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OREOGLANIS MACRONEMUS, A NEW SPECIES OF GLYPTOSTERNINE CATFISH (TELEOSTEI: SILURIFORMES: SISORIDAE) FROM NORTHERN LAOS

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ABSTRACT. – *Oreoglanis macronemus*, new species, is described from the Xieng Khouang Plateau (Plain of Jars) in northern Laos. It belongs to the *O. delacouri* species group (sensu Ng & Rainboth), which consist of species with a lower lip lacking a median notch and with prominent projections along the posterior margin, as well as a lunate caudal fin with extensions of the outermost principal caudal rays. *Oreoglanis macronemus* can be distinguished from other members of the *O. delacouri* species group in having a short caudal peduncle (15.6–17.3% SL) and very long nasal barbels (35.4–41.7% HL).

KEY WORDS. – *Oreoglanis*, Sisoridae, Glyptosterninae, Laos, Xieng Khouang.

INTRODUCTION

Glyptosternine catfishes of the genus *Oreoglanis* Smith, 1933, are found in swift, highland streams throughout India, China, and mainland Southeast Asia. They are easily distinguished from other catfishes by their strongly depressed head and body, and greatly enlarged paired fins that have been modified to form an adhesive apparatus. As previously mentioned (Ng & Rainboth, 2001), the phylogenetic relationships within the Glyptosterninae is poorly known and some of the genera within the group are suspected to be non-monophyletic.

One such genus, *Oreoglanis* Smith, 1933, has been traditionally defined by a continuous postlabial groove on the lower jaw and heterodont dentition (e.g., Chu et al., 1990). However, He (1995, 1996) demonstrated the paraphyly of *Oreoglanis* with *Pareuchiloglanis* and *Pseudexostoma* (possibly including *Myersglanis* and *Parachiloglanis* as well), and there is a clear need to rediagnose glyptosternine genera. Until such a time when a detailed study can be undertaken and better diagnoses obtained for glyptosternine genera, *Oreoglanis* is tentatively considered a valid genus as in previous studies (Ng & Kottelat, 1999; Ng & Rainboth, 2001; Ng & Freyhof, 2001).

While examining material in the Natural History Museum, London, for a phylogenetic study of the Sisoridae, I came across material collected from northern Laos identified as *Euchiloglanis*. Close examination of this material revealed it to be an undescribed *Oreoglanis* species that is easily distinguished from its congeners. The description of this species as *O. macronemus* forms the basis of this study.

MATERIALS AND METHODS

Measurements were made point to point with dial calipers and data recorded to tenths of a millimetre. Counts and measurements were made on the left side of specimens whenever possible. Subunits of the head are presented as proportions of head length (HL). Head length itself and measurements of body parts are given as proportions of standard length (SL). Measurements were made following Ng & Rainboth (2001).

Fin rays were counted under a binocular dissecting microscope using transmitted light. Vertebral counts were taken from radiographs following Ng & Rainboth (2001). Numbers in parentheses following a particular fin-ray, branchiostegal-ray, gill-raker or vertebral count indicate the number of specimens with that count. Institutional codes follow Eschmeyer (1998).

TAXONOMY

Oreoglanis macronemus, new species

(Fig. 1)

Material examined. – Holotype – BMNH 1933.8.19.51, male, 64.7 mm SL, Laos: Xieng Khouang, coll. J. Delacour & W. Lowe, 1926.

Paratypes – BMNH 1933.8.19.52–54, 2 ex., females, 47.5–59.7 mm SL, 1 ex., male, 61.8 mm SL, data as for holotype.

Diagnosis. – *Oreoglanis macronemus* shares with members of the *O. delacouri* group a lower lip lacking a median notch,

Table 1. Morphometric data for *Oreoglanis macronemus* (n=4).

MORPHOMETRICS	Holotype	Range
%SL		
Predorsal length	32.6	32.6–37.2
Preanal length	75.2	75.2–79.6
Prepelvic length	41.1	39.6–43.7
Prepectoral length	15.9	13.9–17.1
Length of dorsal-fin base	8.2	8.2–10.2
Length of anal-fin base	5.9	5.0–5.9
Pelvic-fin length	17.0	16.0–17.9
Pectoral-fin length	23.0	23.0–28.0
Caudal-fin length	27.8	17.5–27.8
Length of adipose-fin base	27.2	25.7–29.9
Dorsal to adipose distance	22.7	15.6–22.7
Post-adipose distance	11.3	9.7–12.2
Caudal peduncle length	17.0	15.6–17.3
Caudal peduncle depth	4.9	4.2–4.9
Body depth at anus	8.2	8.2–9.5
Head length	22.4	22.1–25.4
Head width	16.2	16.2–18.6
Head depth	8.0	6.6–9.0
%HL		
Snout length	54.5	52.2–55.4
Interorbital distance	29.7	28.0–32.6
Eye diameter	8.3	6.4–9.7
Nasal barbel length	40.7	35.4–41.7
Maxillary barbell length	54.5	54.5–69.0
Inner mandibular barbel length	20.7	17.8–27.4
Outer mandibular barbel length	27.6	24.2–33.6

with prominent projections along the posterior margin and a lunate caudal fin with extended principal rays. This distinguishes it from congeners of the *O. siamensis* species group (*O. insignis*, *O. macropterus*, *O. setiger* and *O. siamensis*), which have a median notch on the lower lip, with an entire or weakly laciniate posterior margin, and emarginate caudal fins. It can be distinguished from congeners of the *O. delacouri* species group in having a shorter caudal peduncle (15.6–17.3% SL vs. 18.7–27.1) and longer nasal barbels (35.4–41.7% HL vs. 11.2–32.0). It is further distinguished from *O. delacouri*, *O. infulatus*, *O. hypsiurus* and *O. lepturus* in having a deeper caudal peduncle (4.2–4.9% SL vs. 2.1–3.6), and from *O. frenatus* in having more vertebrae (39–40 vs. 36–38).

***Description.* –** Morphometric data as in Table 1. Head moderately broad and extremely depressed; dorsal profile slightly convex and ventral profile almost straight. Eye ovoid, horizontal axis longest, subcutaneous; located dorsally on head. Gill openings extremely narrow, extending from middle of pectoral-fin base to level just medial to base of last pectoral-fin ray.

Mouth strongly inferior, with broad, thin and papillate lips. Lower lip lacking median notch, posterior margin with lobulate projections. Postlabial groove on lower jaw present and uninterrupted. Jaw teeth pointed and in large, broad band with small median indentation and rounded ends on both sides in upper jaws. Two kinds of teeth present on lower jaw in two separate, roughly triangular patches: anterior teeth short and spatulate, with curved inner face; posterior teeth pointed as in those of upper jaw.

Barbels in four pairs. Maxillary barbels flattened, with membranous flap of skin on dorsoposterior edge and rounded tip. Ventral surface with numerous plicae, with crenulate ventroposterior edge. Nasal barbel extending to point midway between barbel base and anterior orbital margin. Inner mandibular-barbel origin close to midline immediately under lower lip and extending to imaginary line through bases of the first pectoral-fin elements. Outer mandibular barbel originates posterolateral of inner mandibular barbel, extending to base of first pectoral-fin element.

Body extremely depressed, becoming compressed towards caudal peduncle. Dorsal profile rising very gently from tip of snout to origin of dorsal fin, then almost horizontal to end of adipose fin base, sloping gently ventrally thereafter to end of caudal peduncle. Ventral profile horizontal to anus and thereafter sloping dorsally to end of caudal peduncle.

Skin smooth. Lateral line complete and midlateral in position. Vertebrae 24+15=39 (n=1), 25+14=39 (n=1), 26+13=39 (n=1) or 26+14=40 (n=1).

Dorsal fin with first element not ossified and i,6 (n=4) rays; fin margin convex. Pectoral fin greatly enlarged, with first element thickened but not ossified, and i,15,i (n=2) or i,17 (n=2) rays. Ventral surface of thickened first pectoral-fin element with numerous striae. Pectoral-fin margin strongly convex. Pelvic-fin origin at midpoint of body. Pelvic fin enlarged, with i,5 (n=4) rays and convex margin. Ventral surface of first pelvic-fin element with numerous striae. Anus and urogenital openings located at vertical through line through posterior quarter of adpressed pelvic fin. Anal fin with short base and ii,4 (n=4) rays. Caudal peduncle short. Caudal fin lunate, with i,5,5,i (n=3), i,6,5,i (n=4) or i,6,6,i (n=1) principal rays.

Males with small conical genital papilla immediately posterior to anus in depression terminating posteriorly with straight transverse wall. Females with tube-shaped papilla similarly positioned.

Colour. **–** In 70% ethanol: brown on dorsal and lateral surfaces of the head and body, dark yellow on ventral region. A paler, dark yellow ovoid patch on the dorsum at the base of the first dorsal-fin element present. Dorsal and caudal fins brown; dorsal surfaces of pectoral and pelvic fins brown, with light yellow ventral surfaces. Anal fin yellow. Dorsal surface of barbels brown, ventral surface light yellow. Caudal-fin base with a vertical darker band that extends along outermost lower principal caudal rays.

Etymology. **–** From the Greek makros, meaning long, and nema, meaning thread. In reference to the long nasal barbels of this species. Used as a noun in apposition.

Distribution. **–** Known from the Xieng Khouang region, most likely from either the Nam Ngiap or the Nam Sen drainage (see discussion).

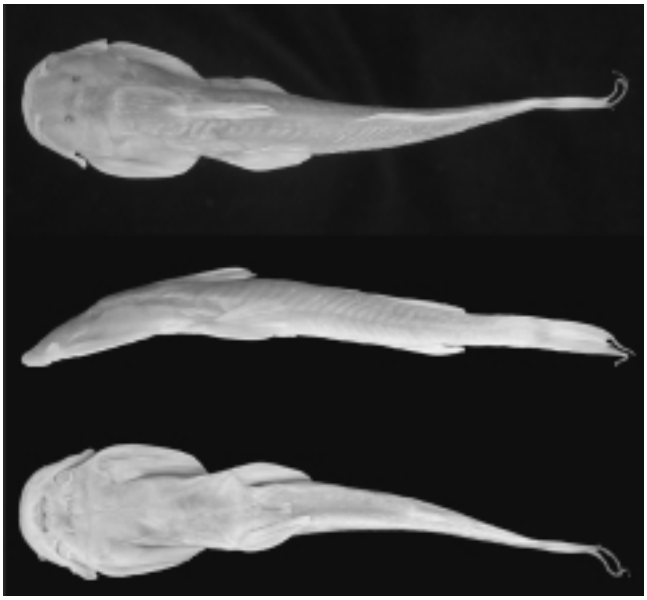

Fig. 1. *Oreoglanis macronemus*, new species, BMNH 1933.8.19.52, paratype male, 61.5 mm SL; Laos: Xieng Khouang.

DISCUSSION

For the ease of comparison between species, *Oreoglanis* has been divided into two species groups by Ng & Rainboth (2001). The *O. siamensis* species group, which includes *O. insignis*, *O. macropterus*, *O. setiger* and *O. siamensis*, is distinguished by having an emarginate caudal fin, and a lower lip notched medially with an entire or weakly laciniate posterior margin. The *O. delacouri* species group, which consists of *O. delacouri*, *O. frenatus*, *O. infulatus*, *O. lepturus* and *O. hypsiurus*, is distinguished by having a lunate caudal fin (sometimes with strap-like extensions of the simple principal caudal rays), and a lower lip without a median notch with prominent extensions along the posterior margin. *Oreoglanis macropterus* belongs to the latter group on the account of its caudal fin and lower lip morphology.

It is difficult to establish the exact locality from which the types (and only specimens so far) of *O. macronemus* were obtained. The only data available from the labels and registers indicated that the fish were collected from Xieng Khouang in Laos by Delacour and Lowe. Jean Delacour was a French ornithologist who had undertaken a series of seven collecting expeditions to what was then French Indochina in the late 1920s and early 1930s. Willoughby Lowe from the Natural History Museum, London [then the British Museum (Natural History)] accompanied Delacour on four (the second to the fifth) of these expeditions. These expeditions were largely of an ornithological nature, although other vertebrates were collected (Delacour et al., 1927). According to the detailed itinerary of these expeditions by Hennache & Dickinson (2000), Delacour & Lowe collected in the vicinity of Xieng Khouang only during the second (November 1925–April 1926) expedition. Only two localities were sampled: Muongsui (Muang Sui, presently Phu Kut, 19°40'N 103°0'E) and Phu Ké (probably Phu Keng, a hill about 18 km WNW of Phonsavan), both of which lie in the Nam Ngum drainage. However, the Xieng Khouang Plateau is drained by the Nam Ngiap, Nam Ngum and Nam Sen drainages, all of which have their headwaters originating there (only a few kilometres apart) and leaving the plateau by a series of rapids and waterfalls (M. Kottelat, pers. comm.). The type locality of *O. delacouri* is almost certainly situated in the Nam Ngiap drainage (Ng & Kottelat, 1999) and the types of *O. delacouri* [Ng & Kottelat (1999) could not find the other syntype (now a paralectotype after their designation of a lectotype) of *O. delacouri*, which has been subsequently located in the BMNH] were collected by Delacour almost certainly during the same expedition.

Examination of other freshwater fishes collected by Delacour & Lowe might presumably help us to identify the type locality of *O. macronemus*. According to the BMNH registers, five other species have been collected from Xieng Khouang by Delacour and Lowe: *Channa striata*, *Nemacheilus multifasciatus*, *Opsariichthys bidens*, *Puntius chola* and *P. sarana*). *Channa striata* is a widespread species and therefore uninformative for our purposes. The material representing *N. multifasciatus*, *P. chola* and *P. sarana* need to be reidentified as they are obvious misidentifications (the names

belong to Indian taxa that have not been found in mainland Southeast Asia). The presence of *Opsariichthys bidens* in the collection may offer clues to a more precise location of the type locality of *Oreoglanis macronemus*. Although *Opsariichthys bidens* is an east Asian species not occurring west of Red River drainage, it is found in Xieng Khouang where it is present in headwaters of all the basins draining the Plain of Jars except the Nam Ngum (M. Kottelat, pers. comm.). This is circumstantial evidence that the type locality of *O. macronemus* lies either in the Nam Ngiap or the Nam Sen drainage.

Because of the restricted distributions of glyptosternine catfishes, more detailed comparisons are only necessary with *O. delacouri* and O. *hypsiurus*, which are the only congeners found in close proximity to *O. macronemus*. *Oreoglanis macronemus* differs from *O. hypsiurus* in having a shorter (15.6–17.3% SL vs. 18.7–21.7), deeper (4.2–4.9% SL vs. 2.7–3.6) caudal peduncle and longer nasal barbels (35.4–41.7% HL vs. 16.1–24.2). These differences between the two species are not due to ontogeny, as bivariate analysis (ANCOVA) shows that the regression lines of caudal peduncle length, caudal peduncle depth and nasal barbel length on SL are significantly different (all at p<0.000005; Fig. 2).

The same three characters [a shorter (15.6–17.3% SL vs. 21.1–24.0), deeper caudal peduncle (4.2–4.9% SL vs. 2.3–2.4) and longer nasal barbels (35.4–41.7% HL vs. 11.2–16.8) in *O. macronemus*] similarly distinguish *O. macronemus* from *O. delacouri*. However, it is more difficult to rule out ontogeny in explaining the morphometric differences between *O. macronemus* and *O. delacouri* (which has a distribution extremely close to, or possibly overlapping that of *O. macronemus*). This is due to the fact that only three specimens of *O. delacouri* are known to be available for study, and they are all significantly bigger than the types of *O. macronemus* (at least twice as large). Bivariate analysis shows that the regression lines of caudal peduncle length, caudal peduncle depth and nasal barbel length on SL are significantly different (at p=0.00297, 0.00003 and 0.00002 respectively; Fig. 3), but there is the problem of the small sample sizes of the two species. Examination of a large ontogenetic series for other *Oreoglanis* species, indicates that the caudal peduncle (with regard to length and depth) and nasal barbels appear to show isometric growth, and that these differences will most probably hold true should a larger series of both species be obtained.

Comparative material. – *Oreoglanis delacouri*: MNHN 1936-31, lectotype, 103.4 mm SL; BMNH 1936.7.30.2, 1 paralectotype, 97.7

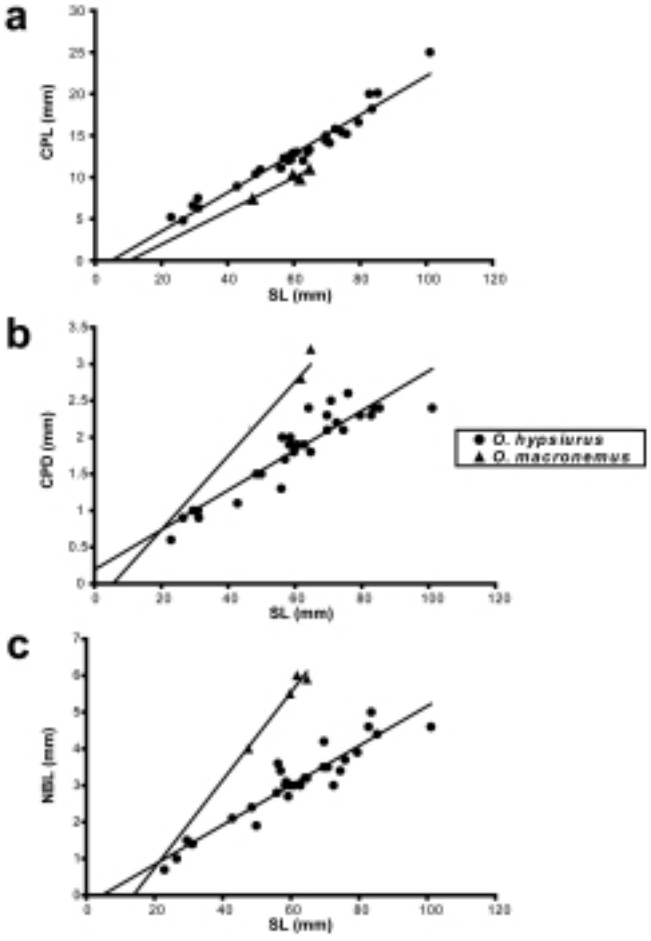

Fig. 2. *Oreoglanis hypsiurus* and *O. macronemus*; biplots of a. caudal peduncle length (CPL); b. caudal peduncle depth (CPD), and c. nasal barbel length (NBL) against standard length.

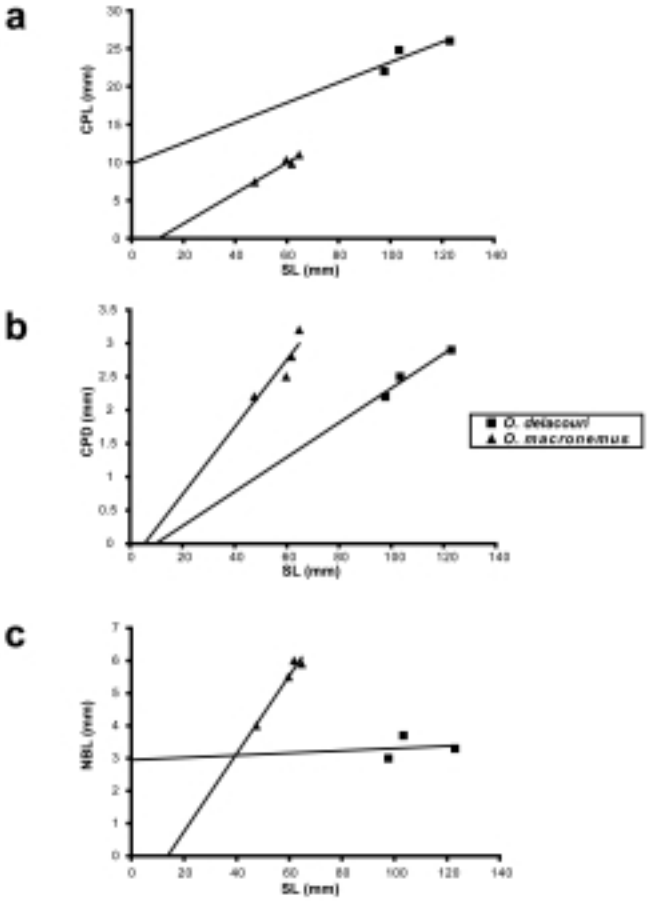

Fig. 3. *Oreoglanis delacouri* and *O. macronemus*; biplots of a. caudal peduncle length (CPL); b. caudal peduncle depth (CPD), and c. nasal barbel length (NBL) against standard length.

mm SL, Laos: Xieng Khouang; CMK 15242, 1 ex., 123.0 mm SL, Laos: Xieng Khouang province, Nam Sen at waterfall 1 km SE of Ban Hokang (19°18'19"N 103°10'42"E); UMMZ 236815, 2 ex., 77.1–108.9 mm SL, Laos: Xieng Khouang province, Nam Ngiap, 2 km S of Ban Nasi (19°19'N 103°22'E).

O. frenatus: UMMZ 236811, holotype, 92.5 mm SL; UMMZ 236812, 17 paratypes, 39.8–84.5 mm SL; ZRC 45707, 4 paratypes, 61.3–87.9 mm SL, Laos: Xieng Khouang province, Nam Ka basin, Houay Kheua at Highway 7 bridge (19°38'N 103°28'E).

O. hypsiurus: ZRC 40440, holotype, 98.5 mm SL; CMK 12367, 26 paratypes, 25.0–129.0 mm SL; NRM 44296, 5 paratypes, 30.3–74.8 mm SL; ZRC 40441, 6 paratypes, 29.1–85.6 mm SL, Laos: Khammouan province, Upper Nam Theun, ca. 1 km upstream of confluence with Houay Nuok Lan (18°4'9"N 105°29'44"E).

O. infulatus: ZFMK 35719, holotype, 76.1 mm SL; UMMZ 238025, 6 paratypes, 42.2–72.6 mm SL; ZFMK 35720–357725, 6 paratypes, 40.3–72.4 mm SL, Vietnam: Ha Tinh province, stream at Son Kim, a tributary of Song Lam (18˚24'25"N 105˚11'10"E).

O. insignis: KIZ 9810191, holotype, 78.5 mm SL; CAS 205600, 16 paratypes, 32.4–83.6 mm SL, China: Yunnan province, Baoshan prefecture, Longchuanjiang and Dajiang, near Qushi; NRM 25111, 3 paratypes, 69.4–81.8 mm SL, China: Yunnan province, Irrawaddy river drainage, road from Tengchong to Myanmar border at Kambawti, Kuyong; NRM 25113, 3 paratypes, 60.1–70.8 mm SL, probably from Myanmar, Kachin state, Kambawti area or China, Yunnan province, Tengchong area.

O. lepturus: UMMZ 236814, holotype, 69.5 mm SL; UMMZ 236816, 8 paratypes, 35.5–84.7 mm SL; ZRC 45708, 2 paratypes, 53.0–90.8 mm SL, Laos: Bolikamsai province, Nam Phao about 2 km from Vietnam border (18˚23'N 105˚19'N).

O. macropterus: RMNH 10236, 1 syntype, 58.1 mm SL, Myanmar: Khahyen Hills; CAS 205601, 2 ex., 66.4–83.3 mm SL, Chian: Yunnan province, Nujiang prefecture, Nujiang (Salween) drainage, Wancaoping River at bridge on highway between Piama and Gangfang; NRM 26669, 4 ex., 68.3–83.9 mm SL, Myanmar: Kachin state, Irrawaddy River drainage, Kambawti.

O. setiger: UMMZ 236813, holotype, 69.1 mm SL, Laos: Louang Namtha province, Nam Ma Oun (21˚5'N 101˚4'E); ZRC 46109, 2 paratypes, 29.1–63.2 mm SL, China: Yunnan province, Simao, Mekong River drainage upstream of Kiaoheijiang, en route (46 km) from Jinggu to Ning'er (23˚21'37.2"N 100˚55'16.2"E).

O. siamensis: CMK 4107, 38 ex., 39.7–117.8 mm SL, Thailand: Chiang Mai province, Wachirathan waterfall, Doi Inthanon National Park; USNM 117732, 1 ex., 43.6 mm SL, Thailand: Huay Om Mang, tributary of Mae Chaem; USNM 118340, 2 ex., 57.5–103.0 mm SL, Thailand: Doi Angka; ZSI F12233/1, 1 ex., 82.1 mm SL, Thailand: Mae Kang River, near the base of doi Angka.

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