

A new record of a bobtail squid, *Euprymna hyllebergi* Nateewathana, 1997 in the Gulf of Thailand

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The bobtail squid, *Euprymna hyllebergi* Nateewathana, 1997 was first described from the Andaman Sea of Thailand. Recently, the species was sampled in the Gulf of Thailand. Previously, 3 species of *Euprymna* have been identified from the Gulf of Thailand: *E. morsei* (Verrill, 1881), *E. stenodactyla* (Grant, 1833) and *E. berryi* (Sasaki, 1929) but these identifications remain unresolved since the material can not be traced.

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INTRODUCTION

Bobtail squids are small benthic or pelagic cephalopods. They belong to the family Sepiolidae. The family contains 14 genera and over 50 species are present in tropical, temperate and sub-polar waters of all oceans.

A total of 12 species have been placed in the genus *Euprymna* (Norman & Lu 1997). However, Norman & Lu (1997) considered only six species to be valid, one species was undescribed, two species were considered *nomen dubia*, while the remaining 4 species were unresolved.

In Thailand the three species *E. morsei* (Verrill, 1881), *E. stenodactyla* (Grant, 1833) and *E. berryi* (Sasaki, 1929), have been reported (Chotiyaputta *et al.* 1992; Chotiyaputta 1993; Supongpan 1995). Based on these records and the revision of *Euprymna* (Norman & Lu 1997), we discuss the occurrence of *E. hyllebergi* Nateewathana, 1997 in the Gulf of Thailand.

MATERIALS AND METHODS

The squids were collected from a research vessel in the eastern part of the Gulf of Thailand. All material was fixed in 10% neutralised-formalin and subsequently preserved in 75% ethyl alcohol according to Roper & Sweeney (1983). Definitions of counts, measurements (mm) and indices follow Nateewathana (1997: Table 1 and Fig. 1). The voucher specimens are deposited in the *Fishery Museum of Natural History*, Department of Fisheries, Chatuchak Bangkok 10900, Thailand.

SYSTEMATIC ACCOUNT

Family Sepiolidae Leach, 1817

Diagnosis. - Mantle short, broad, sac-like; fins large, round, separated. Eyes covered with corneal membranes. Shell reduced to chitinous gladius or absent. One or both dorsal arms, or

one dorsolateral arm, hectocotylied; no protective membranes on arms. Mantle-funnel locking-cartilage simple, straight.

Subfamily Sepiolinae Appellöf, 1898

Diagnosis. - Dorsal mantle fused with head. Left dorsal arm hectocotylied. Gladius rudimentary to absent.

Genus *Euprymna* Steenstrup, 1887

Diagnosis. - Left arm I of male hectocotylied with suckers normal on proximal half including 1-2 prominent, nipple-like papillae in ventral sucker row; the distal half of the arm with closely-packed, palisaded papillae. Arms with 2-8 oblique sucker rows. Tentacular club with more than 16 sucker rows. A saddle-shaped luminous organ on ink sac.

Euprymna hyllebergi, Nateewathana, 1997

Figs. 1-3. Table 1

Euprymna hyllebergi Nateewathana, 1997: 466-474, figs. 2-5

Material examined. - 20 specimens. Chantaburi and Trat Provinces, eastern part of the Gulf of Thailand, R/V Pramong 12, Bottom trawled, 20-25 m depth, Pitiporn Nilaphat, 23 November, 1998.

Description. - Mantle (Fig. 1 a-b) round to ovoid, thick, broad anteriorly and bluntly round posteriorly, slightly longer than wide; antero-dorsal margin fused with the head (Fig. 1a); antero-lateral margin slightly projects forward; antero-ventral margin well developed almost covering the long funnel, median ventral margin slightly concave (Fig. 1b).

Fins rounded, almost circular in outline, separate and attached at the middle of the mantle; anterior margin pronounced and strongly auriculate, posterior margin nearly straight, non-auriculate attachment.

Head broad, dorsoventrally flattened and compact, the width slightly less than that of the mantle; eyes large, oval with nearly round

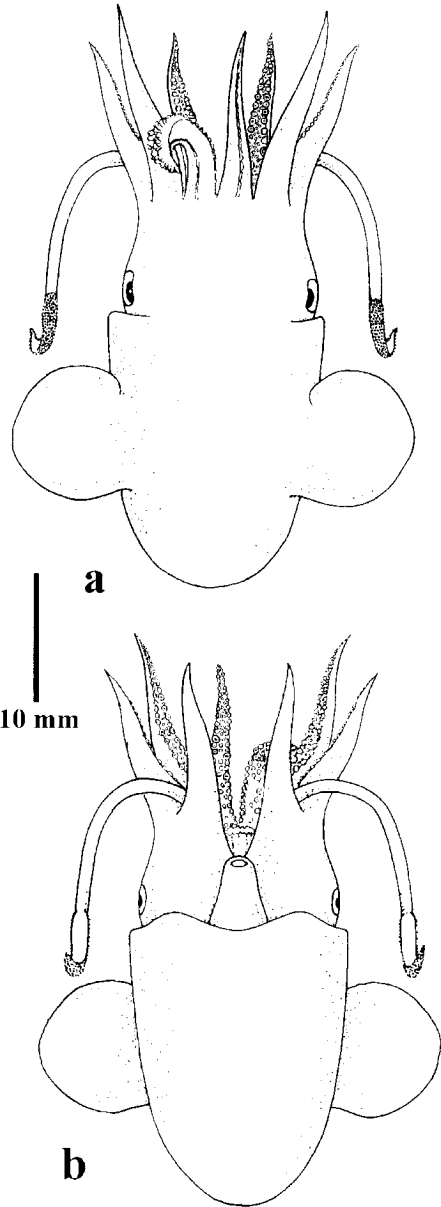


Fig. 1. *Euprymna hyllebergi*. Male. (a), dorsal view. (b), ventral view. After Nateewathana (1997).

pupil.

Funnel long, tubular, free for most of its length, reaching to the gap between the ventral arms (Fig. 1b). Funnel organs with triangular to rounded flap-like funnel valve, a roughly triangular inverted v-shaped dorsal pad and

two oval ventral pads. Anterior end of dorsal pad free in some specimens, but all with a slightly elevated crest projecting in the midline. Funnel locking cartilage ovate, rounded at both ends with deep groove; mantle cartilage straight, ridge-like, two times longer than funnel cartilage.

Arms relatively long, rounded, tapering distally and subequal in the order II. III. IV. I. Keels on arms vary considerably. Protective membranes absent. Web between arms III and IV well developed, extends up about one-fourth of the arm length. In females, arm suckers quadriserial but biserial at both base and distal end. Suckers almost of equal size, subglobular, with a small, smooth aperture; pedicel thin. In males (Fig. 2), arm suckers arranged differently, but usually the suckers arranged irregularly biserial for about three to four pairs at the base and then changed to quadriserial toward the distal end; in the right arm I, the suckers of the outer rows, both dorsal and ventral, are almost equal and somewhat larger than the suckers of the two inner rows; in arm II the suckers similar to those in right arm I, the suckers of the outer rows are equal and slightly larger than the suckers in the inner rows; in arm III the suckers of the outer rows somewhat larger than the inner rows but the outer row of the ventral

side carries four to five enlarged suckers, about two to three times larger than the smallest suckers; in arm IV the suckers of the outer rows somewhat larger than the suckers in the inner rows, but there are seven to twelve suckers of the outer rows, both dorsal and ventral rows, enlarged, having the same size as the enlarged suckers in arm III. Arm suckers globular, smooth horny ring, rounded aperture on normal sucker, but more ovate on enlarged sucker.

The left arm I of male hectocotylyzed (Fig. 2, 3a), stout, shorter than other arms and curved outward; unmodified proximal part with about eight suckers arranged in a row basally, and then changed to four rows, one to two suckerless nipple-like papillae and swollen pedicels present at the position of 2nd and 3rd ventral marginal suckers from the base; modified distal half of the arm basically divided into two parts, a proximal part with 5 rows (35-60 suckers), and a distal part with 2 rows (about 40 swollen sucker pedicels), comb-like appearance, terminating in a slit-like aperture containing a small sucker.

Tentacles (Fig. 3b) short, round, flattened on the oral surface, the edges of flat area angled, the dorsal margin elevated into a low web towards the club. The club short, curled, and rounded with numerous rows of very small

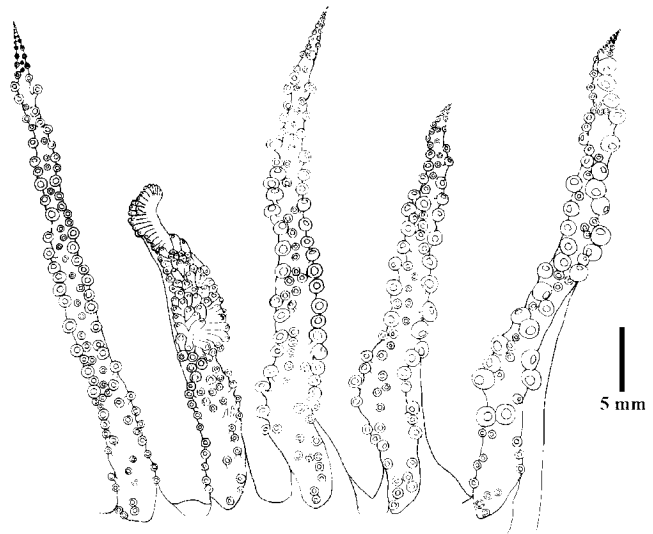


Fig. 2. *Euprymna hyllebergi*. right arm I, hectocotylyzed arm and left arms II, III, and IV. After Nateewathana (1997).

suckers.

Gladius absent. Buccal membrane smooth without suckers.

Beak: upper beak with long, strong, black, curved rostrum, hood curved, crest curved and brownish, lateral wall translucent; lower beak with small black rostrum, irregular crenulated edge and large, thin, hyaline lateral wall.

Radula with seven transverse rows of teeth; rachidian, laterals and marginal teeth with one simple cusp (Fig. 3c).

Ink sac present, with a prominent saddle-shaped luminous organ on the ventral surface.

Spermatophores: measured 6-11 mm in length and 0.5 mm in width (Fig. 3d). The sperm cord is tight and somewhat coiling upon itself, occupying about 1/4 of the length of the spermatophore. The cement body and ejaculatory apparatus long, occupying the greater part of the spermatophore, divided into four parts by constrictions.

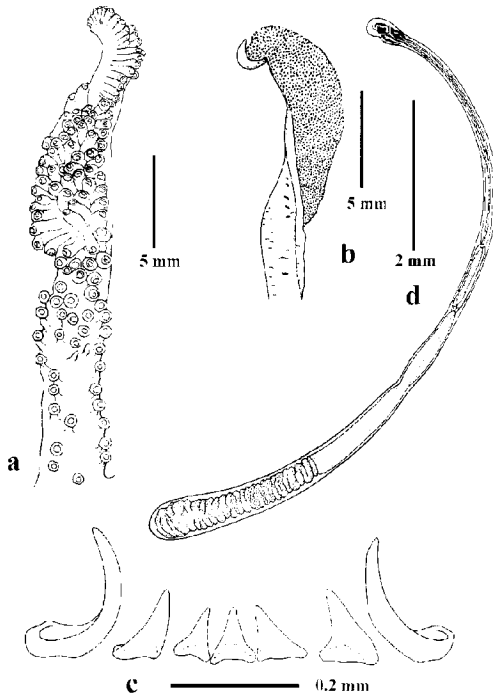


Fig. 3. *Euprymna hyllebergi*. (a) hectocotyized arm. (b) tentacle and club. (c) radula. (d) spermatophore. After Nateewathana (1997).

Colour in alcohol yellowish; numerous large and conspicuous purplish-brown chromatophores cover the mantle, head and arms, more dense on dorsal than ventral side; fins devoid of chromatophores except for a small portion on bases; series of large rectangular to oval chromatophores present on aboral surfaces of arms; an oval blotch also occurs on the pedicel of each sucker of the two outer arms; in some specimens, a row of large oval chromatophores present transversely on the aboral surface of tentacular stalk and club.

Type locality. - the Andaman Sea of Thailand.

Distribution. - the Andaman Sea and the Gulf of Thailand.

DISCUSSION

Norman & Lu (1997) revised species of the genus *Euprymna* complex. Unfortunately, the characters, which can be used to separate the species are limited to the basis of a male secondary sexual characteristics (the distinctly enlarged suckers of mature males) and unique combinations in numbers and positions of large suckers on male's arms. No characters have been proposed to identify female or immature male specimens.

Norman & Lu (1997) considered six species to be valid: *Euprymna berryi*, *E. hoylei*, *E. morsei*, *E. scolopes*, *E. tasmanica*, an undescribed species (*E. sp. 1*), two species were considered to be *nomen dubia* (*E. schneehageni* and *E. pusilla*) and the last 4 species were unresolved (*E. albatrossae*, *E. bursa*, *E. phenax* and *E. stenodactyla*). In the Gulf of Thailand three species have been reported: *E. morsei* (Verrill, 1881), *E. stenodactyla* (Grant, 1833) and *E. berryi* (Sasaki, 1929) (Chotiyaputta *et al.* 1992; Chotiyaputta 1993; Supongpan, 1995).

Norman & Lu (1997) pointed out that *E. stenodactyla* was described from Mauritius by Grant (1833) is an unresolved species since its description was based on a single specimen and the original type material is lost. The species is characterized by having 7-8 rows at the broadest point of the arm. It is a unique character. Regarding the other two species, *E.*

Table 1. Means, standard deviations and ranges of selected measurement (mm) and indices (I: in %) of *Euprymna hyllebergi* from the Gulf of Thailand. See Nateewathana (1997) for similar measurements and indices from the Andaman Sea.

Index	MALE				FEMALE			
	n	mean	s.d.(n-1)	Range	n	Mean	s.d.(n-1)	Range
ML(mm)	10	19.4	1.0	17.9 - 20.7	10	26.2	2.0	24.0 - 29.3
MWI	10	76.5	7.5	66.0 - 90.6	10	74.7	5.2	64.9 - 80.6
FLI	10	53.7	3.1	49.1 - 59.8	10	55.3	4.6	46.3 - 60.9
FWI	10	146.8	15.5	126.2 - 172.6	10	149.3	10.3	128.6 - 163.2
FBI	10	44.7	7.6	37.72- 57.2	10	39.4	2.9	33.4 - 44.1
HLI	10	51.8	8.0	38.8 - 61.7	10	52.5	6.3	45.4 - 64.8
HWI	10	70.0	6.0	60.9 - 83.4	10	67.6	7.6	53.5 - 79.1
ALI _I	10	66.9	7.4	57.2 - 78.0	10	72.3	9.0	60.7 - 85.6
ALI _{II}	10	90.4	13.5	69.9 - 113.5	10	88.1	12.5	74.8 - 113.5
ALI _{III}	10	76.8	6.8	64.1- 87.7	10	80.5	6.2	67.4 - 88.1
ALI _{VI}	10	72.9	7.2	62.3 - 82.9	10	77.3	7.3	65.1 - 89.7
ASI _I	10	2.5	0.5	1.93- 3.8	10	3.1	1.1	2.1 - 6.1
ASI _{II}	10	3.4	0.4	2.4 - 3.8	10	2.7	0.6	1.6 - 3.6
ASI _{III}	10	5.0	1.0	3.5 - 6.6	10	2.9	0.4	2.5 - 3.6
ASI _{VI}	10	5.2	0.5	4.5 - 6.2	10	2.6	0.7	1.6 - 3.6
TtLI	10	175.0	35.5	117.0- 228.8	10	165.6	23.6	134.1 - 202.4
CILI	10	28.7	4.2	22.4 - 34.7	10	42.6	6.8	32.6 - 54.4
HcAI	10	52.9	6.8	41.7 - 63.0	10	-	-	-
HcLI	10	59.1	5.3	50.7 - 67.9	10	-	-	-
SpLI	10	46.3	5.2	35.3 - 52.4	10	-	-	-
SpWI	10	5.7	0.9	4.7 - 7.4	10	-	-	-
EDI	10	46.2	5.4	38.2 - 55.4	10	38.1	4.1	29.8 - 43.8
LnDI	10	16.3	4.0	11.5 - 25.7	10	13.5	2.0	10.4 - 17.0

morsei is restricted to cool temperate Japanese waters and *E. berryi* occurs in tropical to warm temperate Asian waters, i.e., coastal China and southern Japan. *E. morsei* is characterized by having approximately 10 enlarged suckers in mature males only in ventral rows of arms II-IV and *E. berryi* has no significantly enlarged suckers on the third arm pair of mature males. Occurrence of these three species in Thai waters is also still unresolved since the voucher material could not be traced. However, *E. hyllebergi* occurs in the Gulf of Thailand as evident from the present study. It is the first record of the species outside the type locality. An intensive collection of the species

complex of the genus in the Gulf of Thailand requires further examination.

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