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**POLYCHAETES OF THAILAND. NEREIDIDAE (PART 2) : *CERATOCEPHALE*
AND *GYMNONEREIS*, WITH DESCRIPTION OF TWO NEW SPECIES AND NOTES
ON THE SUBFAMILY GYMNONEREIDINAE.**

by

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ABSTRACT

A total of 150 specimens of Gymnonereidinae Banse were identified from the Andaman Sea and the Gulf of Thailand. Three species were recorded: *Ceratocephale andaman* n.sp. with and without eyes, cirrophores enlarged on setiger 9, *Gymnonereis fauveli* (Pillai, 1961) with smooth cutting edge of jaws, and *G. phuketensis* n.sp. with serrated cutting edge of jaws. The generic diagnosis of *Gymnonereis* is emended to include species with dorsal flaps and serrated jaws. The terminology of nereid parapodia is briefly reviewed and parapodia of Gymnonereidinae compared with typical Nereidinae parapodia.

I. INTRODUCTION

The subfamily Gymnonereidinae was erected by Banse (1977) to encompass 4 genera; *Ceratocephale* Malmgren, *Gymnonereis* Horst, *Micronereides* Day, and *Tambalagamia* Pillai with an anterior body region carrying very numerous setae, bifid neuropodial cirri, and pharynx without hardened paragnaths. The principal diagnostic characters on the generic level within the subfamily comprises presence or absence of the following characters: teeth on the jaws, large transversal folds and flaps, and accessory notopodial cirri on anterior setigers.

Banse (1977) emphasized that accessory notopodial cirri and proboscideal papillae restricted to the oral ring are also known from the subfamily Nereidinae Johnston, 1865, e.g. *Dendronereis* Peters. Presence or absence of eyes were not included in the generic diagnoses but he used this character at the species level in *Ceratocephale*.

In the present study we emend the generic diagnosis of *Gymnonereis* to include species with dorsal flaps and serrated jaws whereby *Tambalagamia fauveli* Pillai, 1961 is changed to *G. fauveli* and a new species *G. phuketensis* with

serrated jaws is placed in this genus.

II. MATERIALS AND METHODS

A total of 150 specimens of Gymnonereidinae were collected from the Andaman Sea and the Gulf of Thailand. The material was preserved onboard the research vessel in 4% formalin. After sorting specimens were transferred to 70% alcohol for permanent storage. Observations were facilitated by a slight staining of the worms in aqueous solution of methylene blue according to Hylleberg et al. (1986).

III. TERMINOLOGY

In accordance with Southern (1921) and

Hylleberg et al. (1986) we have viewed the parapodia from the tip, and illustrated an anterior setiger (3–13) on the right side of the worm with the head towards the right. Fig. 1B shows this and an anterior view of the parapodium with the terminology adopted in this paper.

Fig. 1A shows a typical Nereidinae parapodium, referred to as A in the following. In our first study of nereids (Hylleberg et al., 1986) we were not aware of the more complex parapodia in Gymnonereidinae, referred to as B in the following. The dorsal cirri are probably homologous structures in A and B (no. 1). The dorsal ligule (A:2) is also called so in B:2 in accordance

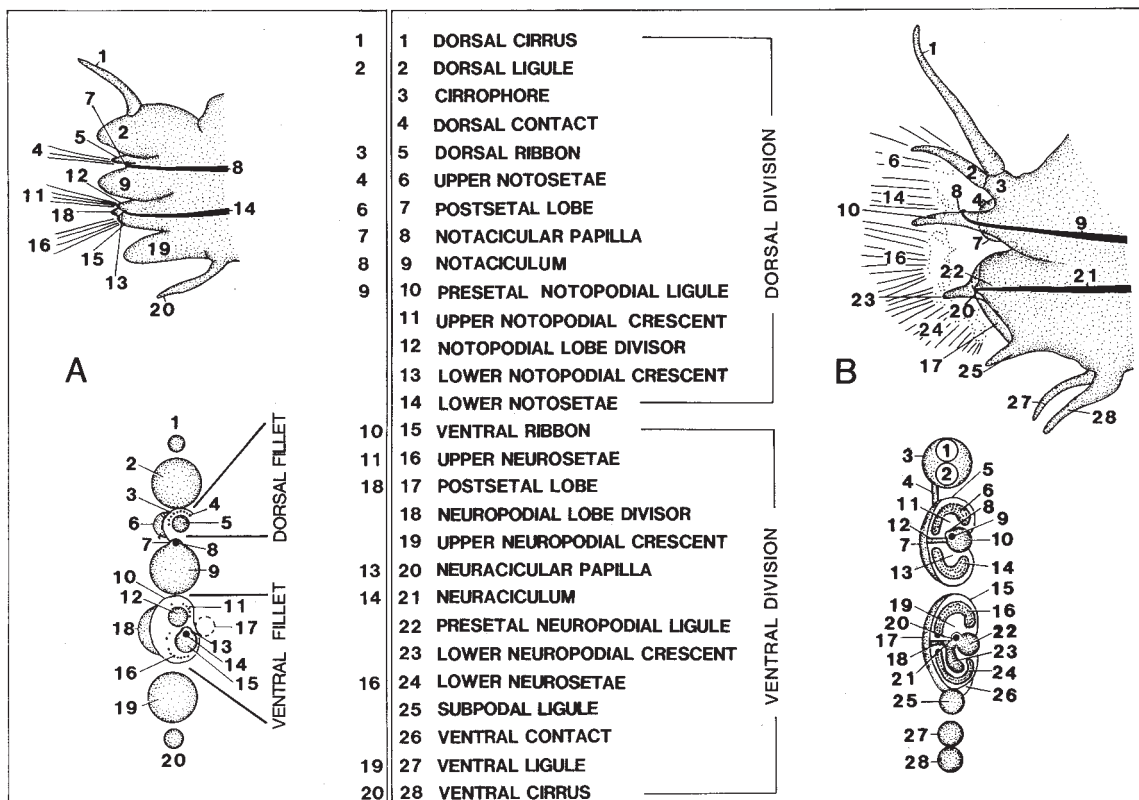


Fig. 1—(A) Terminology and diagram of a Nereidinae parapodium right side in lateral aspect, anterior view, and terminal view, according to Hylleberg et al. (1986). (B) Terminology and diagram of Gymnonereidinae parapodium (*Gymnonereis*) right side in lateral aspect, anterior view, and terminal view.

with Pettibone (1970). Imajima (1972) and Banse (1977) refer to this dorsal ligule as the accessory dorsal cirrus. In accordance with Pillai (1961), Gallardo (1968) and Hartman (1974) the dorsal cirrus and dorsal ligule are also referred to as double dorsal cirri in the present study for practical reasons. We have no evidence of how these digitiform processes develop in *Gymnonereidinae* since our statements only are based on observations of parapodia in situ at a magnification of 50 times. The dorsal cirrus and dorsal ligule extend from a cirrophore (B:3) which becomes enlarged posteriorly in *Gymnonereis* and *Ceratocephale* but not in *Micronereides*. In *Ceratocephale* cirrophores carry on dorsal cirrus, only.

In *Gymnonereis* the base of the cirrophore is connected with the postsetal notopodial lobe (B:4). The prominent median ligule (A:9) is part of the dorsal division in *Gymnonereis* (B:10). We call this slender, conical process a presetal notopodial ligule in accordance with Pettibone (1970), median ligule in Horst (1918), Notoacicular lobe in Hartman (1974) and presetal lip in Banse (1977). The aciculum is embedded in the upper part of this ligule at a point marked as the acicular papilla (B:8). In addition, the dorsal fillet (B:5–14) consists of a low postsetal lobe (B:7), an obscure dorsal ribbon (B:5) marking the periphery of the fillet, and two bundles of notosetae (B:6&14) divided by a low membrane termed notopodial lobe divisor (B:12) which connects the postsetal lobe with the presetal ligule.

The ventral division is nearly a mirror image of the dorsal division. At the lower part of the ventral fillet (B:15–26) is a slender process re-

ferred to as the subpodal ligule (B:25) in accordance with Pettibone (1970). The lower anterior part of the ventral ribbon projects as a membrane referred to as the ventral contact (B:26). It has only been observed in large specimens. The crescentic areas enclosed by upper and lower bundles of setae in notopodia (B:11&13) and neuropodia (B:19&23) appear as low ridges except in B:23 which, in the form of a dome, connects with the neuracicular area (B:20&22). The ventral division also includes two digitiform processes referred to as the ventral ligule (B:27) and ventral cirrus (B:28), respectively, in accordance with Pettibone (1970). For practical reasons they are also called double ventral cirri in the present study in accordance with Hartman (1974). Banse (1977) refers to them as bifid ventral cirri, and Imajima (1972) as bifurcate cirri. The two cirri sometimes appear to extend from a low cirrophore, giving associations to the dorsal cirrus and ligule (B:1&2). The true nature of these cirri remains to be studied as pointed out by Banse (1977).

IV. TAXONOMIC ACCOUNT

Gymnonereidinae Banse, 1977

Nereididae with palps and two antennae. Proboscis protusible, divided into maxillary and oral rings; without hardened paragnaths, with papillae. Prostomium with median cleft. Four pairs of tentacular cirri. Second tentacular segment short. Parapodia with dorsal cirri on first two setigers; with bifid neurocirri on most setigers; with ligules. Setae homogomph and hemigomph setigers; very numerous in first 10 to 15 setigers, giving the impression of a distinct anterior body region.

Key to the genera of *Gymnonereidinae*

1. With double dorsal cirri in anterior setigers *Gymnonereis*
- With double dorsal cirri 2

2. Single dorsal cirri throughout body, with conspicuous neuropodial presetal ligules, enlarged cirrophores in median body region *Ceratocephale*
 - Single dorsal cirri throughout body, without neuropodial presetal lips and enlarged cirrophores in median body region *Micronereides*

Ceratocephale Malmgren, 1867
 (Banse, 1977)

Gymnonereidinae with papillae on oral ring of proboscis. Jaws with teeth. Dorsal cirri simple throughout. Median body region with dorsal cirri on elongated vascularized cirrophores, with or without mid-dorsal transversal flaps, and with conspicuous neuropodial presetal ligules.

Key to the species of *Ceratocephale*

1. With prominent mid-dorsal flaps in median body region, cirrophore enlarged from setiger 9, double ventral cirri from setiger 3..... *C. hartmanae* Banse, 1977
 - Without prominent mid-dorsal flaps in median body region..... 2
2. Double neuropodial cirri from setiger 3 *C. loveni* Malmgren, 1867
 - Double neuropodial cirri from setiger 1 3
3. Cirrophore enlarged from setiger 7 *C. orientalis* Hartman, 1974
 - Cirrophore enlarged from setiger 8..... *C. pacifica* Hartman, 1960
 - Cirrophore enlarged from setiger 9..... *C. andaman* n.sp.
 - Cirrophore enlarged from setiger 10..... *C. oculata* Banse, 1977

Ceratocephale andaman n.sp.
 Fig. 2

HOLOTYPE: PMBC 6016, An anterior fragment with 24 setigers, length 5.2 mm, width 1.2 mm, including setae, west of Thai Muang, Phang-nga, 54 m depth, Coll. B. Chatanantawej, 3.2.1983.

PARATYPE: PMBC 6017, An anterior fragment with 24 setigers, length 4.2 mm, width 0.8 mm, including setae, west of Thai Muang, Phang-nga, 54 m depth, Coll. B. Chatanantawej, 3.2.1983.

MATERIAL EXAMINED: PMBC 6003–6007, 32 specimens from the Andaman Sea, Thailand, 16–68 m depth, Coll. B. Chatanantawej 1982–1983.

DIAGNOSIS: A *Ceratocephale* species with or

without eyes, double ventral cirri from setiger 1 up to setiger 26, single dorsal cirri throughout, dorsal cirrophores gradually increase in size from setiger 1 to setiger 8, at setiger 9 the cirrophore attains twice the length of cirrophore on setiger 8, cirrophores large up to setiger 30, thereafter reduced in size, dorsal flaps may occur at posterior body, jaws with serrated cutting edge, up to 13 teeth.

DESCRIPTION: All incomplete, anterior fragments, up to 37 setigers; length 5 mm, width 1.5 mm, including setae. Body white in alcohol. Prostomium (Fig. 2A,B) deeply incised, length equal to width, antennae and palps with long styles, two pairs of reddish brown eyes, faded eyes, or eyes without pigment (Fig. 2B), two pairs of tentacular cirri with

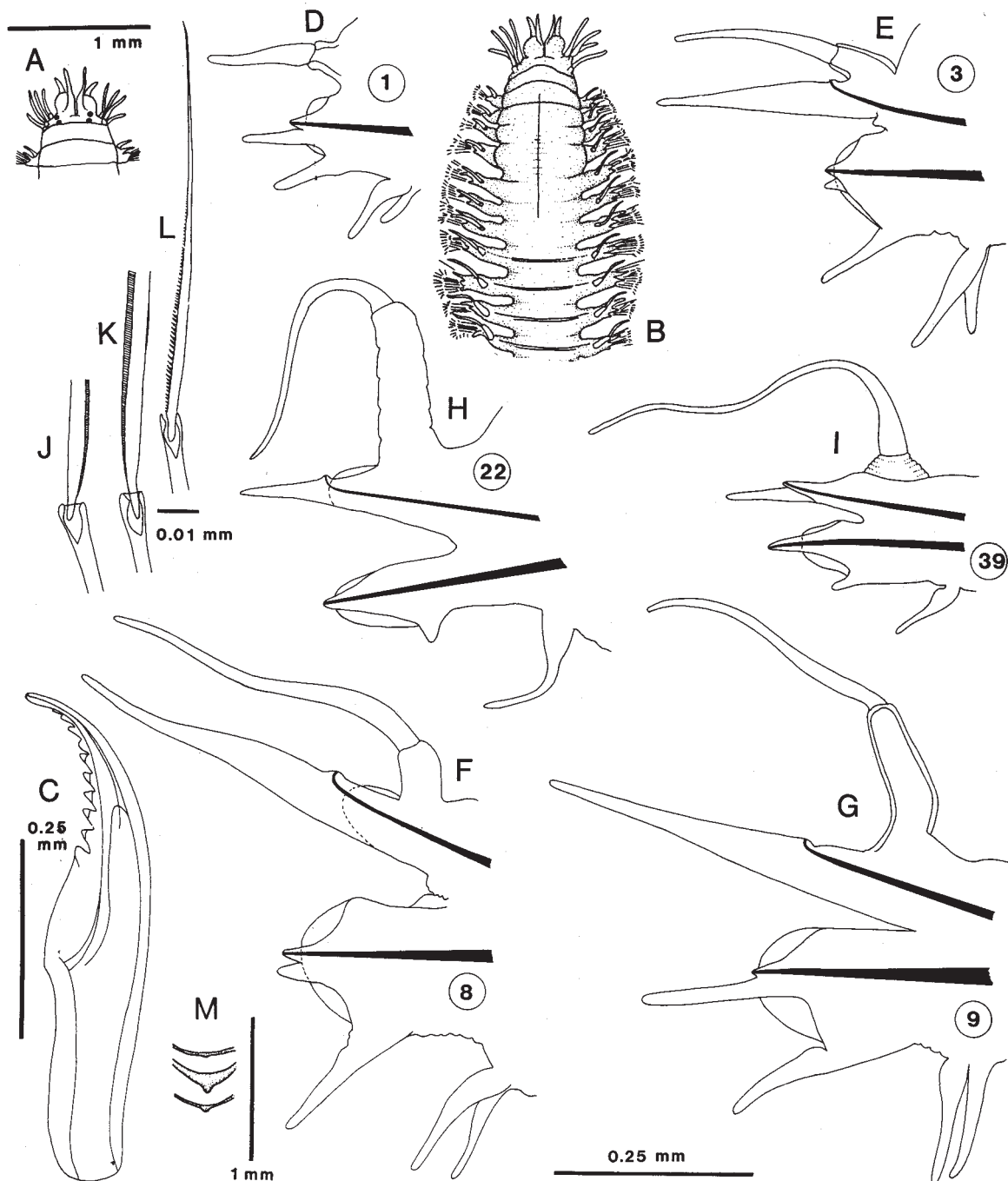


Fig. 2—*Ceratocephale andaman* n.sp. (A) anterior body, dorsal view of specimen with, and (B) without eyes. (C) jaw, (D-I) setiger 1, 3, 8, 9, 22, 39, anterior view, setae omitted. (J) notoseta. (K-L) neurosetae, setiger 13. (M) dorsal ridges and flaps at setiger 22-24. Scales; A, B, M: 1 mm, C-I: 0.25 mm, J-L: 0.01 mm. PMBC 6003-6007.

distinct cirrophores subequal cirri, the longest reach back to setiger 1 (rarely setiger 2). Pharynx with brown, serrated jaws, 6–13 teeth. Soft conical papillae on oral ring: 3 dorsally (area V–VI), 7 ventrally (VII–VIII).

Setiger 1 and 2 uniramous, the following biramous. Dorsal cirrus digitiform, distally attached to cirrophore, increasing in length from setiger 1 to setiger 8, posterior to setiger 30 the cirri become longer than the dorsal presetal lobe (Fig. 2I) and the cirrophores are reduced to low projections. Cirrophores gradually increase in size from setiger 1 to 8; at setiger 9 the length is abruptly doubled (Fig. 2F&G), the length may further increase on setiger 10 to 12, but in most specimens the cirrophores are subequal from setiger 9 up to setiger 30 (Fig. 2G&H).

Small notacicular papillae and long presetal ligules on setiger 3 and posteriorly (Fig. 2E–I). Neuropodia with small conical neuracicular papillae, rounded postsetal lobes, digitiform presetal ligules which are as long as the subpodal ligules (Fig. 2D) on setiger 1&2 (Fig. 1:22&25), thereafter become smaller than the subpodal ligules on setiger 3 to 8; on setiger 9 up to setiger 12 the presetal ligule is slender, and as long as the subpodal ligule, sometimes slightly longer (Fig. 2G), posterior to setiger 12 both the presetal and the subpodal ligules become reduced in size (Fig. 2H,I). Double ventral cirri from setiger 1 up to setiger 26, the ventral cirri are variable on the first 2 setigers. In most specimens the lower cirrus is half as long as the upper cirrus, but it may be much shorter, reduced to a small filament about 1/10th of the length of the upper cirrus. In all specimens the lower cirri increase in size from setiger 1 to setiger 8 where they obtain subequal size. Posterior to setiger 12 the lower cirrus is reduced until only 1 cirrus is present on setiger 20–26 (Fig. 2H,I). Dorsal flaps normally absent but a few specimens had developed flaps with

mid-dorsal, triangular projections at posterior setigers (Fig. 2M). Dorsal ridges always present starting at setiger 5–12.

Notosetae: long-bladed homogomph spinigers with finely serrated blades (Fig. 2J), neurosetae: homogomph spinigers with finely and coarsely serrated blades (Fig. 2K, L). Numerous setae on setiger 1–16, (60 setae on setiger 8) Acicula black, tip curved in notopodia, straight in neuropodia.

ETYMOLOGY: The species is named after the Andaman Sea.

REMARKS: Banse (1977) recognized 4 species: *C. loveni*, *C. hartmanae*, *C. pacifica* and *C. oculata*. Hartman (1974) described *Tambalagamia orientalis* from the Arabian Sea and Bay of Bengal. According to her description, and fig. 5g, the species should be *Ceratocephale orientalis* new combination, since the single dorsal cirrus is distally attached to the notopodial lobe in all parapodia, typical of *Ceratocephale*. Hartmann-Schröder (1977) added *Pisionura abyssorum* Hartman and Fauchald, 1971 to the list of *Ceratocephale* species (new combination) but it should be transferred to the genus *Micronereides* because it has very small neuropodial ligules (papilla-like). Comparison of these 5 *Ceratocephale* species with *C. andaman* can be summarized as follows: *C. loveni* is a large species, width up to 5 mm, including setae. *C. hartmanae* has a width of about 3 mm, while *C. oculata*, *C. orientalis*, *C. pacifica* and *C. andaman* all measure from 1–1.5 mm, including setae. These 4 species of similar size all have double ventral cirri from setiger 1, but they differ in the starting point of enlarged cirrophores: *C. orientalis*, *C. pacifica*, *C. andaman* and *C. oculata* start on setiger 7, 8, 9, 10 respectively. *C. hartmanae* has

enlarged cirrophore from setiger 9 but the ventral double cirri start on setiger 3. Considering the variation we have noted in *C. andaman*, e.g. that the lower ventral cirrus can be very obscure on setiger 1 & 2, and that dorsal flaps and eyes may be present or absent, it is concluded that *C. andaman* is very similar to *C. hartmanae*, so similar that it may be difficult to distinguish the two species apart from the dorsal flap character pointed out by Banse (1977) as being diagnostic for *C. hartmanae*.

We have considered to put these similar sized *Ceratocephale* into synonymy, alternatively into subspecies instead of maintaining 5 species. However, we are under the impression that sufficient evidence exists to maintain the species, and we erect a new species *C. andaman* because of the constant characters associated with setiger 8–12, viz. the cirrophore is doubled in length from setiger 8 to 9, the neuropodial presetal ligule is very short on setiger 8, very long on setiger 9 to 12, thereafter reduced in length until shorter than the subpodal ligule. Description of *C. orientalis*, *C. pacifica*, *C. oculata* and *C. hartmanae* do not refer to these characters and figures of the setigers where enlarged cirrophores start are not shown. Hartman (1974) shows setiger 12 of *C. orientalis* (cirrophore abruptly enlarged on set. 7); Hartman (1960) set. 10 of *C. pacifica* (cirrophore enlarged on set. 8); Banse (1977) set. 14 of *C. oculata* (cirrophore abruptly enlarged on set. 10); Banse (1977) set. 12 of *C. hartmanae* (cirrophores gradually increase in size from setiger 9). Comparison of setiger 12, 10, 14, 12, mentioned above, with the corresponding setigers in *C. andaman* show that the differences might seem subtle. However, in *C. orientalis* the neuropodial presetal ligule is about 3 times longer than the subpodal ligule, while they are subequal in *C. andaman*

In addition, *C. orientalis* differs from *C. andaman* in having notopodium (without setae and aciculum) on setiger 2, and tentacular cirri extending back to setiger 3.

In *C. pacifica* the neuropodial presetal ligule is about 2 times longer than the subpodal ligule and the cirrophore is much longer than the presetal notopodial ligule. The opposite is found in *C. andaman*, *C. oculata* and *C. andaman* do not differ in parapodia characteristics on setiger 14 but double ventral cirri are present to at least setiger 40 (the last one on the fragment) in *C. oculata* while double ventral cirri are reduced to one cirrus at setiger 20–26 in *C. andaman* in *C. hartmanae* the cirrophore is very long compared with *C. andaman*. Otherwise the parapodia are very similar. However, the diagnostic character of prominent dorsal flaps from setiger 12 and posteriorly, has not been observed in our material of *C. andaman*.

The material of *Gymnonereis* presented in this study showed that the pattern of cirrophore enlargement, the occurrence and distribution of dorsal flaps, and the size of the species constitute constant, species specific, characteristics. On this background we conclude that the differences between *C. andaman* and the closely related *C. orientalis*, *C. pacifica*, *C. oculata* and *C. hartmanae* are significant enough to erect the new species *C. andaman*.

DISTRIBUTION: The Anadaman Sea. Thailand

Gymnonereis Horst emend

TYPE SPECIES: *Gymnorhynchus sibogae* Horst, 1918, p. 247.

DIAGNOSIS: *Gymnonereidinae* with papillae on oral ring of pharynx, jaws with or without teeth, double dorsal cirri in anterior body region, single dorsal cirri in median and posterior body region, cirrophores usually enlarged

and vascularized in mid-body, with or without transversal dorsal folds with projecting mid-dorsal flaps, conspicuous neuropodial presetal ligules.

Key to the species of *Gymnonereis*

1. Jaws with smooth or crenulate cutting edge 2
– Jaws with serrated cutting edge. Double dorsal cirri from setiger 1 up to setiger 13, cirrophores abruptly enlarged on setiger 14 or 15, from 10–25 setigers with enlarged cirrophores, dorsal flaps with pointed triangular mid-dorsal projections, starting large at setiger 14, flaps disappear posteriorly when cirrophores become reduced in size *G. phuketensis* n.sp.
2. With enlarged cirrophores at mid-body 3
– Cirrophores low, not enlarged at mid-body, double dorsal cirri on setiger 1&2, dorsal flaps absent *G. crosslandi* (Monro, 1933)
3. Benthic from 4
– Planktonic form (*Heteronereis*). Double dorsal cirri from setiger 1 up to setiger 12, cirrophores enlarged from setiger 15–16, dorsal flaps absent *G. sibogae* (Horst, 1918)
4. Presetal noto- and neuropodial lobes conical, thickset. Diameter at base of lobes similar to diameter at base of enlarged cirrophores. Double dorsal cirri up to setiger 13, enlarged cirrophores on setiger 15 up to setiger 60, dorsal flaps absent *G. hartmannschroederiae* Pettibone, 1970
– Presetal noto- and neuropodial lobes conical, slender. Diameter at base of lobes, about 0.5x diameter at base of enlarged cirrophores. Double dorsal cirri from setiger 1 up to setiger 17 cirrophores gradually enlarged from setiger 15 to 18, dorsal flaps with low mid-dorsal triangular projections, gradually enlarged from setiger 16–22 *G. fauveli* (Pillai, 1961)

Gymnonereis fauveli (Pillai, 1961)

Fig. 3

Tambalagamia fauveli Pillai, 1961: 37, fig. 1A–G, 2A–F. Imajima, 1972: 44–46, fig. 3 a–1, fig. 7. Banse, 1977: 625–626, fig. 1c. non *G. fauveli* (Hartmann-Schröder, 1962). Wu et al., 1985: 49–51, fig. 25A–M.

Ceratocephale fauveli Gallardo, 1968: 63–64, pl. 13 figs. 7–8.

Gymnonereis fauveli Pettibone, 1970: 239–241, figs. 35–37.

DIAGNOSIS: A *Gymnonereis* species with or without eyes, jaws with smooth cutting edge,

two dorsal cirri on setiger 1–15, cirrophores gradually enlarged on setiger 15–18, dorsal flaps with rounded triangular mid-dorsal projections at setiger 15–18, flaps increase in size posteriorly, fully grown at setiger 19–25, two ventral cirri present from setiger 1.

MATERIAL EXAMINED: Andaman Sea, Thailand: PMBC 6008, 13 specimens, 13–41 m depth, Coll. B. Chatanantawej, 1982–1983. Gulf of Thailand; PMBC 6009, 6 specimens, 5–59 m depth, Coll. N. Piamthipmanus, 1981–1984.

DESCRIPTION: All incomplete specimens, largest size 45 setiger, length 18 mm, width

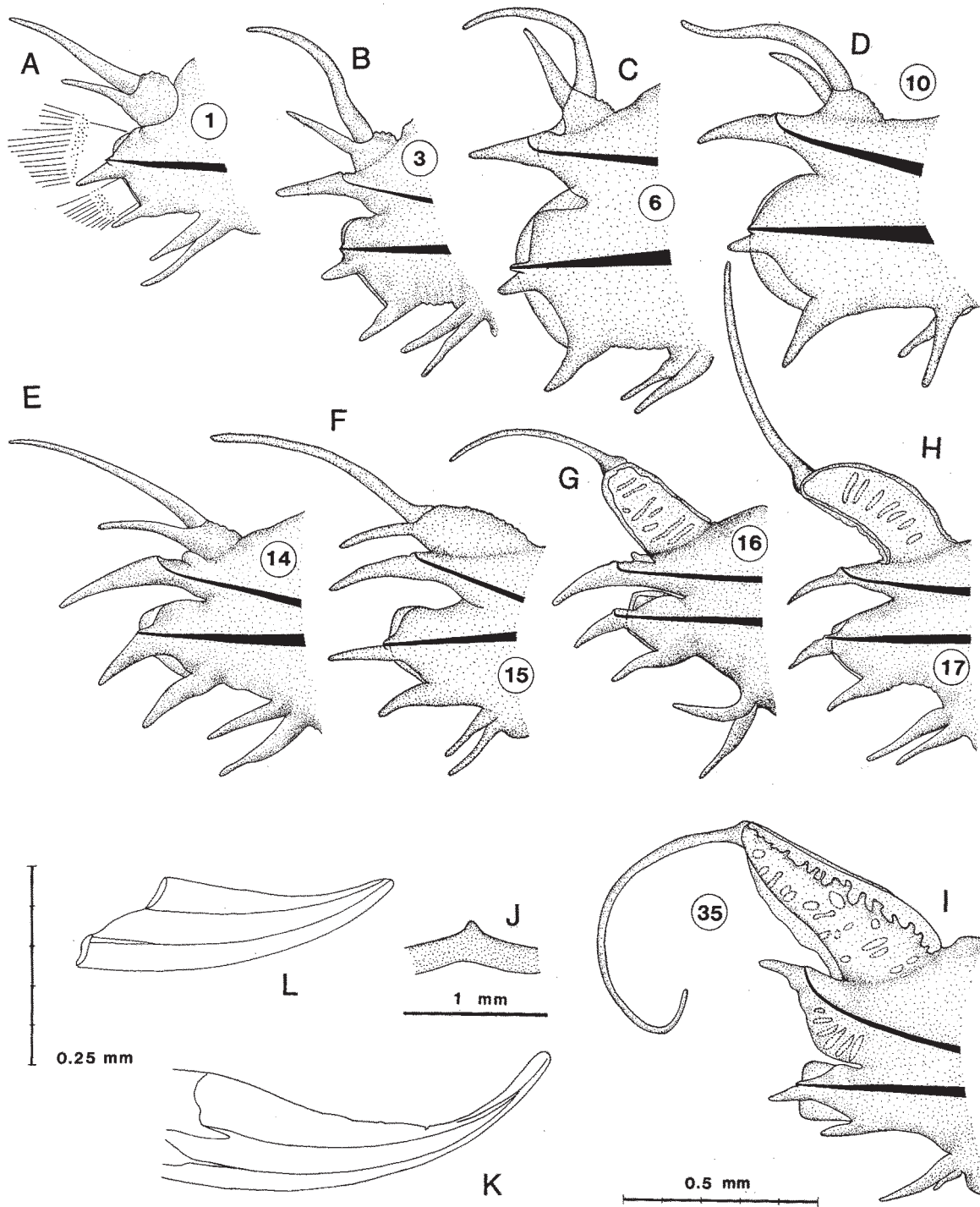


Fig. 3—*Gymnonereis fauveli*. (A–I) setiger 1, 3, 6, 10, 14, 15, 16, 17, 35, anterior view, setae omitted except on setiger 1. (J) dorsal flap at setiger 35. (K, L) jaws from 2 specimens. Scales; A–I: 0.5 mm, J: 1 mm, K–L: 0.25 mm. PMBC 6008, 6009.

2.6 mm; 35 setigers, length 17 mm, width 3.2 mm. Colour light brown in alcohol. Prostomium subrectangular, wider than long, deeply notched between based of antennae, palpostyles cone-shaped (as in Fig. 4A). Usually 2 pairs of red brown eyes but eyes may be unpigmented, weakly pigmented (crescents), or small black eye spots. Four pairs of tentacular cirri, the longest extending back to setiger 6–10. Jaws lightbrown, smooth cutting edge (Fig. 3K–L). Soft, pointed conical papillae, usually with thickened base; oral ring: 5 papillae dorsally (area V–VI), 7 ventrally (VII–VIII) as seen in Fig. 4 & 6A, B.

Parapodia uniramous on setiger 1&2. Setiger 1 (Fig. 3A), with dorsal cirrus and dorsal ligule (Fig. 1:1&2), the ligule about half as long as the cirrus, cirrophore shorter than presetal neuropodial ligule (Fig. 1:22), small conical neuracicular papilla, (Fig. 1:20) neuropodial and subpodal ligules digitiform (Fig. 1:22&25), postsetal lobe is low, rounded (Fig. 1:17), two ventral cirri referred to as ligule and cirrus (Fig. 1:27&28), subequal, long and digitiform. Parapodia biramous from setiger 3.

Small cirrophores on setiger 3–14 (Fig. 3 B–E), at the base cirrophores are connected (Fig. 1:4) with the low rounded postsetal lobes (Fig. 1:7), small notacicular papillae (Fig. 1:8), long digitiform presetal ligules, setae in 2 bundles (Fig. 1:6&14) separated by a low membrane (Fig. 1:12). Neuropodia basically as described in setiger 1, maximum size attained at setiger 6 (Fig. 3C). Dorsal cirri and dorsal ligules present up to setiger 15 (setiger 16 in 2 specimens, setiger 17 in 1 specimen), thereafter only the distally attached dorsal cirrus. Cirrophores gradually enlarged from setiger 15–18 (Fig. 3 F–H) until longer than presetal ligules on setiger 16 (Fig. 3H). Subequal ventral cirri and ventral ligules up to setiger 15–18 (Fig. 3

A–H), thereafter the ventral cirri gradually become smaller than the ligules, about half size at the last setiger (45) of the longest fragment. Cirrophores posterior to setiger 30–33 carry membranous extensions along the outer edges (Fig. 3I) and the lower parts of the dorsal fillets.

Low transverse dorsal flaps provided with equilateral triangular, mid-dorsal projections first present at setiger 16–18 (22), gradually increasing in size until fully grown with well developed mid-dorsal flaps at setiger 19–25 (Fig. 3J). All setae homogomph or slightly heterogomph spinigers of 3 types: blade smooth, finely or coarsely serrated (Fig. 5J–M). All 3 types found in both noto- and neuropodia. Numerous setae in anterior 15 setigers (120 setae on setiger 6), the number decreases markedly posteriorly. Acicula black, the tip curved in notopodia but straight in neuropodia (Fig. 3A–I), occur singly in each ramus of parapodia.

Gymnonereis cf. fauveli

Fig. 4–6

DIAGNOSIS: A *Gymnonereis* very similar to *G. fauveli*, except that two dorsal cirri occur only up to setiger 14.

MATERIAL EXAMINED: PMBC 6013, Andaman Sea, 3 specimens, 55 m depth. PMBC 6011, 17 specimen 13–44 m depth, coll. B. Chatananhawej, 1982–1983. PMBC 6012, 6014, Gulf of Thailand, 4 specimens, coll. N. Piamthipmanus and P. Sirimontraporn, 1981–1984.

DESCRIPTION: All incomplete specimens, largest size 34 setigers, length 17 mm, width 3.2 mm, mature female. Morphology identical to *G. fauveli* except that dorsal cirri and dorsal ligules only are present up to setiger 14 (Fig. 4H, Fig. 5C), lateral projections on cirrophores and dorsal fillets of posterior setigers (> 33) less developed (Fig. 4L, Fig.

5G) compared with *G. fauveli* (Fig. 3K). Jaws are basically as in *G. fauveli* but the cutting edge may develop crenulations (Fig. 5N).

REMARKS: Pillai (1961) erected the genus *Tambalagama* to encompass the only species with vascularized dorsal transversal folds known prior to this study. This view point was supported by Banse (1977). The genus *Gymnonereis* is used here in accordance with Gallardo (1968) and Pettibone (1970). Our reasons to follow Pettibone (1970) are the following: The benthic form of the heteronereis *Gymnonereis sibogae* (Horst, 1918) is unknown. Five specimens of *G. sibogae* were collected from shallow water plankton in the Malay Archipelago during 1899, and no other records are known. Many specimens in the present collection especially *G. cf. fauveli* are difficult to distinguish from *G. sibogae* as figured and described by Pettibone (1970) with two exceptions. First, presetal neuropodial lobes on anterior setigers of *G. sibogae* are shorter than postsetal lobes, while they are longer in *G. fauveli*. Second, dorsal flaps have not been found in *G. sibogae* while they normally show up clearly in *G. fauveli*, although there are exceptions. Two specimens referred to *G. cf. fauveli* lack dorsal flaps to the end of 25 and 37 setigers present (fragments), indicating that dorsal flaps may be absent in *G. fauveli*. In addition it is unknown if dorsal flaps can disappear in connection with heteronereis modifications. Similarly, it is not known to what extent the length of presetal neuropodial lobes is influenced by heteronereis modifications. It should be noted that presetal neuropodial lobes are only slightly longer than postsetal lobes in anterior setigers of *G. cf. fauveli*, (Fig. 6). According to Pettibone (1970) heteronereis modifications occur posterior to setiger 16 or 17, that is on the same setigers where cirrophores are enlarged

and morphology of the lobes will change in the benthic material of *G. fauveli*.

In most specimens of *G. fauveli* dorsal ligules are at least half as long as the dorsal cirri, accounting for clear (so-called) double dorsal cirri on the first 14–15 anterior setigers. Part of our material, especially *G. cf. fauveli*, has specimens where dorsal ligules are significantly smaller than the cirri, or they are completely reduced on a variable number of anterior setigers. Small dorsal ligules on setiger 14 (Fig. 5C) or setiger 12 (Fig. 6H) (in a single specimen already on setiger 2) could be a juvenile character since reduced dorsal ligules are most commonly observed in the smallest individuals. It is, however, also seen in larger specimens (1.6 mm width).

The starting point of dorsal flaps, as well as their size, is related to the starting point and size of enlarged cirrophores. If the enlarged cirrophore is small on setiger 15 the flaps will be small and start at setiger 17–22 (Fig. 5:0). If the cirrophore is clearly enlarged on setiger 15, the flaps will start at setiger 15–16 and be large at setiger 18 (Fig. 5A,D).

The species of *Gymnonereis* have been distinguished on morphology of jaws, length of tentacular cirri, presence or absence of eyes, starting point and termination of double dorsal cirri, cirrophores, and dorsal flaps, in addition to start and termination of double ventral cirri. Our specimens of *G. fauveli* display considerable variation in these characters and we have decided to deal with this by separating into *G. fauveli* and *G. cf. fauveli* based on differences in the position of the setiger where double dorsal cirri are replaced by a single cirrus. Apart from the co-occurrence of cirrophore and dorsal flap characteristics, discussed above, we have not discovered other correlations. On the basis of the present material we consider *G. cf. fauveli* to

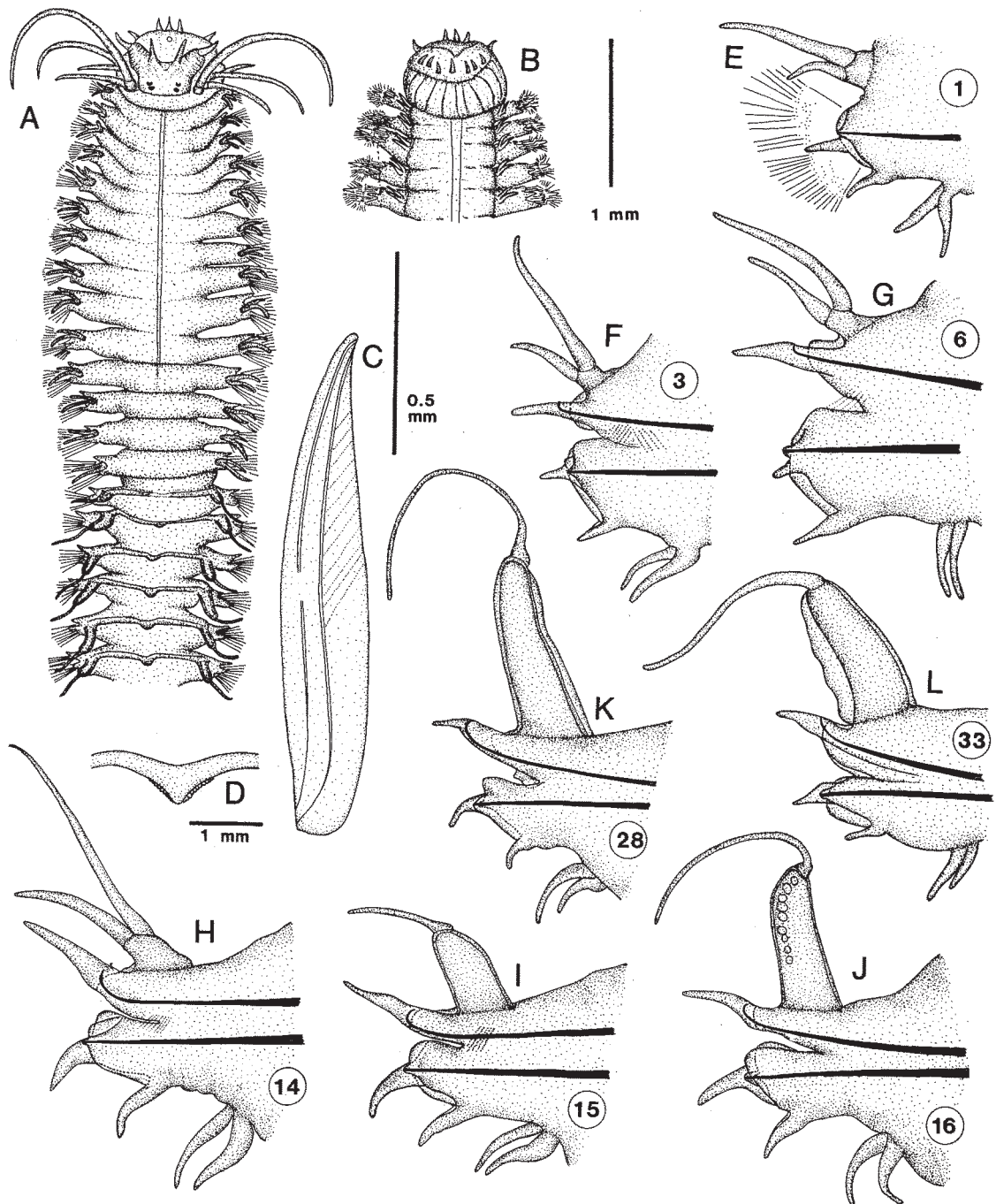


Fig. 4—*Gymnonereis* cf. *fauveli*. Gulf of Thailand & Songkla Lake. (A–B) Anterior body, dorsal & ventral views. (C) jaw. (D) dorsal flap at setiger 33. (E–K) setiger 1, 3, 6, 14, 15, 16, 28, 33, anterior view, setae omitted except on setiger 1, Scales; A–B: 1 mm, C: 0.5 mm, D: 1 mm, E–K: 0.5 mm. PMBC 6012.

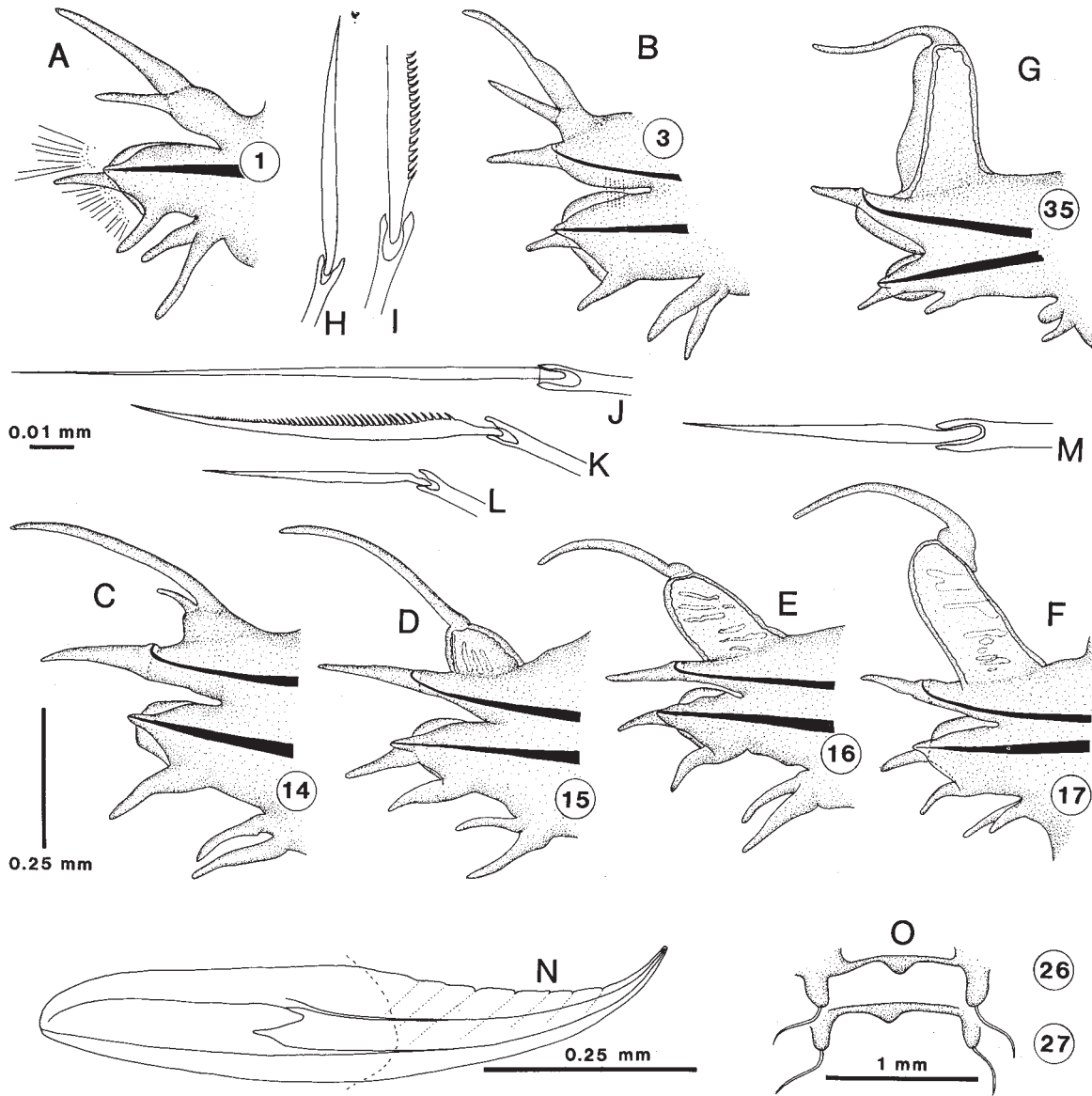


Fig. 5—*Gymnonereis* cf. *fauveli*. Andaman Sea, Thailand. (A–G) setiger 1, 3, 14, 15, 16, 17, 35, anterior view, setae omitted except on setiger 1. (H–I) setae from setiger 1. (J) notoseta, and (K–L) neurosetae from setiger 16. (M) notoseta from setiger 35. (N) jaw. (O) dorsal flaps at setiger 26–27. Scales; A–F: 0.25 mm, H–M: 0.01 mm, N: 0.25 mm, O: 1 mm. PMBC 6011.

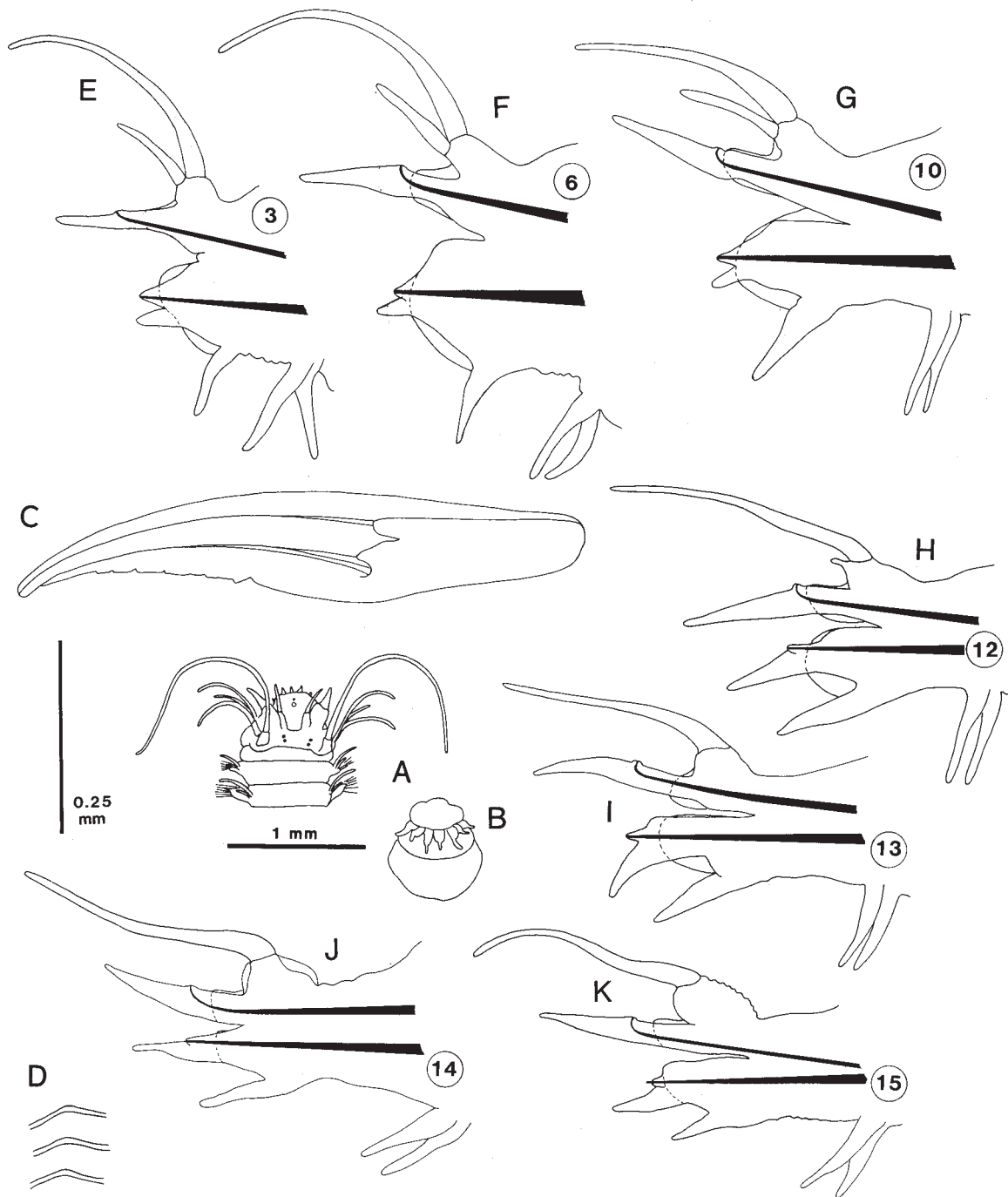


Fig. 6—*Gymnonereis* cf. *fauveli*. Andaman Sea, Thailand. (A–B) anterior body, dorsal and ventral views. (C) jaw. (D) dorsal ridges at setiger 16–18. (E–K) setiger 3, 6, 10, 12, 13, 14, 15, anterior view, setae omitted. Scales; A, B, D: 1 mm, C, E–K: 0.25 mm. PMBC 6013.

be conspecific with *G. fauveli*. The latter agrees well with the original description by Pillai (1961).

DISTRIBUTION: Japan, China, Vietnam, Gulf of Thailand, Andaman Sea, Sri Lanka.

Gymnonereis phuketensis n.sp.

Fig. 7

Tambalagamia fauveli Hartman 1974:
216–217, fig. 5 f.

HOLOTYPE: PMBC 6000, complete specimen with 96 setigers, length 20 mm, width 1.6 mm, including setae, southern part of Bang Tao Bay, Phuket Island, fine sand, 10 m depth, 18.6.1982.

PARATYPES: –1, PMBC 6001, anterior fragment with 66 setigers, length 17 mm, width 1.9 mm, including setae, east of Lanta Yai Island, Trang, very fine sand, 20 m depth, coll. B. Chatanathawej, 8.1.1983. –2, AMW 202573: anterior fragment with 31 setigers, length 7 mm, width 1.5 mm, south of Lanta Yai, Trang, 12 m depth, coll. B. Chatanathawej, 9.4.1982. –3, BMNH ZB 1988. 9 : anterior fragment, mature female, 51 setigers, length 12 mm, width 2 mm, including setae, red secretions on the head and tip of anterior acicula, Bang Tao Bay, Phuket Island, 10 m depth, 26.4.1983. –4, USNM 118349: anterior fragment with 39 setigers, length 6 mm, width 1.2 mm, west of Takua-Pa, Phang-Nga, 13 m depth, coll. B. Chatanathawej, 20.3.1982. –5, ZMC : anterior fragment with 36 setigers, length 6 mm, width 1.2 mm, Bang Tao Bay, Phuket Island, fine sand, 20 m depth, 7.4.1981. –5, ZMH P-19530 : anterior fragment with everted pharynx, 21 setigers, length 4.5 mm, width 1.5 mm, northern part of Patong Bay, Phuket Island, very fine sand, 10 m depth, 26.4.1982.

MATERIAL EXAMINED: A total of 79 specimens collected from the Andaman Sea, Thailand at 5–30 m depth during 1980–1983.

DIAGNOSIS: A *Gymnonereis* species with or without eyes, tentacular cirri reach back to setiger 4–7; jaws with serrated cutting edge; two dorsal cirri on setiger 1–13, single dorsal cirri posterior to setiger 14, cirrophore abruptly enlarged on setiger 14; subequal, enlarged cirrophores on 10–24 setigers; dorsal flaps with pointed, triangular middorsal projections at the same setigers which carry enlarged cirrophores. Two subequal ventral cirri on setiger 1–14 (24), thereafter gradual reduction of the lower of the two cirri.

DESCRIPTION: Body flattened anteriorly, tapering posteriorly, colour light brown in alcohol (Fig. 7A). Prostomium wider than long, 2 pairs of black eyes, weak eyespots, or eyes without pigment; frontal margin deeply incised between basis of frontal antennae; one pair of biarticulated stout palps with small cylindrical palpostyles; 4 pairs of tentacular cirri, longest pair extending back to setiger 5–7; translucent brown jaws with serrated cutting edge, 10 teeth (Fig. 7 C–E). Paratype; soft conical pharyngeal papillae on oral ring, 3 papillae dorsally (V–VI), 7 ventrally (VII–VIII) (Fig. 7A–B).

Setiger 1 and 2 uniramous (Fig. 7F). Dorsal cirri slender, longer than the dorsal ligules (Fig. 1:1–2). Neuropodium with small conical neuracicular papilla, presetal neuropodial and subpodal ligules digitiform, much longer than the postsetal, rounded lobes, 2 subequal ventral cirri (ligule and cirrus Fig. 1:27&28). The following setigers biramous. Notopodia with short, small conical notacicular papillae and long presetal notopodial ligules (Fig. 1:10), low postsetal notopodial lobe (Fig. 7G–L). Dorsal cirri and

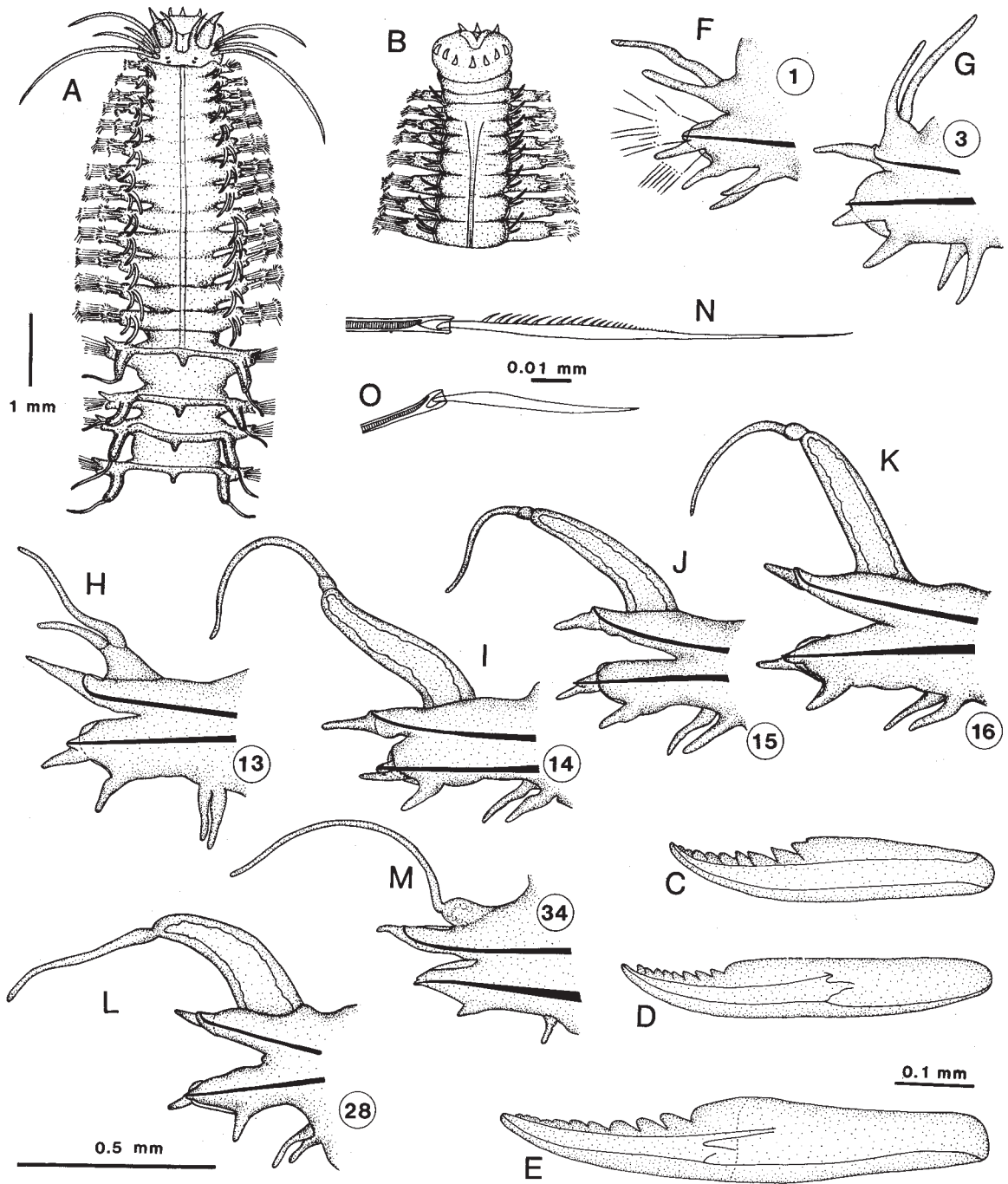


Fig. 7—*Gymnonereis phuketensis* n.sp. (A–B) anterior body, dorsal and ventral views. (C–E) jaws of three specimens. (F–M) setiger 1, 3, 13, 14, 15, 16, 28, 34, anterior view, setae omitted except on setiger 1. (O–N) setae from setiger 1, lower bundle. Scales; A–B: 1 mm, C–E: 0.1 mm, F–M: 0.5 mm, O–N: 0.01 mm. PMBC 6000–6002.

dorsal ligules arising from a low cirrophore on the first 13 setigers. Beginning on setiger 14, the cirrophore abruptly enlarged, cirrus in terminal position, ligule reduced (Fig. 7I). Elongated cirrophores reduced on setiger 24–38 (Fig. 7M). Prominent dorsal flaps with pointed triangular mid-dorsal projections abruptly present from setiger 14. The flaps are present at the setigers carrying enlarged cirrophores (Fig. 7A). Two ventral cirri (cirrus and ligule Fig. 1:27&28) subequal from setiger 1 up to setiger 24, thereafter reduced ventral cirrus, single ventral cirrus present at about setiger 35, cirri absent from last 10 setigers. Aciculum dark brown, curved in notopodia, straight in neuropodia (Fig. 7F–M). All setae homogomph or slightly heterogomph spinigers with blades of 3 types: smooth (Fig. 7:0), coarsely serrated (Fig. 7N) or finely serrated both noto- and neuropodia carry setae of the 3 types. Numerous setae in anterior setigers (about 50 setae on setiger 4), the numbers decrease gradually posteriorly (about 35 setae on setiger 35). Two short anal cirri. A few specimens carry red pigment granules at the tips of acicula and jaws.

ETYMOLOGY: The species is named after Phuket Island, Andaman Sea, Thailand.

REMARKS: *Gymnonereis phuketensis* is characterized by having serrated cutting edge of jaws, enlarged cirrophores starting abruptly on setiger 14, transverse dorsal flaps with prominent, pointed triangular mid-dorsal projections, starting abruptly at setiger 14. We place the new species in the genus *Gymnonereis* for reasons mentioned in remarks to *G. fauveli*.

Hartman (1974) reported *Tambalagamia fauveli* from the Arabian Sea, 35 m depth. It is very similar to *G. phuketensis* in having dorsal cirri double on the first 13 setigers, abruptly changed to single cirri from setiger 14, and

double ventral cirri in the anterior body (setiger 1–16). According to her description it apparently differs from *G. phuketensis* in having neuropodia with a broadly rounded presetal lobe and long postsetal lobe. However, the fig. 5f of setiger 13 indicates that she must have described the species assuming a posterior view instead of anterior view. We consider *T. fauveli* described by Hartman (1974) to be conspecific with *G. phuketensis* based on the important transition from double cirri to a single cirrus on setiger 14, although she did not mention important characters such as jaw structure and transverse dorsal flaps.

DISTRIBUTION: Andaman Sea, Thailand, Arabian Sea (?).

Gymnonereis cf. *phuketensis*

Fig. 8

DIAGNOSIS: A *Gymnonereis* very similar to *G. phuketensis* except that double dorsal cirri occur only up to setiger 12, cirrophores abruptly enlarged on setiger 15, dorsal flaps low at setiger 15–16, increasing in size and with pointed, triangular mid-dorsal projections from setiger 18(22) and posteriorly.

MATERIAL EXAMINED: PMBC 6010, Andaman Sea, 21 specimens, 5–45 m depth, coll. B. Chatanantawej, A. Nateewathana & J. Hylleberg, 1981–1984.

DESCRIPTION: All incomplete specimens, largest size 25 setigers, width 1.5 mm, length 5 mm; 55 setigers, width 1.1 mm, length 8 mm. Morphology identical to *G. phuketensis* except for differences pointed out in the above diagnosis (Fig. 8A, F–K).

REMARKS: We have conferred 21 specimens of *Gymnonereis* to *G. cf. phuketensis* on account of the serrated jaws and large, pointed triangular mid-dorsal projections of the dor-

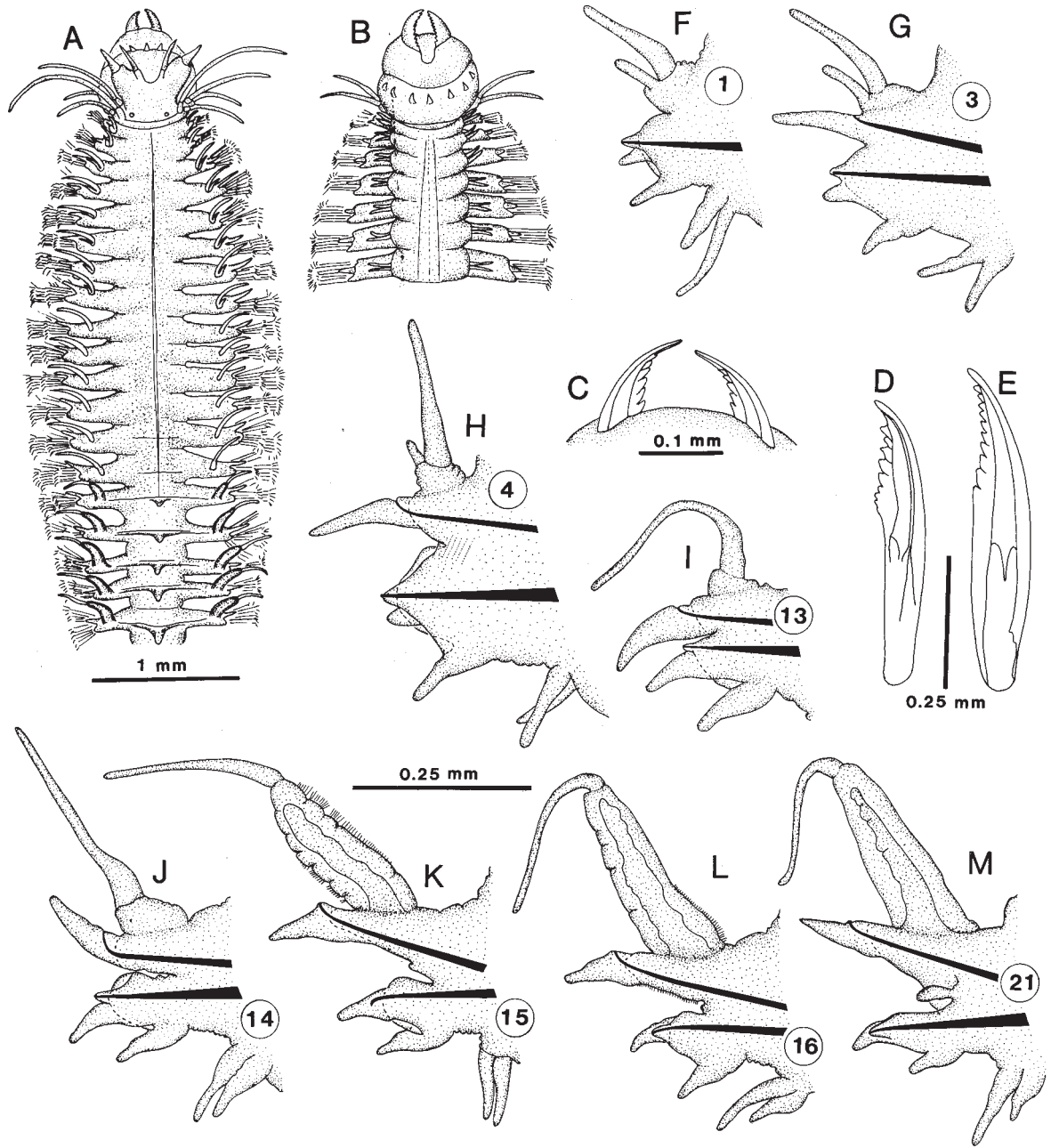


Fig. 8—*Gymnonereis* cf. *phuketensis* n.sp. (A–C) anterior body, dorsal and ventral views, jaws in situ. (D–E) jaws of two specimens. (F–M) setiger 1, 3, 4, 13, 14, 15, 16, 17, anterior view, setae omitted. Scales; A–B: 1 mm, C: 0.1 mm, D–E: 0.25 mm, F–M: 0.25 mm. PMBC 6010.

sal flaps in the region of enlarged cirrophores since these characters are shared with between the two forms, considered to be conspecific. In *G. phuketensis* the starting point of enlarged cirrophores is setiger 14; in *G. cf. phuketensis* on setiger 15. In addition, the dorsal flaps start abruptly with pointed, triangular mid-dorsal projections on setiger 14 in *G. phuketensis* while *G. cf. phuketensis* show a gradual size increase of the flaps from setiger 15–16, attaining full size at setiger 18–22. This pattern of dorsal flap distribution is similar to *G. fauveli*. However, in the latter species the dorsal flaps carry low, triangular mid-dorsal projections; not pointed as seen in *G. phuketensis*.

The finding of single dorsal cirri anterior to setiger 14 (Fig. 8I) is a character shared with *G. cf. fauveli* but has also been found in a few specimens of otherwise typical *G. phuketensis*. It should be noted that serrated cutting edges of the jaws in *G. cf. phuketensis* can be difficult to distinguish from crenulate cutting edges in *G. cf. fauveli* in cases where serrations

are weakly developed in the first species, and crenulations well developed in the latter species. In such cases the morphology of dorsal flaps has been used to separate the species.

In conclusion, we have separated specimens with serrated jaws, enlarged cirrophores on setiger 15, and pointed, triangular mid-dorsal projections of flaps on setiger 18–22, and conferred these specimens to *G. phuketensis*. The above combination of characters is constant in the material. When enlarged cirrophores and large dorsal flaps co-occur at setiger 14 the specimens are considered typical *G. phuketensis*.

DISTRIBUTION: Andaman Sea, Thailand.

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