

FOUR NEW SPECIES OF *AKYSIS* (TELEOSTEI: SILURIFORMES: AKYSIDAE) FROM MAINLAND SOUTHEAST ASIA, WITH COMMENTS ON *A. SIMILIS*

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ABSTRACT. – Four new species of *Akysis* are described from mainland Southeast Asia in this study: *Akysis filifer*, *A. fuliginatus* and *A. nitidus* are described from the Mekong River drainage, while *A. clinatus* is described from the Stung Chhay drainage in southwest Cambodia. Both *A. clinatus* and *A. fuliginatus* belong to the *A. variegatus* species group while *A. filifer* and *A. nitidus* belong to the *A. pseudobagarius* species group. The fresh coloration and additional remarks are provided for *A. similis*, another species from mainland Southeast Asia.

KEY WORDS. – Indochina, catfish, Cardamones, Mekong River.

INTRODUCTION

Catfishes of the genus *Akysis* are small cryptically-coloured species generally found in the sandy or a rocky bottoms of fast-flowing streams or rivers in Southeast Asia. They are characterized by the possession of four pairs of barbels, lack of palatal teeth, a long-based adipose fin, the gill opening extending above the pectoral base and a tough leathery skin covered with tubercles arranged in longitudinal rows on the flanks. Until recently, the genus has been poorly studied, mainly due to their being overlooked in ichthyological surveys and subsequent poor representation in museum collections. There are currently 24 species of *Akysis*, of which 17 are found in mainland Southeast Asia (Ng & Kottelat, 1998, 2000; Ng & Tan, 1999; Ng & Freyhof, 2004; Ng & Kottelat, 2004), and the rest in Sundaic Southeast Asia. The phylogenetic relationship of *Akysis* has been studied by de Pinna (1996), who concluded that *Akysis* is the sister group to all other akysids (*Parakysis*, *Acrochordontichthys* and *Breitensteinia*). However, de Pinna (1996) acknowledged that *Akysis* was poorly sampled in his study and may be deemed non-monophyletic in more encompassing studies. This has been vindicated by current evidence from a more detailed study of the genus (de Pinna & Ng, unpublished data).

Ng & Kottelat (1998) divided *Akysis* into two species groups based on distinct differences in morphology: the *A. variegatus* species group and the *A. pseudobagarius* species group. Members of the *A. variegatus* species group (consisting of *A. brachybarbatus* Chen in He & Chen, 1981, *A. clavulus*

Ng & Freyhof, 2004, *A. ephippifer* Ng & Kottelat, 1998, *A. hendricksoni* Alfred, 1961, *A. heterurus* Ng, 1996, *A. maculipinnis* Fowler, 1934, *A. microps*, Ng & Tan, 1999, *A. pictus* Günther, 1883, *A. prashadi* Hora, 1936, *A. recavus* Ng & Kottelat, 1998, *A. variegatus* (Bleeker, 1846), *A. varius* Ng & Kottelat, 1998, and *A. vespa* Ng & Kottelat, 2004) can be distinguished from the members of the *A. pseudobagarius* species group (consisting of *A. alfredi* Ng & Kottelat, 1998, *A. baramensis* Fowler, 1905, *A. fuscus* Ng, 1996, *A. inermis* Ng & Kottelat, 2000, *A. leucorhynchus* Fowler, 1934, *A. macronema* Bleeker, 1860, *A. meridionalis* Ng & Siebert, 2004, *A. pseudobagarius* Roberts, 1989, *A. similis* Ng & Kottelat, 1998, *A. sinensis* He in He & Chen, 1981, and *A. subtilis* Ng & Kottelat, 1998) in having a subterminal (vs. inferior) mouth, the anterior and posterior nostrils separated by a distance greater than the width of the nasal-barbel base (vs. separated only by the base of the nasal barbel), and an emarginate (vs. forked) caudal fin.

During ichthyological surveys of river drainages in mainland Southeast Asia (Indochina) undertaken by the authors, material representing four distinct species of *Akysis* was obtained. Three of these were obtained from the Mekong River drainage in Laos and Cambodia, and the fourth from the Stung Chhay drainage in southwest Cambodia. Comparison with other known species reveals these species to be undescribed and they are described herein. Of the four new species described in this study, *A. clinatus* and *A. fuliginatus* belong to the *A. variegatus* species group while *A. filifer* and *A. nitidus* belong to the *A. pseudobagarius*

species group. Observations on fresh coloration and additional material for *A. similis* are appended.

MATERIALS AND METHODS

Measurements were made with dial callipers and data recorded to 0.1 mm. Counts and measurements were made on the left side of the specimens when possible. In tables and text, subunits of the head are presented as proportions of head length (HL). Head length and measurements of body parts are given as proportions of standard length (SL).

The measurements and terminology follow Ng & Kottelat (1998). Drawings of the specimens were made with a Wild M5 microscopic camera lucida. Institutional acronyms follow Eschmeyer (1998). The reader is referred to Ng & Kottelat (1998) for a list of comparative material examined.

TAXONOMY

Akysis clinatus, new species (Fig. 1)

Material examined. – Holotype - ZRC 47288, 30.5 mm SL, Cambodia: Stung Chhay River, Tok Kong village on road from Phnom Penh to Sihanoukville, 10°56'37.8"N 113°47'47.4"E, coll. H. H. Tan & H. H. Ng, 24 May.1999.

Paratypes - ZRC 46159, 3 ex., 27.0–33.0 mm SL, data as for holotype.

Diagnosis. – *Akysis clinatus* is distinguished from congeners of the *A. variegatus* group in having a short adipose-fin base (13.0–15.4% SL), a steeply-sloping predorsal profile and a unique combination of the following characters: pectoral spine length 16.1–17.4% SL, body depth at anus 15.7–17.0% SL, eye diameter 9–10% HL, anterior nostrils separated by more than half of interorbital distance, serrations on posterior edge of pectoral spine, and emarginate caudal fin.

Description. – Body moderately compressed. Dorsal profile rising evenly and somewhat steeply from tip of snout to origin of dorsal fin, then sloping gently ventrally from there to end of caudal peduncle. Ventral profile flat to anal-fin base, then sloping gently dorsally from there to end of caudal peduncle. Anus and urogenital openings located at vertical through

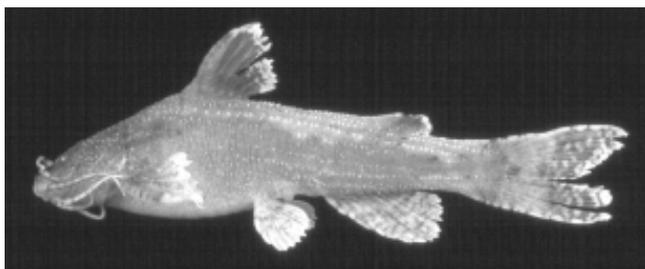


Fig. 1. *Akysis clinatus*, holotype, ZRC 47288, 30.5 mm SL; Cambodia: Stung Chhay River, Tok Kong village on road from Phnom Penh to Sihanoukville.

middle of appressed pelvic fin. Skin tuberculate. Lateral line midlateral and complete.

Head depressed and broad, triangular when viewed laterally and with rounded snout margin when viewed from above. Anterior nostril tubular, separated from posterior nostril by distance in excess of width of nasal-barbel base. Gill opening narrow, extending from immediately ventral to posttemporal to two-thirds of distance from ventral midline of body to base of pectoral spine. Bony elements of dorsal surface of head covered with thick, tuberculate skin.

Barbels in four pairs. Maxillary barbel long and slender, extending to middle of pectoral-fin base. Nasal barbel slender, extending to three-quarters of distance between posterior orbital margin and gill opening. Inner mandibular-barbel origin close to midline, extending to vertical through base of pectoral spine. Outer mandibular barbel originates posterolateral of inner mandibular barbel, extending to middle of pectoral-fin base.

Eye ovoid, horizontal axis longest; located entirely in dorsal half of head. Orbit with free margin.

Mouth subterminal, premaxillary tooth band not exposed when mouth is closed. Oral teeth small and viliform, in irregular rows on all tooth-bearing surfaces. Premaxillary tooth band rounded, of equal width throughout. Dentary tooth band much narrower than premaxillary tooth band at symphysis, tapering laterally.

Dorsal fin located at point delineating anterior third of body; fin margin convex; spine short and straight. Adipose fin with anterior margin concave and posterior margin angular.

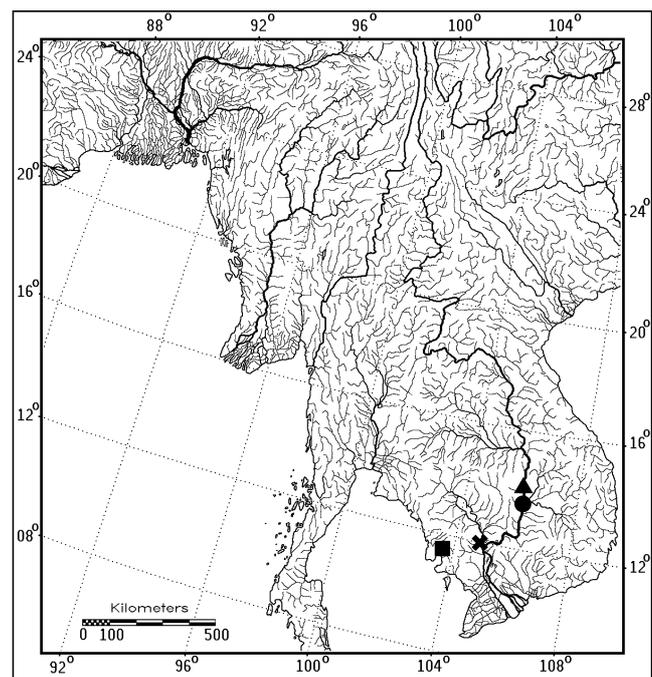


Fig. 2. Map showing distributions of new *Akysis* species described in this study: *A. clinatus* (■); *A. filifer* (×); *A. fuliginatus* (●) and *A. nitidus* (▲).

Caudal fin emarginate. Procurrent rays symmetrical and extend only slightly anterior to fin base. Anal-fin base ventral to adipose-fin origin. Fin margin convex. Pelvic-fin origin at vertical through posterior end of dorsal-fin base. Pelvic-fin margin slightly convex, tip of adpressed fin just reaching anal-fin origin. Pectoral fin with stout spine, sharply pointed at tip; fin margin posteriorly convex. Anterior spine margin smooth, without serrations; posterior spine margin with 4–5 large serrations.

Morphometric and meristic data as in Table 1.

Coloration. – Dorsal surface and sides of head and body chocolate brown, with anterior and posterior nostrils rimmed with light brown. Belly, chest and ventral surface of head light brown. Ventral surface of body posterior to belly light brown with scattered melanophores. Dorsal half of body with three saddle-shaped light brown spots: first immediately anterior to base of dorsal spine, second elongate and on sides of body between dorsal and adipose fins, and third between posterior end of adipose-fin base and caudal flexure. Similar saddle-shaped, light brown spot on ventral half of body between posterior base of anal fin and caudal flexure. Proximal three-quarters of dorsal fin chocolate brown, remaining one-quarter hyaline. Anal, pectoral and pelvic fins hyaline with scattered chocolate brown spots. Caudal fin chocolate brown with tips of lobes hyaline; middle portion

of each lobe with large hyaline spot. Adipose fin chocolate brown, with hyaline posterior margin. Barbels dark yellow with brown rings.

Distribution and habitat. – Known from Stung Chhay, which is a river on the western slope of the Chaîne des Cardamones in southwest Cambodia and draining westwards to the Gulf of Thailand (Fig. 2). *Akysis clinatus* was collected from amongst leaf litter in a swift-flowing stream with a sandy bottom. Other species collected with it were: *Hampala dispar* (Cyprinidae) *Rasbora trilineata* (Cyprinidae), *Pangio anguillaris* (Cobitidae), *P. myersi* (Cobitidae), *Silurichthys schneideri* (Siluridae), *Dermogenys* sp. (Hemiramphidae), *Nandus nebulosus* (Nandidae), *Monopterus albus* (Monopteridae), *Chaudhuriia caudata* (Chaudhuriidae), *Macrogathus maculatus* (Mastacembelidae), *M. circumcinctus* (Mastacembelidae), and *Betta prima* (Osphronemidae).

Etymology. – From the Latin *clinatus*, meaning slanting, in reference to the steeply-sloping predorsal profile of this species

Remarks. – *Akysis clinatus* can be distinguished from other Indochinese members of the *A. variegatus* species group in having a short adipose-fin base (13.0–15.4% SL vs. 20.7–32.4) and a steeply-sloping predorsal profile (Fig. 3). It further differs from *A. brachybarbatus*, *A. fuliginatus*, *A. microps*, *A. recavus* and *A. varius* in having an emarginate (vs. truncate) caudal fin. *Akysis clinatus* further differs from *A. ephippifer* in having more widely-separated anterior nostrils (more than half of interorbital distance vs. less than half of interorbital distance), from *A. hendricksoni* in having a shorter pectoral spine (16.1–17.4% SL vs. 18.6–23.0), and *A. maculipinnis* in having a deeper body (15.7–17.0% SL vs. 11.0–14.0) and smaller eye (9–10% HL vs. 12–16). It further differs from *A. pictus* and *A. prashadi* in having (vs. lack of) serrations on the posterior edge of the pectoral spine.

The occurrence of two sympatric species (*A. clinatus* and *A. ephippifer*) on the western slope of the Cardamones is not unique: *Akysis* species have been found in sympatry, even in syntopy in other regions in Southeast Asia (e.g. *A. hendricksoni* and *A. microps* found syntopically in the Endau River drainage in the Malay Peninsula; Ng & Tan, 1999). Although *A. maculipinnis* is found in the same zoogeographic region (fide Kottelat, 1989), it is not known from anywhere to the southwest of Trat (in Thailand).

Akysis fuliginatus, new species

(Fig. 4)

Material examined. – Holotype - UMMZ 241338, 21.5 mm SL, Cambodia: Stung Treng province, Mekong River on W edge of Kaoh Han, 16 km NE of Stung Treng, 13°38'N 106°3'E, coll. W. J. Rainboth & Y. Chea, 12 Feb. 1996.

Paratypes - UMMZ 235691, 2 ex., 19.1–19.9 mm SL, data as for holotype.

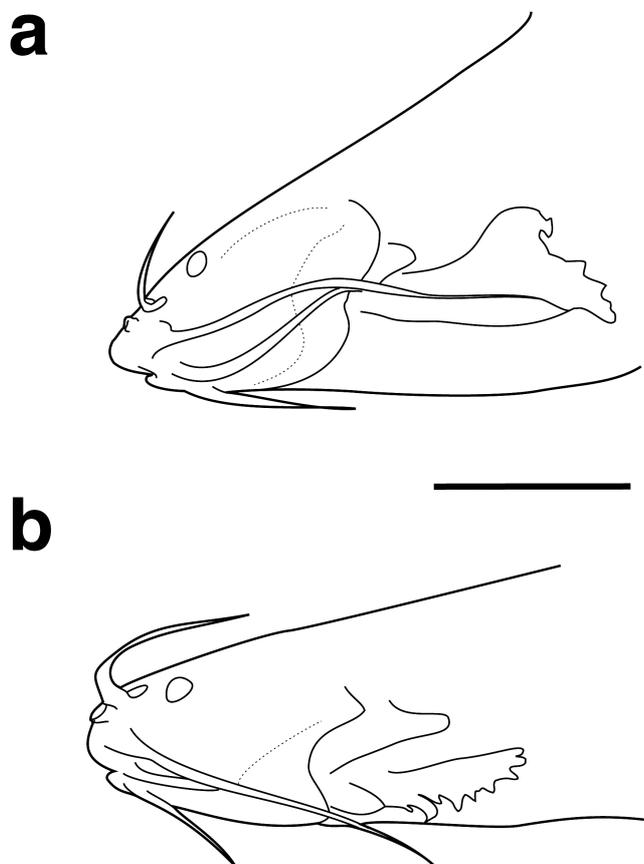


Fig. 3. Predorsal profile of: a. *Akysis clinatus*, holotype, ZRC 47288, 30.5 mm SL; b. other Indochinese members of the *A. variegatus* species group (*A. ephippifer*, UMMZ 240416, 32.0 mm SL illustrated). Scale bar represents 5 mm.

Table 1. Morphometric and meristic data for species of *A. variegatus* group described herein: *A. clinatus* and *A. fuliginatus*.

	<i>A. clinatus</i> n=4	<i>A. fuliginatus</i> n=3
MORPHOMETRICS		
<u>In % SL</u>		
Predorsal length	37.9–39.3	33.7–36.7
Preanal length	60.0–63.0	64.3–66.0
Prepelvic length	45.2–49.0	48.2–50.3
Prepectoral length	21.2–23.6	19.4–23.3
Length of dorsal-fin base	12.5–14.8	13.6–15.8
Length of anal-fin base	18.5–21.7	17.2–19.4
Pelvic fin length	12.7–14.1	15.3–17.3
Pectoral fin length	20.0–25.1	23.0–27.1
Pectoral spine length	16.1–17.4	15.7–19.6
Caudal fin length	22.1–26.7	20.9–23.6
Length of adipose-fin base	13.0–15.4	15.1–19.5
Caudal peduncle length	17.4–19.3	16.1–19.4
Caudal peduncle depth	8.5–10.7	10.1–10.5
Body depth at anus	15.7–17.0	14.1–16.6
Head length	23.9–25.9	22.6–25.6
Head width	23.6–27.8	25.1–28.3
Head depth	16.7–19.1	17.8–19.6
<u>In % HL</u>		
Snout length	33–39	33–42
Interorbital distance	41–47	42–47
Eye diameter	9–10	10–13
Length of nasal barbel	68–74	52–58
Length of maxillary barbel	91–117	100–109
Length of inner mandibular barbel	59–71	44–55
Length of outer mandibular barbel	88–101	76–84
MERISTICS		
Dorsal-fin rays	II,4,i (4)	II,4,i (3)
Anal-fin rays	iv,5,i (1); iv,6,i (2); v,5 (1)	iii,5,ii (1); iii,6,i (2)
Pelvic-fin rays	i,5 (4)	i,5 (3)
Pectoral-fin rays	I,5,i (4)	I,6 (3)
Principal caudal rays	i,5,6,i (3); i,6,6,i (1)	i,6,6,i (2); i,6,7,i (1)
Branchiostegal rays	5 (4)	5 (3)
Gill rakers on first gill arch	1+6 (4)	1+5 (3)
Vertebrae	15+17 (2); 16+17 (1); 16+18 (1)	15+17 (1); 16+16 (2)

Diagnosis. – *Akysis fuliginatus* is distinguished from congeners of the *A. variegatus* group in having an overall dark-coloured body devoid of lighter-coloured markings and a unique combination of the following characters: length of adipose-fin base 15.1–19.5% SL, body depth at anus 14.1–16.6% SL, depth of caudal peduncle 10.1–10.5% SL, interorbital distance 41.7–45.5% HL, lack of suborbital

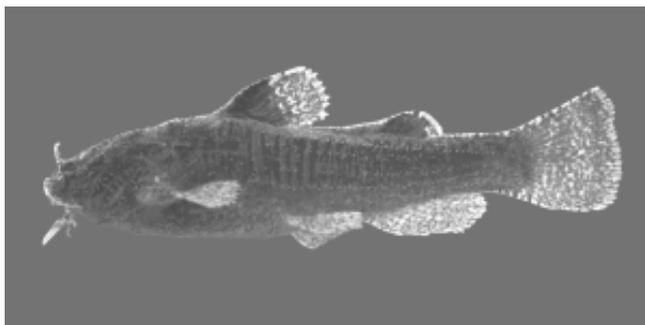


Fig. 4. *Akysis fuliginatus*, holotype, UMMZ 241338, 21.5 mm SL; Cambodia: Stung Treng province, Mekong River on W edge of Kaoh Han, 16 km NE of Stung Treng.

depression, ventralmost extent of gill opening one-third distance from ventral midline of body to base of pectoral spine, absence of serrations on posterior edge of pectoral spine, and truncate caudal fin.

Description. – Body moderately compressed. Dorsal profile rising evenly but not steeply from tip of snout to origin of dorsal fin, then sloping gently ventrally from there to end of caudal peduncle. Ventral profile flat to anal-fin base, then sloping gently dorsally from there to end of caudal peduncle. Anus and urogenital openings located at vertical through middle of adpressed pelvic fin. Skin tuberculate. Lateral line complete and midlateral.

Head depressed and broad, triangular when viewed laterally and with rounded snout margin when viewed from above. Anterior nostrils tubular, separated from posterior nostrils by distance in excess of width of nasal-barbel base. Gill openings narrow, extending from immediately ventral to posttemporal to one-third of distance from ventral midline of body to base of pectoral spine. Bony elements of dorsal surface of head covered with thick, tuberculate skin.

Barbels in four pairs. Maxillary barbel long and slender, extending to middle of pectoral-fin base. Nasal barbel slender, extending just beyond posterior orbital margin. Inner mandibular-barbel origin close to midline, extending almost to vertical through base of pectoral spine. Outer mandibular barbel originates posterolateral of inner mandibular barbel, extending to middle of pectoral-fin base.

Eye ovoid, horizontal axis longest; located entirely in dorsal half of head. Orbit with free margin.

Mouth subterminal, premaxillary tooth band not exposed when mouth is closed. Oral teeth small and viliform, in irregular rows on all tooth-bearing surfaces. Premaxillary tooth band rounded, of equal width throughout. Dentary tooth band much narrower than premaxillary tooth band at symphysis, tapering laterally.

Dorsal fin located at point delineating anterior third of body; fin margin convex; spine short and straight. Adipose fin with anterior margin concave and posterior margin angular. Caudal fin truncate. Procurrent rays symmetrical and extend only slightly anterior to fin base. Anal-fin base ventral to adipose-fin origin. Fin margin convex. Pelvic-fin origin at vertical through posterior end of dorsal-fin base. Pelvic-fin margin slightly convex, tip of adpressed fin just reaching anal-fin origin. Pectoral fin with stout spine, sharply pointed at tip; fin margin posteriorly convex. Anterior spine margins smooth, without serrations.

Morphometric and meristic data as in Table 1.

Coloration. – Dorsal surface and sides of head dark brown, fading to lighter colour on ventral third of flanks and belly. Proximal third of dorsal fin base and spine dark brown; remainder of fin hyaline with numerous fine dark brown spots distributed evenly throughout except for thin distal margin. Pectoral fin with numerous fine dark brown spots distributed evenly throughout; spots more densely arranged on proximal third of fin. Anal, pelvic and caudal fins with numerous fine dark brown spots distributed evenly throughout. Adipose fin dark brown, with hyaline posterior margin. Barbels dark yellow with brown rings.

Distribution and habitat. – Known from the Mekong River in Cambodia (Fig. 2). *Akysis fuliginatus* was collected from amongst roots in a small stream crossing an island in the Mekong River. The following fish were also collected in the vicinity: *Henicorhynchus lobatus* (Cyprinidae), *Labeo erythropterus* (Cyprinidae), *Opsarius koratensis* (Cyprinidae), *Paralabuca typus* (Cyprinidae), *Poropuntius deauratus* sp. (Cyprinidae), *Raiamas guttatus* (Cyprinidae), *Acanthopsoidea* sp. (Cobitidae), *Homaloptera smithi* (Balitoridae), *Schistura* spp. (Balitoridae), *Pseudomystus siamensis* (Bagridae), *Mastacembelus armatus* (Mastacembelidae), *M. favus* (Mastacembelidae), *Osphronemus exodon* (Osphronemidae), *Monotretia cochinchinensis* (Tetraodontidae).

Etymology. – From the Latin *fuliginatus*, meaning sooty. In reference to the dark coloration of this species.

Remarks. – *Akysis fuliginatus* can be distinguished from other Indochinese members of the *A. variegatus* species group, except for *A. brachybarbatus*, in lacking serrations on the posterior edge of the pectoral spine and, except for *A. microps*, *A. recavus* and *A. varius*, in having a truncate (vs. emarginate) caudal fin. It further differs from *A. brachybarbatus* in having a shorter adipose-fin base (15.1–19.5% SL vs. 25.8–26.5), deeper caudal peduncle (10.1–10.5% SL vs. 7.9–8.1) and larger interorbital distance (41.7–45.5% HL vs. 38.6–39.1). *Akysis fuliginatus* further differs from *A. microps* in having a more restricted gill opening, whose ventralmost extent is one-third (vs. half) the distance from the ventral midline of the body to the base of the pectoral spine, from *A. recavus* in having a deeper body (14.1–16.6% SL vs. 8.9–13.5), absence (vs. presence) of a suborbital depression, and from *A. varius* in having a shorter adipose-fin base (15.1–19.5% SL vs. 25.6–29.5), a deeper caudal peduncle (10.1–10.5% SL vs. 6.5–9.3) and a more restricted gill opening, whose ventralmost extent is one-third (vs. half) the distance from the ventral midline of the body to the base of the pectoral spine. The colour pattern of *A. fuliginatus* is also distinct from other *Akysis* species, being a uniform dark brown colour: All other species of *Akysis* have one or more patches of light coloration on the head or body, and although colour variation in some species may lead to the patches on the body being absent (Ng & Tan, 1999), there is still some light coloration on the head (which is completely lacking in *A. fuliginatus*).

Akysis filifer, new species

(Fig. 5)

Material examined. – Holotype - UMMZ 235728, 1 ex., 50.1 mm SL, Cambodia: Kandal, Tonle Sap, fishing lot 8, 22 miles upstream from Phnom Penh, 11°44'N 104°50'E, coll. W. J. Rainboth & Y. Chea, 1 Mar.1996.

Diagnosis. – *Akysis filifer* is distinguished from congeners of the *A. pseudobagarius* group in having an extremely elongate first pectoral-fin element and a unique combination of the following characters: caudal peduncle length 23.0% SL, elongate snout, sides of body with well-defined rows of enlarged elongate tubercles, and well-defined fold of skin where branchiostegal membranes meet.

Description. – Body moderately compressed. Dorsal profile rising evenly and somewhat steeply from tip of snout to origin of dorsal fin, then sloping gently ventrally from there to end of caudal peduncle. Ventral profile flat to anal-fin base, then



Fig. 5. *Akysis filifer*, holotype, UMMZ 235728, 50.1 mm SL; Cambodia: Kandal, Tonle Sap, fishing lot 8, 22 miles upstream from Phnom Penh.

sloping gently dorsally from there to end of caudal peduncle. Anus and urogenital openings located at vertical through middle of adpressed pelvic fin. Skin tuberculate. Lateral line complete and midlateral.

Head depressed and broad, triangular when viewed laterally and with rounded snout margin when viewed from above. Anterior nostrils tubular, separated from posterior nostrils only by width of nasal-barbel base. Gill openings wide, extending from immediately ventral to posttemporal to isthmus. Bony elements of dorsal surface of head covered with thick, tuberculate skin.

Barbels in four pairs. Maxillary barbel long and slender, extending to midway between posterior orbital margin and gill opening. Nasal barbel slender, extending just beyond posterior orbital margin. Inner mandibular-barbel origin close to midline, extending just beyond branchiostegal membrane at isthmus. Outer mandibular barbel originates posterolateral of inner mandibular barbel, extending to base of pectoral spine.

Eye ovoid, horizontal axis longest; located entirely in dorsal half of head. Orbit with free margin.

Mouth inferior, anterior quarter of premaxillary tooth band exposed when mouth is closed. Oral teeth small and viliform, in irregular rows on all tooth-bearing surfaces. Premaxillary

tooth band rounded, of equal width throughout. Dentary tooth band much narrower than premaxillary tooth band at symphysis, tapering laterally.

Dorsal fin located at point delineating anterior third of body; fin margin convex; spine short and straight. Adipose fin with anterior margin concave and posterior margin angular. Caudal fin deeply forked. Procurrent rays symmetrical and extend only slightly anterior to fin base. Anal-fin base ventral to adipose-fin origin. Fin margin convex. Pelvic-fin origin at vertical through posterior end of dorsal-fin base. Pelvic-fin margin slightly convex, tip of adpressed fin just reaching anal-fin origin. Pectoral fin with stout spine, sharply pointed at tip; fin margin posteriorly convex. Anterior spine margin smooth, without serrations; posterior spine margin with 7 large serrations.

Morphometric and meristic data as in Table 2.

Coloration. – Dorsal surface and sides of head and body chocolate brown, with anterior and posterior nostrils rimmed with dark yellow. Belly, chest and ventral surface of head dark yellow. Ventral surface of body posterior to belly dark yellow with scattered melanophores. Dorsal half of body with two almost round, saddle-shaped dark yellow spots: first on sides of body between dorsal and adipose fins, second more elongate and between posterior end of adipose-fin base and

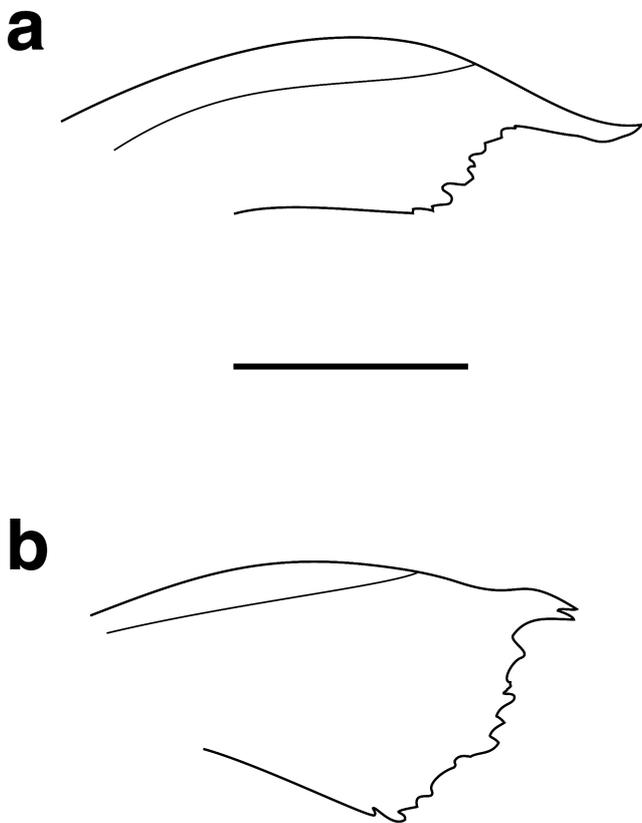


Fig. 6. Pectoral fins of: a. *Akysis filifer*, holotype, UMMZ 235728, 50.1 mm SL; b. other Indochinese members of the *A. pseudobagarius* species group (*A. similis*, UMMZ 241332, 51.0 mm SL illustrated). Scale bar represents 5 mm.

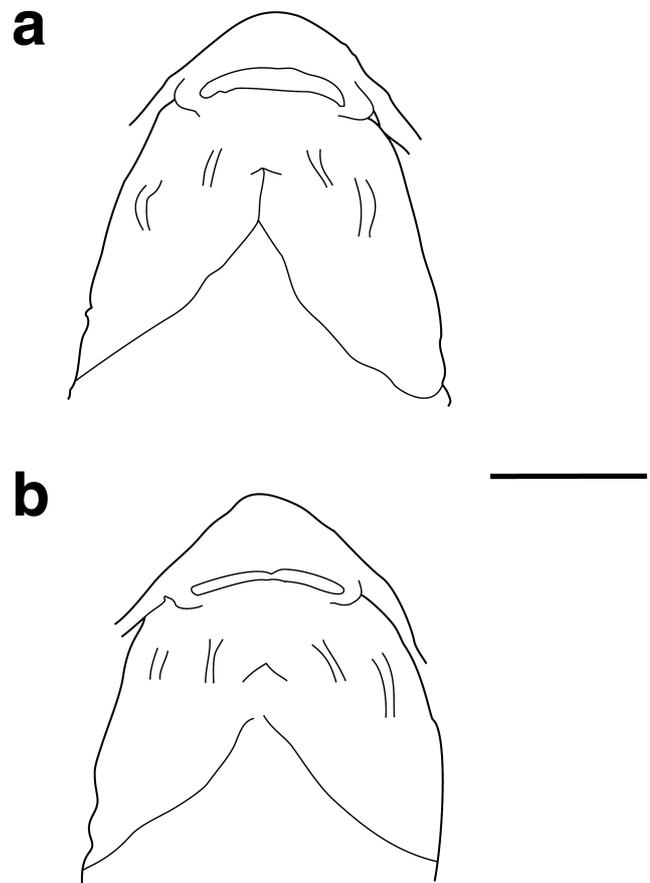


Fig. 7. Ventral views of heads of: a. *Akysis filifer*, holotype, UMMZ 235728, 50.1 mm SL; b. *A. similis*, UMMZ 241332, 51.0 mm SL. Scale bar represents 5 mm.

Table 2. Morphometric and meristic data for species of the *A. pseudobagarius* group described herein: *A. filifer* and *A. nitidus*.

	<i>A. filifer</i> n=1	<i>A. nitidus</i> n=1
MORPHOMETRICS		
<u>In % SL</u>		
Predorsal length	25.1	41.9
Preanal length	62.9	67.8
Prepelvic length	47.5	47.7
Prepectoral length	33.5	25.4
Length of dorsal-fin base	11.6	9.9
Length of anal-fin base	13.8	13.1
Pelvic fin length	13.6	13.8
Pectoral fin length	22.8	21.8
Pectoral spine length	16.6	18.6
Caudal fin length	21.0	19.4
Length of adipose-fin base	13.0	12.6
Caudal peduncle length	23.0	21.3
Caudal peduncle depth	5.0	5.3
Body depth at anus	10.8	12.1
Head length	27.4	27.6
Head width	25.2	18.9
Head depth	15.8	14.0
<u>In % HL</u>		
Snout length	28	37
Interorbital distance	41	28
Eye diameter	7	4
Length of nasal barbel	27	26
Length of maxillary barbel	73	62
Length of inner mandibular barbel	25	28
Length of outer mandibular barbel	52	54
MERISTICS		
Dorsal-fin rays	II,4	II,4,i
Anal-fin rays	iii,7,i	iii,6,ii
Pelvic-fin rays	i,5	i,5
Pectoral-fin rays	I,6	I,7
Principal caudal rays	i,6,7,i	i,6,7,i
Branchiostegal rays	5	5
Gill rakers on first gill arch	1+6	1+5
Vertebrae	16+19	17+18

caudal flexure. Ventral half of body with three similar saddle-shaped, dark yellow spots: first immediately anterior to base of anal fin, second ventral to base of adipose fin and third between posterior base of anal fin and caudal flexure. Proximal quarter of dorsal fin chocolate brown, remaining three-quarters hyaline with scattered chocolate brown spots. Anal, pectoral and pelvic fins hyaline with very few chocolate brown spots. Caudal fin chocolate brown with tips of lobes hyaline; middle portion of each lobe with large hyaline spot. Adipose fin chocolate brown, with hyaline posterior margin. Barbels dark yellow with brown rings.

Distribution and habitat. – Known from the Great Lake in the Tonlé Sap drainage (part of the Mekong drainage) in Cambodia (Fig. 2). The type locality of *A. filifer* is a turbid lake with a moderate current (0.25 ms⁻¹) and a sandy bottom. Other fishes collected at this locality include: *Clupeichthys aesarnensis* (Clupeidae), *Lycothrissa crocodilus* (Engraulidae), *Albulichthys albuloides* (Cyprinidae), *Labiobarbus lineatus* (Cyprinidae), *Henicorhynchus lobatus* (Cyprinidae), *H. siamensis* (Cyprinidae), *Lobocheilos*

rhabdoura (Cyprinidae), *Osteochilus microcephalus* (Cyprinidae), *Paralaubuca typus* (Cyprinidae), *Rasbora aurotaenia* (Cyprinidae), *Acantopsis* sp. (Cobitidae), *Mystus* aff. *wolffii* (Bagridae), *Xenentodon canciloides* (Belontiidae), *Toxotes microlepis* (Toxotidae) and *Euryglossa panoides* (Soleidae).

Etymology. – From the Latin *filum*, meaning thread and *ferre* meaning to bear. In reference to the filamentous extensions of the first pectoral-fin ray.

Remarks. – *Akysis filifer* can be distinguished from other Indochinese members of the *A. pseudobagarius* species group (except for *A. sinensis* and *A. subtilis*) in having an elongate snout and the sides of the body with well-defined rows of enlarged elongate tubercles. It can be further distinguished from other Indochinese members of the *A. pseudobagarius* species group (including *A. sinensis* and *A. subtilis*) in having an extremely elongate extension of the first pectoral-fin element (Fig. 6). *Akysis filifer* also differs from *A. similis* in having a broader head (25.2% SL vs. 17.5–20.2) and a well-

defined fold of skin where the branchiostegal membranes meet (vs. fold lacking; Fig. 7), and from *A. sinensis* in having a longer caudal peduncle (23.0% SL vs. 18.2–18.9).

***Akysis nitidus*, new species**

(Fig. 8)

Material examined. – Holotype: UMMZ 235400, 41.3 mm SL, Laos: Champasak province, Mekong River at Ban Hang Khone, just downstream from Khone falls; coll. I. Baird, date not recorded.

Diagnosis. – *Akysis nitidus* is distinguished from congeners of the *A. pseudobagarius* group in having very a small eye (4% HL) and a unique combination of the following characters: length of adipose-fin base 12.6% SL, interorbital distance 28% HL, vs. 34–39), sharply contrasted colour pattern of dark yellow patches on chocolate brown body, 35 total vertebrae, 1+5 gill rakers on first gill arch, and small tubercles on the dorsal third of the flanks.

Description. – Body moderately compressed. Dorsal profile rising evenly and somewhat steeply from tip of snout to origin of dorsal fin, then sloping gently ventrally from there to end of caudal peduncle. Ventral profile flat to anal-fin base, then sloping gently dorsally from there to end of caudal peduncle. Anus and urogenital openings located at vertical through middle of adpressed pelvic fin. Skin tuberculate. Lateral line complete and midlateral.

Head depressed and broad, triangular when viewed laterally and with rounded snout margin when viewed from above. Anterior nostrils tubular, separated from posterior nostrils only by width of nasal-barbel base. Gill openings wide, extending from immediately ventral to posttemporal to isthmus. Bony elements of dorsal surface of head covered with thick, tuberculate skin.

Barbels in four pairs. Maxillary barbel long and slender, extending to midway between posterior orbital margin and gill opening. Nasal barbel slender, extending just beyond posterior orbital margin. Inner mandibular-barbel origin close to midline, extending just beyond branchiostegal membrane at isthmus. Outer mandibular barbel originates posterolateral of inner mandibular barbel, extending to base of pectoral spine.

Eye ovoid, horizontal axis longest; located entirely in dorsal half of head. Orbit with free margin.



Fig. 8. *Akysis nitidus*, holotype, UMMZ 235400, 41.3 mm SL; Laos: Mekong River at Ban Hang Khone.

Mouth inferior, anterior quarter of premaxillary tooth band exposed when mouth is closed. Oral teeth small and viliform, in irregular rows on all tooth-bearing surfaces. Premaxillary tooth band rounded, of equal width throughout. Dentary tooth band much narrower than premaxillary tooth band at symphysis, tapering laterally.

Dorsal fin located at point delineating anterior third of body; fin margin convex; spine short and straight. Adipose fin with anterior margin concave and posterior margin angular. Caudal fin deeply forked. Procurrent rays symmetrical and extend only slightly anterior to fin base. Anal-fin base ventral to adipose-fin origin. Fin margin convex. Pelvic-fin origin at vertical through posterior end of dorsal-fin base. Pelvic-fin margin slightly convex, tip of adpressed fin just reaching anal-fin origin. Pectoral fin with stout spine, sharply pointed at tip; fin margin posteriorly convex. Anterior spine margin smooth, without serrations; posterior spine margin with 7 large serrations.

Morphometric and meristic data as in Table 2.

Coloration. – Dorsal surface and sides of head and body chocolate brown, with anterior and posterior nostrils rimmed with dark yellow. Belly, chest and ventral surface of head dark yellow. Ventral surface of body posterior to belly dark yellow with scattered melanophores. Dorsal half of body with two almost round, saddle-shaped dark yellow spots: first on sides of body between dorsal and adipose fins, second more elongate and between posterior end of adipose-fin base and caudal flexure. Ventral half of body with three similar saddle-shaped, dark yellow spots: first immediately anterior to base of anal fin, second ventral to base of adipose fin and third between posterior base of anal fin and caudal flexure. Proximal quarter of dorsal fin chocolate brown, remaining three-quarters hyaline with scattered chocolate brown spots. Anal, pectoral and pelvic fins hyaline with very few chocolate brown spots. Caudal fin chocolate brown with tips of lobes hyaline; middle portion of each lobe with large hyaline spot. Adipose fin chocolate brown, with hyaline posterior margin. Barbels dark yellow with brown rings.

Distribution and habitat. – Known from the Mekong River in Laos (Fig. 2).

Etymology. – From the Latin *nitidus*, meaning elegant. In reference to the distinctive colour pattern of this species.

Remarks. – *Akysis nitidus* can be distinguished from Indochinese members of the *A. pseudobagarius* species group in having a smaller eye (4% HL vs. 6–14). It further differs from *A. alfredi* in having a smaller adipose-fin base (12.6% SL vs. 19.7–26.4) and a smaller interorbital distance (28% HL vs. 34–39), from *A. similis* in having a smaller adipose-fin base (12.6% SL vs. 17.1–25.0), more vertebrae (35 vs. 31–32) and with small (vs. enlarged) tubercles on the dorsal third of the flanks, from *A. sinensis* in having a sharply contrasted colour pattern of dark yellow patches on a chocolate brown body (vs. weakly contrasting colour pattern of irregular light brown patches on a medium brown body),

and from *A. subtilis* in having a smaller interorbital distance (28% HL vs. 33–38) and more gill rakers (1+5 vs. 1+3).

COMMENTS ON *AKYSIS SIMILIS*

Akysis similis Ng & Kottelat, 1998 (Fig. 9)

Material examined. – UMMZ 224619, 3 ex., 16.8–37.0 mm SL, Vietnam: Chau Doc province, Bassac River next to highway 10 S of Khanh Hoa island; UMMZ 241228, 1 ex., 48.2 mm SL, Vietnam: Vinh Long province, Song Co Chien, 9–10 km downstream from Vinh Long; UMMZ 241324, 68 ex., 27.2–50.3 mm SL, Vietnam: Vinh Long province, Song Co Chien, 3–4 km downstream from Vinh Long, 10°15'N 106°7'E; UMMZ 241331, 2 ex., 41.7–44.2 mm SL, Vietnam: Bassac River, side channel downstream from Can Tho, 10°1'N 105°47'E; UMMZ 241332, 15 ex., 28.2–51.0 mm SL, Vietnam: An Giang province, Bassac River, 4 km downstream from Long Xuyen, 10°20'N 105°29'E; UMMZ 241336, 1 ex., 42.9 mm SL, Vietnam: Soc Trang province, Bassac River near Ke Sanh, 9°32'N 106°13'E. Refer to Ng & Kottelat (1998) for additional material.

Coloration. – Of adult (>32 mm SL) specimens: dorsal surface of head chocolate brown, sides of head light brown speckled with numerous tiny dark brown spots. Dorsal and sides of body chocolate brown, fading to dark yellow ventrally and on belly. Nape with light brown spot at supraoccipital region. Nuchal shield light brown. Dorsal half of body with two ovoid, saddle-shaped light brown spots: first between dorsal and adipose fins, and second between posterior end of adipose-fin base and caudal flexure. Ventral half of body with two similar saddle-shaped, light brown spots: first immediately posterior to base of pelvic fin, and second between posterior base of anal fin and caudal flexure. Dorsal and ventral light brown spots sometimes coalescing to form irregular bands. Proximal third of dorsal fin with scattered chocolate brown melanophores, remaining two-thirds hyaline. Anal, pectoral and pelvic fins hyaline. Caudal fin hyaline, with rounded chevron-shaped band on posterior

two-thirds of fin. Adipose fin chocolate brown, with hyaline posterior margin. Barbels dark yellow with brown rings.

Remarks. – *Akysis similis* appears to be one of the largest species of *Akysis*, reaching up to ca. 50 mm SL. The colour pattern of freshly preserved adult *A. similis* is also described here, as the one provided in the original description was that of the juveniles and this species shows ontogenetic changes in colour. The colour of juveniles (<32 mm SL) is very similar to that of *A. pseudobagarius* (as noted in the original description) in consisting of a strongly contrasting pattern of alternating chocolate brown and yellow bands (Fig. 9a). However, in larger specimens (>32 mm SL), the coloration shows less contrast and is more typical of other *Akysis* species: with the yellow bands becoming light brown ovoid markings that sometimes coalesce to form bands (Fig. 9b).

Habitat. – *Akysis similis* is the only species of *Akysis* known to date from brackish water. At the Song Co Chien, where UMMZ 241228 was collected, the river was turbid and brackish, with a silt and sand bottom. The following fish were collected syntopically: *Corica laciniata* (Clupeidae), *Lycotricha crocodilus* (Engraulidae), *Rasbora aurotaenia* (Cyprinidae), *Doryichthys boaja* (Syngnathidae), *Toxotes chatareus* (Toxotidae), *Eleotris melanosoma* (Eleotridae) and *Carinotetraodon lorteti* (Tetraodontidae).

DISCUSSION

The description of four new species in this study brings the total number of Indochinese *Akysis* to 21, but there is at least one undescribed species from Laos (as discussed in Ng & Kottelat, 1998). The *Akysis* sp. 1 of Taki (1974) differs from all Indochinese congeners of this group in having 1–2 very weak serrations (vs. without serrations or with 3–6 strong serrations) on the posterior edge of the pectoral spine. The disposition of this material is unclear, and no fresh material of this species has been collected since. Thus we are unable to further verify its identity.

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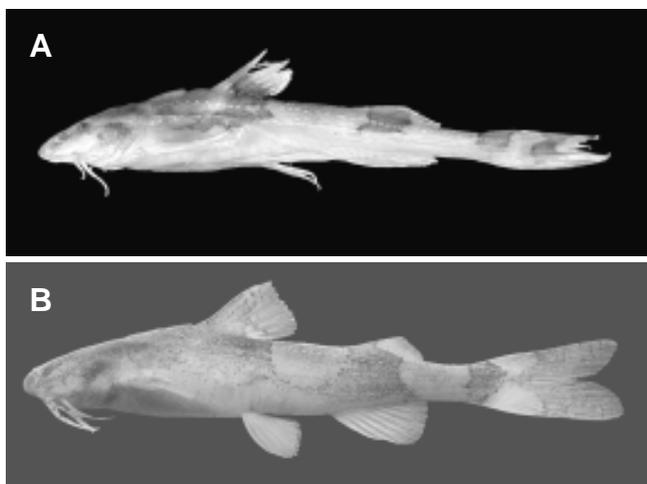


Fig. 9. *Akysis similis*, fresh coloration: a. juvenile coloration, UMMZ 241324, 29.7 mm SL; b. adult coloration, UMMZ 241336, 42.9 mm SL.

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