

# Description of a new species of catshark, *Atelomycterus baliensis* (Carcharhiniformes: scyliorhinidae) from eastern Indonesia

by

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**ABSTRACT.** - A new atelomycterine catshark species (Scyliorhinidae: Atelomycterinae), *Atelomycterus baliensis* sp. nov., is described from eastern Indonesia (Jimbaran Bay, Bali). It differs from other *Atelomycterus* species in having a higher pectoral-pelvic to pelvic-anal ratio and short claspers with the glans extending over more than half of the clasper length. Most similar to its more widely distributed, sympatric congener *A. marmoratus*, *A. baliensis* differs from this species in having lower total and precaudal vertebrae counts, more strongly tricuspid denticles, white spots absent from the body, obvious dark saddles on the back, and less oblique pale tips on its weakly falcate dorsal fins.

**RÉSUMÉ.** - Description d'une nouvelle espèce de roussette, *Atelomycterus baliensis* (Carcharhiniformes: Scyliorhinidae) d'Indonésie orientale.

Une nouvelle espèce de roussette, *Atelomycterus baliensis* (Carcharhiniformes: Scyliorhinidae) d'Indonésie orientale a été capturée dans la baie de Jimbaran, Bali. Elle diffère des autres espèces du genre *Atelomycterus* par un rapport des distances pectorale-pelviennne / pelviennne-anale plus grand et des ptérygopodes plus courts dont la partie distale (glands) représente plus de la moitié de la longueur du ptérygopode. *A. baliensis* ressemble à *A. marmoratus* ; les deux espèces sont sympatriques, mais *A. marmoratus* a une plus grande distribution géographique. *A. baliensis* diffère d'*A. marmoratus* par un plus petit nombre de vertèbres précaudales, un plus petit nombre total de vertèbres, des denticules cutanés tricuspidés avec des pointes plus fortes, l'absence de points blancs sur le corps, la présence de taches sombres sur le dos, des bandes claires moins obliques sur les nageoires dorsales qui sont légèrement falciformes.

**Key words.** - Carcharhiniformes - *Atelomycterus baliensis* - Catshark - ISEW - Eastern Indonesia - New species.

The genus *Atelomycterus*, proposed by Garman (1913) for *Scyllium marmoratum*, consists of three described species *Atelomycterus marmoratus* (Bennett, 1830), *A. macleayi* Whitley, 1939 and *A. fasciatus* Compagno & Stevens, 1993. *A. marmoratus* has a wide geographic range in the Indo-West Pacific from India and Pakistan through to the Philippines and New Guinea (Fowler, 1941; Springer, 1979; Compagno, 1984, 1999). The tropical Australian endemic *A. macleayi* is known from Western Australia, the Northern Territory and Queensland (Whitley, 1939; Last and Stevens, 1994). *A. fasciatus* is a common benthic shark on the offshore continental shelf of Western Australia and single specimens of a different colour morph have been reported from the Arafura Sea, the Gulf of Carpentaria, and Torres Strait (Compagno and Stevens, 1993).

Recent market surveys in eastern Indonesia produced a variety of sharks, skates, rays and chimaeras, including several scyliorhinid catsharks. Amongst this material were seven specimens of the new *Atelomycterus* that is described below.

## METHODS

Numerical characters were selected to enable morphological and meristic comparisons with other *Atelomycterus* species. The holotype and four paratypes of the new species, and six Indonesian specimens and one Philippine specimen of *A. marmoratus*, were measured in full; the two remaining paratypes of the new species were used in the diagnostic definition (Tab. I). In the description, morphometric and meristic values for the holotype are given first followed in parentheses by the ranges of the paratypes. The morphometric measurements used follow the FAO system of Compagno (1984), with a modified measurement for mouth length described by Compagno and Stevens (1993). Meristics were taken from X-rays of five type specimens and the seven specimens of *A. marmoratus*. Vertebral counts were obtained separately for trunk (monospondylous centra), precaudal (monospondylous + diplospondylous centra to origin of upper lobe of caudal fin) and caudal (centra of the caudal fin) regions (Tab. II). Tooth row counts were

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taken *in situ* from the dissected mouth of one paratype (CSIRO H 5868-04).

Type specimens and comparative material are deposited in the ichthyological collections of the Commonwealth Scientific and Industrial Research Organisation, Hobart (CSIRO), the Museum Zoologicum Bogoriense (MZB) in Indonesia, the Australian Museum, Sydney (AMS) and United States National Museum of Natural History, Washington D.C. (USNM); their registration numbers are prefixed with these acronyms.

## SYSTEMATIC ACCOUNTS

Family Scyliorhinidae Gill, 1862

### Genus *Atelomycterus* Garman, 1913

*Type species.* - *Scyllium marmoratum* Bennett, 1830, by monotypy.

### *ATELOMYCTERUS BALIENSIS* SP. NOV.

(English name: Bali catshark)

(Figs 1-6, Tabs I, II)

#### Material studied

*Holotype.* - CSIRO H 5868-03, adult male 433 mm TL, Kedonganan landing site and fish market (08°45'S, 115°10'E), Bali, Indonesia, 3 June 2002.

*Paratypes.* - 6 specimens collected with holotype: MZB 12901, female 471 mm TL; MZB 12902, male 474 mm TL; CSIRO H 5868-04, female 443 mm TL; CSIRO H 5868-05, female 425 mm TL; CSIRO H 5868-01, female 397 mm TL; CSIRO H 5868-02, female 431 mm TL.

#### Diagnosis

A relatively small (max. size 474 mm TL) *Atelomycterus* with the following combination of characters: relatively short preoral length, 4.0-4.6% TL; short interdorsal space, 11.6-12.9% TL; high pectoral-pelvic to pelvic-anal ratio 1.28-1.48; dorsal fins weakly falcate, with posterior margins vertical or sloping anteroventrally from fin apices; prebranchial denticles strongly tricuspid with narrow, elongate medial cusps; claspers of adults short, not stubby, not tapering sharply distally, outer length 8.3-9% TL, base width 5.4-6.3% of outer length; clasper glans covering more than half of clasper; cover rhipidion relatively narrow; rhipidion large, relatively low, and only partly concealed by cover rhipidion and exorhipidion; exorhipidion small with proximal end well behind distal end of cover rhipidion; total vertebral centra 154-163, precaudal centra 101-106; dorsal surface with well-

defined dark saddles consisting mainly of four, partly coalesced, diffuse-edged, dark brown blotches; white spots absent from body and rarely on fins; inner margin of pale tips of dorsal fins orientated almost vertically; upper pectoral fin lacking a broad, sharply defined whitish margin.

#### Description

Proportions as percentages of total length for the holotype and paratypes (4) are presented in table I.

Head short, length subequal 0.99 (0.94-1.00) to pectoral-pelvic space; narrow and moderately depressed; outline bluntly pointed in lateral view; dorsal profile above eye often weakly concave; narrowly parabolic in dorsoventral view anterior to gill openings. Preoral length short, 0.66 (0.58-0.62) times mouth width; bluntly rounded in dorsoventral view; not or very slightly indented adjacent to anterior of orbits. Eyes relatively small, spindle-shaped; length 7.18 (6.61-6.96) in head length, 4.51 (3.72-4.95) times eye height; dorsolateral on head, with lower edges well medial to horizontal head rim in dorsal view, subocular ridges strong but not sharply defined. External eye openings with prominent anterior and posterior eye notches; posterior notch connected to spiracle. Nictitating lower eyelids of rudimentary type, with shallow, scaled subocular pouches and secondary lower eyelids free from upper eyelids. Spiracles small, length 4.25 (4.38-5.11) in eye length, slightly below posterior margin of eye. First four gill slits substantially higher than fifth, height of fifth 0.69 (0.70-0.86) of third; height of third 10.53 (8.25-9.58) in head and 0.68 (0.70-0.83) of eye length. Gill slits straight, undulated, or slightly concave; not elevated on dorsolateral surface of head, upper ends about opposite lower edges of eyes or slightly below; gill filaments not visible from outside. Nostrils almost reaching mouth, with very small incurrent apertures lacking posterolateral keels; width 1.27 (0.96-1.16) in internarial space, 1.32 (1.25-1.44) in eye length, and 0.90 (0.98-1.15) in third gill slit opening. Anterior nasal flaps very large, with broadly rounded tips, directed posterolaterally, covering excurrent apertures, almost reaching lower jaw; united near symphysis of upper jaw, interspace between insertions of lobes covering upper lip, usually straight to weakly concave; mesonarial flaps very small and positioned well laterally. Mouth strongly concave, width 2.76 (2.66-2.86) in head length; length 3.06 (3.12-3.31) in width; lower symphysis almost abutting upper symphysis; teeth adjacent upper symphysis exposed in ventral view; tongue moderate-sized, flat and rounded, filling most of floor of mouth. No large buccal papillae in mouth, palate and floor of mouth covered with buccopharyngeal denticles, except just in front of tongue. Upper labial furrows long, reaching level of upper symphysis; lower labial furrows longer or subequal to upper furrows, separated by less than eye length. Teeth in



Figure 1. - *Atelomycterus baliensis* sp. nov., holotype adult male, 433 mm TL (CSIRO H 5868-03). **A**: Lateral view; **B**: Dorsal view. [*Atelomycterus baliensis* sp. nov., holotype mâle adulte. **A** : Vue latérale ; **B** : Vue dorsale.]



Figure 2. - Lateral view of *Atelomycterus baliensis* sp. nov., fresh non-type specimen (MZB 12901). [*Vue latérale de Atelomycterus baliensis* sp. nov., spécimen frais, non-type.]

72/63 rows; 5/4 series functional; posterolateral teeth not arranged in diagonal files; no toothless spaces at symphysis; not strongly differentiated in upper and lower jaws, medials, anterolaterals and posteriors in both jaws weakly defined. Tooth formula (N = 1) is:  $\frac{36}{32} \frac{3}{3} \frac{36}{31}$

Teeth tricuspid (Fig. 4); central cusp typically pungent, much longer than lateral cusps; cusps strongly erect to semi-oblique, more erect posteriorly; upper anterior symphyseal teeth smaller than those adjacent; posterior teeth with low central cusps, in several rows in both jaws, distinctly smaller than anterior teeth; sexual heterodonty weak, median cusps relatively thicker distally in adult males. Body slender, trunk subcircular in section at first dorsal base; length of trunk from fifth gill openings to vent 1.24 (1.19-1.21) times head length; no predorsal, interdorsal or postdorsal ridges on midline of back; no postnatal ridge between anal fin base and lower caudal fin origin; no lateral ridges. Caudal peduncle short, moderately compressed, without lateral keels; height 1.32 (1.46-1.82) in width at second dorsal fin insertion, 1.76 (1.61-1.78) in dorsal-caudal space. Lateral trunk denticles below first dorsal fin narrow, weakly tricuspid, teardrop-shaped (Fig. 5); crowns with pair of strong medial ridges extending entire length onto long, narrow



Figure 3. - Ventral head view of *Atelomycterus baliensis* sp. nov., holotype adult male, 433 mm TL (CSIRO H 5868-03). [*Vue ventrale de la tête de Atelomycterus baliensis* sp. nov., holotype mâle adulte.]

medial cusp; lateral cusps short, each with prominent lateral ridge extending onto cusp from crown; length about 1.5 times width; medial cusp about half total length of crown; crowns somewhat elevated, weakly imbricate. Pectoral fins broadly triangular and apices rounded, not falcate; moder-

ately convex anterior margins, 1.17 (1.01-1.08) times its length; bases narrow; narrowly rounded apices with posterior margins straight or weakly convex; free rear tips and inner margins broadly rounded; origins under interspace between third and fourth gill openings. Apex of pectoral fin slightly posterior to its free rear tip when fin is elevated and appressed to body. Pelvic fins broadly triangular; pelvic anterior margins slightly convex or nearly straight, 0.69 (0.63-0.70) of pectoral-fin anterior margins; rounded apically, with posterior margins nearly straight; free rear tips angular and not attenuated, inner margins straight or slightly convex; forming a weak fold, connected to median dorsal surface of each clasper; fold not fused together over claspers of adult males. Claspers (Fig. 6) of adult male holotype relatively short; lateral margins nearly straight, not undulated; extending well behind pelvic-fin free rear tips, distance 1.8 times pelvic-fin inner margin; apex about 0.95 times anal-fin base short of anal-fin origin; glans moderately elongate, length slightly more than half clasper outer margin, blunt distally with a small knob-like apex; covered dorsolaterally and ventrally with small clasper denticles; dorsomedial surfaces of glans (including rhipidion) and lateral strip adjacent clasper groove naked; clasper denticles typical seed like, much longer than broad, cusps inobvious; narrow band of low, semi-upright tricuspidate denticles near tip of glans; apophyle and hypophyle connected by long clasper groove, with its dorsal margins loosely fused over clasper canal; cover rhipidion elongate, formed as distally tapering wedge with narrow tab anteriorly,

posterior end proximal to pseudopera, exorhipidion and rear end of the rhipidion; rhipidion greatly enlarged, formed as a flat convex-shaped blade, extending across most of length

Table I. - Morphometric data for the holotype of *Atelomycterus baliensis* sp. nov., with ranges provided for the paratypes, and ranges also provided for *A. marmoratus* from Indonesia and data for single specimen from the Philippine Islands. Measurements expressed as percentage of the total length. [Données morphométriques pour l'holotype de *Atelomycterus baliensis* sp. nov., pour les paratypes, et pour *A. marmoratus* d'Indonésie ainsi que données pour le seul spécimen des Philippines. Mesures exprimées en pourcentage de la longueur totale.]

|                                 | <i>A. baliensis</i> sp. nov. |                      |       | <i>A. marmoratus</i> |       |                      |
|---------------------------------|------------------------------|----------------------|-------|----------------------|-------|----------------------|
|                                 | Holotype<br>CSIRO            | Paratypes<br>(n = 4) |       | Indonesia<br>(n = 6) |       | Philippines<br>CSIRO |
|                                 | H 5868-03                    | Min                  | Max   | Min                  | Max   | H 4132-01            |
| Total length (mm)               | 433.0                        | 397.0                | 443.0 | 433.0                | 554.0 | 618.0                |
| Pre-caudal length               | 79.7                         | 78.4                 | 79.6  | 78.7                 | 81.3  | 80.9                 |
| Pre-second dorsal length        | 64.4                         | 63.7                 | 65.2  | 64.8                 | 66.9  | 66.7                 |
| Pre-first dorsal length         | 44.3                         | 44.0                 | 45.2  | 42.4                 | 45.2  | 42.2                 |
| Head length                     | 19.5                         | 19.4                 | 19.8  | 17.9                 | 21.1  | 18.8                 |
| Pre-branchial length            | 14.6                         | 13.9                 | 14.6  | 13.5                 | 16.0  | 13.8                 |
| Pre-spiracular length           | 9.8                          | 9.0                  | 9.8   | 8.4                  | 9.9   | 8.9                  |
| Pre-orbital length (horizontal) | 4.9                          | 5.1                  | 5.5   | 4.5                  | 5.7   | 4.9                  |
| Pre-orbital length (direct)     | 6.3                          | 5.9                  | 6.3   | 5.5                  | 6.4   | 5.8                  |
| Pre-oral length                 | 4.6                          | 4.0                  | 4.4   | 3.8                  | 4.6   | 4.4                  |
| Pre-narial length               | 3.6                          | 3.2                  | 3.8   | 3.1                  | 3.4   | 3.2                  |
| Pre-pectoral length             | 18.0                         | 17.8                 | 18.7  | 16.9                 | 20.5  | 18.7                 |
| Pre-pelvic length               | 40.8                         | 39.9                 | 40.8  | 38.0                 | 42.8  | 39.2                 |
| Snout-vent distance             | 43.6                         | 42.7                 | 43.4  | 40.0                 | 43.8  | 40.8                 |
| Pre-anal length                 | 61.7                         | 60.5                 | 61.8  | 61.0                 | 63.9  | 62.9                 |
| Interdorsal distance            | 12.3                         | 11.6                 | 12.9  | 12.5                 | 16.8  | 16.6                 |
| Dorsal-caudal distance          | 6.1                          | 5.8                  | 6.7   | 4.9                  | 6.9   | 5.6                  |
| Pectoral-pelvic distance        | 19.8                         | 19.7                 | 20.7  | 16.7                 | 19.5  | 19.9                 |
| Pelvic-anal distance            | 15.5                         | 14.8                 | 15.3  | 15.9                 | 19.2  | 19.7                 |
| Anal-caudal distance            | 7.9                          | 7.3                  | 8.7   | 5.9                  | 8.9   | 9.0                  |
| Eye length                      | 2.7                          | 2.8                  | 3.0   | 2.5                  | 3.2   | 2.8                  |
| Eye height                      | 0.6                          | 0.6                  | 0.8   | 0.3                  | 0.7   | 0.5                  |
| Interorbital width              | 5.8                          | 5.8                  | 6.3   | 5.0                  | 6.4   | 5.3                  |
| Nostril width                   | 2.1                          | 2.1                  | 2.3   | 1.7                  | 2.3   | 2.0                  |
| Internarial space               | 2.6                          | 2.0                  | 2.4   | 1.7                  | 2.3   | 2.1                  |
| Anterior nasal flap length      | 2.9                          | 2.8                  | 3.0   | 2.4                  | 2.9   | 2.7                  |
| Spiracle length                 | 0.6                          | 0.6                  | 0.7   | 0.5                  | 0.7   | 0.8                  |
| Eye-spiracle distance           | 0.9                          | 0.8                  | 0.9   | 0.8                  | 1.0   | 0.7                  |
| Mouth length                    | 2.3                          | 2.1                  | 2.4   | 1.9                  | 2.3   | 1.8                  |
| Mouth width                     | 7.1                          | 6.8                  | 7.3   | 5.4                  | 7.8   | 6.2                  |
| Upper labial furrow length      | 2.8                          | 2.7                  | 2.9   | 2.5                  | 3.3   | 2.9                  |
| Lower labial furrow length      | 3.6                          | 3.4                  | 3.8   | 2.8                  | 4.0   | 3.1                  |
| First gill slit height          | 1.7                          | 2.0                  | 2.6   | 1.9                  | 2.5   | 2.4                  |
| Second gill slit height         | 1.8                          | 1.9                  | 2.7   | 1.9                  | 2.6   | 2.5                  |
| Third gill slit height          | 1.8                          | 2.0                  | 2.4   | 1.8                  | 2.7   | 2.6                  |
| Fourth gill slit height         | 1.6                          | 1.7                  | 2.1   | 1.8                  | 2.4   | 2.2                  |
| Fifth gill slit height          | 1.3                          | 1.4                  | 1.8   | 1.6                  | 1.9   | 1.9                  |
| Head height                     | 7.2                          | 7.3                  | 7.8   | 6.6                  | 8.9   | 7.0                  |
| Trunk height                    | 8.2                          | 7.8                  | 9.0   | 7.4                  | 10.1  | 8.0                  |
| Caudal peduncle height          | 3.5                          | 3.5                  | 3.8   | 3.5                  | 4.0   | 3.7                  |
| Head width                      | 11.0                         | 10.3                 | 11.2  | 9.0                  | 12.8  | 10.2                 |
| Trunk width                     | 9.1                          | 8.9                  | 10.4  | 8.5                  | 10.6  | 8.8                  |

of clasper glans, terminating below exorhipidion; pseudosphon moderately elongate, slitlike, situated opposite posterior half of cover rhipidion base; pseudopera present below

Table I. - Continued. [Suite.]

|  | <i>Atelomycterus baliensis</i> |                      |      | <i>Atelomycterus marmoratus</i> |      |                                   |
|--|--------------------------------|----------------------|------|---------------------------------|------|-----------------------------------|
|  | Holotype<br>CSIRO<br>H 5868-03 | Paratypes<br>(n = 4) |      | Indonesia<br>(n = 6)            |      | Philippines<br>CSIRO<br>H 4132-01 |
|  |                                | Min                  | Max  | Min                             | Max  |                                   |
| Caudal peduncle width                          | 2.6                            | 2.0                  | 2.5  | 2.0                             | 2.7  | 2.8                               |
| Pectoral fin length                            | 10.4                           | 11.5                 | 12.1 | 10.2                            | 12.0 | 10.4                              |
| Pectoral fin anterior margin length            | 12.2                           | 11.8                 | 12.4 | 10.7                            | 12.6 | 10.7                              |
| Pectoral fin base length                       | 5.0                            | 4.5                  | 4.7  | 4.3                             | 5.0  | 4.2                               |
| Pectoral fin height                            | 9.0                            | 9.4                  | 9.6  | 7.4                             | 10.0 | 9.3                               |
| Pectoral fin inner margin length               | 5.2                            | 4.6                  | 5.6  | 5.1                             | 6.1  | 5.4                               |
| Pectoral fin posterior margin length           | 7.9                            | 8.0                  | 8.6  | 6.2                             | 8.7  | 6.4                               |
| Pelvic fin length                              | 10.1                           | 9.5                  | 10.5 | 8.9                             | 10.6 | 9.1                               |
| Pelvic fin anterior margin length              | 8.4                            | 7.8                  | 8.5  | 7.7                             | 8.7  | 8.1                               |
| Pelvic fin base length                         | 7.4                            | 6.6                  | 7.2  | 5.9                             | 7.0  | 5.8                               |
| Pelvic fin height                              | 5.2                            | 6.4                  | 6.7  | 5.7                             | 6.8  | 5.4                               |
| Pelvic fin inner margin length                 | 2.9                            | 3.2                  | 4.1  | 3.7                             | 4.5  | 3.0                               |
| Pelvic fin posterior margin length             | 5.9                            | 6.0                  | 7.0  | 5.3                             | 6.5  | 5.2                               |
| Clasper outer length                           | 8.8                            | 0.0                  | 0.0  | 0.0                             | 8.7  | 12.1                              |
| Clasper inner length                           | 10.9                           | 0.0                  | 0.0  | 0.0                             | 11.7 | 14.9                              |
| Clasper base width                             | 1.4                            | 0.0                  | 0.0  | 0.0                             | 1.3  | 1.1                               |
| First dorsal fin length                        | 10.4                           | 9.8                  | 10.3 | 9.2                             | 11.1 | 9.6                               |
| First dorsal fin anterior margin length        | 11.2                           | 10.7                 | 11.4 | 11.3                            | 12.6 | 10.5                              |
| First dorsal fin base length                   | 8.2                            | 7.5                  | 7.9  | 6.3                             | 8.1  | 6.3                               |
| First dorsal fin height                        | 5.5                            | 5.6                  | 5.9  | 5.3                             | 6.6  | 5.3                               |
| First dorsal fin inner margin length           | 2.2                            | 2.3                  | 2.8  | 2.9                             | 3.3  | 3.5                               |
| First dorsal fin posterior margin length       | 5.1                            | 5.2                  | 5.7  | 4.8                             | 6.0  | 5.3                               |
| Second dorsal fin length                       | 11.9                           | 10.6                 | 11.2 | 9.8                             | 11.1 | 9.3                               |
| Second dorsal fin anterior margin length       | 11.8                           | 11.0                 | 11.9 | 11.2                            | 12.0 | 10.2                              |
| Second dorsal fin base length                  | 9.1                            | 8.3                  | 9.1  | 7.2                             | 8.7  | 7.0                               |
| Second dorsal fin height                       | 4.9                            | 4.7                  | 5.4  | 4.5                             | 5.4  | 6.7                               |
| Second dorsal fin inner margin length          | 2.3                            | 2.1                  | 2.8  | 2.4                             | 3.0  | 3.3                               |
| Second dorsal fin posterior margin length      | 4.2                            | 4.6                  | 5.0  | 4.5                             | 5.3  | 4.9                               |
| Anal fin length                                | 9.5                            | 9.8                  | 10.6 | 8.7                             | 10.2 | 9.2                               |
| Anal fin anterior margin length                | 7.6                            | 7.8                  | 8.8  | 6.9                             | 8.0  | 7.3                               |
| Anal fin base length                           | 7.5                            | 7.8                  | 8.5  | 6.6                             | 7.9  | 7.2                               |
| Anal fin height                                | 3.0                            | 3.2                  | 3.7  | 2.7                             | 3.8  | 2.7                               |
| Anal fin inner margin length                   | 2.1                            | 1.9                  | 2.2  | 1.9                             | 2.5  | 2.2                               |
| Anal fin posterior margin length               | 3.4                            | 3.6                  | 4.1  | 3.2                             | 4.1  | 3.7                               |
| Caudal fin dorsal margin length                | 20.6                           | 20.1                 | 21.2 | 18.0                            | 20.9 | 20.3                              |
| Caudal fin preventral margin length            | 7.9                            | 8.5                  | 9.2  | 7.5                             | 8.8  | 8.2                               |
| Caudal fin upper postventral margin length     | 11.3                           | 12.1                 | 12.9 | 10.9                            | 12.7 | 11.0                              |
| Caudal fin subterminal margin length           | 3.7                            | 3.5                  | 3.9  | 3.2                             | 4.0  | 3.7                               |
| Caudal fin terminal margin length              | 3.8                            | 4.2                  | 4.8  | 3.5                             | 4.6  | 4.2                               |
| Caudal fin terminal lobe length                | 4.9                            | 4.7                  | 5.5  | 4.8                             | 6.0  | 5.1                               |
| Second dorsal fin origin-anal fin origin       | 3.4                            | 2.6                  | 3.8  | 2.0                             | 2.9  | 2.9                               |
| Second dorsal fin insertion-anal fin insertion | 4.1                            | 3.3                  | 4.3  | 2.9                             | 3.6  | 3.4                               |

fin origin over last quarter of pelvic-fin bases, mid-point of base slightly forward or opposite pelvic-fin free rear tips; insertion much closer to pelvic-fin insertions than anal-fin origin; free rear tip 3.16 (2.24-2.91) times length of inner margin anterior to anal fin origin; fin insertion anterior to fin apex; first dorsal-fin base 1.50 (1.50-1.71) in interdorsal space, 2.51 (2.56-2.82) in dorsal caudal-fin margin, height 1.48 (1.30-1.40) in base length, inner margin 2.53 (2.01-2.50) in height, 3.74 (2.73-3.47) in base length. Second dorsal fin similar to first dorsal fin, subequal to first dorsal-fin area; height 0.88 (0.79-0.94) of first dorsal-fin height, base length 1.11 (1.09-1.16) of first dorsal fin base length; free rear tip in front of upper caudal-fin origin by 1.72 (1.10-1.81) times the inner margin; origin well in front of anal-fin midbase; insertion well behind anal-fin free rear tip, well in front of fin apex; second dorsal-fin base length 0.68 (0.69-0.75) in dorsocaudal space, height 1.87 (1.55-1.89) base length, inner margin 2.15 (1.78-2.52) in height and 4.03 (3.05-3.91) in base length. Anal fin low, subtriangular, apically broad, not falcate, much smaller than second dorsal fin; height 0.63 (0.68-0.71) in second

anterior end of exorhipidion and about opposite posterior end of cover rhipidion; exorhipidion well differentiated, originating well behind the cover rhipidion; no specialised clasper hooks. First dorsal fin moderately raked, anterior margin weakly convex, narrowly rounded apically, weakly falcate; posterior margin vertical or sloping anteroventrally from apex, angular free rear tip; inner margin short, straight;

dorsal-fin height and base 0.83 (0.90-1.01) times second dorsal-fin base; base without preanal ridges; anterior margin moderately convex to nearly straight, apex broadly rounded; posterior margin nearly straight, directed posterodorsally; free rear tip sharply angular, 2.75 (2.44-3.63) times inner margin length anterior to lower caudal-fin origin; inner margin short, nearly straight; fin origin 2.07 (1.76-1.93) times

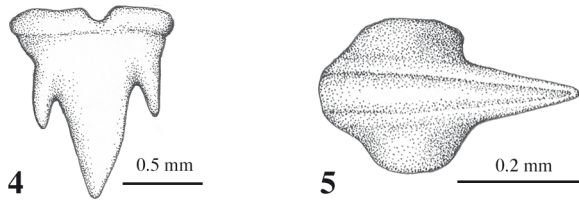


Figure 4. - Upper tooth of *Atelomycterus baliensis* sp. nov., holotype adult male, 433 mm TL (CSIRO H 5868-03). Illustration by Stephanie Barnes. [Dent de la mâchoire supérieure de *Atelomycterus baliensis* sp. nov., holotype mâle adulte. Illustration de Stephanie Barnes.]

Figure 5. - Typical lateral trunk denticle of *Atelomycterus baliensis* sp. nov., holotype adult male, 433 mm TL (CSIRO H 5868-03). Illustration by Stephanie Barnes. [Denticule typique de la région latérale du corps de *Atelomycterus baliensis* sp. nov., holotype mâle adulte. Illustration de Stephanie Barnes.]

base length behind pelvic-fin insertions; insertion slightly behind apex; anal fin base 0.95 (0.96-1.17) in anal-caudal space, height 2.46 (2.09-2.61) in base length, inner margin 1.44 (1.52-1.76) in height and 3.54 (3.68-4.43) in base length. Caudal fin moderately elongate, narrow; dorsal margin slightly undulating, 3.86 (3.69-3.96) in precaudal length; preventral margin length 2.60 (2.22-2.45) in dorsal caudal fin margin, almost straight, forming low, broadly rounded lobe with postventral margin; postventral margin straight to convex, not differentiated into upper and lower parts; origin of subterminal notch forming a deep, narrow slot, margin straight to concave, its length 1.01 (1.15-1.22) in terminal region; terminal margin slightly convex and sometimes notched, edges of lobe bluntly angular, its length 4.19 (3.69-4.50) times dorsal caudal fin margin. Vertebral counts, ratios and statistics are given in table II. Transition between monospondylous (MP) and diplospondylous (DP) centra about 5 (4-6) centra behind front of pelvic girdle. Last few MP centra before MP-DP transition hardly enlarged, not forming 'stutter zone' of alternating long and short centra.

### Colour (preserved in alcohol)

Dorsal surface of body mottled, light brownish grey with dark brownish blotches, spots and saddles; pale ventrally; narrow interorbital dark bar present, its posterior margin darkest, straight or curved posteriorly; four weak dark saddles (strongly demarcated in dorsal view), quadrangular in appearance, each formed from four diffuse-edged blotches; pairs of less coalesced blotches below each quadrangular saddle, blotches weakly coalescing in holotype, more strongly united in smaller paratypes; first saddle situated between gill slits 1-3, second just behind insertions of pectoral fins, third above mid-abdomen, fourth over base of pelvic fin; weak saddle beneath each dorsal fin; strong saddles on mid-interdorsal region and caudal peduncle; additional large, diffuse-edged, spots and blotches on lateral surface, forming a broad mosaic in some

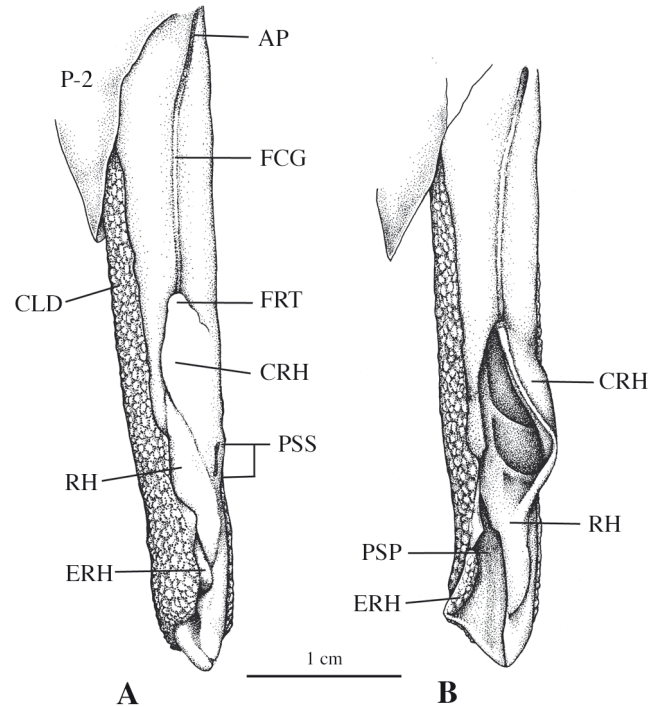


Figure 6. - Clasper of *Atelomycterus baliensis* sp. nov., holotype adult male, 433 mm TL (CSIRO H 5868-03). **A**: Glands not dilated; **B**: Glands spread. Abbreviations: AP: apophyle; CLD: clasper denticles; CRH: cover rhipidion; ERH: exorhipidion; FCG: fused clasper groove; FRT: free tab on cover rhipidion; P-2: pelvic fin; PSP: pseudopera; PSS: pseudosiphon; RH: rhipidion. Illustration by Stephanie Barnes. [Pterygopode de *Atelomycterus baliensis* sp. nov., holotype mâle adulte. **A**: Gland non dilaté; **B**: Gland développé. Abréviations: AP: apophyle; CLD: denticules de pterygopode; CRH: couverture de rhipidion; ERH: exorhipidion; FCG: sillon amalgamé du pterygopode; FRT: attache défective sur la couverture du rhipidion; P-2: nageoire pelvienne; PSP: pseudopera; PSS: pseudosiphon; RH: rhipidion. Illustration de Stephanie Barnes.]

paratypes, more irregularly blotched in holotype; no well-defined, white stripe along lateral surface of head, often with a feeble, pale wavy marking across upper gills; body not covered with a dense array of large white spots. Ventral head and abdomen whitish; tail distinctly darker, pale greyish; mouth and lips white; dorsal surface of clasper uniformly brownish grey, white ventrally. Fins similar to upper body colour. Dorsal fins with dark brown blotch at origin, distally with two enlarged dark blotches; posterior blotch bordered by narrow white margin at fin apices, its border directed anterodorsally at about 15° from vertical. Caudal fin with three weakly bifurcated saddles on upper lobe, similar blotches over rest of fin. Pectoral fin upper surface pale to medium brownish grey with faint darker blotches anteriorly, lacking a broad white posterior margin; ventral surface whitish or dusky. Pelvic fins similar to pectoral fins, posterior margin slightly paler. Anal fin pale with a central enlarged dark brown blotch or incomplete stripe. Colour similar when fresh.

|                               | <i>A. baliensis</i> sp. nov.   |                      |       | <i>A. marmoratus</i> |       |                                   |
|-------------------------------|--------------------------------|----------------------|-------|----------------------|-------|-----------------------------------|
|                               | Holotype<br>CSIRO<br>H 5868-03 | Paratypes<br>(n = 6) |       | Indonesia<br>(n = 6) |       | Philippines<br>CSIRO<br>H 4132-01 |
|                               |                                | Min                  | Max   | Min                  | Max   |                                   |
| Vertebrae:                    |                                |                      |       |                      |       |                                   |
| monospondylous (MP)           | 43.0                           | 42.0                 | 46.0  | 44.0                 | 50.0  | 41.0                              |
| diplospondylous -trunk (DP)   | 59.0                           | 57.0                 | 63.0  | 63.0                 | 68.0  | 70.0                              |
| diplospondylous - caudal (DC) | 52.0                           | 52.0                 | 59.0  | 49.0                 | 61.0  | 50.0                              |
| total precaudal (PC)          | 102.0                          | 101.0                | 106.0 | 108.0                | 114.0 | 111.0                             |
| Total (TC)                    | 154.0                          | 155.0                | 163.0 | 162.0                | 174.0 | 161.0                             |
| % MP                          | 27.9                           | 27.1                 | 28.2  | 27.2                 | 28.7  | 25.5                              |
| % DP                          | 38.3                           | 36.5                 | 39.9  | 36.2                 | 41.7  | 43.5                              |
| % DC                          | 33.8                           | 33.5                 | 34.8  | 30.2                 | 35.1  | 31.1                              |
| DP/MP                         | 1.4                            | 1.3                  | 1.5   | 1.3                  | 1.5   | 1.7                               |
| DC/MP                         | 1.2                            | 1.2                  | 1.3   | 1.1                  | 1.3   | 1.2                               |

Table II. - Vertebral counts and ratios for specimens of *A. baliensis* sp. nov. and *A. marmoratus*. [Nombres de vertèbres et ratios pour les spécimens de *A. baliensis* sp. nov. et *A. marmoratus*.]

### Distribution

*Atelomycterus baliensis* is known only from the Indonesian island of Bali where it is caught occasionally by fisherman operating from Jimbaran Bay in the south of the island. The type series was collected at the Kedonganan fish market located at the northern end of Jimbaran Bay.

### Etymology

Named in allusion to the known geographic range and type locality (Bali, Indonesia).

### Comparison with other species

*Atelomycterus baliensis* is readily distinguishable from other *Atelomycterus* species in external morphology, squamation, morphometrics, clasper structure, coloration and vertebral counts (Tabs I, II). It is most similar to *A. marmoratus* but differs in the form of the prebranchial denticles (narrow and strongly tricuspidate vs broad and weakly tricuspidate in *A. marmoratus*), and in having a higher pectoral-pelvic to pelvic-anal ratio (1.28-1.48 vs 0.84-1.18 times in *A. marmoratus*). It differs from *A. marmoratus* and *A. macleayi* in having weakly falcate (rather than strongly falcate) dorsal fins, with their posterior margins slanting only slightly anteroventrally from the narrowly rounded apex. The dorsal fins of *A. fasciatus* have less concave posterior margins and slant posteroventrally.

The four *Atelomycterus* species are well separated by the dimensions and external morphologies of their claspers. Adult males of *A. baliensis* and *A. fasciatus* have moderately stout, elongated claspers that more strongly tapering distally in the latter. In *A. marmoratus* they are very long and attenuated, whereas the claspers of *A. macleayi* are short and very stout (Fig. 4; Compagno and Stevens, 1993). Relative inner clasper lengths of *A. baliensis* (10.9% TL) were slightly lower than in *A. macleayi* (11.5-11.6% TL), while those for *A. fasciatus* and *A. marmoratus* were substantially higher (14.9-16.2% TL) (Tab. I; Compagno and Stevens, 1993).

Relative clasper base width to outer length is greater in *A. macleayi* than the other three species (0.22 vs 0.07-0.16) (Tab I; Compagno and Stevens, 1993). The claspers of *Atelomycterus marmoratus* are unique in having the glans length less than half the length of the clasper's outer margin (extending over more than half the outer margin length in the other three species).

The coloration of adult *Atelomycterus fasciatus* differs from that of the other *Atelomycterus* species in having brownish-grey saddles and bands on a light grey background, with very few dark brown spots or markings. Adults of *A. baliensis* and *A. marmoratus* differ from *A. macleayi* in having the body covered in large dark brown blotches and spots, forming saddle-like markings dorsally. *A. baliensis* coloration differs from that of *A. marmoratus* in having more well-defined dark saddles on the dorsal surface that are formed from diffuse-edges blotches (less well defined and less regular in *A. marmoratus*), pale spots absent from body and most fins (large whitish spots on body and fins), ventral surface not as well delineated from dorsal background coloration, inner margin of white-edged tips of dorsal fins orientated almost vertically (rather than strongly oblique), no strongly defined white stripe through the gill slits, and lacking a broad, white posterior margin on the pectoral fins.

*Atelomycterus baliensis* and *A. fasciatus* have lower total centra (TC), precaudal centra (PC) and precaudal diplospondylous centra (DP) count ranges than *A. macleayi* and *A. marmoratus* (TC = 149-163 vs 161-183; PC = 100-110 vs 106-132; DP = 55-69 vs 63-85) (Tab. II; Compagno and Stevens, 1993). A substantial difference in vertebral counts for the *A. macleayi* specimen examined in this study (AMS IA 7822) compared to that examined by Compagno and Stevens (1993) (USNM 174070), highlights the need for further investigation of this species.

*Atelomycterus macleayi* and *A. marmoratus* apparently attain a larger size (mature males 508-618 mm TL) than *A. baliensis* (mature males 433-474 mm TL) and *A. fasciatus*

(mature males 329-402 mm TL). Females of *A. baliensis* appear to attain a similar size to those of *A. fasciatus* (Compagno and Stevens, 1993).

### KEY TO THE SPECIES OF ATELOMYCTERUS

- 1a.** Dorsal fins not angled rearwards, posterior margins sloping posteroventrally from fin apices. Dark brown blotches and large markings sparse, colour pattern dominated by brownish-grey saddles and bands on pale background .....  
.....*Atelomycterus fasciatus* (northern Australia)
- 1b.** Dorsal fins angled rearwards, posterior margins vertical or sloping anteroventrally from fin apices. Dark brown spots and markings dominating colour pattern ..... 2
- 2a.** Saddle markings obsolete, numerous light grey and white spots on head, body and fins; and a strongly defined white stripe through gill slits. Claspers elongate and narrow, with glans extending less than half length of clasper outer margin  
*Atelomycterus marmoratus* (Indo-West Pacific)
- 2b.** Colour pattern of brownish-grey saddles, very few or no pale spots on head, body and fins. Claspers shorter and less elongate, sometimes stout, with glans extending more than half length of clasper outer margin ..... 3
- 3a.** Dorsal fins strongly falcate. About 6 well-defined saddle markings between first dorsal fin origin and posterior of eye. Claspers very stout, their outer margin length less than 5 times width at base .....  
.....*Atelomycterus macleayi* (northern Australia)
- 3b.** Dorsal fins weakly falcate. Four well-defined saddle markings between first dorsal fin origin and posterior of eye. Claspers moderately elongate, their outer margin length much more than 5 times width at base .....  
.....*Atelomycterus baliensis* (Bali, Indonesia)

### Comparative material

*Atelomycterus marmoratus*. - CSIRO H 5889-05, female 433 mm TL, Indonesia; CSIRO H 5889-22, female 474 mm TL, Indonesia; CSIRO H 5889-23, adult male 554 mm TL, Indonesia; CSIRO H 5889-24, female 498 mm TL, Indonesia; CSIRO H 5876-01, female 535 mm TL; CSIRO H 5876-02, female 528 mm TL, Indonesia; CSIRO H 4132-01, adult male 618 mm TL, Philippines.

*Atelomycterus macleayi*. - AMS IA 7822, adult male 508 mm TL, Australia.

*Atelomycterus fasciatus*. - CSIRO H 1118-01, juvenile male 300 mm, Australia.

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### REFERENCES

- COMPAGNO L.J.V., 1984. - FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 2- Carcharhiniformes. *FAO Fish. Synop.*, (125) Vol. 4(2): 1-655.
- COMPAGNO L.J.V., 1999. - Sharks. In: FAO Species Identification Guide for Fishery Purposes. The living marine Resources of the Western Central Pacific. Vol. 2. Cephalopods, Crustaceans, Holothurians and Sharks (Carpenter K.E. & Niem V.H., eds), pp. 1193-1366. Rome: FAO.
- COMPAGNO L.J.V. & J.D. STEVENS, 1993. - *Atelomycterus fasciatus* n.sp., a new catshark (Chondrichthyes: Carcharhiniformes: Scyliorhinidae) from tropical Australia. *Rec. Aust. Mus.*, 45: 147-169.
- FOWLER H.W., 1941. - The fishes of the groups Elasmobranchii, Holocephali, Isospondyli, and Ostariophysi obtained by United States Bureau of Fisheries Steamer Albatross in 1907 to 1910, chiefly in the Philippine Islands and adjacent seas. *Bull. U.S. Natl. Mus.*, (100)13: 1-879.
- GARMAN S., 1913. - The Plagiostomia. *Mem. Mus. Comp. Zool. Harvard*, 36: 1-515.
- LAST P.L. & J.D. STEVENS, 1994. - Sharks and Rays of Australia. 513 p. Australia: CSIRO.
- SPRINGER S., 1979. - A revision of the catsharks, family Scyliorhinidae. *NOAA Tech. Rep., Nat. Mar. Fish. Ser. Circ.*, 422: 1-152.
- WHITLEY G.P., 1939. - Taxonomic notes on sharks and rays. *Aust. Zool.*, 9(3): 227-262.

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