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HEPTACERAS HYLLEBERGI SP.N. (POLYCHAETA: ONUPHIDAE) FROM KATA
BEACH, WEST COAST OF PHUKET ISLAND, ANDAMAN SEA, THAILAND,
WITH NOTES ON THE HABITAT.

by

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ABSTRACT

Heptaceras hyllebergi n.sp. is described from a sandy beach in Kata Bay, west coast of Phuket Island, Thailand. A total of sixty-six specimens were collected. The main distinguishing characteristics of the species are very long ceratophores (more than 60 rings) in the antennae, no dark pigment at the ceratophores and no eyes.

I. INTRODUCTION

Nephtyid, nereid and magelonid polychaetes have been described from the Andaman Sea Coast of Thailand (Hyllenberg, *et al.*, 1986; Nateewathana & Hyllenberg, 1986a,b). Until now onuphid polychaetes have not been studied in this area, even though many species are known to occur in other parts of the Andaman Sea (Fauvel, 1953; Hartman, 1974). The genus *Heptaceras* of the family Onuphidae was erected by Ehlers (1868) for *Diopatra phyllocirra* described by Schmarda (1861) from Sri Lanka. Recently, Paxton (1986) revised the genus and provided key characters. Three species are recognized; *H. phyllocerum* (Schmarda, 1861), *H. quinquedens* (Day, 1951)

and *H. fukianensis* (Uschakov & Wu, 1962). The first two species occur in the Western Indian Ocean, while the latter is found in the Pacific.

In the course of surveys of polychaetes attracted by bait carried out around Phuket Island Andaman Sea during 1984–1985 (Hyllenberg, *et al.*, 1986; Phasuk & Hyllenberg, 1986). A new species of *Heptaceras* was found in Kata Bay. This is here described and notes given on distribution and some environmental factors.

II. MATERIALS AND METHODS

The specimens were collected in the intertidal zone of Kata Bay, west coast of Phuket

Island, Andaman Sea (Fig. 11 in Hylleberg, *et al.*, 1986). The bay is exposed and sandy to the west. In front of the habitat of the species, i.e. the northern part of the bay, a group of rocks

are situated between the Pu Island and the shore line. A small mangrove with narrow channel is present close to the hill in the north-eastern part (Fig. 1).

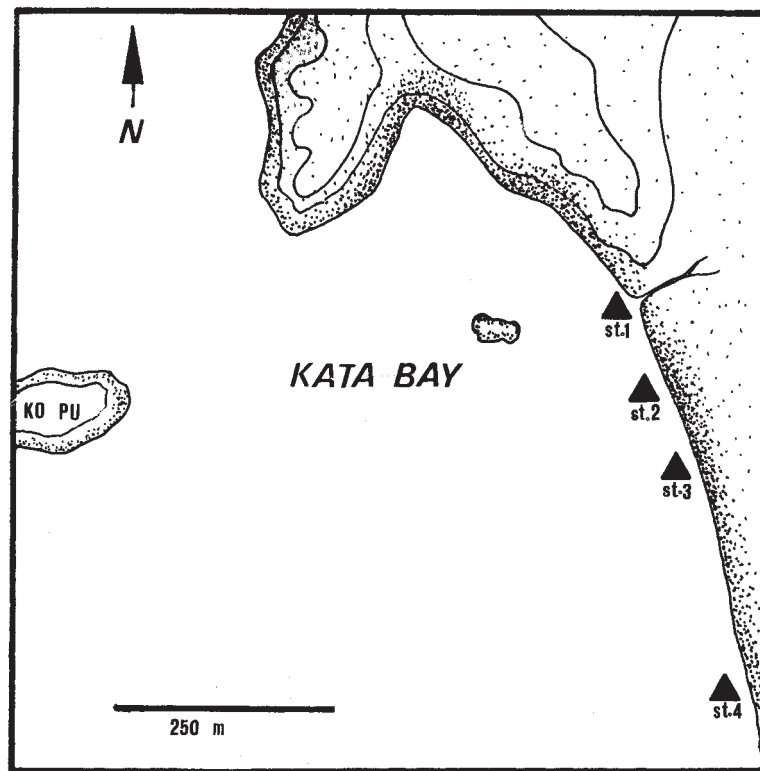


Fig. 1—Map showing the studied area.

Polychaetes were collected by using crushed fish mixed with sea water sprinkled on the sand near the water line at tide level. The polychaetes were attracted by the fish smell and emerged 1–2 cm along the sediment surface where they may be caught by grabbing the head. To obtain general information concerning horizontal and vertical distribution, four stations and three transect lines were fixed in the study area (Fig. 1). Salinity, pH and dissolved oxygen were measured according to Strickland & Parsons (1972). Grain sizes and organic matter were

measured as described by Frith *et al.*, (1976).

The polychaetes were preserved in 10% formalin and stored in 70% alcohol. Not all polychaetes were sampled along the transect lines. In some cases, only counts were made when they emerged from the sand. Observations in the laboratory were facilitated by a slight staining of the worms in an aqueous solution of methylene blue. The stain was easily removed in alcohol afterwards.

Holotype and paratype are deposited in the

Reference Collection of Phuket Marine Biological Center (PMBC), Phuket 83000, Thailand. Duplicate specimens (paratypes) have been deposited in the following institutions:

- AM Australian Museum, Sydney, Australia
BMNH British Museum (Natural History), London, U.K.
USNM National Museum of Natural History, Smithsonian Institution, Washington D.C., U.S.A.
ZMC Zoologisk Museum, Copenhagen, Denmark
ZMH Zoologisches Institut and Zoologisches Museum, Universität Hamburg, W. Germany

III. RESULTS AND DISCUSSION

A) TAXONOMIC ACCOUNT

Family Onuphidae Kinberg, 1865

(Fauchald, 1977)

Eunicea with two frontal and five occipital antennae. Maxillary carriers short, third carrier absent. Maxilla I smooth and curved. Notopodia represented by the base of the branchiae and the dorsal cirri, often supported by internal acicula. Setae include composite hooks and spinigers, pectinate setae, limbate setae and subacicular hooks.

Genus *Heptaceras* Ehers, 1868
(Paxton, 1986 emended)

Antennae with long to very long ceratophores (20–74 rings); with shallow to deep middorsal notch.

Heptaceras hyllebergi n.sp.
Fig. 2A–F & 3A–I

HOLOTYPE: A complete specimen with 450 setigers; length 262 mm, width 4 mm, Kata beach, west coast of Phuket Island, Thailand,

sand, intertidal, 8.11.1984. PMBC no. 4696

PARATYPES have been deposited as follows: –1, PMBC no. 4697 : anterior fragment with 358 setigers, length 195 mm, width 3.1 mm, Kata beach, sand, intertidal, 8.11.1984. –2, AM W202121 : anterior fragment with 92 setigers, length 55 mm, width 4 mm, Kata beach, sand, intertidal, 27.10.1985. –3, BMNH ZB 1987.611 : anterior fragment with 139 setigers, length 58 mm, width 4 mm, Kata beach, sand, intertidal, 27.10.1985. –4, USNM 376301–102891 : anterior fragment with 115 setigers, length 57 mm, width 4 mm, Kata beach, sand, intertidal, 27.10.1985. –5, ZMC : anterior fragment with 113 setigers, length 61 mm, width 4 mm, Kata beach, sand, intertidal, 27.10.1985. –6, ZMHP–19068 : anterior fragment with 152 setigers, length 76 mm, width 4 mm, Kata beach, sand, intertidal, 27.10.1985.

MATERIAL EXAMINED: A total of 66 specimens was collected from Kata beach, west coast of Phuket Island. (PMBC no. 4698–4700).

DESCRIPTION: Preserved specimens in alcohol white, iridescent. No colour pattern along the body, except 3 specimens (PMBC no. 4700) pale brown colour occur on branchiae.

Prostomium (Fig. 2A) small and rounded; five antennae, ceratophores with many rings and longer than styles (approx. 2:1), anterior lateral antennae, 30 rings, reach back to setiger 3, posterior lateral antennae, 70 rings, reach back to setiger 11, the median antennae, 38 rings, reach back to setiger 4; frontal palps (Fig. 2C) filiform as long as tentacular cirri, labial palps (Fig. 2F) rectangular, medially touching, small median fold present between the two labial palps; glandular distal area slightly set off; lower lips with median section. A median ridge (Fig.

2B) present from the peristomium to the median antenna; nuchal grooves along edge of

peristomium, grooves separated by the median ridge. Eyes absent.

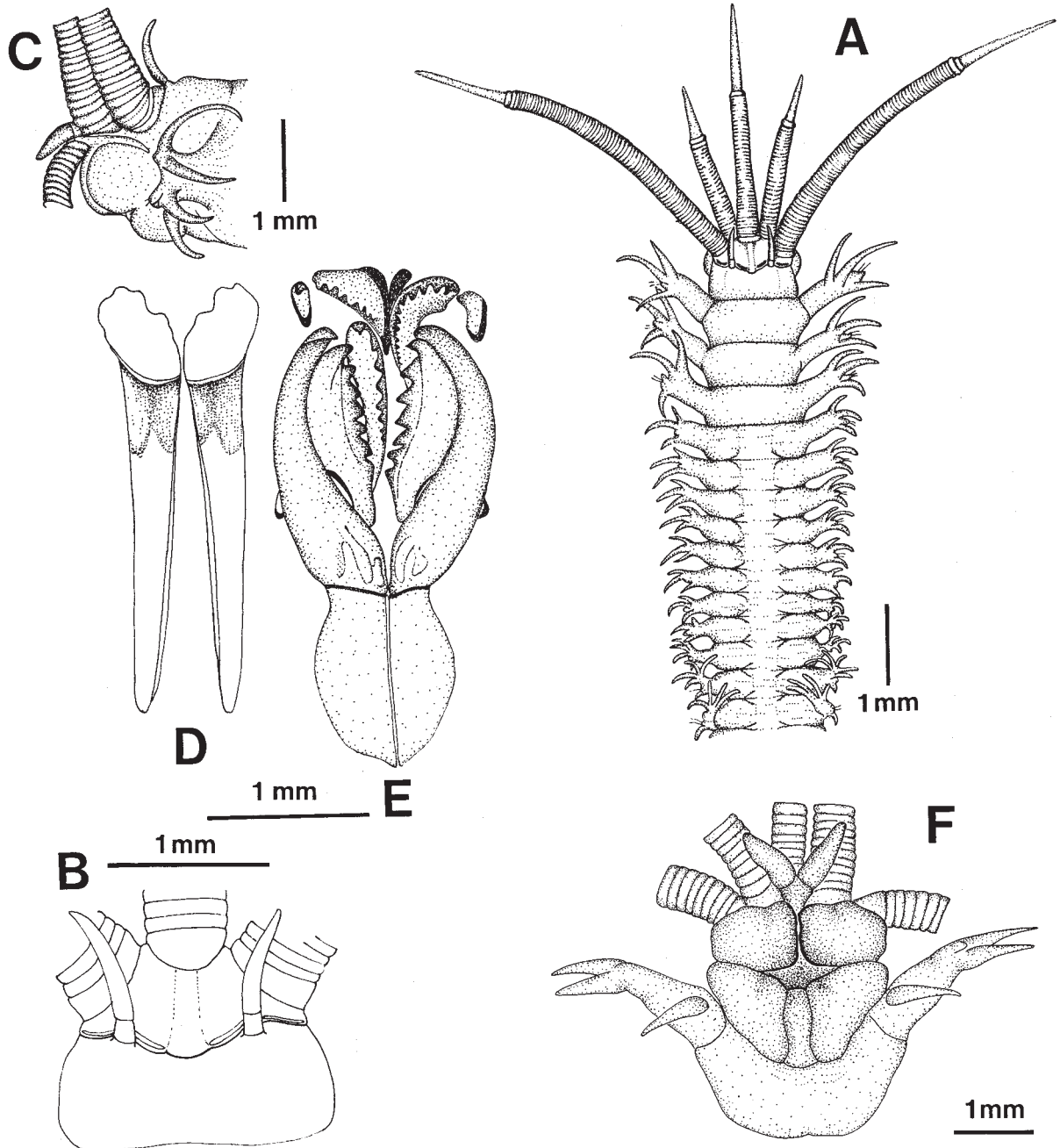


Fig. 2—*Heptaceras hyllebergi* n.sp. (A) anterior body, dorsal view, (B) prostomium and peristomium, dorsal view, (C) anterior body and setiger 1, left side, anterior view, (D) mandibles, (E) maxillae, ventral view, (F) prostomium, peristomium and setiger 1, ventral view.

Peristomium (Fig. 2A–B) 2–3 times wider than long; shallow middorsal notch. Tentacular cirri long and slender, inserted distally on peristomium on each side of notch.

Anterior three pairs of parapodia (Fig. 2A) prolonged and different from the following setigers. First setiger (Fig. 3A) with low rounded lobe and long digitiform postsetal lobe. Dorsal and ventral cirri digitiform. A contraction fold present below presetal lobe. The following setigers: smaller but similar to the first one; pre-setal lobes gradually reduced in size; dorsal cirri with small basal swelling from setiger 8 (Fig. 3C); ventral cirri changed into globular ventral glandular pads from setiger 6; more elongated from setiger 7 and succeeding setigers (Fig. 3B, C).

Branchiae from setiger 1–9 with single filament only, bifid from setiger 10, reaching a maximum of 6–7 filaments at about setiger 24 and absent about last 50 setigers.

First four setigers with tridentate pseudocompound hooded hooks (Fig. 3F). Limbate setae (Fig. 3H) present in all setigers. Pectinate setae (Fig. 3G) occur from setiger 6; each with 13–15 teeth. Bidentate subacicular hooks (Fig. 3I) first present from setiger 10.

Mandibles (Fig. 2D) with calcified cutting plates, shaft slender. Sclerotized maxillae (Fig. 2E), maxillary formula: Mx I = 1 + 1; Mx II = 7 + 6; Mx III = 5 + 0; Mx IV = 5 + 11; Mx V = 1 + 1.

Pygidium with an anal pore and a pair of small anal cirri.

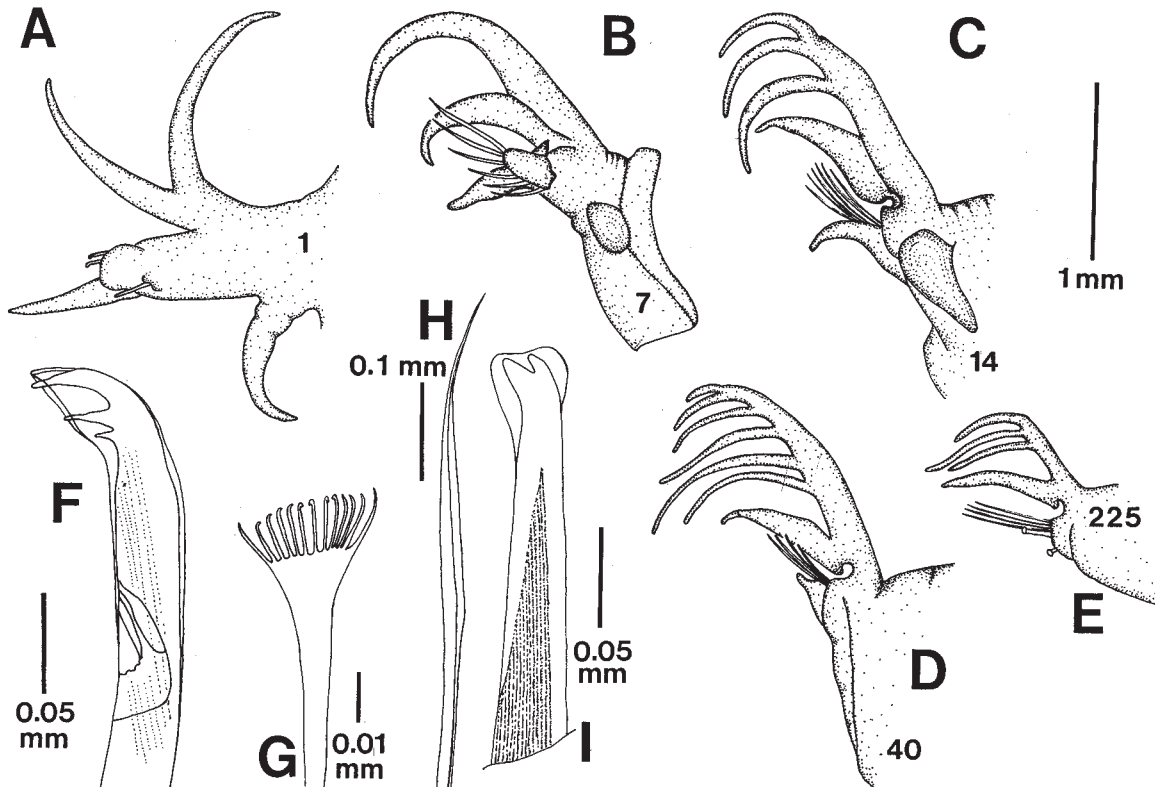


Fig. 3—*Heptaceras hyllebergi* n.sp. A,B,C,D and E show setigers 1, 7, 14, 40, and 225 from the right side, anterior view, (F) trident, hooded, pseudocompound hook from setiger 1, (G) comb seta, setiger 225, (H) limbate seta, setiger 7, (I) bidentate, hooded hook, setiger 225.

Tube with mucous inner layer and outer thin layer of sand grains.

The variation encountered within this species was examined by scanning the collected material and random samples were taken for detailed count. From 19 specimens, the number of rings in anterior lateral antennae averaged 26 ± 3 (s.d.), posterior lateral antennae averaged 68 ± 4 (s.d.) and median antenna averaged 38 ± 3 (s.d.).

ETYMOLOGY: The new species is named in honour of Dr Jorgen Hylleberg, Danish consultant of the Phuket Marine Biological Center, who initiated the polychaetous taxonomic works in Thailand.

REMARKS: The genus *Heptaceras* was redefined by Paxton (1986), placing emphasis on the notched peristomium and very long ceratophores. It is considered a well characterized, valid genus. The genus has only three species, viz. *H. phyllocirrum* (Schmarda, 1861) from Sri Lanka, *H. fukianensis* (Uschakov & Wu, 1962) from China and *H. quinquedens* (Day, 1951) from South Africa. The latter two species have both bidentate and tridentate pseudocompound hooks.

H. hyllebergi is very close to *H. phyllocirrum* in having long ceratophores and only tridentate pseudocompound hooks in the modified setigers.

H. phyllocirrum is characterized as follows:

- 1) ceratophores with brown pigment spots (key characters, Paxton, 1986)
- 2) peristomium with deep middorsal notch
- 3) eyes present
- 4) up to 60 rings in ceratophores of posterior lateral antennae

H. hyllebergi differs from the latter in the following characters:

- 1) ceratophores of antennae iridescent, uniform white colour
- 2) peristomium with shallow middorsal notch
- 3) eyes absent
- 4) number of rings in ceratophores of posterior lateral antennae more than 60 (maximum 74)

DISTRIBUTION: Kata beach, Phuket Island, Andaman Sea, Thailand.

B) NOTES ON SPECIES DISTRIBUTION AND ENVIRONMENTAL FACTORS

Sandy beach polychaetous annelids of the family Onuphidae attracted to the surface by the stimulus of food are called beachworms by Paxton (1979). She listed one species and described four new species of beachworms in Australia, viz. *Australonuphis teres* (Ehlers, 1868), *A. parateres*, *Onuphis taeniata*, *O. gygis* and *O. mariahirsuta*. A species of beachworm, *Heptaceras quinquedens* (Day, 1951) was reported from South Africa (Day, 1967). *H. hyllebergi* is the seventh species of beachworms according to the definition of Paxton (1979).

H. hyllebergi was found to live in a restricted area of the northern part of Kata Bay. They occupied about 1/3 of the intertidal zone at st.2 and st.3. On the sandy slope they were distributed from 20 m below highest tide level down to the lowest tide (70 m distance). Sublittoral surveys were not made. The density varied across the beach. At 20–45 m distance from the highest tide level, the density ranged from 8–36 ind. m⁻², increased to about 44–72 ind. m⁻² at 50–70 m distance with a maximum of 72 ind.m⁻² at the 65 m distance.

Environmental factors are shown in Table 1. These measurements give only an indication of the conditions in Kata Bay, since these parameters obviously vary in relation to tide, sea-

sonal and meteorological factors. Salinity was lower at st.1 than at the other three stations. This was due to freshwater run-off from a small channel of the mangrove during low tide. When sea water runs into the mangrove channel during high tide, salinity may be as high as at the other stations. However, *H. hyllebergi* was not found in this area indicating that they can not tolerate lowered salinity.

At st.2 and 3, grain sizes were smaller than those at st.4 in the middle of the bay. During the

SW monsoon, severe storms and strong wave impact always occur along the west coast of Phuket Island. Bottom sediment in this area is changed accordingly (Hylleberg, *et al.*, 1985). The middle of Kata Bay (st.4) is more open to the sea, while in the northern part (st.2 and 3) is somewhat sheltered because of a small island located in front. In this area, with lower wave energy levels, polychaetes can come up from the sand and presumably pick up the food carried by currents and waves.

Table 1. Environmental factors at sandy beach, Kata Bay.

Station	1	2	3	4
Particle size (% of total wt.)				
Gravel (> 2.0 mm)	–	0.04	0.13	0.31
Very coarse sand (1.0–2.0 mm)	–	0.82	0.16	2.27
Coarse sand (0.5–1.0 mm)	–	1.86	1.02	10.19
Medium sand (0.25–0.5 mm)	–	2.92	6.84	29.04
Fine sand (0.125–0.25 mm)	–	67.66	73.94	47.38
Very fine sand (0.063–0.125 mm)	–	25.46	16.38	8.08
Silt-clay (< 0.063 mm)	–	0.56	1.17	1.39
Mean particle diameter* (mm)	–	0.16	0.16	0.23
Organic content (% of dry wt.)	–	1.44	2.25	2.08
Salinity (‰)	7.1	30.0	32.0	–
pH	7.8	8.16	8.15	–
DO (mg. l ⁻¹)	5.9	6.1	6.3	–

* Obtained from reading 50% grain size composition of cumulative curves.

Sediments at st.2 and 3 were well sorted and composed of 2/3 of fine sand. At st.4, grain sizes were coarser and the species was not found in this area. Distribution of the species is unlikely to be limited by the grain sizes since many studies have been unable to show a close relationship between sediment composition and distribution of benthic fauna (Buchanan, 1963; Hylleberg & Nateewathana, 1984; Nichols, 1970). Results of a survey of the benthic fauna

and ecological parameters on sandy beaches around Phuket Island, made by student groups during marine ecological courses at the Center, have shown that environmental conditions of many beaches are the same as found in the northern part of Kata Bay (unpublished data). Other benthic fauna in the sandy beach of Kata Bay included amphipods and isopods, also found in other bays. It is a puzzle why *H. hyllebergi* only occurred in this area. More studies

on feeding and reproductive strategies are needed in order to understand why the population of this beachworm apparently is limited to one part of a particular bay on Phuket Island.

IV. CONCLUSIONS

A new species of beachworm, *Heptaceras hyllebergi*, is described. All materials were collected from the northern part of Kata Bay, Phuket Island. The species lived in the sand of the intertidal zone and were attracted by bait. Some environmental factors were measured. High population densities correlated with high salinity, pH, dissolved oxygen and well sorted sand with a high percentage of fine sand.

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