

A new family of polychaeta—Euniphysidae

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Abstract—*Euniphysa*, originally a genus of the family Eunicidae, was erected by Wesenberg-Lund in 1949, and for a long time there has been only one species in this genus. The present report is based on our samples collected from the South China Sea, and we consider that the differences between *Euniphysa* and *Eunice* are very significant. Five occipital tentacles distributed unequidistantly; the jaw consists of 6 pairs of maxillary plates; the body may be divided into anterior region and posterior region, etc. Therefore we suggest that *Euniphysa* should be separated from Eunicidae, and become a new family Euniphysidae. At present this family includes 3 genera, namely, *Euniphysa*, *Paraeuniphysa* and 1 new genera *Heterophysa*; Totally there are 7 species, including 3 new species and 1 new combination species.

Euniphysa, originally a genus of the family Eunicidae, was erected by Wesenberg-Lund in 1949, with *Euniphysa aculeata* Wesenberg-Lund as the type species, the holotypes being collected from the Persian Gulf and the Gulf of Oman. On the basis of the specimens collected from the water of the Sunda Islands and Java, Indonesia during the "Siboga" Expedition in 1899~1900, Pettibone reported the species for the second time. For a long time only one species in this genus has been reported. In 1981 Wu *et al.* discovered *Euniphysa oculata* in the waters of the South China Sea. In 1986 Miura corrected the new species *Eunice spinea* collected from Kagosihima Bay in his publication of 1977 to *Euniphysa spinea*. Now this genus has 3 species.

The family Eunicidae comprises a fairly large number of species, including about 8 genera, among which *Eunice* is the largest and *Euniphysa* the smallest genus. In 1986 Miura considered that according to the types of setae the members of *Euniphysa* consists mainly of two groups; i. e. the group with and the group without falcigerous setae. We consider that *Euniphysa* is very much different from *Eunice* and suggest to establish the new family Euniphysidae by separating *Euniphysa* from Eunicidae.

The main characteristics of Euniphysidae are as follows:

1. Five occipital tentacles, with short basal part, distributed unequidistantly, the distance between the inner and the outer lateral tentacles is shorter than that between the median tentacle and the inner lateral tentacles.

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2. The maxillary formula. The jaw consists of 6 pairs of maxillary plates, on the right side M_{II} is fused with M_{IV} , the teeth of the maxillary plates M_{II} - M_{V} are not serrate, and the teeth are moderately developed and U-shaped.
3. The body may be divided into the anterior region without compound setae and the posterior region with compound setae.
4. Dorsal cirri are conical. Lower part expanded, base fairly slender, forming a short stem.

The type species of this new family is *Euniphysa aculeata* reported by Wesenberg-Lund in 1949. With *Euniphysa* as the type genus, the new family Euniphysidae is erected. At present this family includes 3 genera, namely, *Euniphysa*, *Paraeuniphysa* and one new genera *Heterophysa*; altogether there are 7 species, including 3 new species and 1 new combination. The names of the species are listed as follows:

- Euniphysa aculeata* Wesenberg-Lund, 1949;
Euniphysa oculata Wu, Sun et Chen, 1981;
Euniphysa unicus sp. nov. ;
Paraeuniphysa taiwanensis Wu et He, 1988;
Paraeuniphysa falciseta sp. nov. ;
Paraeuniphysa spinea (Miura 1977), comb. nov. ;
Heterophysa tridontesa sp. nov. .

FAMILY EUNIPHYSIDAE FAM. NOV.

Type species: *Euniphysa aculeata* Wesenberg-Lund, 1949

Diagnosis: Prostomium slightly bilobed and fused with the fleshy palps; with 5 occipital tentacles, eyes present or absent. Two apodous segments, the second segment bearing a pair of cirri; dorsal cirri conical, lower part expanded, the base relatively slender, with short stem, with acicula. Branchiae present, with filaments or single; ventral cirri present on setiger I and the posterior segments, the ventral side of the anterior segment with developed glandular pads. Body divided into the anterior region without compound setae and the posterior region with compound setae, the parapodia with several neuro-acicular setae, and only one aciculum posteriorly. Parapodis with setae of several kinds; simple setae, compound setae, acicular setae, subacicular setae, subacicular hooky setae and comb setae. Simple setae in several kinds, varying with species, such as winged capillary setae; serrate-dentate capillary setae and unidentate spinigerous setae; compound setae of two kinds; spinigerous and falcigerous setae. The maxillary formula; composed of 6 pairs of maxillary plates, right M_{II} fused with M_{IV} , the teeth of maxillary plate fairly long and incisor shaped, with one pair of anal cirri.

KEY TO GENUS AND SPECIES

- 1a. 9 setigers devoid of compound setae, without falcigers
 (*Euniphysa*) ... 2
- 1b. Setigers without compound setae not 9 in number, with compound falcigers 4

- 2a. With eyes, branchiae with single filaments *Euniphysa oculata*
- 2b. Without eyes, branchiae with filaments 3
- 3a. With simple unidentate neurosetae on setigers without compound setae, comb setae short ...
..... *Euniphysa unicus*
- 3b. Without simple unidentate neurosetae on setigers without compound setae, comb setae long...
..... *Euniphysa aculeata*
- 4a. 6 setigers without compound setae, notosetae serrated capillary, M_1 with 3 teeth
..... (*Heterophysa*)
..... *Heterophysa tridontesa*
- 4b. 10 setigers without compound setae, notosetae without serrate capillary, M_1 with 1 tooth ...
..... (*Paraeuniphysa*)5
- 5a. Eyes present. On setigers devoid of compound setae, with simple unidentate neurosetae
..... *Paraeuniphysa spinea*
- 5b. Eyes absent. On setigers devoid of compound setae, without simple unidentate neurosetae ... 6
- 6a. Median tentacle extending backward to 18th setiger, branchiae start from setiger 17, compound
falcigers beginning appearance after setiger 25 *Paraeuniphysa taiwanensis*
- 6b. Median tentacle extending backward to 10th setiger, branchiae starting from setiger 14, com-
pound falcigers beginning appearance after setiger 31
..... *Paraeuniphysa falciseta*

Euniphysa Wesenberg-Lund, 1949.

Type species: *Euniphysa aculeata* Wesenberg-Lund, 1949.

Type locality: the Persian Gulf and the Oman Gulf.

The five occipital tentacles, unequidistantly distributed; the distance between the inner and the outer lateral tentacles is shorter than that between the median and the inner lateral tentacles. The jaw apparatus consists of paired mandibles and 6 pairs of maxillary plates; body divided into anterior and posterior regions, the anterior region bears 9 setigers, compound seta begins on setiger X; setae include acicular, subacicular hooks, simple limbate capillaries, simple spinigers of unidentate setae; only compound spinigers present but without compound falcigers, comb setae present.

1. *Euniphysa aculeata* Wesenberg-Lund, 1949

2. *Euniphysa oculata* Wu, Sun et Chen, 1981

Euniphysa oculata Wu Baoling *et al.*, 1981, 22, Figs 1~2 Maxillary formula: $M_I = 1+1$, $M_{II} = 4+4$; $M_{III} = 2+0$; $M_{IV} = 2+3$; $M_V = 1+1$; $M_{VI} = 1+1$. The authors did not describe the number of setigers in the anterior region.

Distribution: west of the Xisha Islands

3. *Euniphysa unicus* sp. nov.

Type locality: Beibu Bay (109°21' E, 21°20' N), in 12 m, mud and sand.

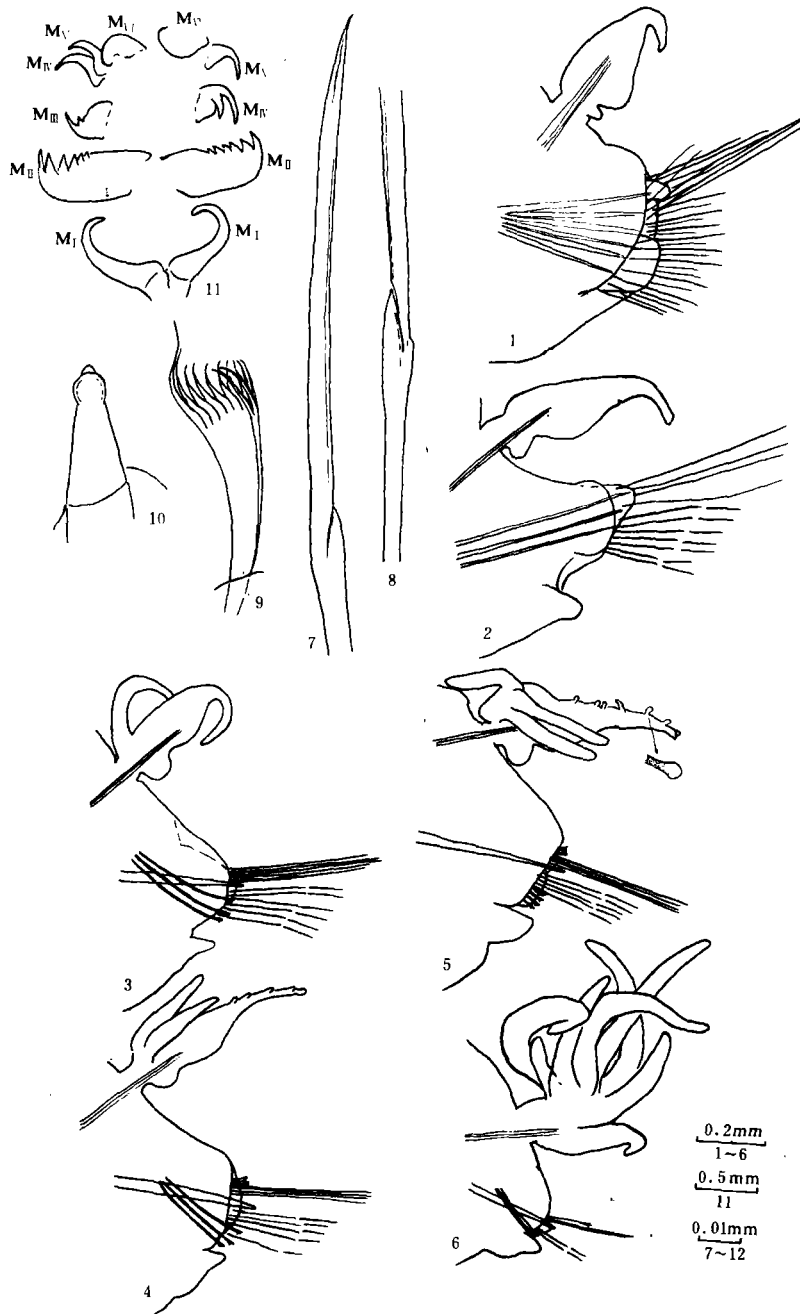


Fig. 1. *Euniphysa unicus* sp. nov. 1. Parapodium 8; 2. parapodium 14; 3. parapodium 31; 4. parapodium 46; 5. parapodium 47; 6. parapodium from caudal region; 7. simple unidonta seta on anterior region; 8. compound seta; 9. compound spinigers; 10. aciculum; 11. maxillae.

This species is very similar to *Euniphysa aculeata*, the prostomium is bilobed with fleshy and fused palps, with 5 occipital tentacles distributed non-uniformly, the distance between the inner and the outer lateral tentacles is shorter than that between the median tentacle and the inner lateral tentacle, the median tentacle is the longest and extends backwards to setiger XIII, eyes absent; with a pair of tentacular cirri.

The IX segments of the anterior region without compound setae. The notosetae of setigers II-IV are simple limbate capillaries. The neurosetae are simple unidentate setae (Fig. 1 (1)), 5~6 acicular in a fan-shaped arrangement. Parapodium 1 with ventral cirri and after parapodium 2 with glandular pads and without ventral cirri (Fig. 1 (1)). Compound spinigers begin to appear from parapodium 10 (Fig. 1 (8)) but without compound falcigers, meanwhile, the ventral cirri appear again and acicular begin to decrease. Subacicular hooks appear from setiger XX, with hood, bidentate, 4 setae at most (Fig. 1 (3), (4)). Acicular setae extend out from the tips of the parapodia, the anterior end being rounded and blunt, with an U-shaped auricular protrusion laterally (Fig. 1 (10)). The terminal pieces of compound setae are spinigerous, with wings on one side, just like pseudocompound setae. Comb setae semi-circular, short, and with 10~12 teeth, the two teeth on the outer side fairly long (Fig. 1 (9)), appearing about the time after setiger XL.

Branchiae are branched, comb-like, starting on setiger XVIII, palpilus, setiger XL appears to have two filaments (Fig. 1 (4)), 3 filaments appear from setiger XLV backwards but is still poorly developed, posterior segments with developed filaments, 7 filaments at most (Fig. 1 (6)). Beginning from about parapodium 40, papillae appear on the outer side of the dorsal cirri, numbering 7~8 at most (Fig. 1 (5)). The maxillary formula: $M_I = 1+1$, $M_{II} = 6+6$, $M_{III} = 2+0$, $M_{IV} = 1+2$ (a smooth and round tubular process between the 2 right teeth); $M_V = 1+1$, $M_{VI} = 1+1$ (rounded tablet).

Type specimens: Holotype: SSBT-0033, Paratype: SSBT-0034, both deposited in the South China Sea Institute of Oceanology, Academia Sinica.

Table 1. Comparison among the species

Characters	<i>E. aculeata</i>	<i>E. oculata</i>	<i>E. unicusu</i>
Eye	absent	present	absent
Number of branchial filaments	8 at most	one	7 at most
Posterior dorsal cirri on median region of body	without papillae	without papillae	with papillae
Simple unidentate setae	absent	absent	present
Shape of comb setae	long stem	long stem	short stem
Subacicular setae appearing	setiger 24	setiger 27	setiger 20

Paraeruniphysa Wu et He, 1988

Type species: *Paraeruniphysa taiwanensis* Wu et He, 1988

Type locality: Central Taiwan Strait.

The prostomium is fleshy, bilobed, with a deep median furrow. The five occipital tentacles non-uniformly arranged, the distance between the inner and outer tentacles is shorter than that between the median tentacle and the inner lateral tentacle. Two apodous segments, the second segment bearing 1 pair of cirri. In the anterior region the setigers without compound setae. The setae comprise limbate capillary setae, comb-setae, subacicular hooked setae, compound spinigers and compound falcigers, and some bear simple unidentate setae.

This genus is very similar to *Euniphysa*, the main differences being that in *Euniphysa* there are 9 setigers without compound falcigerous setae in the anterior region whereas in this genus there are 10 setigers with compound falcigerous setae in the anterior region.

4. *Paraeuniphysa taiwanensis*; Wu et He

Paraeuniphysa taiwanensis; Wu et He, 1988; 123, Figs 1~5.

The prostomium is fleshy, bilobed, with a round front. Median tentacle extends backward to the 18th setiger, branchiae start from setiger 17. Compound falcigers begin to appear after setiger 25. $M_1 = 6 + 6$.

Distribution: Central Taiwan Strait (25°12'N, 120°13.75'E and 24°30'N, 119°00'E).

5. *Paraeuniphysa falciseta* sp. nov.

The prostomium is bilobed, with a deep median furrow, the thick fleshy palps are fused with the prostomium. The five occipital tentacles are arranged non-uniformly. The distance between the inner and outer lateral tentacles is shorter than that between the median and inner lateral tentacles, the median tentacle is the longest and extends backward to the 10th setiger, the inner laterals extend to setiger 7 and the outer laterals the shortest, extend to the first segment, the second segment with a pair of cirri Fig. 2 (1). Eyes absent.

The parapodia subbiramous, without notopodia. The first parapodium small; the dorsal and ventral cirri large, the dorsal cirri are flat laterally and triangular, with the lower part expanded and fairly slender short stems, slender curved tips. The ventral cirri are thick, fleshy and blunt. The second parapodium begins to become widened, their dorsal cirri are basically similar to those of the first parapodium. The ventral cirri become shortened, the following dorsal cirri gradually become subconical, the base expanded and with short stem.

The ventral cirri gradually form cushion-like glandular bodies. The branchiae start from setiger 14, have 2 papillae at first and comb-like later, 3~4 branches at most (Fig. 2 (11)). The branchial filaments are poorly developed, shorter than the dorsal cirri.

The body is divided into the anterior and posterior regions. In the anterior region are altogether 10 setigers, all of which bear simple winged capillary. The posterior region begins after setiger XI, the upper part of notopodium with simple setae, the lower part of neuropodium with compound spinigerous setae (Fig. 2 (4)), the compound falcigerous begin to appear after setiger XXXI (Fig. 2 (5)). At first only one seta appears, and gradually the setae increase to 6~8 in number. The subacicular hooky setae are bidentate with hood, appearing almost simultaneously with the compound falcigers, at first

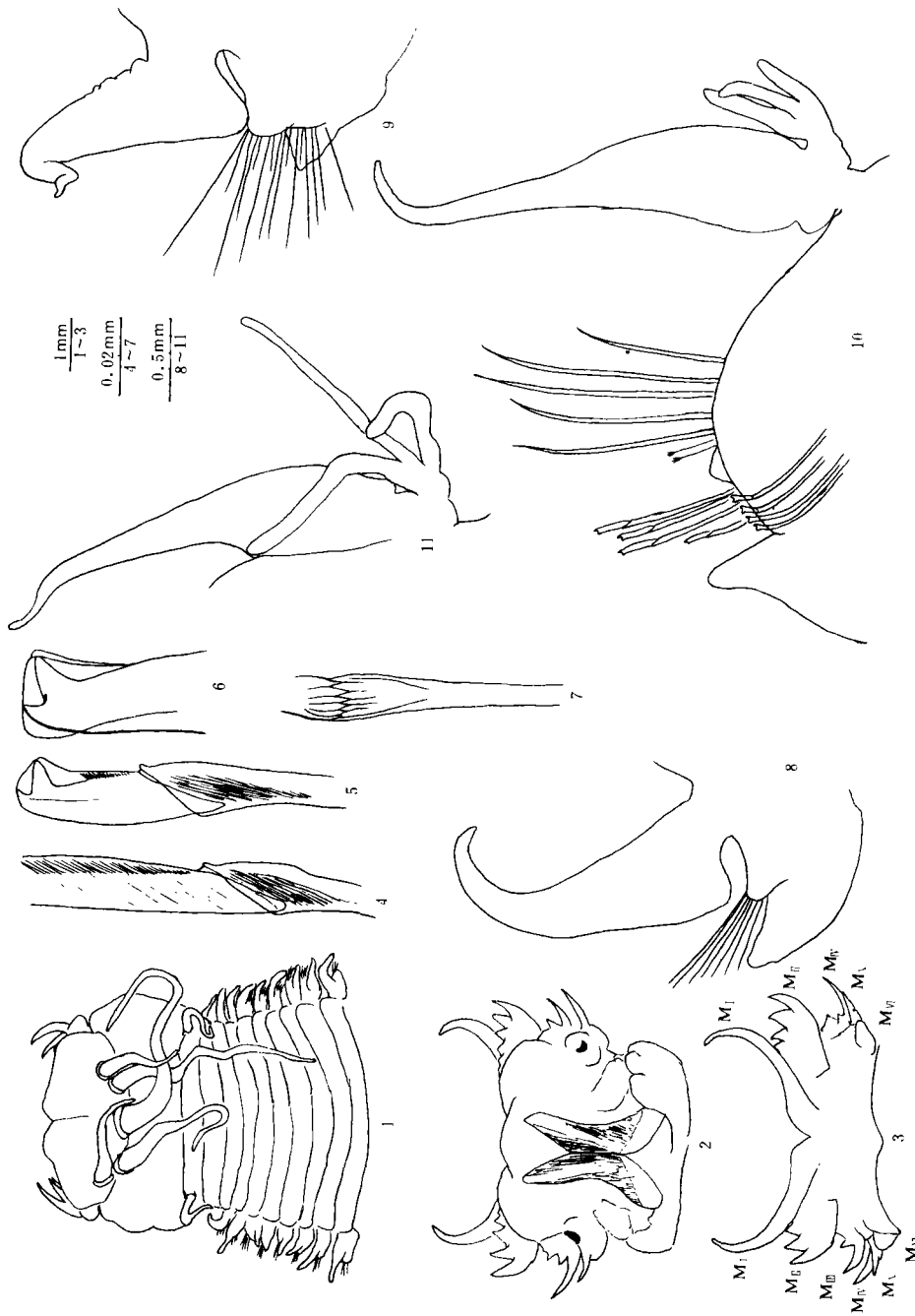


Fig. 2. *Paraeuniphysa falcirostris* sp. nov. 1. Dorsal view, anterior end; 2. ventral view, anterior end; 3. maxillae; 4. lower compound spinigerous seta from setiger 11; 5. lower compound falxiger from setiger 33; 6. subacicular bidentate hooded hook from setiger 31; 7. upper comb-seta; 8. first parapodium, posterior view; 9. parapodium 2, posterior view; 10. parapodium 45, posterior view; 11. branchiae from setiger 50.

only one seta appears and gradually 4 setae begin to appear from about setiger XXXIII, in a fan-shaped arrangement and located in the lower part of neuropodium (Fig. 2 (6), (10)). The comb setae bear 9~10 teeth (Fig. 2 (7)), located in the upper part of notopodium.

There is a pair of mandibles, the mandibular apparatus consists of 6 pairs of mandibular plates, the teeth of the mandibular plates M_{III} - M_V are developed and canine-tooth shaped. The maxillary formula is: $M_I = 1+1$; $M_{II} = 5+4$; $M_{III} = 2+0$; $M_{IV} = 1+3$; $M_V = 1+1$; $M_{VI} = 1+1$. M_{II} on the right is fused with M_{IV} .

Type specimens: Holotype SSBT-0015 and Paratype SSBT-0016, all collected from the southern waters of the Nansha Islands (the South China Sea), 17 specimens in all, at a water depth of 111 m, sandy mud deposited in the South China Sea Institute of Oceanology, Academia Sinica.

6. *Paraeuniphysa spinea* (Miura) comb. nov.

Eunice spinea Miura, 1977: 64~67, Fig. 2.

Euniphysa spinea, Miura, 1986: 312~315. Figs 35~37.

This species is very similar to *Paraeuniphysa falciseta* in the external form, the main differences are as follows:

A pair of semilunar eyes, relatively small, located on the outside of the basal part of the inner lateral tentacles. (Fig. 3 (1)).

The branchial filaments are developed, beginning on setiger IX, comb-shaped, and about 4~5 filaments at most, and about as long as the dorsal cirri (Fig. 3 (8)).

In the anterior region are 10 setigers without compound setae, but the simple setae on the lower ventral side are unidentate (Fig. 3 (11), (12)), their pointed ends with spinules.

The teeth of comb setae are slightly asymmetrical, with a few lateral teeth (7~8), whereas in *Paraeuniphysa falciseta*, the lateral teeth, 9~10, in different shapes.

The maxillary formula is: $M_I = 1+1$; $M_{II} = 4+4$; $M_{III} = 3+0$; $M_{IV} = 2+3$; $M_V = 1+1$; $M_{VI} = 1+1$.

Distribution: Southern pacific coast of Japan, Kagoshima Bay, in 20~200 m; Bungo Channel, in 70~90 m, south of the Nansha Islands; in 111 m, sandy mud. The first record in the South China Sea.

Discussion: In 1986 Miura corrected *Eunice spinea* identified as belonging to *Eunice* in 1977 to *Euniphysa spinea*, but in his description he did not mention that the maxillary apparatus consists of 6 pairs of maxillary plates. In 1977 he described it as being composed of 5 pairs. M_{VI} is a pair of slightly rounded small dental plate. Secondly, both Wesenberg-Lund and Pettibone pointed out the body of *Euniphysa aculeata* having an anterior region (or thoracic region) without compound setae but no description was made by Miura. According to our specimens, the anterior region of that species should have 10 setigers. Thirdly, in Fig. 2: a published in 1977, the 5 occipital tentacles seem to be equidistantly arranged. Fourthly, in 1986 Miura described pseudocompound spiniges in his supplement to that species and affixed a diagram of the external form of the setae (1986, Fig 35; d). Those setae are the unidentate simple setae we described and this kind of setae appear only on the ventral side of the anterior 10 pairs of parapodia instead of on setigers 12~25. Owing to the presence of compound falcigers in

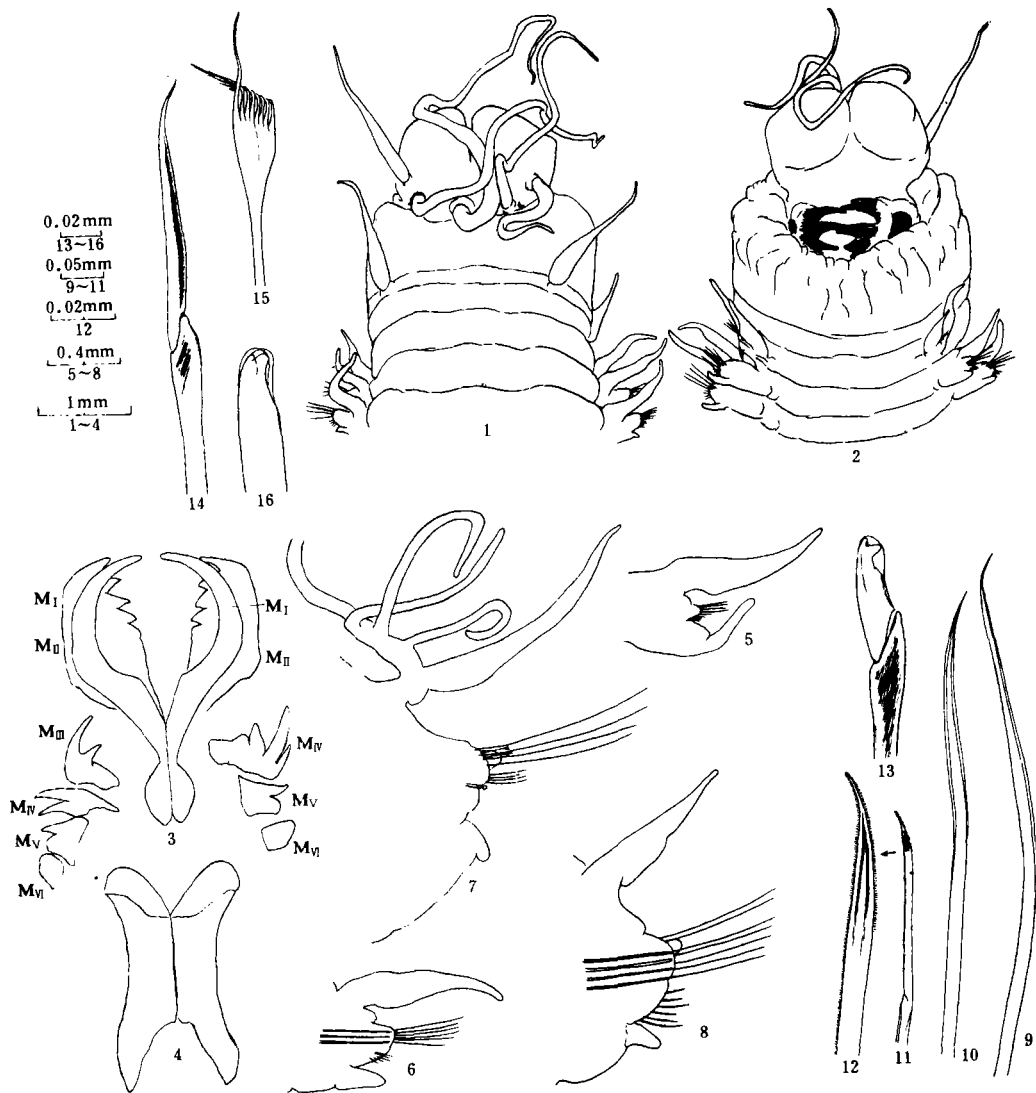


Fig. 3. *Paraeuniphysa spinea* comb. nov. 1. Dorsal view, anterior end; 2. ventral view, anterior end; 3. maxillae; 4. mandible; 5. first parapodium, posterior view; 6. parapodium 2, posterior view; 7. parapodium 3, posterior view; 8. parapodium 4, posterior view; 9-10. upper simple capillary; 11-12. lower simple unidentate seta from anterior setiger; 13. lower compound falciger from setiger 31; 14. lower compound spinigerous seta from setiger 11; 15. upper comb-seta; 16. subacicular bidentate hooded hook;

that species, we combine it in to *Paraeuniphysa*, i. e. naming it as *Paraeuniphysa spinea*.

Moreover, in 1986 Miura also proposed that *Eunice jeffreysii* McIntosh, 1904, *Eunice tubifer* Grossland, 1904, and *Eunice tubicola* Treadwell, 1922, all originally belonging to *Eunice* should be all included in *Euniphysa*. The above three species proposed by Miura have all 5 pairs of maxillary formu-

las and the teeth of maxillary plates are all serrate instead of claw-shaped. They are not similar to *Eumiphysa* and should still be kept in *Eunice*.

This species is quite similar in its external form to *Eumiphysa oculata* reported by Wu Baoling, *et al.* in 1981. Both of them bear a pair of semilunar eyes. However, except for the differences in the generic features such as the number of segments in the anterior region and the presence or absence of compound falcigers, the branchae of this species are comb-shaped and its anterior region has simple unidentate setae, whereas the branchae of the latter are single filaments, and also devoid of simple unidentate setae. Thus, it is concluded that they are distinctly different.

HETEROPHYSAGEN. NOV.

The prostomium is fleshy, bilobed with a deep furrow anteriorly, and fused with the palps. The 5 occipital tentacles are unequidistantly arranged. Two apodous segments, the second segment bearing one pair of cirri. The anterior region of the body is composed of 6 setigers without compound setae, the posterior region with compound setae starting from setiger VII. Parapodium 1 bears ventral cirri; dorsal cirri are conical, parapodia 2~6 devoid of ventral cirri have glandular pads. The branchiae with filaments. The setae include limbate capillary setae, simple serrated setae, compound spinigerous setae, compound falcigers, comb-like setae, subacicular hooks and aciculars. The jaw apparatus consists of 6 pairs of maxillary plates, M_1 bearing 3 teeth, falciform.

Type species *Heterophysa tridontesa* sp. nov.

7. *Heterophysa tridontesa* sp. nov.

The prostomium is bilobed with thick and fleshy palps fused with the prostomium, with a median furrow, and a blunt front tip. The 5 occipital tentacles are arranged unequidistantly, the distance between the inner lateral and the outer lateral tentacles is shorter than that between the median and inner lateral tentacles. The median tentacle is the longest, reaching backwards to setiger XIII, the inner laterals extend backwards to setiger IV, the outer laterals are the shortest, extending to about the posterior edge of setiger I. With 2 apodous segments, the second of which bears tentacular cirri. A pair of small eye-spots situated in the basal part of inner lateral tentacles.

Parapodia are subbiramous, parapodium 1 is small and with large dorsal and ventral cirri, the dorsal cirri conical, with expanded lower part and fairly slender short stems, parapodium 1 bears ventral cirri but parapodia 2~6 are devoid of ventral cirri, all glandular pads. Ventral cirri appear again on parapodium 7, papillous; and disappear again after parapodium 31. The dorsal cirri are conical, with blunt tips. The branchiae begin on setiger XX, the branchial filaments of the 40th parapodia begin to develop generally with 4~5 filaments, the branchial filaments are longer than the dorsal cirri.

In the anterior region are 6 setigers without compound setae. Compound setae begin on setiger VII. All the parapodia in the anterior region bear simple setae, serrated capillary setae situated on the upper part; the lower setae are short, almost only with visible tips of setae; there are 3 acicular setae. Compound setae begin on parapodium 7, at first all are compound spinigers, without compound falcigers, this parapodium bears 4 acicular setae; only one compound falciger begins on setiger XXIV; comb se-

tae appear simultaneously, bearing 7~9 teeth; the outer lateral two teeth relatively long, and the stem of seta long. Sub-acicular hooks begin on setiger XIX, with hood, bidentate. After setiger XLI are two subacicular setae, but only one at the terminal end of body with acicular, one subacicular, two compound spinigers and capillaries, without compound falcigers and comb setae.

The maxillary formula is: $M_I = 3 + 3$; $M_{II} = 5 + 5$; $M_{III} = 2 + 0$; $M_{IV} = 1 + 3$; $M_V = 1 + 1$. Right M_{III} is fused with M_{IV} . The teeth of the maxillary plates M_{III} - M_V moderately developed and long, teeth claw-like.

This species differs mainly from the other species in the following three points

1. The falcigerous M_I bear 3 teeth;
2. The anterior region devoid of compound setae consists of 6 setigers;
3. The notosetae of the anterior region are serrate capillary setae instead of limbate capillary setae.

Type specimen Holotype: SSBT-0031 and Paratype: SSBT-0032 all collected from the Xieyang Island of the Beibu Bay, the South China Sea, depth of 15m, muddy sand, now deposited in the South China Sea Institute of Oceanology, Academia Sinica.

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