmus* apparently from the same series (however deprived of type status) of the 10 cm specimen designated holotype by Károli (1882: 177). Apart from those,

no specimen of *T. lipophthalmus* has been reported for the subsequent 124 years.

In her book on the fishes of the Kuching River in Sarawak, Atack (2006: 174–175) used two colour photographs taken by Chien Lee of a live fish (reproduced herein as Figure 1), obtained from estuarine waters of the Sungai Kuap (Sarawak River basin), to illustrate a juvenile specimen of ‘Soleidae sp. 1’. However, the length, listed as 15 cm, does not seem to qualify it as a juvenile sole. There is suspicion that the size of this specimen was not accurately stated. Unfortunately, the



Fig. 2. Fresh coloration of *Typhlachirus lipophthalmus* (right side), ZRC 59653. 61.2 mm SL, shortly after capture.



Fig. 3. Right (top) and left (bottom) side views of *Typhlachirus lipophthalmus*, ZRC 59653, 61.2 mm SL (note right side of body bears abrasions from capture).

specimen was not preserved or retained (Atack, pers. comm.).

In January 2018, the authors obtained a fresh specimen of an eye-less sole from fishermen along the tidal reaches of the Sadong River in Sarawak. It was identified in Tan & Grinang (2018: 4) as *Typhlachirus caecus*.

From morphological and meristic characters that can be viewed from the pictures in Atack (2006: 175) and the more recently preserved specimen from the Sadong River, we now identify both as *Typhlachirus lipophthalmus*. Our diagnosis follows the recent revision of the genus *Typhlachirus* by Evseenko & Bolshakov (2018), and is based on characters on the specimens, i. e. absence of eyes, collection localities, as well as fin-ray counts and vertebral counts which are within the range documented for *Typhlachirus lipophthalmus* by Károli (1882) and Chabanaud (1948) [see Table 1].

The recent specimen of *Typhlachirus lipophthalmus* from the Sadong River has been preserved and deposited in the Zoological Reference Collection of the Lee Kong Chian Natural History Museum, at the National University of Singapore (ZRC). A description based on selected meristic and morphometric data gathered from it, supported by radiographs and photographs taken of it, as well as notes on its capture and habitat, are presented in this paper.

Material and methods

Counts and methods generally follow those of Hubbs & Lagler (1958), except as indicated. Measurements to the nearest 0.1 mm were conducted point-to-point with a pair of dial callipers. Abbreviations used: SL, standard length (measured

from tip of upper jaw or snout to base of caudal fin); TL, total length (measured from tip of upper jaw or snout to extremity tip of caudal fin). Vertebral and fin ray counts were obtained from digital radiographs using Faxitron LX60.

Results

Typhlachirus lipophthalmus (Károli, 1882)

Figs. 1–6

Synaptura lipophthalma Károli, 1882: 176 (Borneo, “Larawak” = Sarawak, ‘in mari’ = [in the sea]).

Typhlachirus lipophthalmus – Chabanaud, 1948 (in part): 4, Figs. 1–10 (various anatomical and osteological drawings), Plate 1, Figs. 1–2 (radiographs); Evseenko & Bolshakov, 2018: 691, Table 1.

Soleidae sp. 1 – Atack, 2006: 174–175 (Sarawak: Sarawak River basin, estuarine waters of Sungai Kuap; with colour figures of a live specimen).

Typhlachirus caecus (not Hardenberg): Tan & Grinang, 2018: 4 (Sarawak: Sungai Sadong).

Material examined. ZRC 59653, 1, 61.2 mm SL; Sarawak: Sadong River basin: Sungai Sadong; local fishers, 31 Jan 2018.

Description. See Figures 1–5 for overall body shape; and Table 1 for selected features. A small-sized sole (largest at least 140 mm SL; implied from Atack, 2006) with no external eyes visible on right side. Overall body tear-drop shaped, with relatively long (head length 25.5 % SL) and, rounded head, head width 127.6 % HL with deepest part of body (42.6 % SL; body depth at anus

Table 1. Selected character states of *Typhlachirus lipophthalmus* based on Károli (1882), Chabanaud (1948), Atack (2006), Evseenko & Bolshakov (2018) and present study (* sum of dorsal-, caudal- and anal-fin ray counts in parentheses; numbers in square parentheses represent values from the original description; NA: not available).

Sources	SL (mm)	Eye	Pectoral fin	Pelvic fin rays (left)	Pelvic fin rays (right)	Total fin ray count of single fins*	Total vertebrae count
Károli, 1882	93 [100]	absent	present	3	3	109 [108] (56 + 12 + 41)	36
Chabanaud, 1948	47	absent	present	3	4	106 (55 + 11 + 40)	35
Evseenko & Bolshakov, 2018	41	absent	present	4	3	107 (56 + 12 + 39)	35
Atack, 2006	150 (TL)	absent	absent	NA	NA	111 (56 + 12 + 43)	NA
Present study	61.2	absent	absent	3	3	105 (54 + 12 + 39)	34

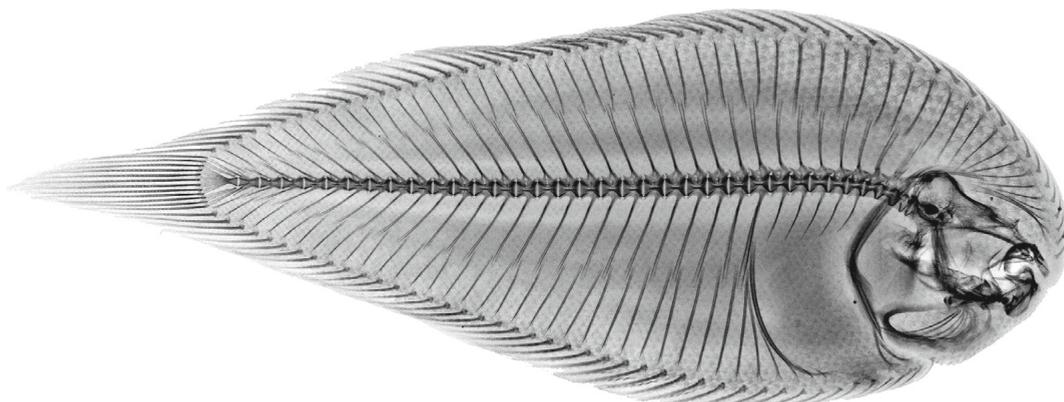


Fig. 4. Radiograph (positive) of *Typhlachirus lipophthalmus*, ZRC 59653, 61.2 mm SL (note total absence of pectoral fin and orbital processes).

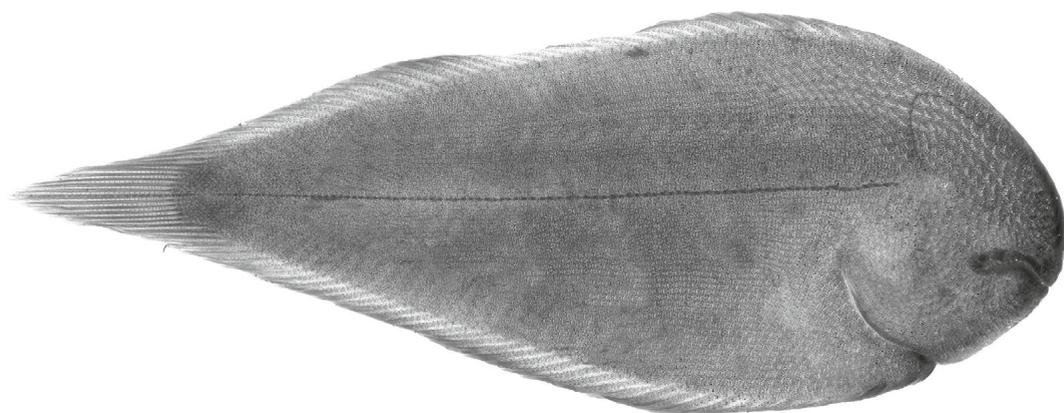


Fig. 5. A colour inversion rendition (using Photoshop software) of the right side habitus of *Typhlachirus lipophthalmus* (ZRC 59653), showing a broken lateral line system: consisting of a reversed "C" shaped lateral line pattern on head above cephalic region, and a straight lateral line system commencing just behind occipital region to distal tip of caudal fin.

36.8 % SL) located about at point about equal to $\frac{1}{4}$ SL, body gently tapering to caudal peduncle (caudal peduncle depth 6.2 % SL). Anus situated in anterior quarter of body, displaced to left.

Absence of pectoral fin on right side of body. All unpaired fins confluent, with caudal fin pointed. Dorsal-fin rays 54, anal-fin rays 39, caudal-fin rays 12 (total of dorsal, anal and caudal fin rays = 105), pelvic-fin rays 3 (right) and 3 (left). Snout region and oral area covered with papillae-like margins. Mouth in a downturned arch on right side; downturned arch with cavity near mouth corner on left side; upper and lower jaws with fringed margins, no teeth on jaws on right side, teeth present only on left side. Gill opening about

50 % from dorsal margin of opercle towards ventral part of head on both right and left sides, opercles not joined to isthmus. No gill rakers on gill arches. Vertebral column with 9 trunk + 25 caudal vertebrae (total vertebrae 34; Fig. 4).

Scales (Figs. 2–3). Body entirely covered with ctenoid scales on both sides. Dorsal portion of anterior half of right side of body with more distinct and largest scales, all ctenoid scales with elongate ctenii on their distal margins, scales gradually decreasing in size (down to half) at caudal peduncle (as depicted by Chabanaud, 1948: figs. 6–10). Left side of body covered evenly with ctenoid scales of uniform size, corresponding in size to smallest scales on right side.

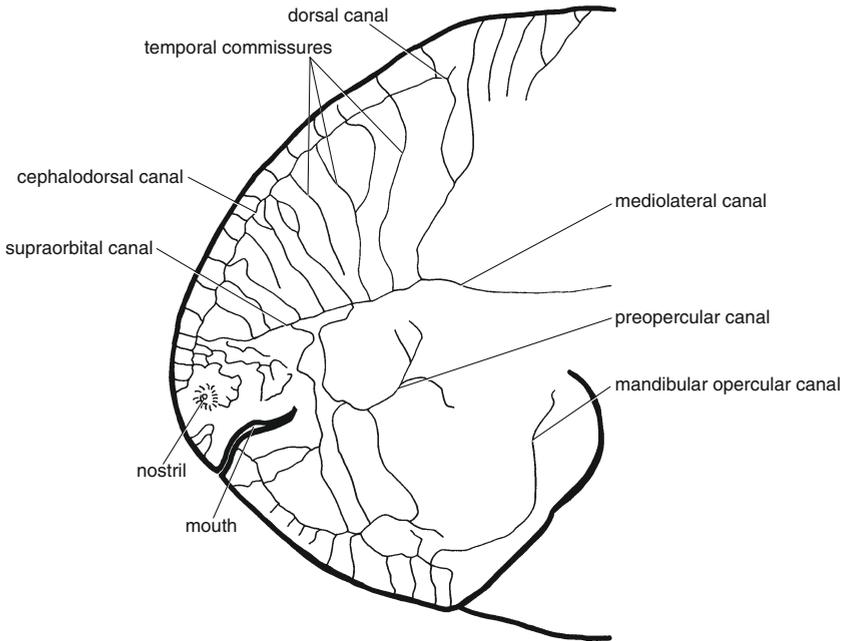


Fig. 6. Line drawing of pore pattern on head region of left side of *Typhlachirus lipophthalmus* (traced from photograph provided by Chien Lee; fin rays, papillae around mouth and snout omitted).

Lateral line pierces 100 pored scales on right side of body, about 99 pored scales on left side of body. 46 scales across widest point of body on right side, 15 scales across caudal peduncle on right side. Dorsal margin of opercular opening starts at ninth pored lateral scale on right side.

Lateral line system (Fig. 5). Right side of body shows interrupted lateral line system with anterior portion consisting of reversed “C” shaped lateral line pattern on head above cephalic region, and posterior portion consisting of almost straight lateral line system commencing just behind occipital region and running posteriorly through sixth caudal-fin ray to distal tip of middle caudal-fin rays.

Cephalic sensory canal system (Fig. 6). On the blind side (left side of fish), head regions with following canals present: supraorbital canal, cephalodorsal canal, dorsal canal, mediolateral canal, preopercular canal, mandibular opercular canal and temporal commissures.

Coloration (live or freshly dead, Figs. 1-2). Right side of body mainly light pink to pink, with margin (spiny portion) of each scale black. Left side of body uniformly light pink. No black edged scales visible. All fins pinkish with purplish in-

terradian membranes. Live coloration depicted in Atack (2006) reproduced in Figure 1. Coloration (preserved, Fig. 3). Body light pink to white on both sides, each scale margin on right side edged with black, more obvious on scales from dorsal area. All fins hyaline, except proximal regions with blackish interradial membranes.

Notes on habitat. The original material examined by Károli (1882) was obtained from the sea, and here assumed to be coastal waters. Sungai Sadong, the source of the recent specimen, was observed to have turbid brackish waters that appear opaque and muddy, and became very fast flowing during tidal changes. *Typhlachirus lipophthalmus* occupies a benthic niche on soft muddy-silt substrata. This fish was a bycatch of the main fishery of the giant river shrimp (*Macrobrachium rosenbergii*) that is known to the local people as Udang Gala. Local fishers use a method called Belat, which consist of a length of netting (length around 15 m, mesh about 4–5 cm wide) held in place by long wooden stakes laid around a shallow dip in the river bank during low tide, and left for one tidal cycle before retrieval. Syntopic fish species obtained are detailed in Tan & Grinang (2018: 2–4).

Distribution. *Typhlacheris lipophthalmus* is presently known only from Sarawak, Malaysian Borneo, having been recorded from the lower reaches of Sungai Sadong of the Sadong River basin (Tan & Grinang, 2018 and present study) and from Sungai Kuap of the Sarawak River basin (Atack, 2006). The range of *Typhlacheris lipophthalmus* is expected to be wider, pending further surveys of estuarine habitats in Borneo. See Figure 7 for the distribution of all three species of *Typhlacheris*.

Remarks. It should be noted that not all data collected from this one specimen is consistent with published information. For example, Károli (1882: 177) mentioned that the holotype has a right-side pectoral fin with five rays; and a combined count of 108 dorsal-, anal- and caudal-fin rays (109 fin rays provided by Evseenko & Bolshakov, 2018). The specimen we examined does not have a pectoral fin and the combined count of dorsal-, anal- and caudal-fin rays is 105 (see Table 1). The absence of a pectoral fin can be an aberration, however, this cannot be confirmed, since only one specimen is available.

Small- to medium-sized fish species that occur only in large riverine habitats in Southeast Asia are considered rare and poorly represented in museum collections. This can be partly explained by infrequent collections made in such habitats due to inaccessibility, insufficient logistic support and presence of hazardous elements, e.g. deep waters with strong currents and the presence of crocodiles.

The butid, *Pogoneleotris heterolepis* is another rare fish that is syntopic with *Typhlacheris lipophthalmus* in the rivers of Sarawak. Several specimens recently obtained have been documented by Tan & Grinang (2018) and redescribed by Larson & Tan (2019).

More efforts should be made to collect safely in riverine habitats. This is possible by linking up with local fishing communities. Important and useful information can be gathered from interviews and inspection of their fish catches. The collection and deposition of properly preserved voucher specimens in recognized and established institutions will provide historical data that will be instrumental for future research.

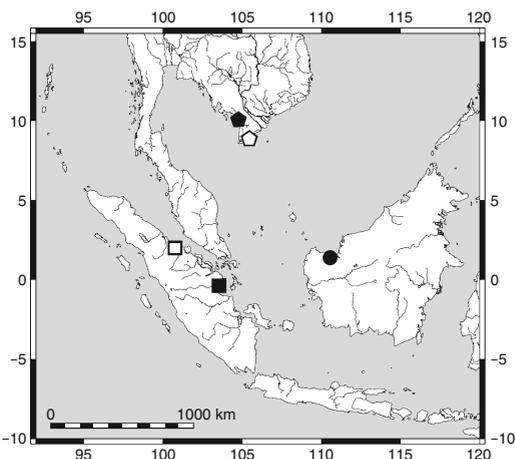


Fig. 7. Map of Southeast Asia showing distribution of *Typhlacheris caecus* (■), *T. elongatus* (◆) and *T. lipophthalmus* (●). White symbols are type localities; each symbol may present more than one location. Non-type locality of *T. caecus* from Abidin & Bontoro (2014).

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