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A REVIEW OF THE SISORID CATFISH GENUS *OREOGLANIS* (SILURIFORMES: SISORIDAE) WITH DESCRIPTIONS OF FOUR NEW SPECIES

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ABSTRACT.—The sisorid catfish genus *Oreoglanis* is reviewed in this study. Eight valid species are recognized, of which four are described as new: ***O. frenatus*** from the Nam Mat River drainage in northeastern Laos, ***O. insignis*** from the upper Irrawaddy (Nu Jiang) drainage in northern Myanmar (Burma) and southern China, ***O. lepturus*** from the Nam Ngiap River drainage (part of the Mekong River drainage) in northeastern Laos, and ***O. setiger*** from the Nam Oun River drainage (part of the Mekong River drainage) in northwestern Laos and the Lancang Jiang (Mekong) in southwestern China.

Key words: *Oreoglanis frenatus*, *O. insignis*, *O. lepturus*, *O. setiger*, Siluriformes, Sisoridae, China, Laos, Myanmar (Burma)

INTRODUCTION

Glyptosterninae (*sensu* de Pinna, 1996) are catfishes living in the bottoms of swift-flowing highland streams in India, China and Southeast Asia. Most of the approximately 10 genera and 90 species are highly specialized, with strongly depressed heads and bodies, and greatly enlarged pectoral and pelvic fins modified to form an adhesive apparatus. As defined in Ng & Kottelat (1999), the term glyptosternines here refers to members of this subfamily.

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Smith (1933) described *Oreoglanis* for glyptosternine catfishes with a continuous postlabial groove of the lower jaw and an unusual dentition: pointed teeth in the upper jaw and posterior part of the lower jaw and short, spatulate teeth in the anterior part of the lower jaw. The systematic relationships of the glyptosternine genera are poorly understood despite numerous studies (*e.g.*, Chu, 1979; Hora & Silas, 1952a) and *Oreoglanis* is not monophyletic. He (1995, 1996) demonstrated that it is paraphyletic with *Pareuchiloglanis* and *Pseudexostoma*, and possibly with *Myersglanis* and *Parachiloglanis* as well. Be that as it may, a systematic reappraisal of the validities of glyptosternine genera is difficult, given the fact that many glyptosternine types deposited in Indian and Chinese museums are not readily accessible to researchers.

Following the rationale of Ng & Kottelat (1999), we tentatively consider *Oreoglanis* to be a valid genus as originally defined (see above) as to make for easier comparisons. There are currently four nominal species of *Oreoglanis: O. delacouri* (Pellegrin, 1936), *O. macropterus* (Vinciguerra, 1890), *O. siamensis* Smith, 1933, and *O. hypsiurus* Ng & Kottelat, 1999.

METHODS AND MATERIALS

Measurements were made point to point with dial calipers and data recorded to tenths of a millimeter. 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 follow those of Ng & Kottelat (1999). Vertebrae were counted with the first rib-bearing vertebra considered the sixth. The numbers in parentheses following a particular meristic count refer to the numbers of specimens examined with that count. Ranges for counts and measurements of all eight species are summarized in Appendix 1 to facilitate comparisons. Drawings of the specimens were made with a Nikon SMZ-10 microscopic camera lucida. The specimens examined for the present study are in: CAS, California Academy of Sciences, San Francisco; CMK, the collection of Maurice Kottelat, Cornol; KIZ, Kunming Institute of Zoology, Academia Sinica, Kunming; NRM, Naturhistoriska Riksmuseet, Stockholm; UMMZ, Museum of Zoology, University of Michigan, Ann Arbor; USNM, National Museum of Natural History, Smithsonian Institution, Washington DC; ZRC, Zoological Reference Collection, National University of Singapore; and ZSI, Zoological Survey of India, Calcutta.

KEY TO THE SPECIES OF *OREOGLANIS*

1. Lower lip notched medially, with entire or weakly laciniate posterior margin; emarginate caudal fin.....2

   Lower lip lacking a median notch, with prominent projections along posterior margin; lunate caudal fin with principal caudal rays extended.....5

2. Tip of the maxillary barbel pointed; interorbital distance small (23.1-26.9 % HL).....*O. siamensis*

   Tip of the maxillary barbel rounded; interorbital distance large (28.0-31.2 % HL).....3

3. Posterior margin of maxillary barbel with laciniate projections.....*O. setiger*

   Posterior margin of maxillary barbel without or with lobulate projections.....4

4. Body and caudal peduncle slender (body depth at anus 8.0-9.4 % SL; depth of caudal peduncle 3.0-3.8 % SL); adipose fin near dorsal fin (dorsal to adipose distance 13.9-16.6 % SL).....*O. insignis*

   Body and caudal peduncle deep (body depth at anus 9.2-12.8 % SL; depth of caudal peduncle (8.0-8.7 % SL); adipose fin distant from dorsal fin (dorsal to adipose distance 17.5-18.6 % SL).....*O. macropterus*

5. Posterior base of adipose fin confluent with upper principal caudal rays.....*O. frenatus*

   Posterior base of the adipose fin separate from upper principal caudal rays.....6

6. Post-adipose distance long (10.7-15.4 % SL); interorbital distance large (27.1-29.5 % HL); male genital papilla in a narrow, longitudinal groove.....*O. delacouri*

   Post-adipose distance short (8.5-11.6 % SL); interorbital distance small (23.7-27.2 % HL); male genital papilla in a U-shaped depression or one terminating posteriorly with a straight transverse wall.....7

7. Caudal peduncle long and thin (8.9-11.2 times longer than deep); adipose fin near dorsal fin (dorsal to adipose distance 12.8-15.5 % SL) ..... *O. lepturus*

   Caudal peduncle short and deep (6.1-7.1 times longer than deep); adipose fin distant from dorsal fin (dorsal to adipose distance 14.8-21.1 % SL) ..... *O. hypsiurus*

SPECIES DESCRIPTIONS

Oreoglanis delacouri (Pellegrin, 1936)
Fig. 1

Paroreoglanis delacouri Pellegrin, 1936: 244; Bertin & Estève, 1950: 34.

Diagnosis. *Oreoglanis delacouri* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip lacking a median notch and having a posterior margin with laciniate projections; lunate caudal fin with elongate; strap-like lower principal ray in mature males; gill slit straight; nasal barbel reaching about one fourth of the distance to the eye; maxillary barbel with rounded tip absence of a pale elliptical patch on sides of body below adipose fin; male genital papilla located immediately behind the anus in a narrow longitudinal groove; caudal peduncle 7.2-10.3 times longer than deep; length of caudal peduncle 21.5-24.0% SL; depth of caudal peduncle 2.4-3.0 % SL; post-adipose distance 10.7-15.4 % SL; interorbital distance 27.1-29.5 % HL.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape inferior with broad, thin, papillate lips. Lower lip lacking median notch, posterior margin with laciniate 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in teeth of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge crenulate (Fig. 2a).

Dorsal fin without spine and i,6 (4) rays. Adipose fin with long base (Fig. 1b). Anal fin with i,4(1)or ii,3(3) rays. Caudal fin lunate, with 7/7 (4) rays; lower principal rays extended into a long, thin strap in mature

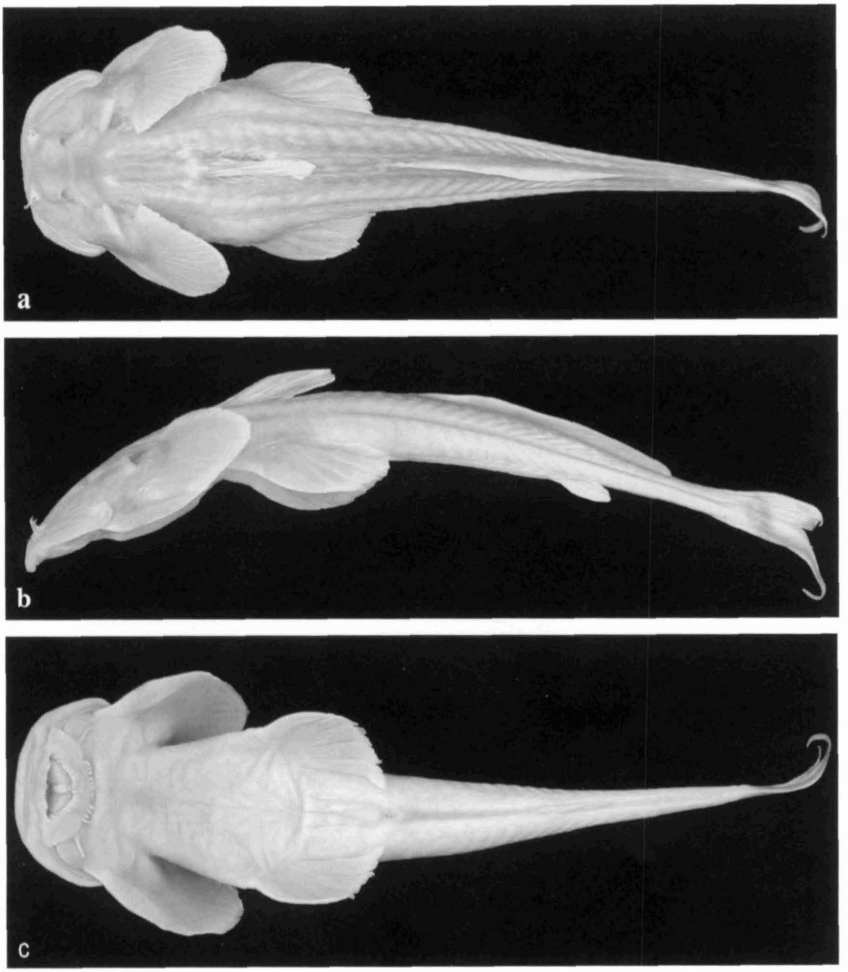

Fig. 1. *Oreoglanis delacouri*, CMK 15242, 123.0 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

males (Fig. 1b). Pelvic fin greatly enlarged, with convex distal margin and i,5 (4) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,18 (2), i,18,i (1) or i,19 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 27 + 13 = 40 (1), 26 + 15 = 41 (2) or 27 + 14 = 41 (1).

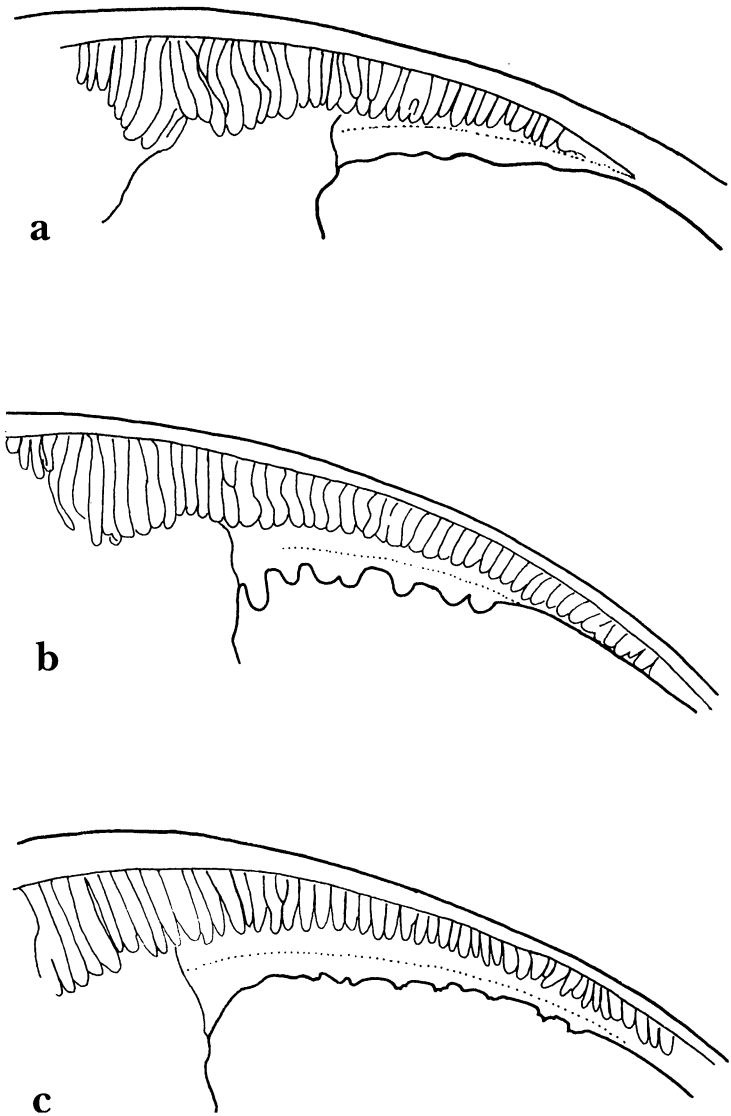

Fig. 2. Schematic illustration of left maxillary barbel of *Oreoglanis* species showing: **a,** crenulate posterior margin (*O. delacouri*, MNHN 1936-31, lectotype, 103.4 mm SL); **b,** posterior margin with lobulate projections (*O. lepturus*, UMMZ 236814, holotype, 108.9 mm SL); and **c,** posterior margin with laciniate projections (*O. setiger*, UMMZ 236813, holotype, 69.1 mm SL).

In % SL: body depth at anus 7.5-8.4; predorsal length 30.8-34.6; preanal length 70.9-74.8; prepelvic length 32.9-38.0; prepectoral length 13.7-17.3; length of dorsal-fin base 8.6-10.4; length of adipose-fin base 30.9-35.3; dorsal to adipose distance 15.2-15.5; post-adipose distance 10.7-15.4; length of anal-fin base 3.6-4.9; length of pelvic fin 18.1-21.8; length of pectoral fin 21.2-26.2; depth of caudal peduncle 2.4-3.0; length of caudal peduncle 21.5-24.0; length of caudal fin 17.2-20.8 (males); 17.5-18.5 (females); head length 18.9-22.3; head width 16.4-20.8; head depth 7.9-8.6.

In % HL: snout length 59.2-62.8; interorbital distance 27.1-29.5; eye diameter 8.7-12.1; length of nasal barbel 11.2-16.8; length of maxillary barbel 62.2-71.8; length of inner mandibular barbel 5.6-8.2; length of outer mandibular barbel 11.2-16.9.

Males with a small genital papilla located immediately posterior to anus in a depression that terminates posteriorly with a straight transverse wall (Fig. 3a). Females with a small genital papilla located immediately posterior to anus in a U-shaped depression (Fig. 4a).

Color. In 70 % ethanol: brown on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: two ovoid patches on occipital region, an ovoid patch on base of first dorsal-fin ray, an elliptical patch on anterior base of adipose-fin and another on posterior base of adipose-fin. Faint pale yellow stripes occasionally present on dorsolateral surface, running along entire length of body above lateral line. Dorsal and caudal fins brown; dorsal surfaces of pectoral and pelvic fins brown, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Dorsal surfaces of barbel brown, ventral surfaces light yellow.

Distribution. The Nam Ngiap River drainage (part of the Mekong River drainage) in northeastern Laos (Fig. 5).

Material examined. MNHN 1936-31, lectotype, 103.4 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 and 108.9 mm SL; Laos: Xieng Khouang province, Nam Ngiap, 2 km S of Ban Nasi, 19°19'N 103°22'E.

Oreoglanis frenatus new species
Fig. 6

Type Material. Holotype: UMMZ 236811, 92.5 mm SL; Laos: Xieng Khouang province, Nam Ka basin, Houay Kheua at Highway 7 bridge, 19°38'N 103°28'E; W. J. Rainboth *et al.*, 21 April 1998.

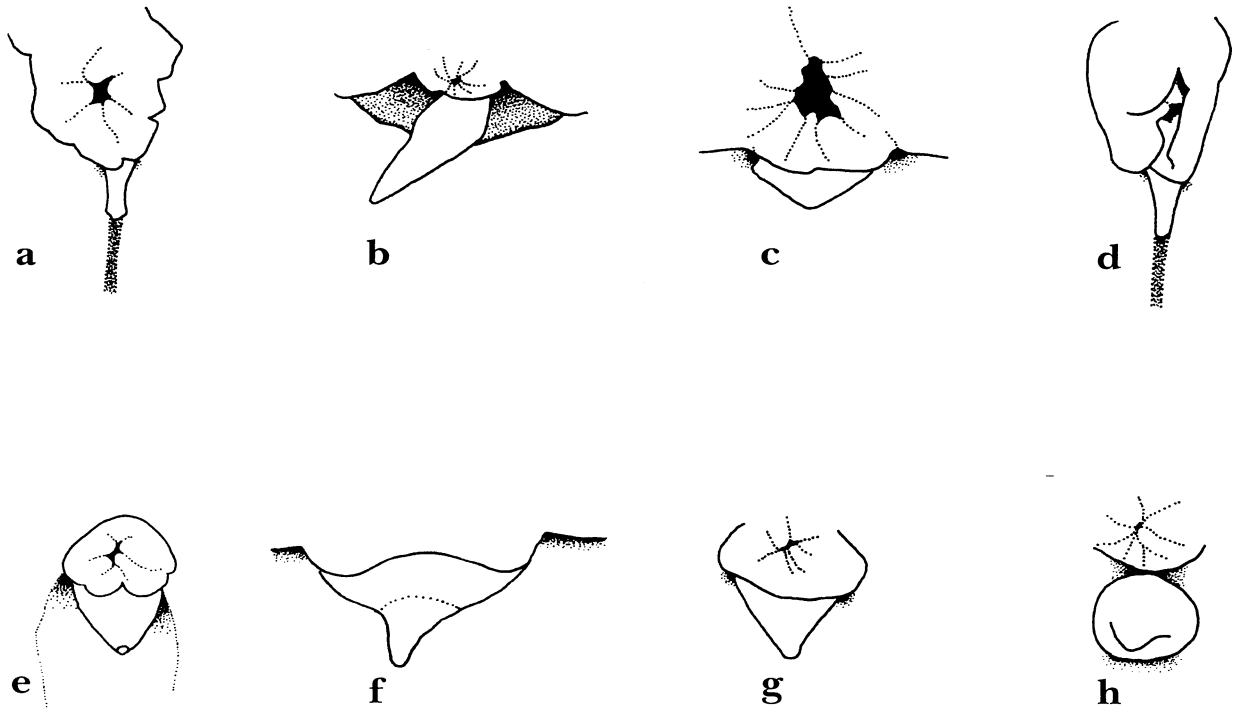

Fig. 3. Schematic illustration of the ventral view of the anus and external genitalia of male *Oreoglanis*: **a,** *O. delacouri*, MNHN 1936-31, lectotype, 103.4 mm SL; **b,** *O. frenatus*, UMMZ 236811, holotype, 92.5 mm SL; **c,** *O. hypsiurus*, ZRC 40440, holotype, 98.5 mm SL; **d,** *O. insignis*, KIZ 9810191, holotype, 78.5 mm SL; **e,** *O. lepturus*, UMMZ 236814, holotype, 69.5 mm SL; **f,** *O. macropterus*, NRM 26669, 83.9 mm SL; **g,** *O. setiger*, UMMZ 236813, holotype, 69.1 mm SL; **h,** *O. siamensis*, CMK 4107, 78.0 mm SL.

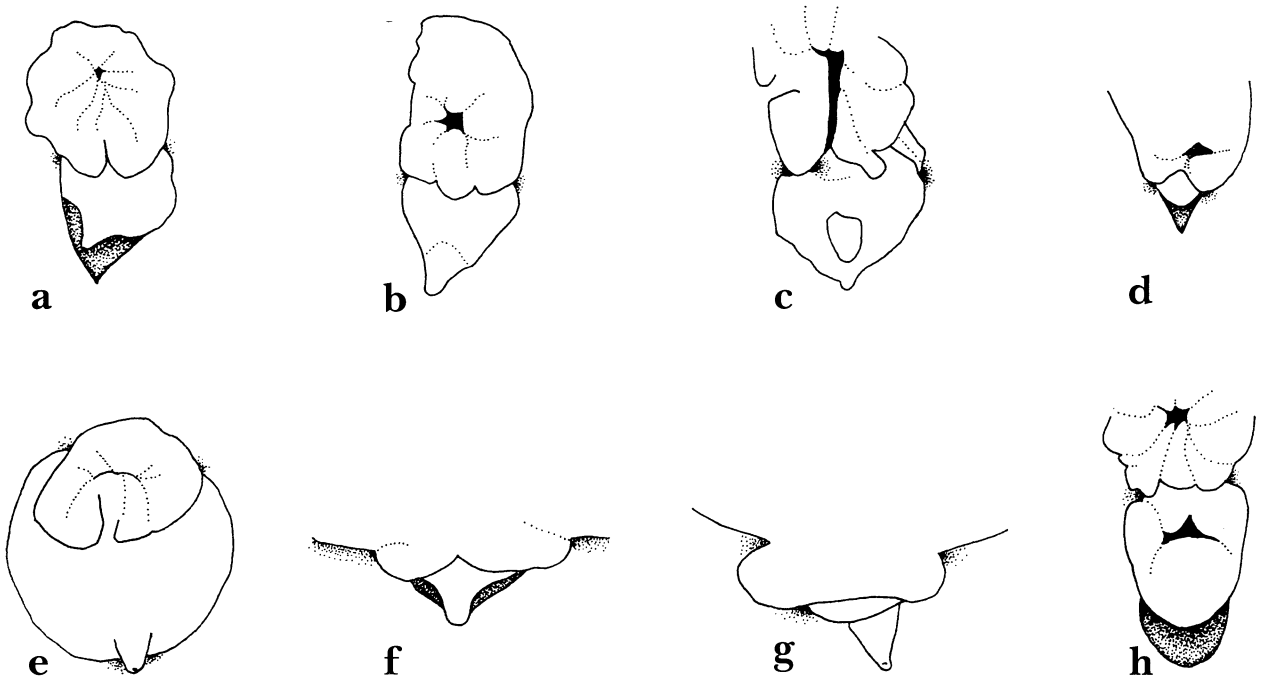

Fig. 4. Schematic illustration of the ventral view of the anus and external genitalia of female *Oreoglanis*: **a,** *O. delacouri*, UMMZ 236815, 108.9 mm SL; **b,** *O. frenatus*, ZRC 45707, paratype, 80.3 mm SL; **c,** *O. hypsiurus*, CMK 12367, paratype, 85.6 mm SL; **d,** *O. insignis*, CAS 205600, paratype, 69.7 mm SL; **e,** *O. lepturus*, UMMZ 236816, paratype, 84.7 mm SL; **f,** *O. macropterus*, CAS 205601, 83.3 mm SL; **g,** *O. setiger*, ZRC 46109, paratype, 63.2 mm SL; **h,** *O. siamensis*, CMK 4107, 83.7 mm SL.

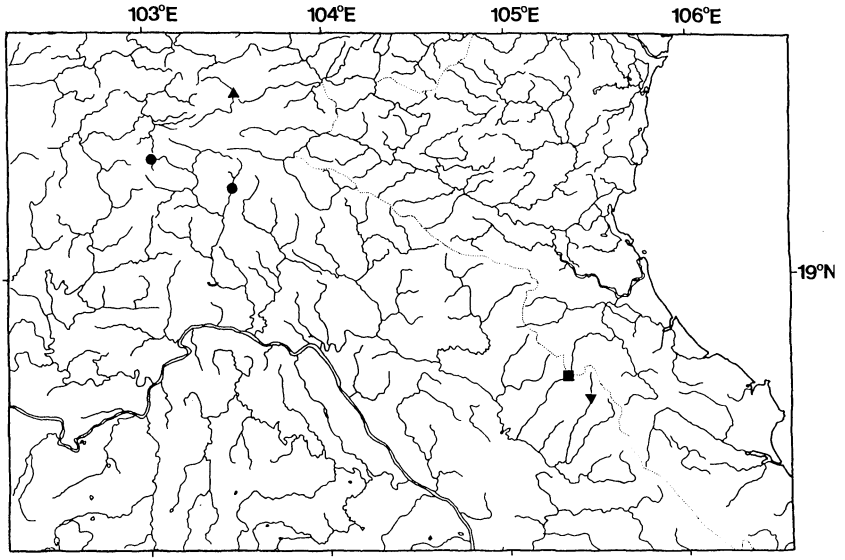

Fig. 5. Map showing distribution of members of the *O. delacouri* species group: *O. delacouri* (●), *O. frenatus* (▲), *O. hypsiurus* (▼), and *O. lepturus* (■).

Paratypes: UMMZ 236812, 17 ex., 39.8-84.5 mm SL; ZRC 45707, 4 ex., 61.3-87.9 mm SL; data as for holotype.

Diagnosis. *Oreoglanis frenatus* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip lacking a median notch and having a posterior margin with laciniate projections; lunate caudal fin with elongate; strap-like lower principal ray in mature males; posterior base of adipose fin confluent with upper principal caudal rays; male genital papilla located immediately behind the anus in a depression which terminates posteriorly with a straight transverse wall; maxillary barbel with rounded tip and entire margin.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape inferior with broad, thin and papillate lips. Lower lip lacking median notch, posterior margin with laciniate 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner

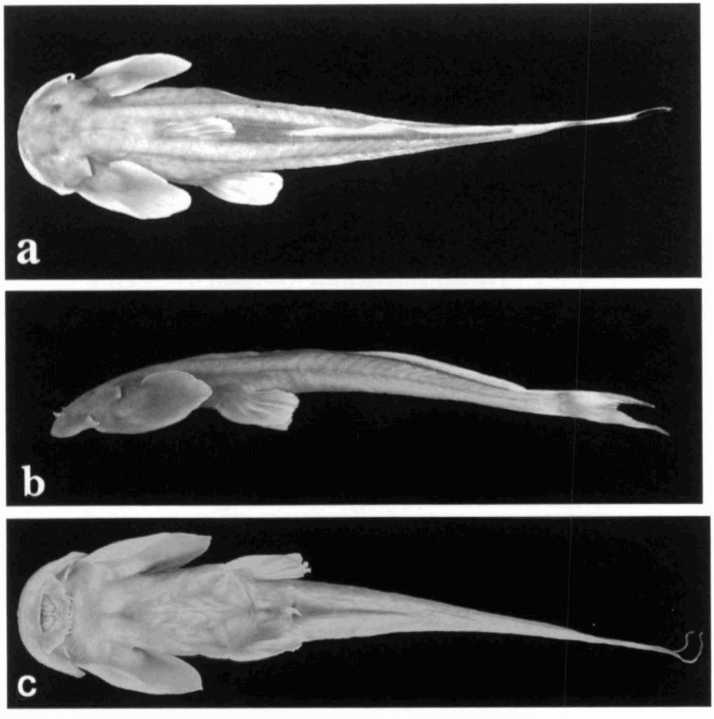

Fig. 6. *Oreoglanis frenatus*, UMMZ 236811, holotype, 92.5 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge entire.

Dorsal fin without spine and i,6 (6) rays. Adipose fin with long base, posterior end confluent with upper principal caudal rays. Anal fin with ii,3 (6) rays. Caudal fin lunate, with 6/6 (4) or 7/6 (2) rays; principal rays somewhat longer on lower lobe. Pelvic fin greatly enlarged, with convex distal margin and i,5 (6) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,17 (1), i,18 (3), i,19 (1) or i,20 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 22 + 14 = 36 (1), 23 + 14 = 37 (1), 24 + 14 = 38 (3) or 25 + 13 = 38 (2).

In % SL: body depth at anus 6.6-8.2; predorsal length 30.2-32.9; preanal length 69.9-73.5; prepelvic length 33.1-38.5; prepectoral length 13.1-14.7;

length of dorsal-fin base 7.4-11.7; length of adipose-fin base 36.7-47.8; dorsal to adipose distance 8.2-14.8; post-adipose distance 7.1-8.9; length of anal-fin base 1.9-3.4; length of pelvic fin 15.1-17.8; length of pectoral fin 23.0-24.4; depth of caudal peduncle 3.1-4.1; length of caudal peduncle 23.6-27.1; length of caudal fin 19.8-22.0 (males); 14.9- 18.3 (females); head length 18.8-20.7; head width 16.0-18.6; head depth 7.3-8.0.

In % HL: snout length 57.5-61.3; interorbital distance 27.2-30.3; eye diameter 7.5-9.8; length of nasal barbel 14.3-21.7; length of maxillary barbel 62.9-69.5; length of inner mandibular barbel 4.4-6.6; length of outer mandibular barbel 10.2-15.6.

Males with a small genital papilla located immediately posterior to anus in a depression that terminates posteriorly with a straight transverse wall (Fig. 3b). Females with a small genital papilla located in a U-shaped depression immediately posterior to anus (Fig. 4b).

Color. In 70 % ethanol: brown on dorsal and lateral surfaces of head and body, light yellow on ventral region. Faint pale yellow stripes occasionally present on dorsolateral surface, running along entire length of body above lateral line. Dorsal fin light yellow with a submarginal brown band. Caudal fin brown with middle portion of each lobe having a large light yellow spot; dorsal surfaces of pectoral and pelvic fins brown, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Dorsal surfaces of barbel brown, ventral surfaces light yellow.

Distribution. The Nam Ka River drainage in northeastern Laos (Fig. 5).

Etymology. From the Latin *frenatus*, meaning bridle or restraint, in allusion to the confluent (or "restrained") adipose and caudal fins. An adjective.

Oreoglanis hypsiurus Ng & Kottelat, 1999
Fig. 7

Oreoglanis hypsiurus Ng & Kottelat, 1999: 376, Figs. 1, 2a, 2c.
Oreoglanis delacouri (*non* Pellegrin, 1936): Kottelat, 1998: 108, Fig. 167.

Diagnosis. *Oreoglanis hypsiurus* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip lacking a median notch and having a posterior margin with lobulate projections; lunate caudal fin with elongate; strap-like lower principal ray in mature males; gill slit arched; nasal barbel reaching about half of the distance to the eye; maxillary barbel with rounded tip and a crenulate margin; presence of a pale elliptical patch on sides of body below adipose fin; male genital papilla located immediately behind the anus in a depression terminating posteriorly with a straight transverse wall; caudal

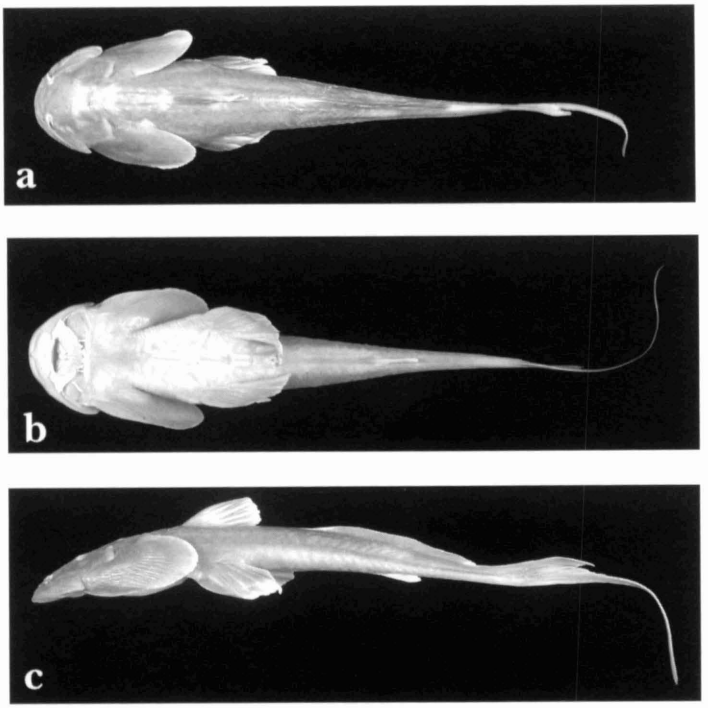

Fig. 7. *Oreoglanis hypsiurus*, CMK 12367, paratype, male, 129.0 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

peduncle 6.1-7.1 times longer than deep; length of caudal peduncle 18.7-21.7 % SL; depth of caudal peduncle 2.7-3.6 % SL; dorsal to adipose distance 14.8-21.1 % SL; post-adipose distance 8.6-11.6 % SL; interorbital distance 23.7-27.2 % HL.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding

flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge crenulate.

Dorsal fin without spine and i,5,i (2) or i,6 (4) rays. Adipose fin with long base. Anal fin with i,3 (2), i,3,i (2), or i,4 (2) rays. Caudal fin lunate, with 7/7 (6) rays; lower principal rays extended into a long, thin strap in mature males. Pelvic fin greatly enlarged, with convex distal margin and i,5 (6) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,18 (2), i,19 (3) or i,20 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 24 + 16 = 40 (1), 25 + 15 = 40 (3), 25 + 16 = 41 (1), 26 + 15 = 41 (5), 27 + 14 = 41 (1) or 26 + 16 = 42 (1).

In % SL: body depth at anus 7.6-9.5; predorsal length 32.2-36.5; preanal length 71.5-77.6; prepelvic length 36.2-40.1; prepectoral length 13.4-18.9; length of dorsal-fin base 8.9-11.1; length of adipose-fin base 30.5-36.3; dorsal to adipose distance 14.8-21.1; post-adipose distance 8.6-11.6; length of anal-fin base 2.7-3.6; length of pelvic fin 19.1-22.7; length of pectoral fin 24.2-28.2; depth of caudal peduncle 2.7-3.6; length of caudal peduncle 18.7-21.7; length of caudal fin 38.1-68.2 (males); 19.7-25.6 (females); head length 21.2-24.1; head width 18.9-22.4; head depth 7.5-9.2.

In % HL: snout length 57.9-61.2; interorbital distance 23.7-27.2; eye diameter 8.6-10.0; length of nasal barbel 16.1-24.2; length of maxillary barbel 56.9-71.5; length of inner mandibular barbel 5.9-8.5; length of outer mandibular barbel 11.1-15.7.

Males with a small genital papilla located immediately posterior to anus in a longitudinal groove (Fig. 3c). Females with two flaps of skin on both sides of anus, and a small genital papilla located in a U-shaped depression immediately posterior to anus (Fig. 4c).

Color. In 70% ethanol: brown on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: two ovoid patches on occipital region, an ovoid patch on base of first dorsal-fin ray, an elliptical patch on anterior base of adipose-fin and another on posterior base of adipose-fin, and an elliptical patch on each lateral surface of body below middle part of adipose-fin base. Dorsal and caudal fins brown; dorsalsurfaces of pectoral and pelvic fins brown, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Dorsal surfaces of barbels brown, ventral surfaces light yellow.

Distribution. The Nam Theun River drainage (part of the Mekong River drainage) in Laos (Fig. 5).

Material examined. ZRC 40440, holotype, 98.5 mm SL; Laos: Khammouan province, upper Nam Theun, about 1 km upstream of confluence with Houay Nuok Lan, 18°04'09"N 105°29'44"E. CMK 12367, 26 ex., paratypes, 25.0-129 mm SL; ZRC 40441, 6 ex., paratypes, 29.1-85.6 mm SL; NRM 44296, 5 ex., paratypes, 30.3-74.8 mm SL; data as for holotype.

Oreoglanis insignis new species
Fig. 8

Oreoglanis delacouri (non Pellegrin, 1936): Chu, 1979: 77 (in part); Chu, 1986: 41, Fig. 5; Chu & Kuang, 1990: 217, Fig. 218 (in part); Chu & Mo, 1999: 176, Fig. 116 (in part).

Type Material. Holotype: KIZ 9810191, 78.5 mm SL; China: Yunnan province, Baoshan prefecture, Longchuanjiang and Dajiang, near Qushi; C. J. Ferraris *et al.*, 25-31 October 1998.
Paratypes: CAS 205600, 16 ex., 32.4-83.6 mm SL; data as for holotype. NRM 25111, 3 ex., 69.4-81.8 mm SL; China: Yunnan province, Irrawaddy River drainage, road from Tengchong to Myanmar border at Kambawti, Kuyong; R. Malaise, 5 May 1934. NRM 25113, 3 ex., 60.1-70.8 mm SL; probably from Myanmar, Kachin state, Kambawti area or China, Yunnan province, Tengchong area; R. Malaise, 1934.

Diagnosis. *Oreoglanis insignis* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip with a median notch and having an entire posterior margin; emarginate caudal fin; male genital papilla located immediately behind the anus in a depression terminating posteriorly with a straight transverse wall; body depth at anus 8.0-9.4 % SL; depth of caudal peduncle 3.0-3.8 % SL; dorsal to adipose distance 13.9-16.6 % SL; maxillary barbel with rounded tip and entire posterior margin.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape inferior with broad, thin and papillate lips. Lower lip with median notch, posterior margin entire. 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to

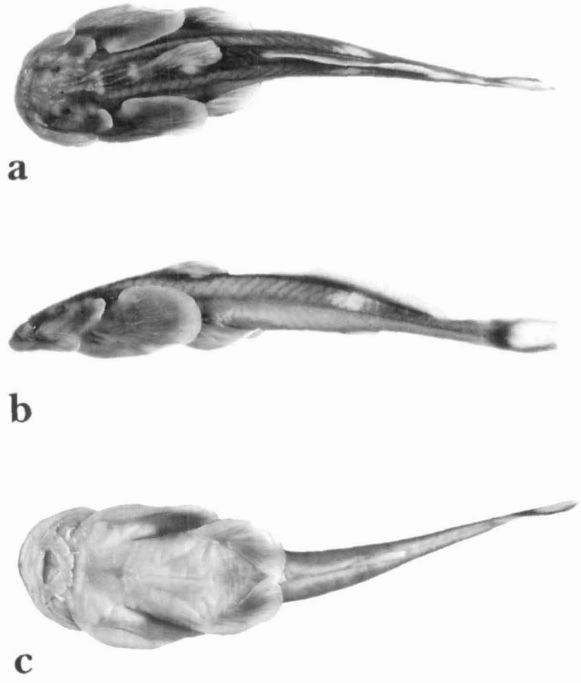

Fig. 8. *Oreoglanis insignis*, CAS 205600, paratype, 69.0 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge entire.

Dorsal fin without spine and i,6 (8) rays. Adipose fin with long base. Anal fin with iii,3 (2), ii,4 (2) or iii,4 (3) rays. Caudal fin emarginate, with 8/7 (8) rays. Pelvic fin greatly enlarged, with convex distal margin and i,5 (8) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,17 (1), i,18 (6) or i,22 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 23 + 13 = 36 (1), 23 + 14 = 37 (3), 24 + 13 = 37 (1) 24 + 14 = 38 (2) or 23 + 16 = 39 (1).

In % SL: body depth at anus 8.0-9.4; predorsal length 30.0-33.4; preanal length 65.2-68.4; prepelvic length 32.2-36.2; prepectoral length 13.1-16.5; length of dorsal-fin base 8.9-11.3; length of adipose-fin base 34.3-39.3;

dorsal to adipose distance 13.9-16.6; post-adipose distance 9.9-10.8; length of anal-fin base 3.1-5.4; length of pelvic fin 18.9-21.5; length of pectoral fin 23.9-27.3; depth of caudal peduncle 3.0-3.8; length of caudal peduncle 22.7-27.7; length of caudal fin 12.7-13.9; head length 21.4-23.8; head width 15.6-18.1; head depth 8.3-8.9.

In % HL: snout length 50.0-56.5; interorbital distance 30.1-31.2; eye diameter 7.7-8.8; length of nasal barbel 8.3-17.5; length of maxillary barbel 61.6-66.2; length of inner mandibular barbel 6.5-10.2; length of outer mandibular barbel 15.6-20.5.

Males with a small genital papilla located immediately posterior to anus in a depression that terminates posteriorly with a straight transverse wall (Fig. 3d). Females with two flaps of skin on both sides of anus, and a small genital papilla located in a longitudinal groove immediately posterior to anus (Fig. 4d).

Color. In 70% ethanol: gray on dorsal and lateral surfaces of head and body, light yellow on ventral region. Posterior margin of operculum light yellow. Dorsal surfaces of head and body with a series of small light yellow patches: two ovoid patches on occipital region, an ovoid patch on base of first dorsal-fin ray, an elliptical patch on dorsal surface of caudal peduncle, and an elliptical patch on each lateral surface of body below middle part of adipose-fin base. Faint pale yellow stripes occasionally present on dorsolateral surface running along entire length of body above lateral line occasionally present. Adipose fin light yellow. Dorsal fin light yellow with gray submarginal band; dorsal surfaces of pectoral and pelvic fins gray, with anal fin and entral surfaces of pectoral and pelvic fins light yellow. Posterior end of caudal peduncle and principal caudal fin rays dark gray; rest of caudal fin light yellow. Dorsal surfaces of barbels gray, ventral surfaces light yellow.

Distribution. The upper Irrawaddy and Salween (Nu Jiang) river drainages in northern Myanmar and southwestern China (Fig. 9).

Etymology. From the Latin *insignis*, meaning marked, in reference to the presence of numerous pale-colored patches on the body of this species. A noun in apposition.

Oreoglanis lepturus new species
Fig. 10

Type Material. Holotype: UMMZ 236814, 69.5 mm SL; Laos: Bolikamsai province, Nam Phao about 2 km from Vietnam border, 18°23'N 105°19'E; W. J. Rainboth *et al.*, 1 March 1998.

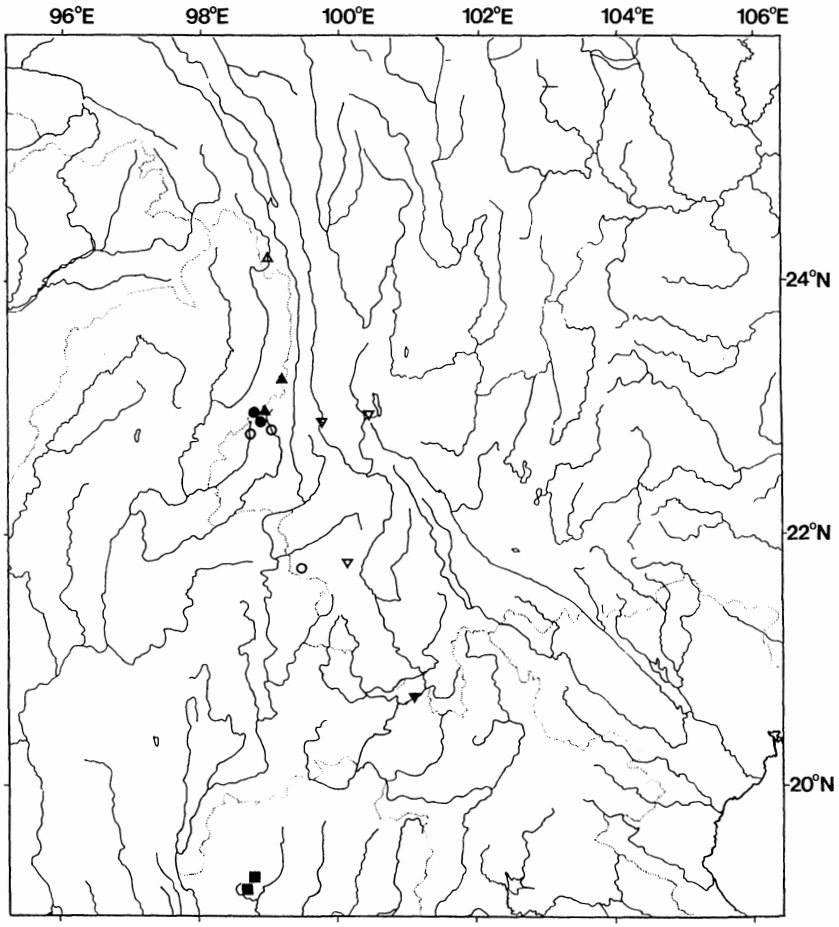

Fig. 9. Map showing distribution of members of the *O. siamensis* species group: *O. insignis* (●), *O. macropterus* (▲), *O. setiger* (▼), and *O. siamensis* (■). Closed symbols indicate localities based on material examined. Open symbols indicate localities based on literature.

Paratypes: UMMZ 236816, 8 ex., 35.5-84.7 mm SL; ZRC 45708, 2 ex.,53.0-90.8 mm SL; data as for holotype.

Diagnosis. *Oreoglanis lepturus* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip lacking a median notch and having a posterior margin with lobulate projections; lunate caudal fin with elongate; strap-like lower principal ray in mature males; male genital papilla located immediately behind the

anus in a u-shaped depression; caudal peduncle 8.9-11.2 times longer than deep; dorsal to adipose distance 12.8-15.5 % SL; post-adipose distance 8.5-10.2 % SL; interorbital distance 25.6-27.0 % HL; maxillary barbel with rounded tip.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge with lobulate projections (Fig. 2b).

Dorsal fin without spine and i,6 (4) rays. Adipose fin with long base. Anal fin with ii,3 (4) rays. Caudal fin lunate, with 7/7 (4) rays; lower principal rays extended into a long, thin strap in mature males. Pelvic fin greatly enlarged, with convex distal margin and i,5 (4) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,17 (1), i,18,i (2) or i,19 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 24 + 15 = 39 (1) or 26 + 14 = 40 (1).

In % SL: body depth at anus 7.5-10.2; predorsal length 36.1-37.1; preanal length 71.0-74.1; prepelvic length 35.3-39.9; prepectoral length 15.3-16.0; length of dorsal-fin base 9.0-12.9; length of adipose-fin base 33.4-34.4; dorsal to adipose distance 12.8-15.5; post-adipose distance 8.5-10.2; length of anal-fin base 3.1-4.6; length of pelvic fin 19.8-22.0; length of pectoral fin 25.9-26.9; depth of caudal peduncle 2.1-2.6; length of caudal peduncle 23.5-25.2; length of caudal fin 21.7-22.4 (males); 17.9-21.3 (females); head length 22.2-23.0; head width 20.3-21.6; head depth 8.4-9.6.

In % HL: snout length 58.1-63.8; interorbital distance 25.6-27.0; eye diameter 8.2-10.6; length of nasal barbel 12.8-16.9; length of maxillary barbel 64.4-70.4; length of inner mandibular barbel 6.3-9.2; length of outer mandibular barbel 16.3-16.4.

Males with a small genital papilla located immediately posterior to anus in a slight depression (Fig. 3e). Females with two flaps of skin on both

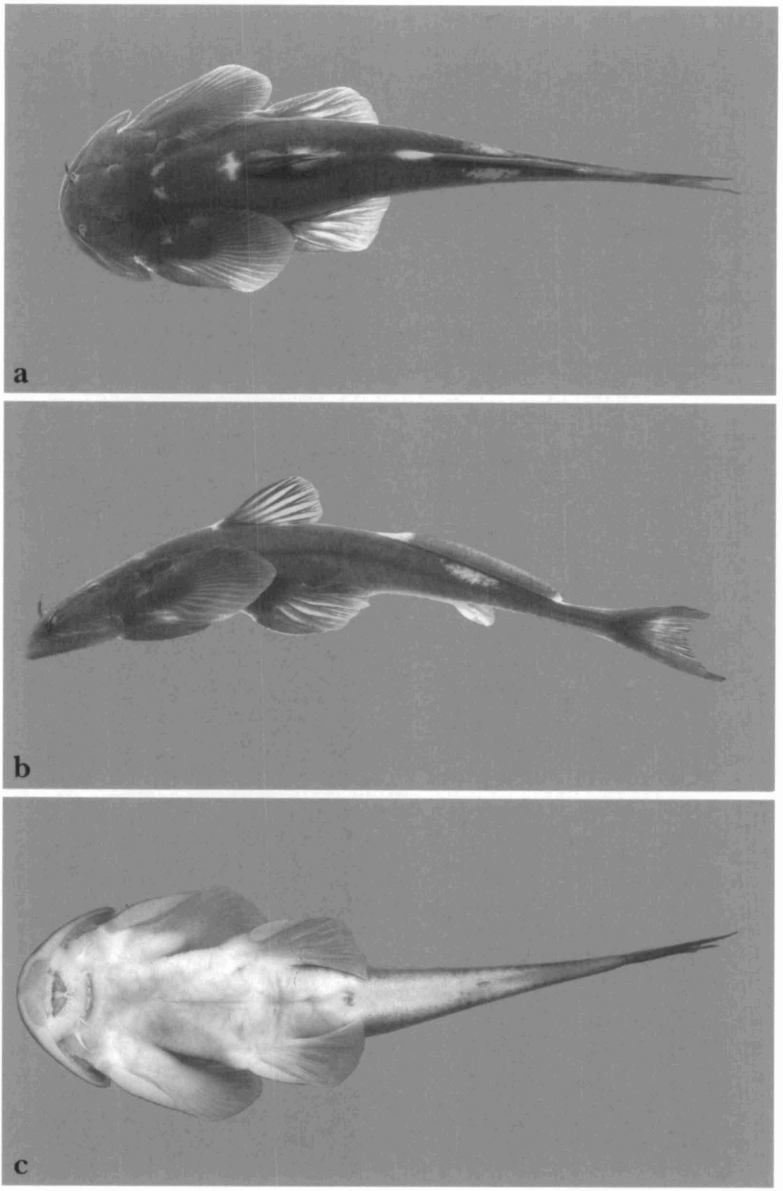

Fig. 10. *Oreoglanis lepturus*, UMMZ 236816, paratype, 84.7 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

sides of anus, and a small genital papilla located in a U-shaped depression immediately posterior to anus (Fig. 4e).

Color. In 70% ethanol: brown on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: two ovoid patches on occipital region, an ovoid patch on base of first dorsal-fin ray, an elliptical patch on anterior base of adipose-fin and another on posterior base of adipose-fin, and an elliptical patch on each lateral surface of body below middle part of adipose-fin base. Dorsal and caudal fins brown; dorsal surfaces of pectoral and pelvic fins brown, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Dorsal surfaces of barbels brown, ventral surfaces light yellow.

Distribution. The Nam Phao River drainage (part of the Mekong River drainage) in northeastern Laos (Fig. 5).

Etymology. From the Greek λεπτοσ, meaning slender, and ουρα, meaning tail, in reference to the relatively long and slender caudal peduncle of this species. A noun in apposition.

Oreoglanis macropterus (Vinciguerra, 1890)
Fig. 11

Exostoma macropterum Vinciguerra, 1890: 253, Pl. 8.
Glyptosternum macropterum: Hora, 1923: 39.
Euchiloglanis macropterus: Norman, 1925: 574.
Oreoglanis macropterus: Hora & Silas, 1952b: 22; Chu, 1979: 77; Chu, 1986: 41; Chu, 1989: 192, Fig. 3-64; Chu & Kuang, 1990: 215, Fig. 216; Chu & Mo, 1999: 175, Fig. 115.
Oreoglanis macropterum: Steinitz, 1961: 109; Jayaram, 1979: 53; Talwar & Jhingran, 1991: 678; Jayaram, 1999: 298.

Diagnosis. *Oreoglanis macropterus* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip with a median notch and having an entire posterior margin; emarginate caudal fin; male genital papilla located immediately behind the anus in a depression terminating posteriorly with a straight transverse wall; body depth at anus 9.2-12.8 % SL; depth of caudal peduncle 8.0-8.7 % SL; dorsal to adipose distance 17.5-18.6 % SL; maxillary barbel with rounded tip and lobulate posterior margin.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape inferior with broad, thin and papillate lips. Lower lip with median notch, posterior margin entire. 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 on upper jaw.

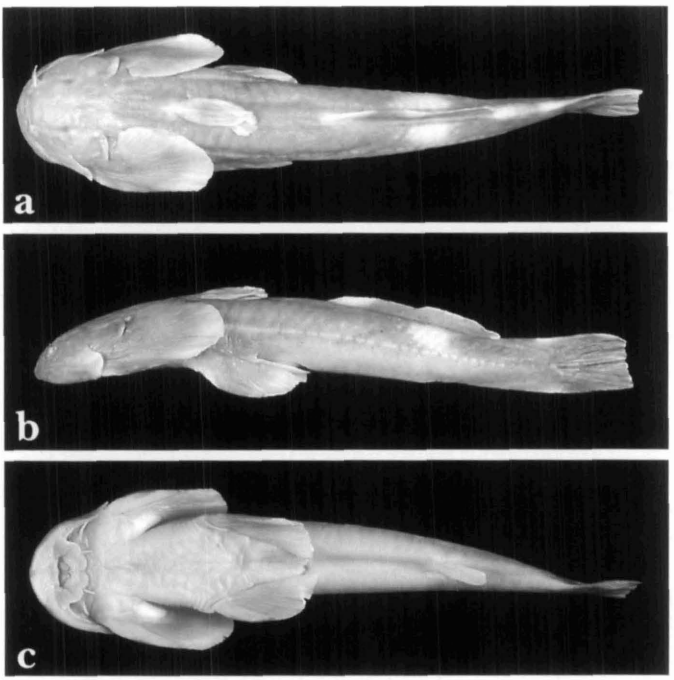

Fig. 11. *Oreoglanis macropterus*, CAS 205601, 83.3 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge with lobulate projections.

Dorsal fin without spine and i,6 (3) rays. Adipose fin with long base. Anal fin with i,3 (1) or i,4 (2) rays. Caudal fin emarginate, with 7/7 (1), 7/8 (1) or 8/7 (1) rays. Pelvic fin greatly enlarged, with convex distal margin and i,5 (3) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,17 (1), i,18 (1) or i,21 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 24 + 13 = 37 (2), 26 + 12 = 38 (2), 27 + 13 = 40 (1) or 28 + 13 = 41 (1).

In % SL: body depth at anus 9.2-12.8; predorsal length 30.5-36.3; preanal length 74.7-79.9; prepelvic length 34.5-36.1; prepectoral length

14.8-15.8; length of dorsal-fin base 7.9-10.4; length of adipose-fin base 30.4-35.9; dorsal to adipose distance 17.5-18.6; post-adipose distance 8.9-12.7; length of anal-fin base 1.8-3.3; length of pelvic fin 20.9-24.4; length of pectoral fin 25.3-26.8; depth of caudal peduncle 8.0-8.7; length of caudal peduncle 19.1-22.4; length of caudal fin 14.9-16.8; head length 22.1-23.6; head width 16.1-20.0; head depth 8.3-10.7.

In % HL: snout length 54.6-56.1; interorbital distance 28.0-31.2; eye diameter 6.7-8.1; length of nasal barbel 15.0-19.5; length of maxillary barbel 62.2-84.9; length of inner mandibular barbel 6.7-11.6; length of outer mandibular barbel 16.6-22.3.

Males with genital papilla located immediately posterior to anus in a depression terminating posteriorly with a straight transverse wall (Fig. 3f). Females with a similar but smaller genital papilla similarly located (Fig. 4f).

Color. In 70% ethanol: light brown on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: an ovoid patch on base of first dorsal-fin ray, an elliptical patch on anterior base of adipose-fin and another two on dorsal and ventral surfaces of caudal peduncle. Dorsal fin light yellow with brown submarginal band; dorsal surfaces of pectoral and pelvic fins light brown, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Posterior end of caudal peduncle and principal caudal fin rays light brown; rest of caudal fin light yellow. Dorsal surface of barbels light brown, with light yellow tips, ventral surface light yellow.

Distribution. The upper Salween and Irrawaddy River drainages in China and Myanmar (Fig. 9).

Material examined. CAS 205601, 2 ex., 66.4 and 83.3 mm SL; China: Yunnan: Nujiang prefecture, Nujiang (Salween) River basin, 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, 7000 ft asl.

Oreoglanis setiger new species
Fig. 12

Oreoglanis delacori (non Pellegrin, 1936): Liu *et al.*, 1987: 148.
Oreoglanis delacouri (non Pellegrin, 1936): Chu, 1979: 77 (in part); Chu & Kuang, 1990: 217, Fig. 218 (in part); Chu & Mo, 1999: 176, Fig. 116 (in part).

Type Material. Holotype: UMMZ 236813, 69.1 mm SL; Laos: Louang Namtha province, Nam Ma Oun, 21°5'N 101°4'E; W. J. Rainboth *et al.*, 18 February 1998.

Paratypes: ZRC 46109, 2 ex., 29.1 and 63.2 mm SL; China: Yunnan province, Simao, Mekong River basin upstream of Xiaoheijiang, en route (46 km) from Jinggu to Ning'er, 23°21'37.2"N 100°55'16.2"E; H.H. Tan & Y.-X. Cai, 21 May 2000.

Diagnosis. *Oreoglanis setiger* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip with a median notch and having a posterior margin with small laciniate projections; emarginate caudal fin; male genital papilla located immediately behind the anus in a depression terminating posteriorly with a straight transverse wall; length of caudal peduncle 26.1-28.8 % SL; maxillary barbel with rounded tip and laciniate posterior margin.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape 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 on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge with laciniate projections (Fig. 2c).

Dorsal fin without spine and i,6 rays. Adipose fin with long base. Anal fin with ii,3 (1) or ii,4 (1) rays. Caudal fin emarginate, with 6/6 (1) or 7/7 (1) rays. Pelvic fin greatly enlarged, with convex distal margin and i,5 (2) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,18 (1) or i,20 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 21 + 15 = 36 (1).

In % SL: body depth at anus 9.4-13.0; predorsal length 31.8-37.0; preanal length 67.1-71.0; prepelvic length 36.9-39.2; prepectoral length 15.1-16.1; length of dorsal-fin base 10.4-11.2; length of adipose-fin base 34.9-35.3; dorsal to adipose distance 13.5-13.6; post-adipose distance 8.9-10.6; length of anal-fin base 2.4-3.6; length of pelvic fin 19.5-22.9; length of pectoral fin 25.6-28.5; depth of caudal peduncle 3.8-5.5; length of caudal peduncle 26.1-28.8; length of caudal fin 15.0-15.6; head length 22.6-24.7; head width 18.7-19.9; head depth 10.0-11.4.

In % HL: snout length 57.7; interorbital distance 30.8-35.9; eye diameter 7.1-7.7; length of nasal barbel 14.1-16.7; length of maxillary

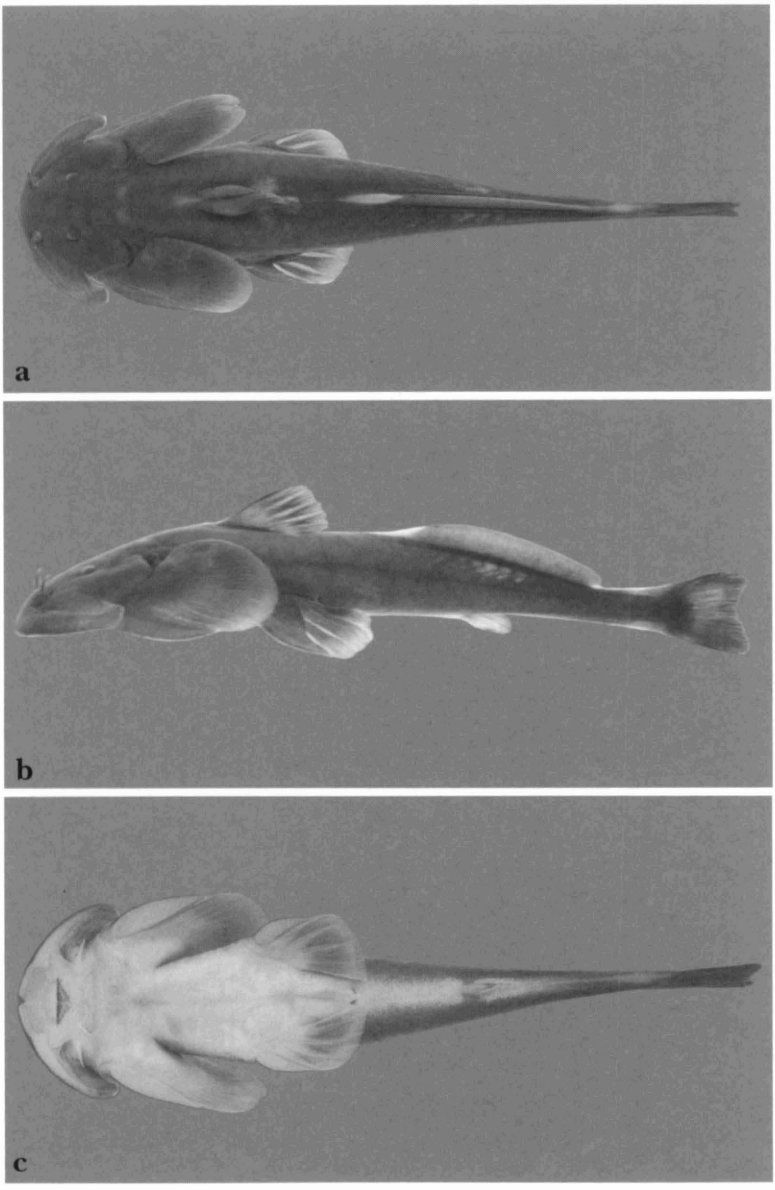

Fig. 12. *Oreoglanis setiger*, UMMZ 236813, holotype, 69.1 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

barbel 66.0-69.2; length of inner mandibular barbel 6.4-7.1; length of outer mandibular barbel 16.0-17.3.

Males with a small genital papilla located immediately posterior to anus in a depression that terminates posteriorly with a straight transverse wall (Fig. 3g). Females with genital papilla located immediately posterior to anus in a depression terminating posteriorly with a straight transverse wall (Fig. 4g).

Color. In 70% ethanol: brown to pale brownish gray on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: two ovoid patches on occipital region, an ovoid patch on base of first dorsal-fin ray, an elliptical patch on anterior base of adipose-fin and another on posterior base of adipose-fin, and an elliptical patch on each lateral surface of body below middle part of adipose-fin base. Pale yellow stripes on dorsolateral surface, running along entire length of body above lateral line sometimes present and coalescent with elliptical patch below adipose fin. Dorsal and caudal fins brown or with pale brownish gray fin rays and light yellow membranes; dorsal surfaces of pectoral and pelvic fins brown or with pale brownish gray fin rays and light yellow membranes, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Dorsal surfaces of barbels brown, ventral surfaces light yellow.

Distribution. The Nam Oun River drainage (part of the Mekong River drainage) in northwestern Laos and the Lancang Jiang (Mekong) River drainage in southwestern China (Fig. 9).

Etymology. From the Latin *setiger*, meaning to bear bristles, in reference to the laciniate posterior margin of the maxillary barbels. An adjective.

Oreoglanis siamensis Smith, 1933

Fig. 13

Oreoglanis siamensis Smith, 1933: 72, Pl. 3 (figs. 1-2), Fig. 4; Smith, 1934: 293; Smith, 1945: 395; Hora & Silas, 1952b: 23.

Diagnosis. *Oreoglanis siamensis* can be distinguished from its congeners in having the following uniquely derived combination of characters: lower lip with a median notch and having a posterior margin with small laciniate projections, emarginate caudal fin, male genital papilla located immediately behind the anus in a depression terminating posteriorly with a straight transverse wall, maxillary barbel with pointed tip and lobulate posterior margin, depth of caudal peduncle 4.7-6.3 % SL, and interorbital distance 23.1-26.9 % SL.

Description. Head and body moderately broad and very strongly depressed. Mouth and gape 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.

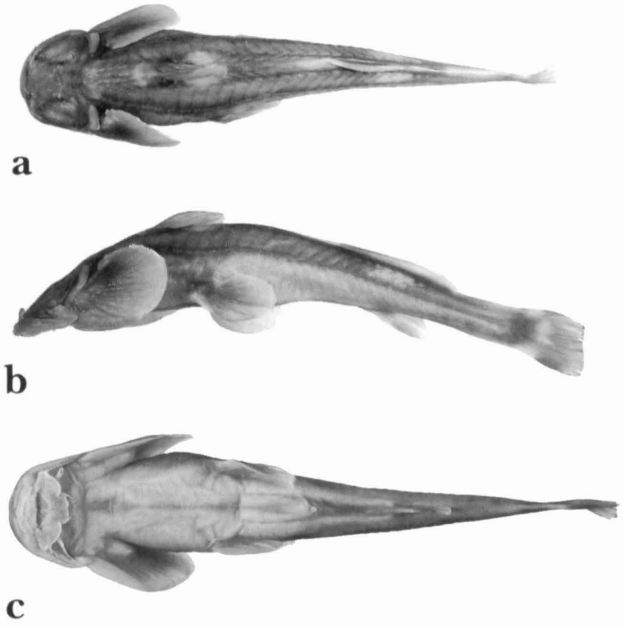

Fig. 13. *Oreoglanis siamensis*, CMK 4107, 117.8 mm SL: **a**, dorsal; **b**, lateral; and **c**, ventral views.

Jaw teeth pointed and in large, broad band with small median indentation and rounded ends on both sides on upper jaw.

Two kinds of teeth present on lower jaw in two well-separated, roughly triangular patches: anterior teeth short, spatulate, with a curved inner face; posterior teeth pointed as in those of upper jaw. Eyes small, dorsolaterally situated and subcutaneous. Gill openings extending to middle of pectoral-fin base. Maxillary barbels flattened, with surrounding flap of skin and rounded tip; ventral surface with numerous plicae, posterior edge with lobulate projections.

Dorsal fin without spine and i,6 (6) rays. Adipose fin with long base. Anal fin with i,4 (6) rays. Caudal fin emarginate, with 6/6 (1) or 7/7 (5) rays. Pelvic fin greatly enlarged, with convex distal margin and i,5 (6) rays; first ray greatly flattened and with numerous plicae on ventral surface. Pectoral fin greatly enlarged, without spine and with i,17 (3), i,18 (1), i,18,i (1) or i,19 (1) rays; first ray greatly flattened and with numerous plicae on ventral surface. Vertebrae 25 + 12 = 37 (1), 25 + 13 = 38 (1), 24 + 15 = 39 (1), 26 + 13 = 39 (1) or 25 + 15 = 40 (2).

In % SL: body depth at anus 8.2-11.7; predorsal length 28.6-33.5; preanal length 68.5-74.2; prepelvic length 35.5-41.2; prepectoral length 13.7-17.0; length of dorsal-fin base 8.4-10.0; length of adipose-fin base 29.1-36.7; dorsal to adipose distance 14.0-20.9; post-adipose distance 9.5-13.0; length of anal-fin base 5.6-7.3; length of pelvic fin 14.5-15.5; length of pectoral fin 19.7-24.3; depth of caudal peduncle 4.7-6.3; length of caudal peduncle 17.4-22.7; length of caudal fin 12.6-14.8; head length 18.4-22.6; head width 15.3-17.7; head depth 7.6-9.6.

In % HL: snout length 55.9-58.6; interorbital distance 23.1-26.9; eye diameter 6.0-9.5; length of nasal barbel 28.1-37.3; length of maxillary barbel 61.3-69.1; length of inner mandibular barbel 8.6-11.9; length of outer mandibular barbel 16.6-21.2.

Males with a small genital papilla located immediately posterior to anus in a depression that terminates posteriorly with a straight transverse wall (Fig. 3h). Females with a small genital papilla located in a depression immediately posterior to anus (Fig. 4h).

Color. In 70 % ethanol: brownish gray on dorsal and lateral surfaces of head and body, light yellow on ventral region. Dorsal surfaces of head and body with a series of small light yellow patches: an ovoid patch on occipital region and base of first dorsal-fin ray, an elliptical patch on posterior base of adipose-fin, and an elliptical patch on each lateral surface of body below middle part of adipose-fin base. Base of adipose fin brownish gray, with pale yellow edge. Dorsal fin light yellow with brownish gray submarginal band; dorsal surfaces of pectoral and pelvic fins brownish gray, with anal fin and ventral surfaces of pectoral and pelvic fins light yellow. Caudal fin with brownish gray base and brownish gray subterminal band; rest of fin light yellow. Dorsal surfaces of barbels brownish gray, ventral surfaces light yellow.

Distribution. The upper Mae Nam Ping River drainage (part of the Chao Phraya River drainage) in northern Thailand (Fig. 9). The second author (Rainboth, 1996) included *Oreoglanis siamensis* as possibly occurring in the Cambodian Mekong, but this is highly unlikely, and in fact at the time was meant to draw attention to the fact that fishes of this general body type were likely to occur although no records existed at that time for the middle or lower Mekong.

Material examined. 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 and 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.

DISCUSSION

Given the non-monophyletic nature of *Oreoglanis*, the difficulty in examining the type material of many nominal glyptosternine species and the scarcity of material available for this study, we have decided to forego a phylogenetic analysis of the species described herein. Of course, this means that the placement of the nominal species in this study would remain somewhat uncertain, but we feel that our primary aim of documenting the diversity of this fascinating group of catfishes can be achieved without recourse to a phylogenetic analysis.

Oreoglanis species can be broadly divided into two groups based on the morphology ofthe lower lip margin, a division that simplifies comparisons among the different species. The first group (the *O. siamensis* group) consists of species having a lower lip notched medially and with an entire or weakly laciniate posterior margin, as well as an emarginate caudal fin; this group includes *O. insignis*, *O. macropterus*, *O. setiger*, and *O. siamensis*. The second group (the *O. delacouri* group) consists 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 principal caudal rays; this group includes *O. delacouri*, *O. frenatus*, *O. lepturus*, and *O. hypsiurus*.

Oreoglanis siamensis can be easily distinguished from other members of the *O. siamensis* group in having a pointed (vs. rounded) tip of the maxillary barbel and a smaller interorbital distance (23.1-26.9 % SL vs. 28.0-31.2). The caudal peduncle of *O. siamensis* is also deeper than that of *O. insignis*, but more slender than that of *O. macropterus* (4.7-6.3 % SL vs. 3.0-3.8 in *O. insignis* and vs. 8.0-8.7 in *O. macropterus*). *Oreoglanis setiger* differs from all other congeners of the *O. siamensis* species group in having the posterior margin of the maxillary barbel with laciniate (vs. lobulate or lacking) projections (Fig. 2). *Oreoglanis insignis* differs from *O. macropterus* in having a more slender body (body depth at anus 8.0-9.4 % SL vs. 9.2-12.8) and caudal peduncle (3.0-3.8 % SL vs. 8.0-8.7), and the adipose fin set nearer the dorsal fin (dorsal to adipose distance 13.9-16.6 % SL vs. 17.5-18.6). Both *O. insignis* and *O. setiger* have been erroneously identified as *O. delacouri* (see Chu, 1986; Liu *et al.*, 1987; Chu & Chen, 1990 and Kottelat, 1998), but both *O. insignis* and *O. setiger* differ notably from *O. delacouri* in the morphology of the lower lip margin: *O. insignis* and *O. setiger* have a lower lip with a median notch and an entire posterior margin while in *O. delacouri* the lower lip lacks a median notch and has a laciniate posterior margin. The shapes of the caudal fin are also different (emarginate in *O. insignis* and *O. setiger* vs. lunate in *O. delacouri*).

As pointed out for *Oreoglanis hypsiurus* and *O. delacouri* in Ng & Kottelat (1999), there are anatomical differences in the urogenital area in males of *Oreoglanis*, and these are particularly important for distinguishing members of the *O. delacouri* species group (since most of them otherwise closely resemble one another). The male genital papilla is located immediately behind the anus in a depression which terminates posteriorly with a straight transverse wall in *O. hypsiurus* (Fig. 3c) and *O. frenatus* (Fig. 3b) (somewhat like that in members of the *O. siamensis* species group; Fig. 3d, f-h), in a u-shaped depression in *O. lepturus* (Fig. 3e), and in a narrow, longitudinal groove in *O. delacouri* (Fig. 3a). *Oreoglanis frenatus* can be distinguished easily from other members of the *O. delacouri* species group (since most of them otherwise closely resemble one another). The male genital papilla is located immediately behind the anus in a depression which terminates posteriorly with a straight transverse wall in *O. hypsiurus* (Fig. 3c) and *O. frenatus* (Fig. 3b) (somewhat like that in members of the *O. siamensis* species group; Fig. 3d, f-h), in a u-shaped depression in *O. lepturus* (Fig. 3e), and in a narrow, longitudinal groove in *O. delacouri* (Fig. 3a). *Oreoglanis frenatus* can be distinguished easily from other members of the *O. delacouri* species group in having the posterior base of the adipose fin confluent with (vs. separate from) the upper principal caudal rays. The color patterns of *O. hypsiurus*, *O. lepturus*, *O. setiger*, and to a certain extent, *O. delacouri*, are exceedingly similar, but *O. setiger* differs from the other three species in having (vs. absence of) a median notch on the lower lip, an emarginate (vs. lunate) caudal fin, and a longer caudal peduncle (26.1-28.8 % SL vs. 18.7-25.2). *Oreoglanis hypsiurus* and *O. lepturus* look very similar, but can be distinguished by the morphologies of the male urogenital area (see above), a longer and thinner caudal peduncle (8.9-11.2 times longer than deep, vs. 6.1-7.1), as well as the adipose fin being situated nearer the dorsal fin (dorsal to adipose distance 12.8-15.5 % SL vs. 14.8-21.1) in the latter species.

Besides the difference in the morphology of the urogenital area in males (see above), *O. lepturus* further differs from *O. delacouri* in having a shorter post-adipose distance (8.5-10.2 % SL vs. 10.7-15.4) and a smaller interorbital distance (25.6-27.0 % HL vs. 27.1-29.5). *Oreoglanis hypsiurus* further differs from *O. delacouri* (Fig. 3) in having the gill slit arched (vs. straight), the posterior edge of the lower lip with lobulate projections (vs. with laciniate projections), the nasal barbel reaching about half of the distance to the eye (vs. about one fourth), a pale elliptical patch on the sides of the body below the adipose fin (vs. absent), a shorter and deeper caudal peduncle (6.1-7.1 times longer than deep, vs. 7.2-10.3; length of caudal peduncle 18.7-21.7 % SL vs. 21.5-24.0; depth of caudal peduncle 2.7-3.6 % SL vs. 2.4-3.0), a shorter post-adipose distance (8.6-11.6 % SL

vs. 10.7-15.4) and a smaller interorbital distance (23.7-27.2 % HL vs. 27.1-29.5).

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Appendix 1. Ranges for counts and measurements of *Oreoglanis species.*

	O. delacouri	*O. frenatus*	*O. hypsiurus*	*O. insignis*	*O. lepturus*	*O. macropterus*	*O. setiger*	*O. siamensis*
In % SL								
Body depth at anus	7.5-8.4	6.6-8.2	7.6-9.5	8.0-9.4	7.5-10.2	9.2-12.8	9.4-13.0	8.2-11.7
Predorsal length	30.8-34.6	30.2-32.9	32.2-36.5	30.0-33.4	36.1-37.1	30.5-36.3	31.8-37.0	28.6-33.5
Preanal length	70.9-74.8	69.9-73.5	71.5-77.6	65.2-68.4	71.0-74.1	74.7-79.9	67.1-71.0	68.5-74.2
Prepelvic length	32.9-38.0	33.1-38.5	36.2-40.1	32.2-36.2	35.3-39.9	34.5-36.1	36.9-39.2	35.5-41.2
Prepectoral length	13.7-17.3	13.1-14.7	13.4-18.9	13.1-16.5	15.3-16.0	14.8-15.8	15.1-16.1	13.7-17.0
Length of dorsal-fin base	8.6-10.4	7.4-11.7	8.9-11.1	8.9-11.3	9.0-12.9	7.9-10.4	10.4-11.2	8.4-10.0
Length of adipose-fin base	30.9-35.3	36.7-47.8	30.5-36.3	34.3-39.3	33.4-34.4	30.4-35.9	34.9-35.3	29.1-36.7
Dorsal to adipose distance	15.2-15.5	8.2-14.8	14.8-21.1	13.9-16.6	12.8-15.5	17.5-18.6	13.5-13.6	14.0-20.9
Post-adipose distance	10.7-15.4	7.1-8.9	8.6-11.6	9.9-10.8	8.5-10.2	8.9-12.7	8.9-10.6	9.5-13.0
Length of anal-fin base	3.6-4.9	1.9-3.4	2.7-3.6	3.1-5.4	3.1-4.6	1.8-3.3	2.4-3.6	5.6-7.3
Length of pelvic fin	18.1-21.8	15.1-17.8	19.1-22.7	18.9-21.5	19.8-22.0	20.9-24.4	19.5-22.9	14.5-15.5
Length of pectoral fin	21.2-26.2	23.0-24.4	24.2-28.2	23.9-27.3	25.9-26.9	25.3-26.8	25.6-28.5	19.7-24.3
Depth of caudal peduncle	2.4-3.0	3.1-4.1	2.7-3.6	3.0-3.8	2.1-2.6	8.0-8.7	3.8-5.5	4.7-6.3
Length of caudal peduncle	21.5-24.0	23.6-27.1	18.7-21.7	22.7-27.7	23.5-25.2	19.1-22.4	26.1-28.8	17.4-22.7
Length of caudal fin (males)	17.2-20.8	19.8-22.0	38.1-68.2	12.7-13.9	21.7-22.4	14.9-16.8	15.0-15.6	12.6-14.8
Length of caudal fin (females)		17.5-18.5	14.9-18.3	19.7-25.6		17.9-21.3		
Head length	18.9-22.3	18.8-20.7	21.2-24.1	21.4-23.8	22.2-23.0	22.1-23.6	22.6-24.0	18.4-22.6
Head width	16.4-20.8	16.0-18.6	18.9-22.4	15.6-18.1	20.3-21.6	16.1-20.0	18.7-19.9	15.3-17.7
Head depth	7.9-8.6	7.3-8.0	7.5-9.2	8.3-8.9	8.4-9.6	8.3-10.7	10.0-11.4	7.6-9.6

Appendix 1. (continued)

	O. delacouri	*O. frenatus*	*O. hypsiurus*	*O. insignis*	*O. lepturus*	*O. macropterus*	*O. setiger*	*O. siamensis*
In % HL								
Snout length	59.2-62.8	57.5-61.3	57.9-61.2	50.0-56.5	58.1-63.8	54.6-56.1	57.7	55.9-58.6
Interorbital distance	27.1-29.5	27.2-30.3	23.7-27.2	30.1-31.2	25.6-27.0	28.0-31.2	30.8-35.9	23.1-26.9
Eye diameter	8.7-12.1	7.5-9.8	8.6-10.0	7.7-8.8	8.2-10.6	6.7-8.1	7.1-7.7	6.0-9.5
Length of nasal barbel	11.2-16.8	14.3-21.7	16.1-24.2	8.3-17.5	12.8-16.9	15.0-19.5	14.1-16.7	28.1-37.3
Length of maxillary barbel	62.2-71.8	62.9-69.5	56.9-71.5	61.6-66.2	64.4-70.4	62.2-84.9	66.0-69.2	61.3-69.1
Length of inner mandibular barbel	5.6-8.2	4.4-6.6	5.9-8.5	6.5-10.2	6.3-9.2	6.7-11.6	6.4-7.1	8.6-11.9
Length of outer mandibular barbel	11.2-16.9.	10.2-15.6	11.1-15.7	15.6-20.5	16.3-16.4	16.6-22.3	16.0-17.3	16.6-21.2
Dorsal-fin rays	i,6	i,6	i,6	i,6	i,6	i,6	i,6	i,6
Anal-fin rays	i,4; ii,3	ii,3	i,3; i,3,i; i,4	iii,3; ii,4; iii,4	ii,3	i,3; i,4	ii,3; ii,4	i,4
Pelvic-fin rays	i,5	i,5	i,5,i; i,6	i,5	i,5	i,5	i,5	i,5
Pectoral-fin rays	i,18; i,18,i; i,19	i,17; i,18; i,19; i,20	i,18;i,19; i,20	i,17; i,18; i,22	i,17; i,18; i,19	i,17; i,18; i,21	i,18; i,20	i,17; i,18; i,18,i; i,19
Caudal-fin shape and rays	lunate 7/7	lunate 6/6; 7/6	lunate 7/7	emarginate 8/7	lunate 7/7	emarginate 7/7; 7/8; 8/7	emarginate 6/6; 7/7	emarginate 6/6; 7/7
Total vertebrae	40-41	36-38	40-42	36-39	39-40	37-41	36	37-40