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A NEW FINBACK CATSHARK *PROSCYLLIUM MAGNIFICUM* (ELASMOBRANCHII: PROSCYLLIIDAE) FROM THE NORTHEASTERN INDIAN OCEAN

Peter R. Last[1] and Vararin Vongpanich[2]

[1]*The Commonwealth Scientific Industrial Research Organisation (CSIRO) Marine Research, Castray Esplanade, Hobart 7001, Australia*
[2] *Phuket Marine Biological Center, P.O. Box 60, Phuket 83000, Thailand*

ABSTRACT: A new finback catshark, *Proscyllium magnificum* sp. nov., is described from the Andaman Sea off the coast of Myanmar. It represents the second valid species of the genus and the first occurrence of the group in the eastern Indian Ocean. Within the family Proscylliidae, it shares with its congener, *P. habereri* (Hilgendorf) from the western Pacific, large anterior nasal flaps with their posterior ends almost reaching the symphysis of the upper jaw but differs from *P. habereri* in possessing a greatly enlarged lobe at the angle of each flap. It also differs in having the second dorsal-fin origin slightly forward of the anal-fin origin, larger head dimensions, relatively longer and lower labial furrows, larger pectoral and caudal fins, a shorter interdorsal distance, a lower vertebral count and a more striking colour pattern.

INTRODUCTION

The marine benthic biodiversity of the Thai sector of the Andaman Sea has been investigated in a series of surveys that commenced in 1966 (Aungtonya *et al*., 2000). A joint Thai/Burmese survey of the continental shelf off the Myanmar coast in 1989 yielded important biological material and some possible endemics. Some of this material was deposited in the collections of the Phuket Marine Biological Center (PMBC) by Mr. Weera Pokapunt.

Included in the PMBC fish collection was a new proscylliid catshark of the genus *Proscyllium* Hilgendorf. The only other recognized species of this genus, *P. habereri* (Hilgendorf, 1904), occurs in the western Pacific where it is known from Vietnam, China, Taiwan, Korea and southeastern Japan (Compagno, 1984). An extralimital record from Java (Fowler, 1929) has been confirmed by Compagno and Niem (1998). *Calliscyllium* (=*Proscyllium*) *venustum* (Tanaka, 1913) is considered to be a junior synonym. Nakaya (1983) provided a detailed redescription of the holotype and compared it with the description and figures of *C. venustum*. He concluded that the forms were morphologically similar, differing only in colour. The new species from the Indian Ocean, which differs in colour, morphology and meristics, is described and compared to its Pacific congener.

MATERIALS AND METHODS

Measurements, which follow standards defined by Compagno (1984), are mostly taken point to point. Meristics were taken from radiographs. The holotype and three paratypes are held at the PMBC; one paratype is held in the ichthyological collection of the Commonwealth Scientific Industrial Research Organisation (CSIRO). A comparative specimen of *Proscyllium habereri*, a 298 mm TL female, was obtained from the Institute of Zoology, Academia Sinica, Taipei (ASIZP).

Proscyllium magnificum sp. nov.
(Figs. 1–2, Table 1)

Holotype: PMBC 6731, 488 mm TL, female, Myanmar (northern Andaman Sea), 12º44.65'–12º 45.20' N, 96º 50.12'–96º 49.68' E, collector Weera Pokapunt, FRTV "Chulabhorn", 3.12.89.

Figure 1. Lateral (A) and dorsal (B) views of the 466 mm TL, female paratype of *Proscyllium magnificum* sp. nov. (PMBC 19617) from the Andaman Sea.

Paratypes: PMBC 19617, 466 mm TL, female, PMBC 19618, 465 mm TL, female, PMBC 19619, 490 mm TL, mature male, CSIRO H 5887-01, 472 mm TL, mature male, collected with the holotype.

Diagnosis: A slender finback catshark with the following combination of characters: second dorsal-fin apex over anal fin with its origin slightly forward of the anal-fin origin; interdorsal distance subequal to head length; snout to cloaca length more than twice (2.1–2.3 times) interdorsal distance; lower labial furrow more than twice (2.7–3.7 times) length of upper furrow; anterior nasal flaps with a greatly enlarged posterior lobe; internarial space only slightly shorter than nostril width; dorsal margin of caudal fin about twice (1.9–2 times) length of second dorsal fin; height of second dorsal fin about twice (1.9–2.1 times) height of anal fin; dorsal surface and sides with a striking colour pattern consisting of numerous dark spots and blotches, some equal or larger than eye diameter; no white spots on body; monospondylous centra 38–39; total centra 140–143.

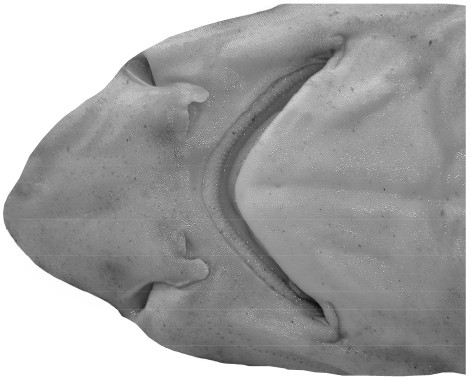

Figure 2. Ventral view of the head of the 466 mm TL, female paratype of *Proscyllium magnificum* sp. nov. (PMBC 19617) from the Andaman Sea.

Description: Body very slender, firm; trunk subcylindrical anteriorly, marginally more compressed laterally and gently tapering to caudal fin; head moderately depressed (more so in largest paratype), width 1.79 (1.71–1.99) times height; abdomen long, pectoral to pelvic space 20.6 (18.3–21.7) % TL, 0.98 (0.84-1.02) times head length, 1.59 (1.20–1.55) times pelvic-anal space; caudal peduncle slender and moderately elongate, anal to caudal space 1.02 (1.07–1.39) times anal-fin base; peduncle weakly compressed, oval in cross section, height 1.14 (1.06–1.30) times width;

Table 1. Morphometrics for the types of *Proscyllium magnificum* sp. nov. Data for *P. habereri* is based on a comparative specimen and published data of Nakaya (1983).

Measurement		*P. magnificum*				*P. habereri*	
		Holotype	Paratypes (n=4)			Holotype	Non-type
		PMBC 6731	Range		Mean	ZMB 16201	ASIZP 58964
TL	Total length (mm)	488	465	490		513	298
PRC	Precaudal length	78.7	77.8	79.6	78.5	79.9	82.8
PD2	Pre-second dorsal length	59.9	59.5	60.5	59.9	62.6	61.3
PD1	Pre-first dorsal length	31.1	31.0	32.6	31.8	31.2	29.5
HDL	Head length	21.1	20.7	22.5	21.5	17.0	17.4
PG1	Prebranchial length	16.4	15.8	17.6	16.6	13.1	14.4
PSP	Prespiracular length	10.8	10.8	11.7	11.3	10.0	10.3
POBh	Preorbital length (horizontal)	5.7	4.9	6.6	5.7	5.1	5.3
POBd	Preorbital length (direct)	6.5	6.6	7.3	6.9	–	6.1
POR	Preoral length	6.1	5.9	6.5	6.3	4.9	5.3
PRN	Prenarial length	5.2	4.9	5.5	5.2	4.5	4.2
PP1	Prepectoral length	19.2	19.5	20.9	20.4	16.3	16.8
PP2	Prepelvic length	43.4	42.0	43.2	42.5	37.4	39.7
SVL	Snout–vent length	44.0	44.0	44.7	44.5	40.4	41.0
PAL	Preanal length	60.9	59.8	61.1	60.5	61.8	59.8
IDS	Interdorsal space	21.0	19.3	20.9	20.3	26.4	23.7
DCS	Dorsal–caudal space	10.8	9.1	11.4	10.6	10.3	11.7
PPS	Pectoral–pelvic space	20.6	18.3	21.7	19.7	17.8	20.2
PAS	Pelvic–anal space	13.0	13.0	15.3	14.3	18.1	15.5
ACS	Anal–caudal space	7.8	7.9	9.4	8.7	10.1	11.2
EYL	Eye length	3.7	3.6	3.9	3.7	3.7	3.5
EYH	Eye height	1.1	0.8	1.4	1.1	–	0.8
INO	Interorbital space (intereye)	6.5	6.2	6.9	6.6	5.2	5.3
NOW	Nostril width	2.9	2.6	2.8	2.7	0.0	2.5
INW	Internarial space	2.5	2.4	2.6	2.5	1.1	1.4
ANF	Anterior nasal flap length	1.4	1.3	1.5	1.4	–	1.6
SPL	Spiracle length	0.6	0.5	0.9	0.7	–	0.6
ESL	Eye–spiracle space	0.9	0.7	0.9	0.8	0.6	0.7
MOL	Mouth length	3.0	2.8	3.5	3.1	2.9	2.7
MOW	Mouth width	7.3	6.9	7.3	7.1	5.1	6.2
ULA	Upper labial furrow length	0.4	0.3	0.3	0.3	0.6	0.6
LLA	Lower labial furrow length	1.0	0.8	1.2	1.0	0.6	0.5
GS1	First gill slit height	1.8	1.6	2.0	1.8	1.5	2.0
GS2	Second gill slit height	1.8	1.6	2.3	2.0	1.4	2.0
GS3	Third gill slit height	1.8	1.4	2.1	1.8	1.4	1.7
GS4	Fourth gill slit height	1.5	1.5	2.3	1.8	1.4	1.4
GS5	Fifth gill slit height	1.1	1.3	1.7	1.5	0.9	0.8
HDH	Head height	6.3	5.4	6.7	6.2	4.8	6.0
TRH	Trunk height	6.6	7.3	9.1	8.2	7.0	6.7
CPH	Caudal peduncle height	2.9	2.6	3.0	2.7	0.0	2.9
HDW	Head width	11.3	10.8	12.5	11.4	8.8	10.1
TRW	Trunk width	8.8	8.8	10.3	9.5	7.0	10.3
CPW	Caudal peduncle width	2.6	2.0	2.5	2.3	–	2.6
GIR	Girth	–	–	–	–	–	–
P1L	Pectoral length	10.9	10.4	11.0	10.7	10.1	9.9
P1A	Pectoral anterior margin	13.6	12.9	14.2	13.4	–	9.4

Table 1. (Continued)

Measurement		*P. magnificum*				*P. habereri*	
		Holotype	Paratypes (n=4)			Holotype	Non-type
		PMBC 6731	Range		Mean	ZMB 16201	ASIZP 58964
P1B	Pectoral base	4.9	4.7	5.5	5.0	3.7	4.4
P1H	Pectoral height	11.2	10.6	11.7	11.3	–	7.5
P1I	Pectoral inner margin	6.4	6.6	6.9	6.8	–	5.8
P1P	Pectoral posterior margin	10.3	9.6	10.7	10.0	–	6.6
P2L	Pelvic length	9.1	8.9	9.9	9.4	–	9.4
P2A	Pelvic anterior margin	6.0	5.3	6.0	5.6	–	5.2
P2B	Pelvic base	5.3	4.8	5.7	5.1	–	5.3
P2H	Pelvic height	4.8	3.8	4.9	4.4	–	3.9
P2I	Pelvic inner margin length	4.0	4.0	4.7	4.4	–	4.8
P2P	Pelvic posterior margin length	5.8	5.6	6.1	5.7	–	4.8
CLO	Clasper outer length	–	6.7	7.1	6.9	–	–
CLI	Clasper inner length	–	9.2	10.2	9.7	–	–
CLB	Clasper base width	–	0.9	1.1	1.0	–	–
D1L	First dorsal length	11.8	11.3	12.1	11.8	–	11.5
D1A	First dorsal anterior margin	10.3	9.2	10.0	9.5	–	10.1
D1B	First dorsal base	8.8	8.0	8.7	8.3	6.7	8.0
D1H	First dorsal height	6.1	5.9	6.4	6.0	5.8	6.3
D1I	First dorsal inner margin	2.9	3.2	3.9	3.5	3.0	3.5
D1P	First dorsal posterior margin	6.7	6.3	7.6	6.9	–	4.8
D2L	Second dorsal length	11.3	11.0	11.7	11.3	–	12.0
D2A	Second dorsal anterior margin	10.4	9.5	10.3	10.0	–	11.0
D2B	Second dorsal base	9.1	8.2	8.8	8.5	6.4	8.5
D2H	Second dorsal height	5.4	5.0	5.5	5.2	4.9	5.3
D2I	Second dorsal inner margin	2.4	2.8	3.4	3.0	2.8	3.2
D2P	Second dorsal posterior margin	5.3	5.0	6.1	5.7	–	5.4
ANL	Anal length	9.7	9.7	9.9	9.8	–	9.6
ANA	Anal anterior margin	7.3	6.5	7.6	7.1	–	5.7
ANB	Anal base	7.6	6.8	7.4	7.1	5.9	6.7
ANH	Anal height	2.7	2.4	2.9	2.7	2.0	2.0
ANI	Anal inner margin	2.5	2.8	3.1	2.9	7.9	2.5
ANP	Anal posterior margin	4.1	3.8	4.6	4.2	–	4.4
CDM	Dorsal caudal margin	21.1	21.6	22.6	22.0	–	17.0
CPV	Preventral caudal margin	6.3	6.4	7.7	6.9	–	6.6
CPL	Lower postventral caudal margin	–	–	–	–	–	–
CPU	Upper postventral caudal margin	12.7	11.7	13.2	12.5	–	9.4
CST	Subterminal caudal margin	3.6	3.5	4.2	3.8	–	3.6
CTR	Terminal caudal margin	4.2	4.1	4.6	4.3	–	4.1
CTL	Terminal caudal lobe	5.9	6.0	6.0	6.0	–	5.6

dorsal surface with a shallow median groove and similar weak interdorsal groove (flat in one paratype); ventral surface with deep median groove and similar groove between cloaca and anal fin (flat in some paratypes). Snout short, slightly bell-shaped or not; front rounded-parabolic in dorsoventral view, tip broadly rounded, expanded beside front of nostril, bluntly pointed in lateral view; preoral length 6.1 (5.9–6.5) % TL, 0.83 (0.85–0.92) times mouth width; prenarial snout 1.43 (1.36–1.53) times eye length. Eye large, elongate to slit-like, length 3.7 (3.6–3.9) % TL, 5.74 (5.71–6.05) in head length in adults; eyes dorsolateral on head, with well-developed

subocular ridges. Mouth moderately large and long, broadly arched, originating over or just behind anterior margin of eye, width 7.3 (6.9–7.3) % TL, 2.43 (1.96–2.54) times its length; anterior roof, floor beside lower tooth band, and gill arches with scattering of oral papillae; upper labial furrows very short, less than half length of lower furrows; lower labial furrows short, length 2.83 (2.20–3.66) times in nostril width. Nostril large with tube-like incurrent apertures; nostril width 1.17 (1.08–1.15) times internarial length; rear edges close to upper jaw (closer than spiracle length apart); anterior nasal flap well developed, with enlarged posterior tip, forming a long, broadly rounded lobe, length of flap 2.10 (1.81–2.13) in nostril width; lobe forming deep concavity at junction of hind margin of flap.

Teeth very small, similar in both jaws, exposed on upper jaw when mouth closed; those near symphysis similar in size to those near angle; multicuspid with basal ridges; typically with five cusps in females, a long pointed median cusp flanked by two small lateral cusps on each side; male paratypes typically with three cusps; teeth near angle rarely comb-like; about 80 (80+) rows in upper jaw. Dermal denticles tricuspid, directed posterolaterally, weakly imbricate with long pedicels in females, possibly more densely arranged in males; crown narrow, not particularly shield-like; lateral cusps prominent (sometimes damaged or reduced); median cusp very long, pointed, forming a longitudinal groove anteriorly. Clasper moderately elongate, extending well beyond tip of pelvic fin; inner length of adult male paratypes 9.2–10.2 % TL, 8.4–10.8 times width at base; tip bluntly pointed.

Dorsal fins not identical in size and shape; first more upright and slightly larger, first dorsal height 1.12 (1.12–1.18) times height of second dorsal, length of first dorsal 1.05 (1.03–1.05) times second dorsal; first dorsal originating 1.2 (0.5–2.7) % TL behind pectoral-fin free rear tip (slightly forward in one male paratype); second inserted slightly in front to slightly behind anal-fin insertion. First dorsal fin moderately erect, with almost straight anterior margin, broadly rounded apex, slightly concave posterior margin, inner margin short, 4.01 (3.11–3.77) times fin length. Second dorsal fin somewhat raked, with almost straight anterior margin, narrowly rounded apex, slightly concave posterior margin, inner margin short, 4.67 (3.34–4.15) times fin length. Pectoral fins broad, anterior margin 13.6 (12.9–14.2) % TL, anterior margin slightly convex, apex rounded, posterior margin straight, rear corner broadly rounded, almost forming right angle with inner margin. Pelvic fins small, narrow, apex broadly rounded, length 9.1 (8.9–9.9) % TL, 1.91 (1.99–2.33) times height. Anal fin triangular, low, height 3.59 (3.43–4.05) times length; much smaller than dorsal fins, height 2.00 (1.86–2.07) times height of second dorsal; length 2.16 (1.95–2.12) times interdorsal space; anterior margin meeting ventral profile of tail well before the fin's origin, elevated part of fin almost straight; base broad, fleshy, point of origin prominent, situated in well developed preanal groove (development of groove variable in paratypes); anal origin slightly posterior to second dorsal origin. Caudal fin relatively short, dorsal caudal margin length 21.1 (21.6–22.6) % TL; upper lobe originating as a very low ridge, its origin distinguishable; lower lobe weakly developed; terminal caudal lobe expanded distally, posterior margin almost truncate, dorsal caudal margin 3.58 (3.62–3.74) times terminal caudal lobe. Vertebral counts of 3 paratypes: monospondylous centra 38–39; dorsal precaudal centra 92–94; ventral precaudal centra 87–90; diplospondylous centra 102–105; total centra 140–143.

Coloration: Upper body and sides medium brownish, strongly marbled with darker spots and blotches; markings variable in size, mostly small, but varying from smaller than spiracle to larger than eye; ventral surface almost uniformly white (dusky with a few blotches in some paratypes). Dorsal head medium brown with two prominent broken saddles (less distinct in paratype), one through eyes (as three pseudo-ocelli) and one over anterior gill slits; saddle consisting of small, irregular, darker brown spots, anterior and posterior margins of hind saddle almost linear; space between saddles of holotype mainly plain brown

with narrower, less well defined transverse darker broken band (less obvious on paratypes); snout and side of head behind eye with dense covering of small, variable-sized, dark spots; very large spots below eye, exceeding half eye length; border between patterned upper half and whitish ventral surface, sharply defined and horizontal, passing through top of nostril and central half of gill slits; eyes dark; buccal cavity white. Dorsal, abdomen and tail similar, with prominent broken saddles below both dorsal fins, 2 on predorsal trunk, usually 3 interdorsally, one pronounced blotch on mid caudal peduncle; transverse margins of saddles usually almost linear, ventral margin merging with dense lateral band of large and small spots, some of which coalesce; median space between saddles almost uniform pale brown; spots along ventrolateral margin are largest, their ventral edges partly penetrating paler ventral surface. Dorsal and caudal fins covered entirely with dense marbling of small and large spots. Upper surface of pectoral and pelvic fins pale brown with similar dark spotting; ventral bases white or dusky, outer portion in holotype uniformly bluish, with a few weak spots in some paratypes; anal fin almost uniformly white, sometimes with a few dusky blotches.

Size: To at least 490 mm TL**;** males mature at 472 mm TL.

Distribution: Known only from the northern Andaman Sea off Myanmar in 141–144 m depth.

Etymology: From the Latin "*magnificus*" (noble, splendid) in reference to the strikingly beautiful colour pattern.

Remarks: Unusual proscylliid catshark with a unique colour pattern, large posteriorly located nostrils with an elongated posterior lobe, and its second dorsal fin originating forward of the anal-fin origin. *Proscyllium magnificum* differs from the type species of the genus, *P. habereri*, in several morphological and meristic characters (see Table 1). *P. habereri* has a less ornate colour pattern often including white spots, no expanded lobe on the anterior nasal flap, and the second dorsal fin originates behind the anal-fin origin. While sample sizes are small (data based on 5 specimens of the new species and 2 of *P. habereri*), several quantitative differences appear to exist between the congeners. All specimens of the new species are likely to be adult so we are unable to determine the extent of ontogenetic variability for the species. However, the morphometrics of the Taiwanese type (ZMB 16201) of *P. habereri*, a 513 mm TL mature male measured by Nakaya (1983), varied little from a Taiwanese female (ASIZP 58964) that is barely larger than half its length (298 mm TL). Compared to the specimens, *P. magnificum* seems to have a longer preoral snout (5.9–6.5 versus 4.9–5.3% TL and which is weakly bell-shaped rather than not bell-shaped as in *P. habereri*), head (20.6–22.5 versus 17.0–17.4 % TL), interorbital (6.2–6.9 versus 5.2–5.3% TL), internarial space (2.4–2.6 versus 1.1–1.4% TL), caudal fin (dorsal caudal margin 21.1–22.6 versus 17% TL), and a larger pectoral fin (pectoral-fin height 10.6–11.6 versus 7.5% TL, base 4.7–5.5 versus 3.7–4.4% TL). It has a smaller pre-second dorsal-fin length (59.1–60.5 versus 61.3–62.6% TL), interdorsal space (19.3–21 versus 23.7–26.4% TL), anal–caudal space (7.8–9.4 versus 10.1–11.2% TL), anterior margin of second dorsal fin (9.5–10.4 versus 11% TL), a lower vertebral count (total centra 140–143 versus 154–156), and the pectoral fin rear tip is relatively closer to the dorsal-fin origin (overlapping to 2.7% apart versus more than 3.5% apart).

The species also differ significantly in some specific ratios. In *P. magnificum* the interdorsal distance is subequal to the head length (rather than about 1.5 times the head length), the snout to cloaca length is more than twice (2.1–2.3 rather than 1.5–1.7 times) the interdorsal distance, the lower labial furrows are more than twice (2.7–3.7 rather than about equal to the length of the upper furrows), the nostril width is 1.1–1.2 (versus about 1.8) times the internarial distance, the dorsal margin of the caudal fin is about twice (1.9–2 versus 1.4 times) the length of the second dorsal-fin, and the height of the second dorsal fin is about twice (1.9–2.1 versus 2.4–2.7 times) the height of the anal fin.

The forms illustrated by Masuda *et al.* (1984) as *P. habereri* and *P. venustum* differ in form and colour in much the same way scyliorhinid sister species vary. Some differences exist between the vertebral counts of the holotype of *P. habereri* (from Nakaya, 1983) and the other specimen that we were able to examine. The total counts were similar (Nakaya gives about 156 for the holotype versus 154 in the ASZIP specimen) but the holotype appears to have significantly fewer monospondylous centra (38 versus 43) and more caudal diplospondylous centra (about 52 versus 47). Populations in the western Pacific probably need further investigation to reassess their status.

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