

A new species of *Mysta* (Annelida, Polychaeta, Phyllodocidae) from Japan

Tetsuya KATO

Division of Biological Science, Graduate School of Science,
Hokkaido University, Sapporo 060-0810 (Japan)
tetsuyakato@hotmail.com

Fredrik PLEIJEL

Muséum national d'Histoire naturelle, Laboratoire de Biologie des Invertébrés marins
et Malacologie, ESA CNRS 8044, 57 rue Cuvier, F-75231 Paris cedex 05 (France)

Shunsuke F. MAWATARI

Division of Biological Science, Graduate School of Science,
Hokkaido University, Sapporo 060-0810 (Japan)

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ABSTRACT

MOTS CLÉS
Annelida,
Polychaeta,
Phyllodocidae,
Mysta ctena n. sp.,
Japon,
espèce nouvelle.

A new species of phyllodocid polychaete, *Mysta ctena* n. sp., is described from Misaki, central Honshu, Japan. It is distinguished from other *Mysta* in having two types of thorny proboscis papillae, rather than a single kind. Two previously unobserved characters in *Mysta* are introduced: a row of papillae on the dorsal tentacular cirri, and small conical papillae on the inside of the proboscis. A table is provided with diagnostic characters for all species of *Mysta*.

RÉSUMÉ

KEY WORDS
Annelida,
Polychaeta,
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Japan,
new species.

Une nouvelle espèce de Mysta (Annelida, Polychaeta, Phyllodocidae) du Japon.
Une nouvelle espèce de Polychète Phyllodocidae, *Mysta ctena* n. sp., est décrite de Misaki, Honshu central, Japon. Elle se distingue des autres espèces de *Mysta* par la présence de deux types de papilles épineuses sur le proboscis plutôt qu'une seule sorte. Deux caractères précédemment non observés chez *Mysta* sont présentés : une rangée de papilles sur les cirres tentaculaires dorsaux et une petite papille conique à l'intérieur du proboscis. Un tableau des caractères différentiels de toutes les espèces de *Mysta* est proposé.

INTRODUCTION

In 1996, the first author collected about 30 specimens of *Mysta* Malmgren, 1865 by dredging on sandy and muddy bottoms at 6–10 m depths in Misaki, Japan, with additional animals obtained intertidally. The specimens differ from all known *Mysta* in possessing two types of thorny papillae on the proboscis, rather than a single type. This new Phyllodocidae Örsted, 1843 is described and compared to other *Mysta*, and some previously unobserved characters for the group are detailed. In order to ease future identification of members of *Mysta*, a summary of diagnostic characters for all species is provided in Table 1.

ABBREVIATIONS

Specimens in the collection of the first author are indicated by “TK”.

Museums and other institutions are indicated by the following abbreviations:

HZM	Zoological Museum, Hamburg, Germany;
MNHN	Muséum national d’Histoire naturelle, Paris;
SMNH	Swedish Museum of Natural History, Stockholm;
USNM	Smithsonian Institution, Washington D. C.;
ZIHU	Zoological Institute, Faculty of Science, Hokkaido University, Sapporo;
ZMUC	Zoological Museum, University of Copenhagen.

TABLE 1. — Characters and character distribution among species of *Mysta*. Abbreviations: **dc**, dorsal cirri; **dtc** dorsal tentacular cirri; **vtc**, ventral tentacular cirri.

Species	Source of information	Proboscis papillae in lateral rows everted	Thorny proboscis papillae inside	Teeth direction of thorny papillae on proboscis	Small conical papillae proboscis	Row of papillae dtc
<i>Mysta ctena</i> n. sp.	holotype, 11 paratypes, 15 other specimens (see text)	single row, 14 papillae, shape discoid	two types: small rounded dorsal, and large elongated dorso-lateral	posteriorly directed radiating	present present	present absent
<i>M. barbata</i>	Malmgren 1865; Wilson 1988; Pleijel 1993; 2 specimens from Sweden (SMNH 22453, 22495), 5 specimens from Kara Sea (MNHN-POLY 59)	2-3 indistinct rows, 35-70 papillae (total rows), shape pointed	small rounded dorsal			
<i>M. maculata</i>	Treadwell 1920; Wilson 1988; holotype (USNM 18940)	single row, 15-16 papillae, shape discoid	large elongated dorso-lateral	unknown	probably present	absent
<i>M. ornata</i>	Grube 1878; Uschakov 1972	unknown	unknown	unknown	unknown	unknown
<i>M. picta</i>	Fauvel 1923; Pleijel 1993; 9 specimens from Arcachon, France (SMNH 22603)	proboscis with papillae laterally and ventrally, shape rounded	small rounded dorsal and proximal ventral	posteriorly directed	present	absent
<i>M. platycephala</i>	Augener 1913; Wilson 1988; syntype (HZM V-7928)	single row, c. 5 papillae, shape discoid	absent	non applicable	unknown	absent
<i>M. syphodonta</i>	Fauvel 1923; 2 specimens from Naples, Italy (ZMUC-POL-1005, 1006)	single row, c. 30 papillae, shape pointed	small rounded dorsal on distal part only	radiating	probably present	absent
<i>M. tchangsii</i>	Uschakov & Wu 1959; 1 specimen from Japan (TK)	single row, c. 60 papillae, shape irregular	simple spine dorsal	non applicable	present	absent

Species	Relative length dtc and vtc	Dc median segments	Dorsal cirrhopores	Rostrum of setal shafts	Eyes	Pigmentation
<i>Mysta ctена</i> n. sp.	similar	oval, symmetrical, longer than wide	short	single large anterior tooth, usually two smaller, posterior teeth (rarely one)	medium sized, distinct	live unknown, preserved white with irregularly scattered reddish brown pigment
<i>M. barbata</i>	dtc twice as long as vtc	almost circular, symmetrical, as long as wide	short	single large anterior tooth, single smaller posterior tooth	medium sized, distinct	live yellow white with three distinct brown longitudinal bands on dorsum, preserved similar
<i>M. maculata</i>	similar	rounded triangular, asymmetrical, wider than long	prominent	single large anterior tooth, single smaller posterior tooth	small	live unknown, preserved light brown with dark spots, forming transverse line on anterior segments
<i>M. ornata</i>	similar	oval, symmetrical, longer than wide	unknown	single large tooth on each side	small, indistinct	live unknown, preserved with three dorsal brown-violet longitudinal stripes
<i>M. picta</i>	similar	oval, symmetrical, as long as wide, or slightly wider than long	short	single large anterior tooth, single smaller posterior tooth	medium sized, distinct	live yellowish white, dorsum with four brown spots on each segment, and yellow pigment in intersegmental area, preserved with brown spots only
<i>M. platycephala</i>	similar	oval, symmetrical, longer than wide	short	single large anterior tooth, single smaller posterior tooth	medium sized (colour not retained in preserved specimens)	live unknown, preserved with dorsum uniformly light yellow brown with short brown transverse lines near base of parapodia
<i>M. syphodonta</i>	similar	oval, asymmetrical, longer than wide	prominent	single large anterior tooth, single smaller posterior tooth	present, size uncertain (not retained in preserved specimens)	live bluish violet dorsum, with yellow cirri, preserved similar
<i>M. tchangsii</i>	similar	oval or triangular, asymmetrical, longer than wide	prominent	single large anterior tooth, single smaller posterior tooth	absent or small, indistinct	live yellowish brown dorsum, with irregularly scattered dark violet spots, preserved similar

MATERIAL AND METHODS

Intertidal specimens were collected by hand, subtidal specimens by dredging. Specimens were relaxed in 10% magnesium chloride, fixed in calcium carbonate-buffered formalin in sea water (10%) for at least 24 hours, rinsed in fresh water, and subsequently transferred to 70% ethanol. All drawings were prepared from preserved animals with a camera lucida. For SEM observations, formalin-fixed specimens were freeze dried, sputter-coated, and examined in a JOEL JSM-5400LV.

SYSTEMATICS

Genus *Mysta* Malmgren, 1865

Mysta – Wilson 1988.

TYPE SPECIES. — *Mysta barbata* Malmgren, 1865, by monotypy.

Mysta ctена n. sp. (Figs 1-3)

MATERIAL EXAMINED. — **Koajiro Bay**, Misaki, Honshu, Japan, 10 m, shell sand, 21.V.1996, coll. TK, holotype (ZIHU 1372), 6 paratypes (ZIHU 1373-1377), 5 paratypes (MNHN-POLY 59); 9 m, fine sand, coll. TK, 21.V.1996, 1 specimen.

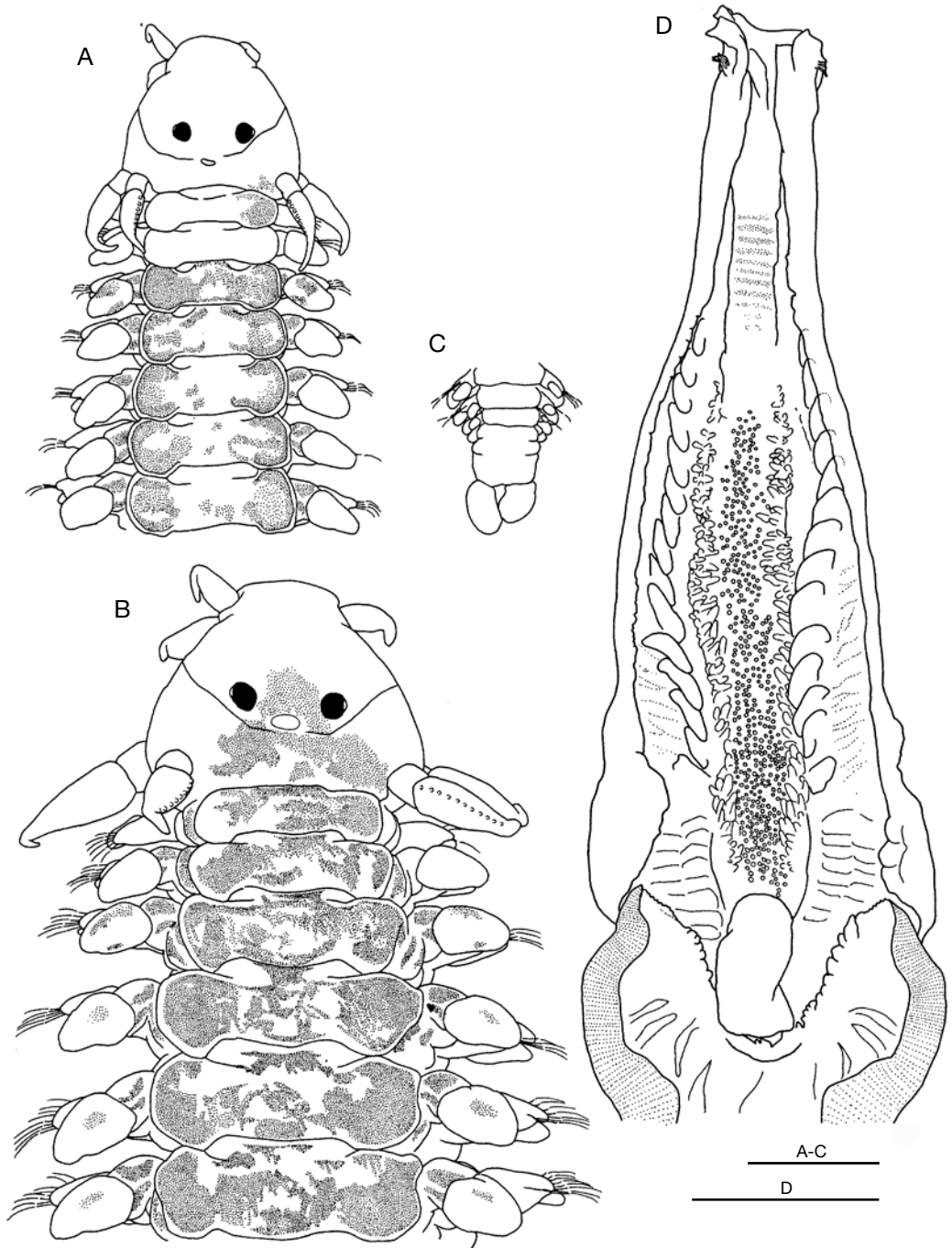


FIG. 1. — *Mysta ctena* n. sp.; **A**, anterior end of holotype, dorsal view; **B**, anterior end of large paratype, dorsal view; **C**, posterior end of holotype, ventral view; **D**, dissected proboscis of paratype, ventral view (median area corresponds to dorsal part). Scale bars: 500 μ m.

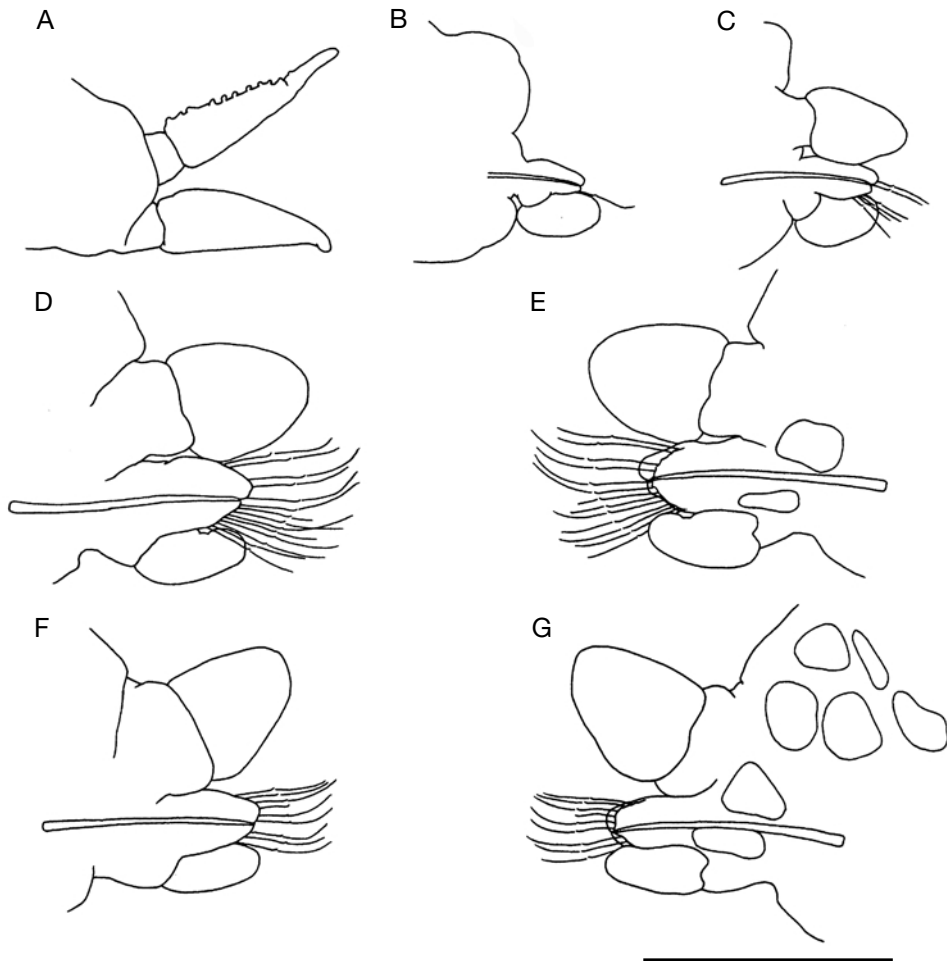


FIG. 2. — *Mysta ctena* n. sp.; **A**, tentacular cirri, segment 2, anterior view; **B**, parapodium of segment 3, anterior view; **C**, parapodium of segment 4, anterior view; **D**, parapodium of segment 28, anterior view; **E**, same, posterior view; **F**, parapodium of segment 83, anterior view; **G**, same, posterior view. Scale bar: 500 μ m.

Off Bentenbana. Misaki, Honshu, Japan, 8 m, mud, 21.V.1996, coll. TK, 3 specimens; 6 m, sand, 21.V.1996, coll. TK, 10 specimens.

Abratsubo. Misaki, Honshu, Japan, intertidal, mud, 19.V.1996, coll. TK, 2 specimens; 20.V.1996, 2 specimens.

ETYMOLOGY. — Named for the comb-like appearance of the papillose dorsal tentacular cirri when seen in anterior or posterior view, “*ctena*” being Greek for comb.

DISTRIBUTION. — Known only from Misaki, Japan. From intertidal to 10 m of depth, in mud, sand, and shell sand.

DESCRIPTION

Holotype complete, 21 mm long and 1 mm wide at middle of body (including parapodia but excluding chaetae), for 112 segments. Largest examined specimen 43 mm long and 1.7 mm wide at middle of body, for 140 segments (lacking posterior end, ZIHU 1374). See Fig. 4 for other specimens.

Body slender, dorso-ventrally flattened, anteriorly and posteriorly tapered. Prostomium rounded, about as long as wide, with pair of distinct eyes with lenses (Fig. 1A, B). Nuchal papilla large,

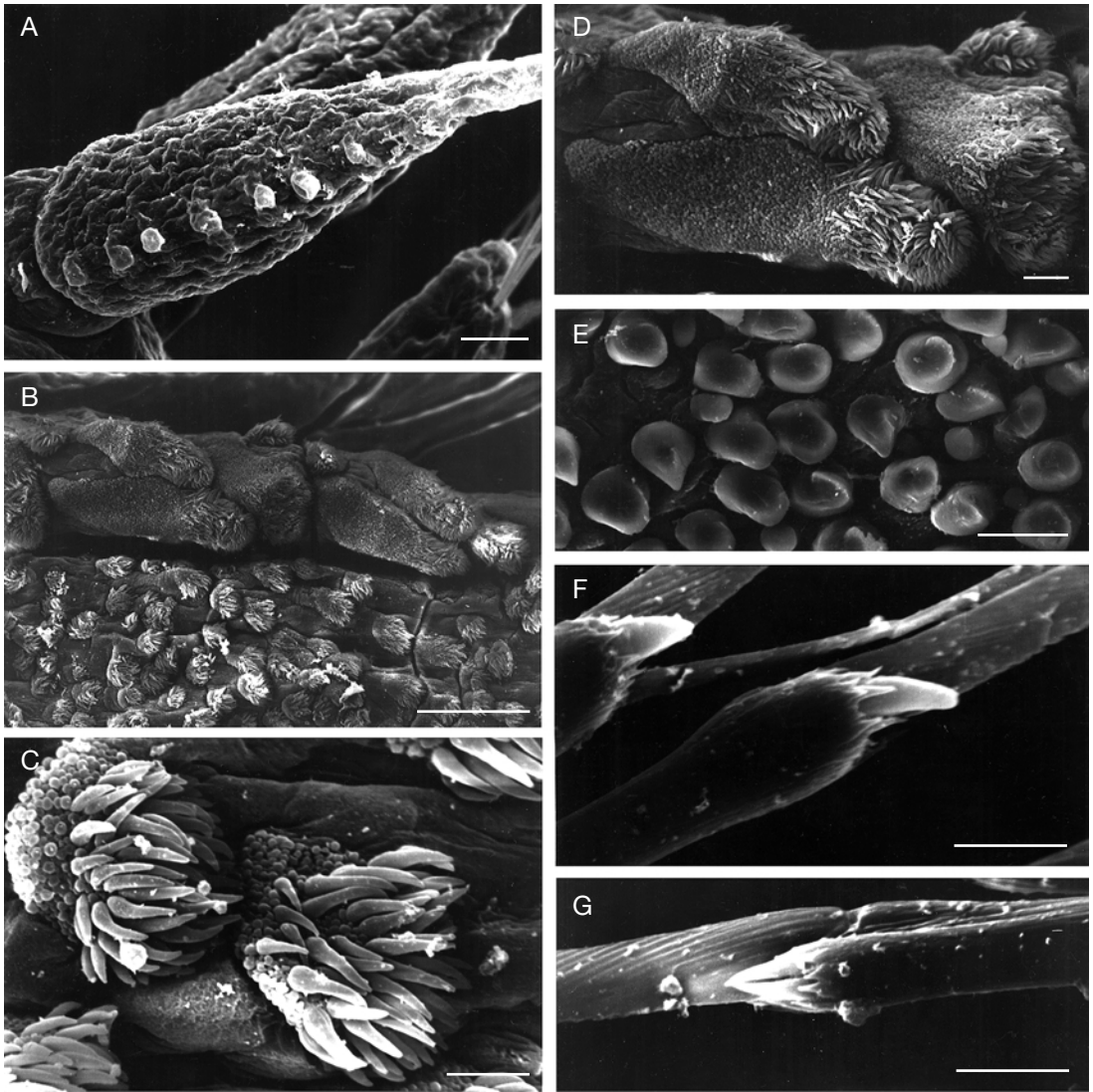


FIG. 3. — SEM micrographs of *Mystra ctena* n. sp.; **A**, dorsal tentacular cirrus, dorsal view; **B**, dorsal proboscis papillae; **C**, small type of dorsal proboscis papillae; **D**, large type of dorsal proboscis papillae; **E**, internal proboscis papillae; **F**, rostrum of setal shaft, median parapodium, anterior view; **G**, same, posterior view. Scale bars: A, 20 μ m; B, 50 μ m; C, F, G, 5 μ m; D, E, 10 μ m.

may be poorly delineated and difficult to distinguish. Proboscis with single row of large, discoidal papillae on each side; proximal, and distal-most sides without papillae (Fig. 1D). Proboscis dorsally with two types of thorny papillae (Fig. 3B); small rounded papillae on mid-dorsal part (Fig. 3C), and large elongated on dorso-lateral parts (Fig. 3D). Terminal pro-

boscis ring with large number of papillae; dorsal and ventral part with small conical papillae, lateral part with large rounded papillae. Internal side of ring densely covered by minute conical papillae (Fig. 3E), and with pair of large lateral papillae.

First visible segment (segment 2) with two pairs of tentacular cirri. Dorsal tentacular cirri as long

as ventral ones, with single row of rounded papillae on dorsal side; each row with 7-13 papillae (Figs 1A, B; 2A; 3A), indistinct in some specimens. Ventral tentacular cirri without row of papillae. Neuropodia of segment 3 with *c.* 10 chaetae and ventral cirri of similar size and shape as those of following segments (Fig. 2B). Dorsal cirri of median segments oval, slightly longer than wide (Fig. 2C-E); dorsal cirri of posterior segments approaching triangular shape (Fig. 2F, G). Neuropodial lobes with 10-15 chaetae. Rostrum of chaetal shaft asymmetrical with single main tooth on anterior side, and two (rarely one) smaller main teeth on posterior side (Fig. 3F, G). Blades long and slender. Ventral cirri narrow, as long as neuropodial lobes (Fig. 2E, G). Pygidial cirri twice as long as wide, with rounded ends (Fig. 1C). Pygidial papilla absent.

Colour

Preserved specimens white with irregular reddish brown pigmentation on dorsum, on dorsal cirrophores and on dorsal cirri. Dorsal pigmentation from segment 4 in small specimens, from prostomium in larger ones. Venter unpigmented. Eyes blackish.

CHARACTER VARIATION WITHIN *MYSTA*

The new species belongs to the *Eteone*-group (including *Eteone* Savigny in Lamarck, 1820, *Hypereteone* Bergström, 1914 and *Mysta*), as seen from the presence of four antennae, a nuchal papilla, two pairs of tentacular cirri on the first visible segment (segment 2), and the absence of tentacular or dorsal cirri on segment 3 (Pleijel 1991). It is assigned to *Mysta* based on the presence of thorny papillae and lateral rows of papillae on the proboscis, and the presence of short pygidial cirri with rounded ends.

A comparison of characters between *M. ctена* n. sp. and other species of *Mysta* is complicated by the situation that only limited information is available from the literature (e.g., Wilson 1988; Pleijel 1993), most notably relating to characters of the proboscis. For this reason, we re-examined the known species of *Mysta* for the presence and

distribution of a number of characters (summarised in Table 1).

Whereas thorny papillae (Fig. 3B, C) are unique within *Mysta* (absent from *M. platycephala* [Augener, 1913]; see below), three different types may be distinguished within the group: 1) small rounded papillae (Fig. 3C); 2) large elongated papillae (Fig. 3D); 3) single spine papillae:

1. the small rounded type is 12-18 μm in diameter in *M. ctена* n. sp., 12-16 μm in *M. barbata* Malmgren, 1865, and has a large number of teeth distributed over the surface (Fig. 3C). These papillae were observed in *M. ctена* n. sp., *M. barbata*, *M. picta* Quatrefages, 1866 and *M. syphodonta* (Delle Chiaje, 1822). There are some differences present between the taxa, both in distribution and morphology of the papillae. In *M. ctена* n. sp., *M. barbata* and *M. syphodonta* they are present only dorsally on the proboscis; in *M. picta* they occur also on the proximal part of the ventral side. Further, in *M. barbata* and *M. syphodonta* the papillae are fully rounded and the teeth are radiating, whereas in *M. ctена* n. sp. and *M. picta* some papillae are slightly elongated, and the teeth are directed posteriorly on the proboscis in everted state;

2. the large elongated type is 60-100 μm long in *M. ctена* n. sp., and has, like the previous type, a large number of thorns distributed over the surface (Fig. 3D). These papillae are present in *M. ctена* n. sp. and *M. maculata* Treadwell, 1920, and appear in two to three indistinctly separated longitudinal rows on each dorso-lateral side of the proboscis. Our observations from the holotype and only known specimen of *M. maculata* (USNM 18940) on the distribution of the papillae deviate from those of Wilson (1988). He described the dorsal side of the proboscis in *M. maculata* as having a dense band of minute denticulate papillae in transverse rows, but whereas we could confirm the transverse folds, we were unable to detect any denticulate papillae;

3. the single spine type is 12-18 μm in diameter, lacks small teeth, and is provided with a single triangular spine. It occurs only in *M. tchangsii* Uschakov & Wu, 1959, and the papillae appear dorsally, either individually or in small clusters of two to five on the proboscis.

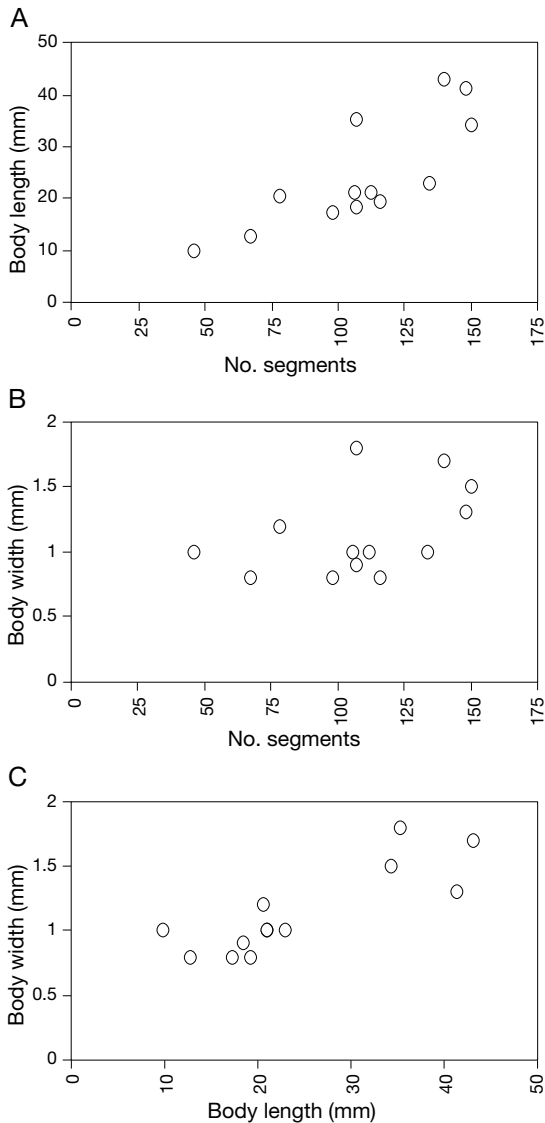


FIG. 4. — *Mysta ctena* n. sp.; relationships between **A**, number of segments and body length; **B**, number of segments and body width; **C**, body length and body width.

The papillae in the lateral, longitudinal rows in *Mysta* are large and fleshy, they may be conical, discoidal, or rounded, and they can be arranged in single or several rows. *Mysta syphodonta* and *M. barbata* both have conical papillae, but differ in that *M. syphodonta* has a single row, and *M. barbata* 2-3 (although poorly delineated) rows. Discoidal papillae are present in *M. ctena* n. sp.,

M. maculata and *M. platycephala*, all of which have the papillae in single rows, and rounded papillae were observed in *M. picta* only, where they cover the proboscis both laterally and ventrally. These papillae in *Mysta tchangsii* also have rounded ends, but are irregularly shaped and arranged in single rows.

The presence of small conical papillae on the inside of the proboscis (Fig. 3E) is a previously unnoticed character within Phyllodocidae. Whereas these papillae are large in *M. ctena* n. sp. and *M. tchangsii*, they are very small and difficult to observe in *M. barbata* and *M. picta*. Due to uncertain observations we are unable to confirm their occurrence in *M. maculata* and *M. syphodonta*. Their presence or absence in *M. ornata* and *M. platycephala* is unknown, and further investigation is needed to assess the variation and distribution of this character.

The presence of a row of papillae on the dorsal tentacular cirri (Fig. 3A) in *M. ctena* n. sp. represents another new character. The papillae, which are situated on the dorsal side of the dorsal tentacular cirri, are small and almost transparent, and examination of dissected cirri at high resolution in a compound microscope is necessary for verification. The papillae appear to be absent from all other species of *Mysta*, although their presence or absence is unknown for *M. ornata*. Furthermore, due to the poor condition of some specimens of the examined taxa, the distribution of this character warrants further investigation.

The shape of the dorsal cirrophores in posterior segments is characteristic in larger specimens of *M. maculata*, *M. syphodonta* and *M. tchangsii*, which all have cirrophores that are prominent and elongated. This differentiation between more anterior and posterior cirrophores is absent from all other species of *Mysta*, including *M. ctena* n. sp., which have short cirrophores along the entire body.

Wilson (1988) re-examined a syntype (HZM V-7928) of *M. platycephala* and additional specimens from Australia. The proboscis was described as having dorsal bands of small thorny papillae in transverse rows, and 10-15 lateral triangular papillae, and with the rostra of the

chaetal shafts as carrying one large tooth on each side. Our re-examination of the syntype instead indicates that it lacks thorny papillae, that there are five lateral papillae which are discoid in shape, and that the rostra of the chaetal shafts have a single large tooth. Either these characters are variable, or several species were present in Wilson's material; the matter warrants further examination. Comparison with *Mysta ornata* (Grube, 1878), described from northern Japan Sea, is problematic in that we have been unable to locate any types or reliably identified specimens, and we lack information relating to the thorny papillae and several other characters in this taxon. Although *M. ornata* at present must be considered a *nomen dubium*, the brief original description indicates that it differs from *M. ctena* n. sp. in having small eyes and three dorsal longitudinal violet bands.

Mysta ctena n. sp. is unique within *Mysta* in having both small rounded and large elongated thorny papillae; all other known members are provided with a single kind of thorny papillae only. Although it shares similarities in the shape and distribution of the lateral proboscis papillae with *M. maculata*, *M. ctena* n. sp. is also unique in having rows of papillae on dorsal tentacular cirri (although the absence of this character requires confirmation in several species of *Mysta*). Although it is obvious that *M. ctena* n. sp. represents a new member of *Mysta*, we are currently unable to specify any phylogenetic relationships within the group.

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