New species of the deep-sea holothurian family Elpidiidae Théel, 1879

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ABSTRACT
Descriptions are given of three new species of the deep-sea holothurian family Elpidiidae: *Achlyonice margitae* n.sp., *Achlyonice myriamae* n.sp. and *Peniagone thieli* n.sp. *Achlyonice myriamae* is recorded from the Bay of Biscay, and the other two species from New Caledonia. The species belonging to the genus *Achlyonice* are briefly discussed.

KEY WORDS
Holothuroidea,
Elpidiidae,
new species.

RÉSUMÉ
Trois nouvelles espèces d'holothuries profondes de la famille des Elpidiidae sont décrites : *Achlyonice margitae* n.sp., *Achlyonice myriamae* n.sp. et *Peniagone thieli* n.sp. *A. myriamae* a été récoltée dans le golfe de Gascogne et les deux autres proviennent de Nouvelle-Calédonie. Les caractères différentiels du genre *Achlyonice* sont discutés.

MOTS CLÉS
Holothuries,
Elpidiidae,
nouvelles espèces.

INTRODUCTION

The Elpidiidae is the largest family of elasipodid holothurians (Elasipodida Théel, 1882). The group was reviewed by Hansen (1975) and more recently by Gebruk (1990). The last revision was based primarly on the extensive collection of deep-sea holothurians from numerous worldwide Soviet deep-sea expeditions, stored at the P. P. Shirshov Institute of Oceanology in Moscow. Recently, the author examined additional material from various deep-sea collections. This has already resulted in some changes to the taxonomy of elpidiid holothurians (Gebruk & Shirshov 1994). The present paper presents a further contribution to elpidiid systematics based on material from the Muséum national d'Histoire naturelle, Paris (MNHN), IFREMER (Brest) and the Zoological Museum, University of Copenhagen (ZMUC). Two of the species described were recorded in New Caledonia, an area actively studied by French researchers in recent years (Richer de Forges 1990). The third species is from the bay of Biscay.

DESCRIPTION

Achlyonice margitae n.sp.
(Fig. 1)

Peniagone vitrea – Sluiter, 1901: 74.
Non *Peniagone vitrea* Théel, 1882: 50-52, Pl. VII (7-9), Pl. XXXIV (17-18), Pl. XLIV (10).

MATERIAL EXAMINED. — Holotype MNHN cat. No. EcEh 8053, stn CP30, 23°08.44'S - 166°40.83'E, depth 1140 m.

ADDITIONAL MATERIAL. — *Siboga*, stn 211, 5°40.7'S - 120°45.5'E, depth 1158 m, ZMUC, slide preparation.

ETYMOLOGY. — The species is named after the echinoderm expert Margit Jensen.

DISTRIBUTION. — New Caledonia and Indonesia, two records from a depth of 1140 m and 1158 m.

DIAGNOSIS
Body slightly elongated; anterior part may be directed ventrally. Tentacles 10 (?). Tubefeet eight-ten pairs in the posterior half of the body, closely placed, partly fused. Broad velum present, followed by at least one pair of small papillae. Dorsal spicules tripartite with strongly downwardly bent spinous arms, 0.3-0.35 mm long, and three long apophyses, reaching 0.2 mm, some bearing small spines at the ends. Ventral spicules have less strongly bent arms, 0.1-0.2 mm long, and shorter apophyses, 0.05-0.08 mm long and often spinous.

DESCRIPTION
The single specimen from New Caledonia is 2.6 cm long and poorly preserved. The anterior part of the body does not seem to be so strongly bent ventrally as in the *Siboga* specimen. The number of tentacles cannot be clearly seen, but they are at least ten. Many of the tubefeet are lost and their number is also not clear: from the marks left, it seems to be eight pairs on the left side and ten on the right. Tubefeet present are small, bordering the posterior half of the ventral sole. Only one pair of small papillae occurs posterior to the relatively large velum (Fig. 1A).
Despite the poor preservation, the integument is present and all details of the spicules can be clearly seen. The arms of tripartite spicules are usually spinous, whereas apophyses may be smooth. Dorsal (Fig. 1B-E) and ventral spicules (Fig. 1F-I) are different, the latter having much straighter arms and shorter apophyses, some of them bearing large spines.

REMARKS
The single specimen from *Siboga* stn 211 was originally assigned by Sluiter (1901) to *Peniagone vitrea,* Théel, mainly on the basis of its external morphology, *i.e.* the anterior part of the body being ventrally or posteriorly directed, tubefeet developed only in the posterior part and the velum being broad. Later Hansen (1975) re-examined this specimen (stored at the Zoological Museum of Amsterdam) and noticed peculiar tripartite spicules, atypical of *Peniagone.* Tripartite spicules, as the main type of skeletal elements, are only common in two elpidiid genera, *Amperima* Pawson, 1965 and *Achlyonice* Théel, 1879. In addition to having three-armed spicules, *Amperima* is characterized by the pre-

sence of small C-shaped elements, which are lacking in *Achlyonice*. Since C-shaped spicules were not present in the *Siboga* specimen, Hansen (1975) proposed that it belonged to the genus *Achlyonice*. This was confirmed by the discovery of a new specimen, from New Caledonia, having

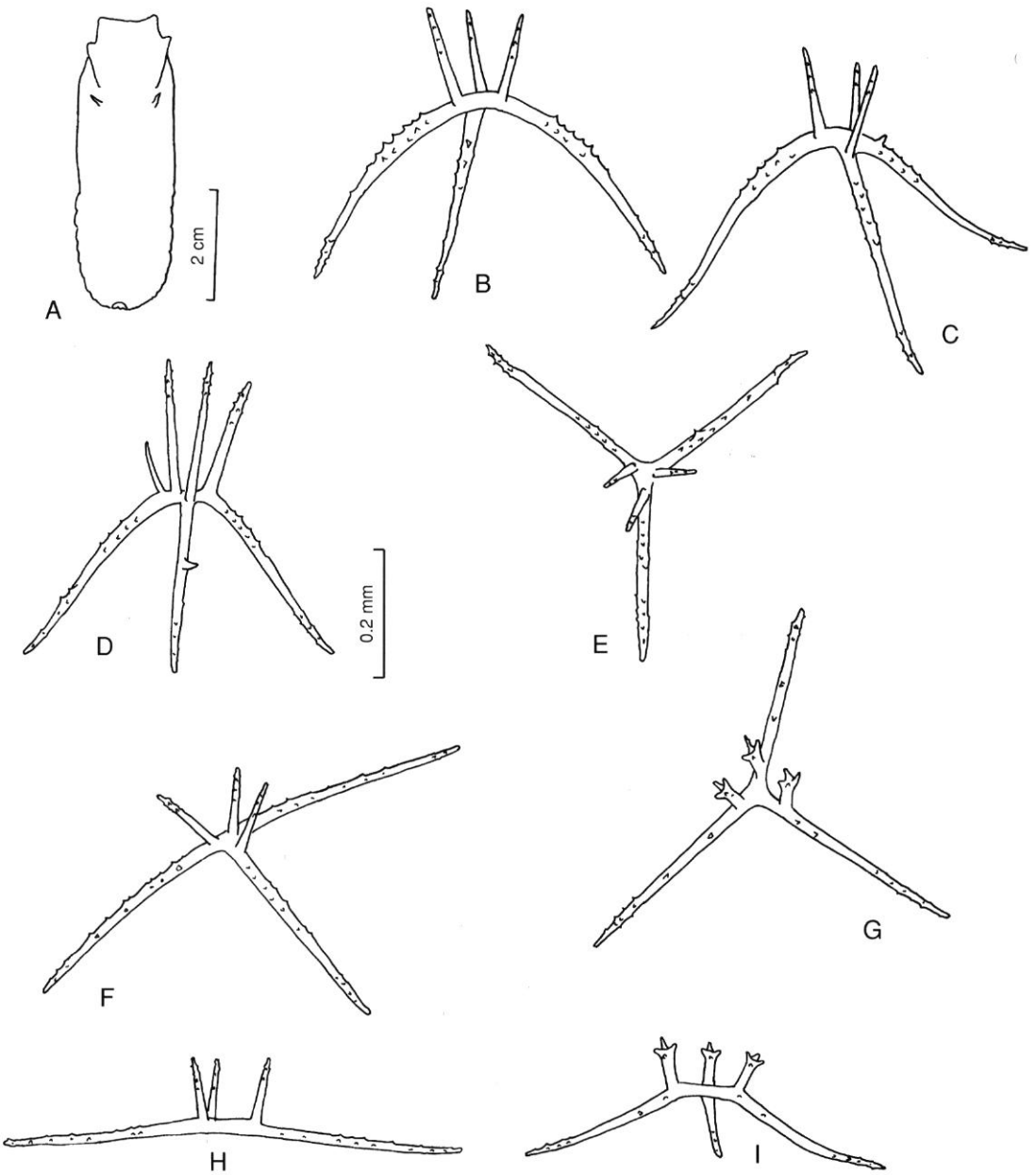

FIG. 1. — *Achlyonice margitae* n.sp. **A**, dorsal view; **B-E**, dorsal spicules; **F-I**, ventral spicules. Bar scale: A, 1 cm; B-I, 0.2 mm. E corresponds to spicule C seen from above.

the same type of spicules as the *Siboga* specimen. The preparation of spicules from the *Siboga* specimen, made by Hansen, was re-examined at ZMUC. In both specimens, the tripartite spicules are absolutely identical and C-shaped elements are not present.

The genus *Achlyonice* is also characterized by the development of usually twelve tentacles rather than ten, as in all the other elpidiids. This feature cannot be seen with certainty in the specimen from New Caledonia, neither was it mentioned by Sluiter (1901) for his specimen. It may well be that only ten tentacles are developed in this particular species. Specimens from New Zealand described by Pawson (1965) as *Amperima tui,* and assigned later by Hansen (1975) to the genus *Achlyonice*, had ten-twelve tentacles. It seems therefore that while some species of *Achlyonice* bear twelve tentacles, others have only ten, as also suggested by Hansen (1975).

The spicules of *A. margitae* resemble those of *Peniagone vitrea*, with the arms being strongly bent downwards and apophyses very high. The number of arms, however, is three in *Achlyonice* and four in *Peniagone.*

RELATIONSHIPS

Achlyonice margitae differs remarkably from all other known species of the genus in having tripartite spicules with strongly bent arms and very high apophyses. There are not enough reasons, however, to establish a new genus for this form.

Achlyonice myriamae n.sp.
(Fig. 2)

MATERIAL EXAMINED. — Holotype: MNHN, cat. No. EcEh 8054 (IFREMER, BIOGAS3, stn CV26, 47°33.9'N - 9°05.3'W, depth 2822 m).
Paratypes: IFREMER, BIOGAS3, stn CV26, 4 individuals.

ETYMOLOGY. — The species is named after Myriam Sibuet, who has contributed much to our knowledge of deep-sea holothurians.

DISTRIBUTION. — Single record in the Bay of Biscay. Depth 2822 m.

DIAGNOSIS

Body flattened, especially in the posterior part, integument gelatinous. Mouth ventral, tentacle crown directed downwards, anus dorsal. Tentacles 12, connected by a thin membrane, except the two ventral which are shorter than others (Fig. 2B). Twelve to thirteen pairs of tube-feet, bordering the posterior two thirds of the ventral sole, anterior 7-8 free, posterior 5-6 fused forming anal lobe. Velum of same breadth as the

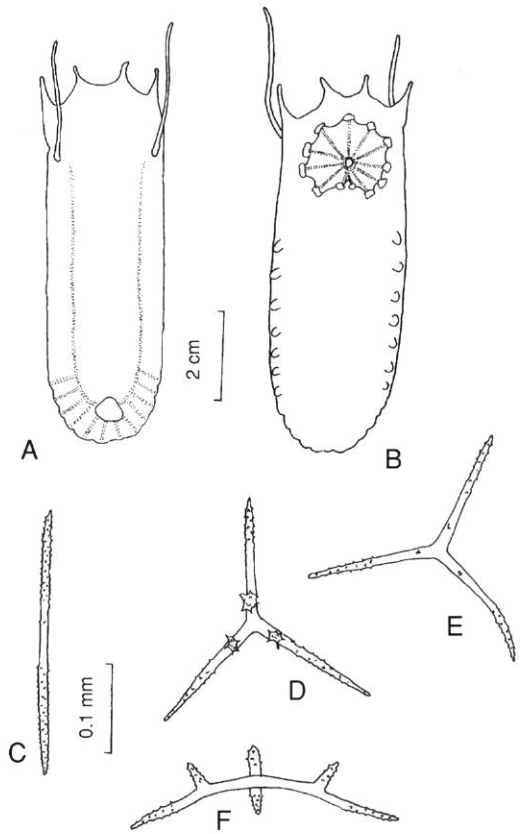

FIG. 2. — *Achlyonice myriamae* n.sp. **A**, dorsal view; **B**, ventral view; **C-F**, spicules. Bar scale: A, B, 2 cm; C-F, 0.1 mm.

body, hanging over the anterior part of the body, composed of two pairs of papillae, inner pair shorter than outer. One pair of extremely long papillae, widely spread, exceeding velum in length, developed directly behind the velum; no other papillae present on dorsum (Fig. 2A, B).

Tripartite spicules and rods are present; scattered,

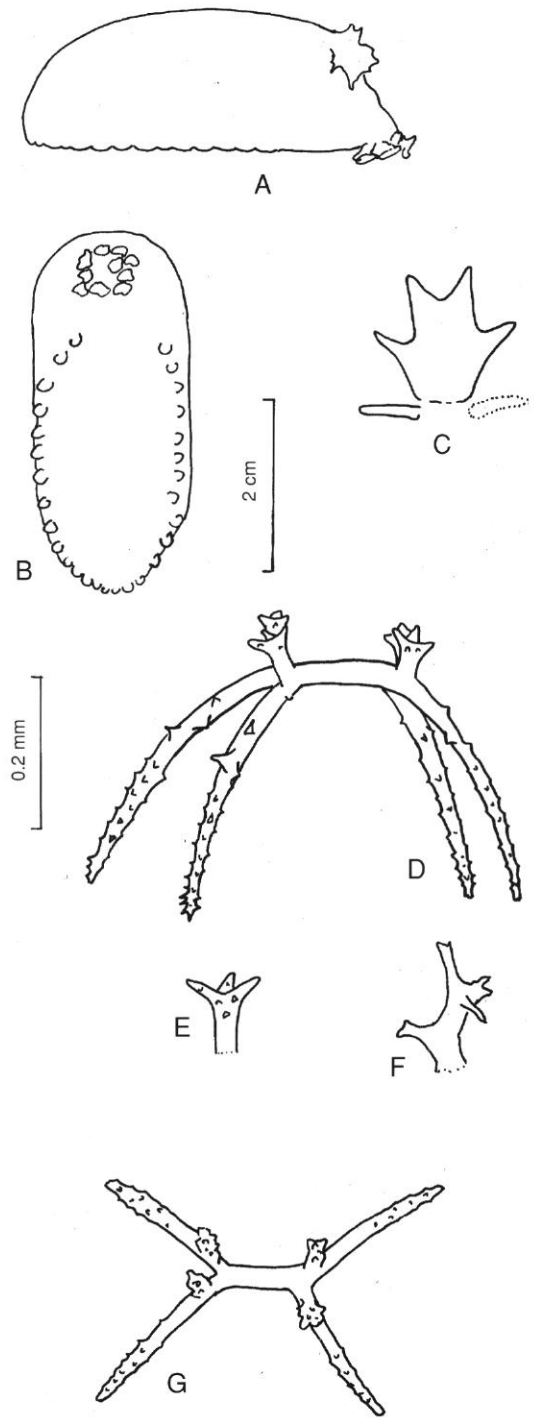

FIG. 3. — *Peniagone thieli* n.sp. **A**, side view; **B**, ventral view; **C**, velum; **D-G**, spicules. Bar scale: A, B, 2 cm ; D-G, 0.2 mm.

with rods slightly more numerous. Spicules are similar on dorsal and ventral sides. Arms of tripartite spicules 0.1-0.2 mm long, spinous at the ends; short apophyses also spinous. Rods slender, bearing small spines, except in the middle part (Fig. 2C-F).

DESCRIPTION

The holotype is 8 cm long and 2.5 cm broad; paratype specimens range from 5 to 7,5 cm in length. In the holotype the right papilla is slightly longer than the left one and is 2.5 cm in length. All five specimens are slightly damaged, but well preserved enough that details of the external morphology and spicules can be clearly seen.

REMARKS

The gelatinous skin layer is quite unusual for this genus and, although it is thick, it can probably be easily lost together with the spicules. The tentacle membrane is atypical for elpidiids, but it has been described also in *Achlyonice monactinica* Ohshima, 1915, known from off Japan.

RELATIONSHIPS

The external morphology of *A. myriamae* is remarkably similar to that of *A. monactinica,* as described by Ohshima (1915) on the basis of sixteen specimens. Points of similarity, besides the tentacle membrane, include a flattened body, especially in the posterior part, broad velum with outer papillae clearly longer than the inner ones, and rods which are more numerous than tripartite spicules. The two species, however, differ in the type of spicules, asymetrical triradiate elements without apophyses being present in *A. monactinica*, and the remarkably long dorsal papillae which are only known in *A. myriamae.*

Peniagone thieli n.sp.
(Fig. 3)

MATERIAL EXAMINED. — Holotype MNHN cat. No. EcEh 8055, stn CP63, 24°28.69'S -168°07.72'E, depth 2160 m.

ETYMOLOGY. — The species is named after the deep-sea explorer Hjalmar Thiel.

DISTRIBUTION. — Single record in New Caledonia.

DIAGNOSIS

Body ovoid, dorsal side vaulted. Mouth almost ventral, anus terminal. Fourteen pairs of tube-feet, bordering almost the entire ventral sole, which slightly narrows anteriorly; posteriormost tubefeet are smallest. Velum composed of two pairs of papillae; one pair of relatively long papillae present just behind velum (Fig. 3A-C).

Dorsal deposits with strongly curved arms, reaching 0.40-0.42 mm in length and strongly spinous; apophyses up to 0.1 mm high, branched at the ends or bearing large spines (usually three; Fig. 3E, F). Ventral deposits usually smaller, with less strongly curved arms and unbranched but spinous apophyses (Fig. 3D-G).

DESCRIPTION

The single specimen is 4.1 cm long and poorly preserved. The right dorsal papilla is lost, but all the other morphological details are clearly seen. The integument is partly present.

REMARKS

Branched apophyses of dorsal spicules have never been reported in this genus before, therefore this specimen obviously represents a new species.

RELATIONSHIPS

The new species is closest to *Peniagone porcella* Perrier, 1896, which also has robust spicules with long, strongly spinous arms and spinous apophyses (Perrier 1902: pl. XIX, figs 15-17). However, the apophyses are simple in *P. porcella* but branched in *P. thieli*.

DISCUSSION

The two new species of *Achlyonice* described here increase the number of species in this peculiar genus to five, namely *A. ecalcarea* Théel, 1879, *A. monactinica* Ohshima, 1915, *A. tui* (Pawson, 1965), *A. margitae* n.sp. and *A. myriamae* n.sp. A number of specimens from the Antarctic, described as *Achlyonice violaecuspidata* Gutt, 1990, were re-examined and found to belong to another genus and species, *Rhipidothuria racowitzai* Hérouard, 1901 (Gebruk & Shirshov 1994). Hansen (1975) also suggested that a single incomplete specimen from New Zealand, described as *Scotopolanes gilpinbrowni* Pawson, 1965, may belong to the genus *Achlyonice*. However, owing to the lack of many morphological details, neither Hansen (1975) nor Gebruk (1990) have considered the description of this species reliable.

One of the peculiarities of the genus *Achlyonice* is that the number of tentacles varies from ten to twelve. Other elpidiids always have ten, with the one exception of *Peniagone islandica* Deichmann, 1930 which has eight tentacles. Other peculiarities include the variation of spicules from regularly tripartite (*A. ecalcarea, A. myriamae, A. margitae*) to rods, which may occasionally have a side-branch but are never symmetrically tripartite (*A. monactinica*). Such variation is unknown in other elpidiid genera, all of which have a certain main type of spicules. Additionally, *A. tui* (Pawson, 1965) is completely devoid of spicules and it was assigned to this genus with some uncertainty by Hansen (1975) only because ten-twelve tentacles were present. It may well be that these specimens were lacking the external skin layer, which seems to be often gelatinous in this group and easily lost. Elpidiids are never completely devoid of skeletal elements in the skin, although some of the *Ellipinion* species (e.g. *E. kumai* Mitsukuri, 1912) may have very few of them. The tentacle membrane developed in *A. myriamae* and *A. monactinica* is another very unusual feature. Apart from *Achlyonice*, it is found only in two archaic elpidiid genera *Rhipidothuria* Hérouard, 1901 and *Psychrelpidia* Hérouard, 1923.

Peniagone thieli and *Achlyonice margitae* increase the number of endemics to the bathyal zone of the Indo-Malayan archipelago (including New Caledonia). This region is thought to play an important role in the formation of the modern deep-sea fauna (Mironov 1985; Gebruk 1994).

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