

## Cumaceans (Crustacea) of the Medes Islands (Catalonia, Spain) with special attention to the genera *Bodotria* and *Iphinoe*\*

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**SUMMARY:** A total of 34 hauls of cumaceans obtained by means of an artificial-light epibenthic trap were studied. More than 80,000 specimens of 17 species belonging to four families were obtained. The commonest and most abundant species were *Cumella limicola* and *Nannastacus unguiculatus*. A new subspecies *Bodotria arenosa leloeffi* ssp. nov. is described, as is the adult male of *Iphinoe acutirostris*. Morphological differences between the males of five species of the genus *Iphinoe* are discussed. The results are similar both quantitatively and qualitatively to those obtained from nocturnal plankton fishing in nearby areas, which proves that the bias of the sampling method is minimal in this crustacean order.

**Key words:** *Bodotria*, *Iphinoe*, Cumacea, nocturnal plankton, NW Mediterranean.

**RESUMEN:** CUMÁCEOS (CRUSTÁCEOS) DE LAS ISLAS MEDES (CATALUNYA, ESPAÑA) CON ESPECIAL ATENCIÓN A LOS GÉNEROS *BODOTRIA* E *IPHINOE*.— En este trabajo se estudian los cumáceos de las muestras obtenidas mediante el empleo de una trampa epibentónica de luz artificial. En total se obtuvieron más de 80.000 ejemplares de 17 especies pertenecientes a 4 familias. Las especies más frecuentes y abundantes fueron *Cumella limicola* y *Nannastacus unguiculatus*. Además, se describe una nueva subespecie, *Bodotria arenosa leloeffi* ssp. nov. y el macho adulto de *Iphinoe acutirostris* Ledoyer, 1965, y se discuten las diferencias morfológicas entre los machos de 5 especies del género *Iphinoe*. El conjunto de resultados es semejante tanto cuantitativamente como cualitativamente a los obtenidos mediante pescas planctónicas nocturnas en zonas geográficamente cercanas, lo que demuestra que el sesgo inducido por el método de muestreo es mínimo en este orden de crustáceos.

**Palabras clave:** *Bodotria*, *Iphinoe*, cumáceos, plancton nocturno, Mediterráneo noroccidental.

### INTRODUCTION

Cumaceans are peracarid crustaceans, some littoral species of which migrate vertically during the night (Macquart-Moulin, 1968; Anger and Valentin, 1976; Kaartvedt, 1986). Their periods of nocturnal activity vary according to the species: some migrate only once, after sunset; others may do so a second time shortly before dawn (Corey,

1970; Macquart-Moulin, 1991). There is no exact synchronism between the different migratory species; this may be the result of external factors such as light or sea swell (Macquart-Moulin and Castelbon, 1990). Artificial light attracts cumaceans during their nocturnal active periods and may be used to help capture them (Fage, 1923, 1933; Foxon, 1936)

Although the use of artificial light catches a great number of species, the results must be evaluated with care owing to a bias produced by the sampling system (Macquart-Moulin, 1991).

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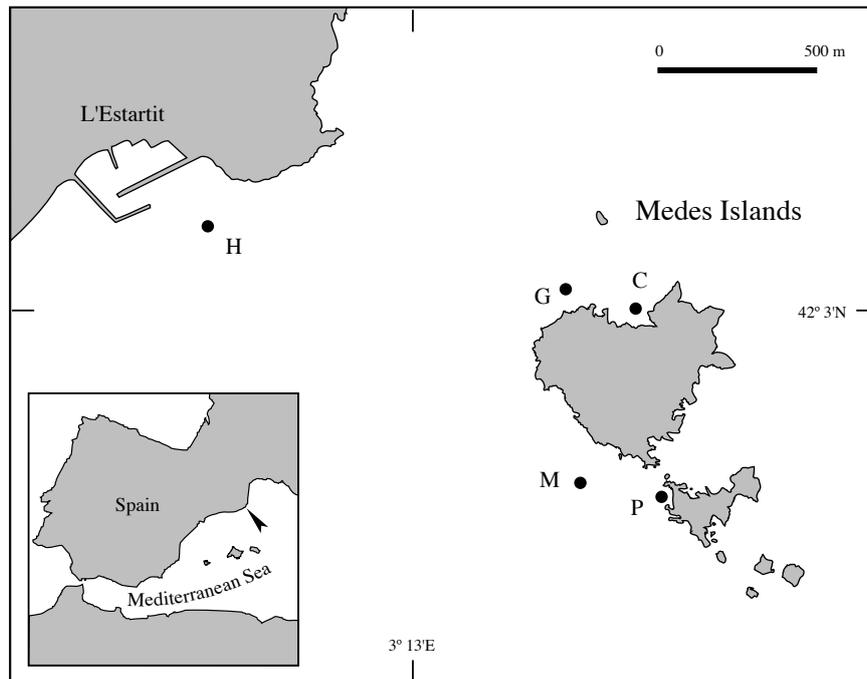


FIG. 1. – Study area showing the locations of the sampling sites.

More than 200 species of the sub-family Bodotriinae (Scott, 1901) are currently known worldwide. Most (93%) live above 200 metres depth (Bacescu, 1988) and 15 of those species have been recorded on the Spanish Mediterranean coast (Corbera, 1995), predominantly *Bodotria* (4 species) and *Iphinoe* (9 species).

The Medes Islands have been a marine reserve since 1983 and its benthic communities have been studied intensively (Ros *et al.*, 1984), although there is no work on the cumaceans of the area.

The study of samples obtained from artificial-light traps and their comparison with those obtained from plankton fishing allows the validity of this type of sampling to be tested.

## MATERIAL AND METHODS

Thirty-four sample catches were obtained from five sites around the Medes Islands (Fig. 1) between 14th May and 21st August 1992. The sampling was done with artificial-light epibenthic traps during the early part of the night. The sites had different bottoms and different depths.

- Site H: outside the harbour of l'Estartit; sandy bottom at 8 m (2 samples).

- Site M: over the beds of *Posidonia oceanica*, between 6 and 12 m (10 samples).

- Site P: el Portitxol, detritic bottom between 3 and 6 m (8 samples).

- Site C: la Cuetera, rocky bottom with large blocks covered with photophile algae, between 6 and 7 m (10 samples).

- Site G: el Guix, large blocks covered with photophile and sciaphile algae (4 samples).

The type material is deposited in the collections of the Institut de Ciències del Mar (ICM).

## RESULTS

### Abundance and frequency of capture

The use of artificial-light traps provided a large number of cumaceans (more than 80,000), mainly adult males (99.9%). Seventeen species from four families were identified (Table 1). *Cumella limicola* and *Nannastacus unguiculatus* were the commonest species (100%). *C. limicola* was the most abundant species in the majority of samples, reaching 50,000 at site P on 13-8-92. *N. unguiculatus* was the dominant species (65.9%) at site C. The greatest number of species (13) was captured over the *Posidonia oceanica* beds (site M), though the number did not vary greatly from site to site. *Cumopsis goodsir* and *Eocuma ferox* were captured only on sandy bottoms (site H); *Iphinoe acutirostris* was found only in one

TABLE 1. – Relative abundance and frequency of occurrence in samples (f) of the different species of cumaceans found in the Medes Islands.  
\* 1-10 ind., \*\* 11-100 ind.; \*\*\* 101-1000 ind.; \*\*\*\* 1001-10000 ind.; \*\*\*\*\* > 10000 ind.

	H	M	sites P	C	G	f (%)
Family Bodotriidae						
Subfamily Vaunthompsoniinae						
<i>Vaunthompsonia cristata</i> Bate, 1858	-	**	**	**	-	29.4
<i>Cumopsis goodsir</i> (Van Beneden, 1861)	*	-	-	-	-	2.9
Subfamily Bodotriinae						
<i>Bodotria scorpioides</i> (Montagu, 1804)	*	****	****	**	*	55.8
<i>Bodotria arenosa leloeffi</i> ssp. nov.	**	**	**	*	**	47.0
<i>Eocuma ferox</i> (Fisher, 1872)	*	-	-	-	-	2.9
<i>Iphinoe tenella</i> Sars, 1878	-	**	-	-	-	5.8
<i>Iphinoe douniae</i> Ledoyer, 1965	-	*	*	*	*	20.6
<i>Iphinoe maculata</i> Ledoyer, 1965	-	*	*	-	-	5.8
<i>Iphinoe acutirostris</i> Ledoyer, 1965	-	*	-	-	-	2.9
<i>Iphinoe rhodaniensis</i> Ledoyer, 1965	-	-	-	*	-	2.9
Family Nannastacidae						
<i>Nannastacus unguiculatus</i> Bate, 1859	**	*****	****	*****	****	100
<i>Scherocumella longirostris</i> (Sars, 1879)	-	**	**	**	**	64.7
<i>Cumella limicola</i> Sars, 1879	**	*****	*****	****	****	100
<i>Cumella pygmaea</i> Sars, 1865	*	****	****	**	**	79.4
Family Diastylidae						
<i>Diastylis rugosa</i> Sars, 1865	-	-	-	*	*	8.8
Family Pseudocumatidae						
<i>Pseudocuma longicorne</i> (Bate, 1858)	**	*	*	*	*	29.4
<i>Pseudocuma simile</i> Sars, 1900	-	*	-	*	-	8.8

sample from site M; and the only specimen of *I. rhodaniensis* was taken at site C.

Several females (26) were found among the specimens of *Bodotria scorpioides* obtained at site M. These individuals had just completed the moult or were undergoing it, for which reason they were very little calcified, and in some cases had not discharged all their eggs. Although these females had well-developed brood pouches, they still presented eggs in the ovaries.

### Systematics

#### *Bodotria arenosa leloeffi* ssp. nov. (Figs. 2 and 3)

*Bodotria scorpioides* Fage, 1993: 162 – 164 (part)  
*Bodotria* sp. Le Loeuff and Intès, 1977: 1155, fig. 8 a – c

Material: site P, 16 ♂♂ ad.; site M, 12 ♂♂ ad.; site C, 7 ♂♂ ad.; site G, 11 ♂♂ ad.

*Holotype*: Adult male, site P, 5.4 m depth, Medes Islands. (ICM cumacean collection)

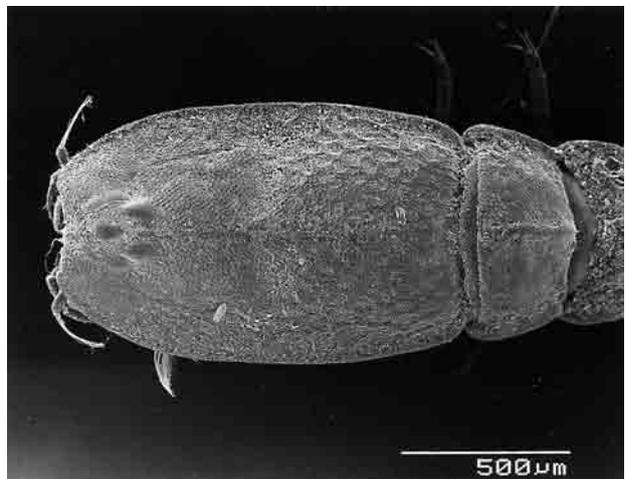
*Etymology*: This subspecies is dedicated to Pierre Le Loeuff, who first observed its differences from *B. arenosa mediterranea*.

*Description*: The total length of the adult male is 4.7 mm and its carapace measures 1.2 mm. The carapace is 1.7 times as long as it is high, and its

width is slightly greater than its height. The integument is well calcified and shows slight reticulation mainly in the posterior half. In dorsal view the frontal part is wide with regularly convex edges. It shows two very distinct dorsolateral carina, which, in the lateral view, are straight and terminate anteriorly just above the antennular incision, which is well excavated (Figs. 2, 3b).

Free thoracic segments with strongly marked carina, the first of which also shows a developed, but not elevated, dorsal carina, which can also be

FIG. 2. – *Bodotria arenosa leloeffi* ssp. nov. Adult male from the Medes Islands. SEM microphotograph of the carapace, dorsal view.



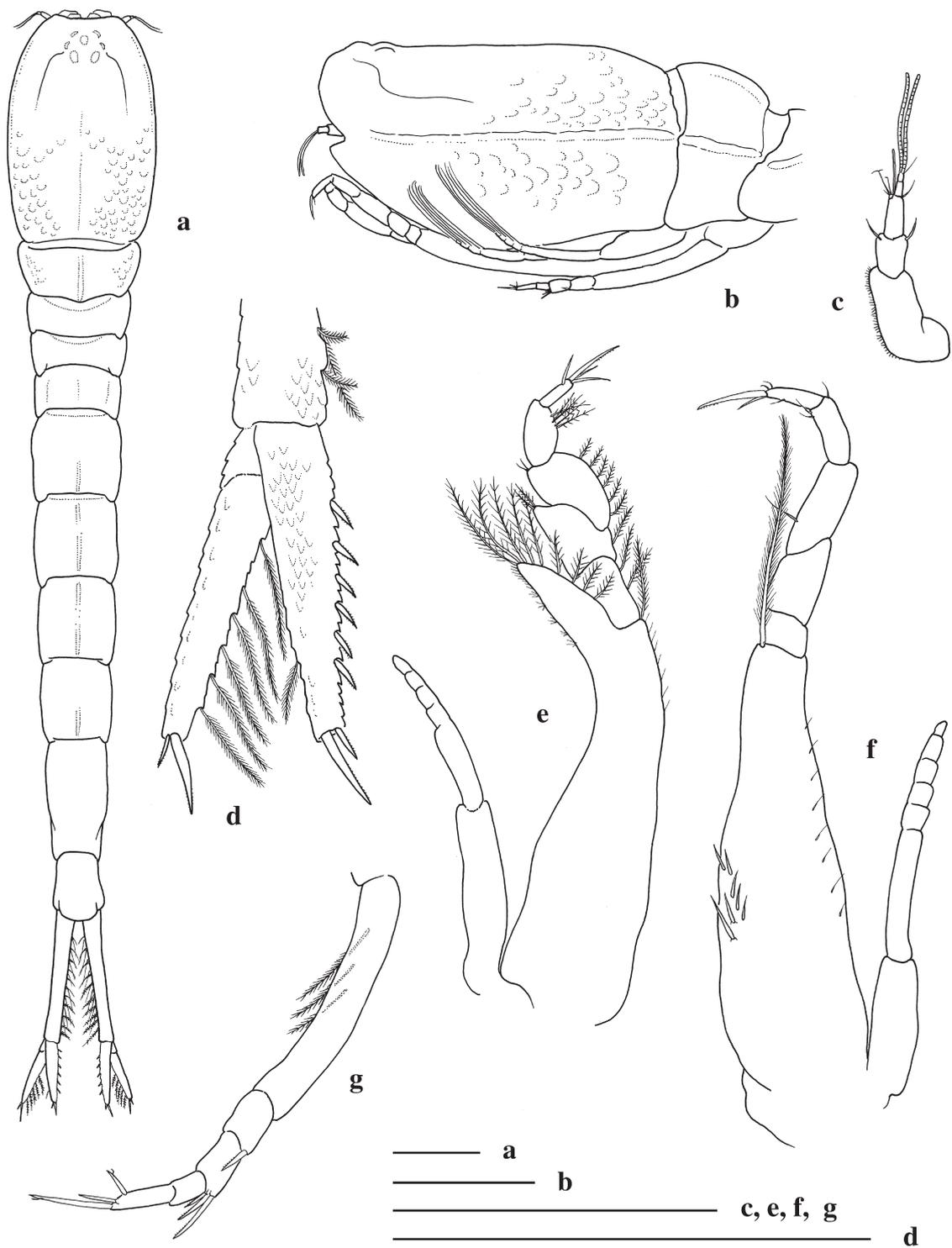


FIG. 3. – *Bodotria arenosa leloeffi* ssp. nov. Adult male from the Medes Islands. a, whole animal, dorsal view; b, side view of carapace; c, first antenna; d, branches of the uropod; e, third maxilliped; f, first pereopod; g, second pereopod. Graphic scale 0.5 mm.

seen in all the abdominal segments except the last. Telsonic somite longer than wide, slightly enlarged between the uropods.

First antenna with rudimentary accessory flagel-

lum (Fig. 3c). The first segment of peduncle is wide and longer than the other segments together. The next two segments are similar in length. Flagellum two-segmented with two terminal aesthetascs.

Basis length of the third maxilliped (Fig. 3e) more than 1.5 times that of the other segments together, with its distal prolongation reaching the middle of the merus. Merus slightly prolonged distally. Propodus and dactylus similar in length.

Basis of the first pereopod (Fig. 3f) with several spines on its inner face, more than 1.5 times as long as the other segments put together. Short ischium, merus and carpus similar in length.

Basis of the second pereopod (Fig. 3g) markedly longer than the rest of the limb.

Peduncle of the uropod almost twice as long as the last abdominal segment and nearly twice as long as the rami. Its inner edge shows numerous plumose setae which disperse into different threads in the terminal half. The exopod is biarticulate with 7 plumose setae on the inner edge and two terminal spines (Fig. 3d). The endopod has only one armed article with 6 spines on the inner edge and a short plumose seta on the outer edge opposite the most distal spine and not reaching to the end of the article. It also has 2 terminal spines; there are no traces of suture fusing of the two primitive articles.

**Remarks:** Bacescu (1950) established the differentiation between the two subspecies of *Bodotria arenosa* from the redescription of *Bodotria scorpioides mediterranea* proposed by Steuer (1936). Later Le Loeuff and Intès (1977), using an allometric study, clearly separated *Bodotria arenosa mediterranea* from *Bodotria scorpioides*. These authors found some specimens among Fage's collection which they described as *Bodotria* sp. and which are exactly like those found in the Medes Islands.

*B. a. leloeuffi* differs from the other two subspecies, based on the key provided by Le Loeuff and Intès (1977), in that the carpus of the first pereopod is similar in length to the merus. The plumose seta of the external edge of the endopod of the uropod barely reaches its distal end, whereas in *B. a. mediterranea* it is much longer and is absent in *B. a. arenosa*. Nevertheless, the main difference is in the form of the carapace, which in dorsal view is wide in the anterior part with regularly convex edges. Moreover, the number of spines on the endopod of the uropod, usually 6, is greater than in *B. a. mediterranea*, which has only 3 to 5 (Bacescu, 1950) and in lateral view the dorsolateral carina is straight in *B. a. leloeuffi* and slightly sinusoidal in *B. a. mediterranea*.

**Distribution:** *B. a. leloeuffi* is known only from the Catalan coast (Northwestern Mediterranean). It has been sampled in Banyuls (France) (Le Loeuff and Intès, 1977) and in the Medes Islands (Spain); it has always been obtained by artificial light.

***Iphinoe tenella* Sars, 1878**  
(Fig. 4A)

*Iphinoë tenella* Sars, 1878: 505. pl. 15-16; Fage, 1951: 47-49, fig. 40-42, 45 te.  
*Iphinoe tenella* Bacescu, 1951: 76-77, fig. 65, 68, 163, 164; Ledoyer, 1965: 259-260, pl. 2 fig. 2A, 2B, 3A, 3B, pl.4 fig. 1A, 1B, pl. 6 fig. 2, 3, pl.7 fig. 1, pl. 10 fig. 2,3, pl.12 fig. 1pl.14 fig. 2,3, pl. 16 fig. 1; Jones, 1976: 22, fig. 6 K-N.

Material: site M, 30 ♂ ad.

**Remarks:** *Iphinoe tenella* is a very variable species. Some adult males from the Black Sea have a totally unarmed carapace (Bacescu 1951; Ledoyer, 1965), while those from the Mediterranean and the

TABLE 2. – Morphological characteristics of the various species of the genus *Iphinoe* of the Medes Islands. TL, total length; CL, Carapace length; CD, carapace depth; n, number of specimens measured

		TL	CL	CD	TL/CL	CL/CD	n
<i>Iphinoe tenella</i>	$\bar{x}$	8.03	1.84	1.00	4.35	1.84	12
	sd	0.30	0.05	0.03	0.07	0.02	
<i>Iphinoe douniae</i>	$\bar{x}$	7.29	1.71	0.77	4.26	2.20	10
	sd	0.80	0.16	0.06	0.14	0.08	
<i>Iphinoe maculata</i>	$\bar{x}$	8.68	2.10	1.07	4.13	1.96	5
	sd	0.77	0.14	0.10	0.16	0.06	
<i>Iphinoe acutirostris</i>	$\bar{x}$	10.06	2.50	1.18	4.02	2.10	5
	sd	0.34	0.03	0.05	0.12	0.08	
<i>Iphinoe rhodaniensis</i>		7.40	1.70	0.7	4.35	2.42	1

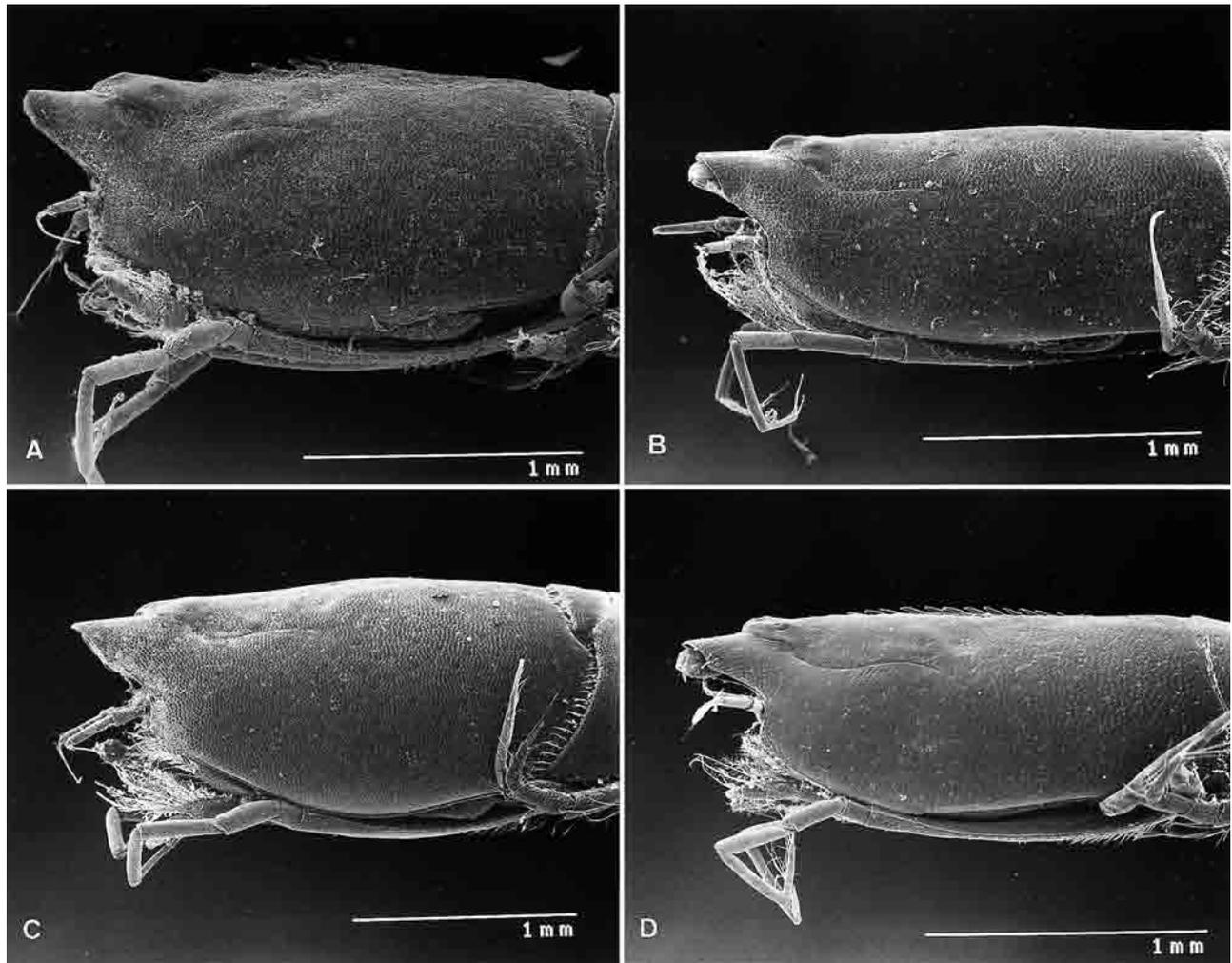


FIG. 4. – SEM microphotograph of the carapaces, lateral view, of adult males of four species of the genus *Iphinoe* found in the Medes Islands: A, *Iphinoe tenella*; B, *Iphinoe douniae*; C, *Iphinoe maculata*; D, *Iphinoe rhodaniensis*.

Atlantic show a serrated dorsal edge. Medes Islands' specimens have 4 strong spines on the dorsal edge followed by 1 or 2 serrations (Fig. 4a), but 265 km away in Alfacs Bay (Ebro Delta), adult males show 6 spines and 2 serrations (pers. obser.). However, the presence of three pairs of perianal setae and the absence of the sternal process differentiate this species from the others of the genus. Carapace length varies between 1.7 mm and 1.9 mm and the length to height ratio is always below 2 (mean 1.8) (Table 2).

***Iphinoe douniae* Ledoyer, 1965**  
(Figs. 4B; 5A)

*Iphinoe* cf. *trispinosa* Massé, 1962: 258.  
*Iphinoe trispinosa* Picard, 1965: 108.  
*Iphinoe douniae* Ledoyer, 1965: 254-255, pl. 1 fig. 1A,1B, pl.5 fig. 1, pl. 9 fig. 1, pl. 13 fig. 1; Ledoyer 1968: 175; Macquart-Moulin,

1968: 294-296; Massé, 1972 a: 314-315; Massé, 1972 b: 211; Katagan, 1982: 314; Corbera, 1995.

Material: site P, 4 ♂♂ ad.; site M, 5 ♂♂ ad.; site C, 2 ♂♂ ad.; site G, 1 ♂ ad.

**Remarks:** the total length of male adults varies between 6.5 mm and 9.2 mm with the carapace (Fig. 4b) representing a quarter (0.238) of the total length excluding the uropods. The mean length to height ratio is 2.2 (Table 2). *Iphinoe douniae* is closely related to *I. trispinosa* (Goodsir, 1843); adult males of both species have an unarmed dorsal edge of the carapace, a single aesthetasc in the terminal article of the first antenna, a sternal process (Fig. 5A) and a pair of perianal setae. They differ, however, in that *I. douniae* has plumose setae in the carpus of the second pereopod and a longer carapace.

*Distribution:* *Iphinoe douniae* is a Mediterranean species, present in the eastern basin (Katağan, 1982) as well as the western one, where it has been observed on shallow sandy bottoms of the Gulf of Lyons (Ledoyer, 1965; 1968; Massé, 1972) and Blanes (Corbera, 1995); it has also been found in littoral plankton (Macquart-Moulin, 1968, 1991). The Mediterranean records of *Iphinoe trispinosa* (Banyuls, Collioure, Port-Vendres Argelés, Roses and Cala Mongó; Fage, 1923, 1933, 1940) should be revised since they could correspond to *I. douniae*. If so, *I. trispinosa* would be an exclusively Atlantic species, and *I. douniae* the vicariant species in the Mediterranean. This hypothesis is supported by the fact that *I. trispinosa* has not been recorded in the western Mediterranean since the revision of the genus *Iphinoe* there (Ledoyer, 1965).

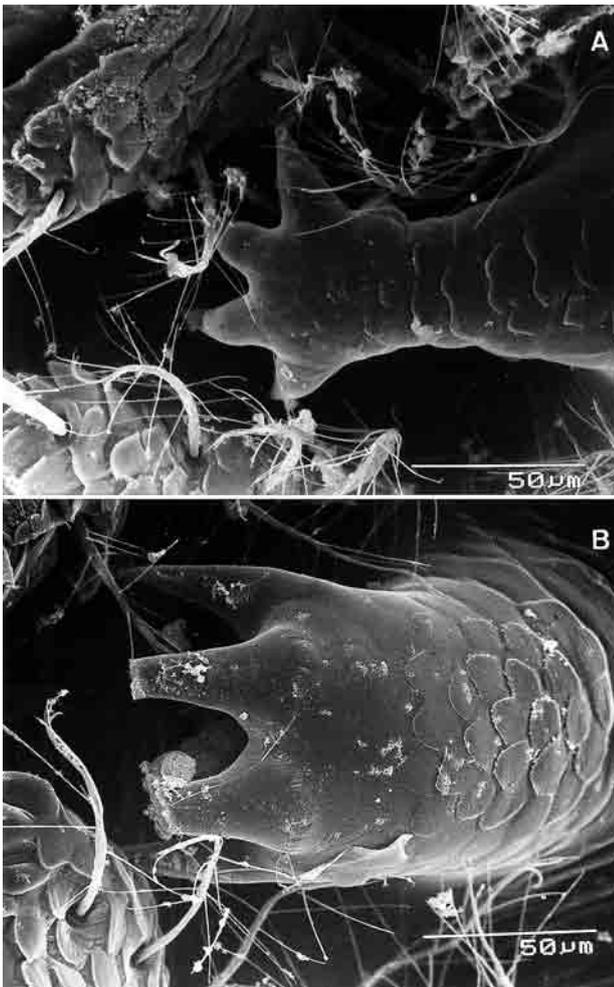


FIG. 5. – SEM microphotograph of the sternal processes of the male adults of two species of the genus *Iphinoe* found in the Medes Islands. A, *Iphinoe douniae*; B, *Iphinoe maculata*.

***Iphinoe maculata* Ledoyer, 1965**  
(Figs. 4C; 5B)

*Iphinoe maculata* Ledoyer, 1965: 255, pl. 1 fig. 2A, 2B, pl.5 fig. 2, pl. 9 fig. 2, pl. 13 fig. 2, pl. 18 fig. 3-4; Ledoyer, 1968: 175; Corbera and Cardell, 1995.

Material: site M, 2 ♂♂ ad.; site P, 4 ♂♂ ad.

*Remarks:* the total length of adult males varies between 7.5 mm and 9.4 mm with the carapace (Fig. 4C) representing a quarter (0.24) of the total length. The mean length to height ratio is 1.96 (Table 2). the dorsal edge of the carapace is unarmed; it has only one aesthetasc in the terminal article of the first antenna and a pair of perianal setae. It differs from other species of the genus, especially *I. douniae* and *I. trispinosa* in the proportions of the carapace and the form of the sternal process, which is quadridentate. (Fig. 5B)

*Distribution:* Gulf of Lyons (Ledoyer, 1965; 1968; Macquart-Moulin, 1991), Barcelona (Corbera and Cardell, 1995), Blanes (Corbera, 1995). *I. maculata* lives on thick sandy bottoms, though in the Medes Islands it has been found on littoral detritic bottoms (-5.4 m) and on the beds of *Posidonia oceanica* (-11 m).

***Iphinoe acutirostris* Ledoyer, 1965**  
(Figs. 6; 7)

*Iphinoe acutirostris* Ledoyer, 1965: 256, pl. 1 fig. 3A, 3B, pl.5 fig. 3, pl. 9 fig. 3, pl. 13 fig. 3, pl. 19 fig. 4-5; Ledoyer, 1968: 175

Material: site M, 5 ♂♂ ad.

*Description:* the total length of adult males varies between 9.75 mm and 10.6 mm. The integument is finely scaled and not very calcified. The carapace (Fig. 6a) is 2.1 times as long as wide, and represents a quarter of the total length. The dorsal carina is unarmed and slightly convex in its central part. The eyelobe is well developed, elevated in lateral view, with 7 lenses. The pseudorostrum is very pointed and characteristically bifid in dorsal view (Fig. 7A). Anterolateral angle rounded. Five free thoracic segments, the first visible dorsally and laterally. There are sternal processes on the sternites of pereopods 2 and 3; the one on the foremost sternite is very strong and curled forwards, while the following sternite consists of a protuberance ending in two or three spines (Fig. 7B).

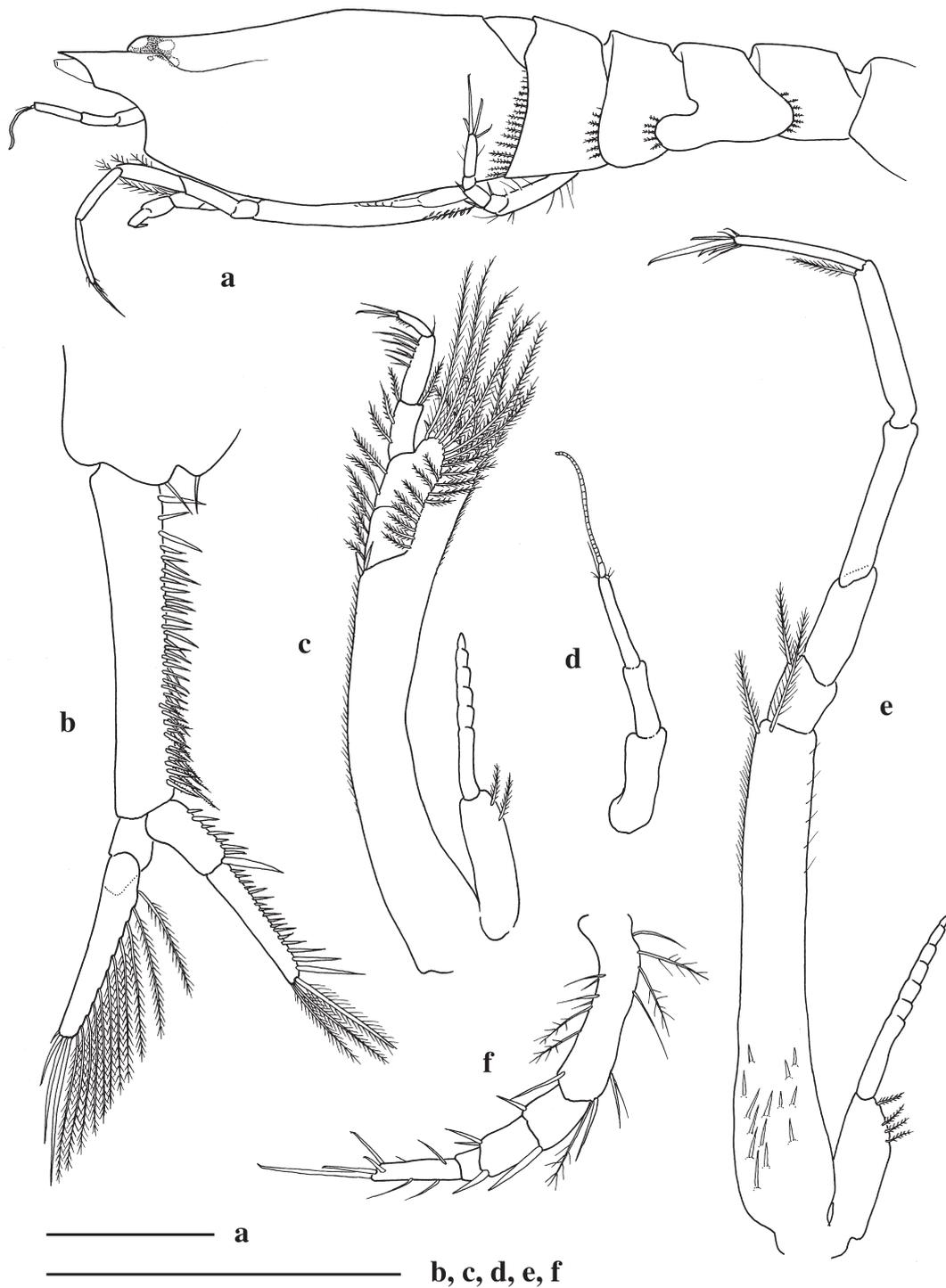


FIG. 6. – *Iphinoe acutirostris* Ledoyer, 1965. Adult male from the Medes Islands; a, Carapace and thoracic segments, lateral view (pereopods 3 to 5 not represented); b, uropod; c, third maxilliped; d, first antenna; e, first pereopod; f, second pereopod. Graphic scale 1 mm.

First antenna (Fig. 6d) has first and third segments of similar length, the second slightly shorter. Flagellum two-segmented with a terminal aes-

thetasc, vestigial accessory flagellum. Second antenna longer than body length.

Third maxilliped (Fig. 6c) with basis much longer

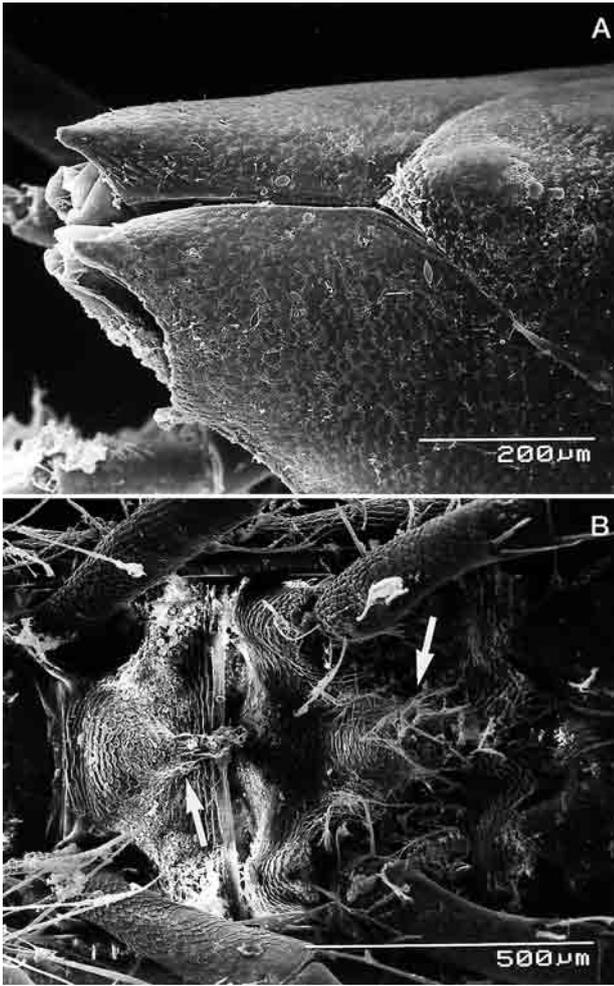


FIG. 7. – *Iphinoe acutirostris* Ledoyer, 1965. Adult male. SEM microphotograph of the pseudorostrum (A) and the pereon sternites showing the processes (B).

than the remaining segments together; distal process slightly narrowed towards the end and reaching the middle of the carpus. Merus expanded distally but not reaching the articulation of carpus and propodus.

Basis of the first pereopod (Fig. 6e) long, slightly shorter than remaining segments together. Smooth margins with some small spines on the ventral face of the basal half.

Second pereopod (Fig. 6f) slightly shorter than remaining segments together with 3 teeth on its internal face; only this article has plumose setae.

Final abdominal segment slightly prolonged between the uropods with a pair of perianal setae. Peduncle of uropod (Fig. 6b) 1.5 times as long as exopod, armed with 50 spines on inner edge, arranged in two lines. Exopod two-segmented, similar in size to endopod with 12 plumose setae on inner edge and 3 terminal spines. Endopod two-segmented, terminal segment 1.5 times the length

of the basal; first segment with 9 spines, and second with 18 spines on inner edge and three terminal plumose setae.

**Remarks:** When Ledoyer (1965) described the species, he supposed that adult males would have unarmed dorsal carina: specimens found in the Medes Islands confirm this. Furthermore, the pseudorostrum and sternal process make this species unmistakable.

**Distribution:** *Iphinoe acutirostris* was known only on the detritic bottoms of the Marseilles region (-35 m) (Ledoyer, 1965). In the Medes Islands it has been found on the beds of *Posidonia oceanica* at a depth of 11 m.

***Iphinoe rhodaniensis* Ledoyer, 1965**  
(Figs. 4d; 8)

*Iphinoe rhodaniensis* Ledoyer, 1965: 257-258, pl. 17, pl. 18 fig.7-8; Ledoyer, 1968: 175; Ledoyer, 1983: 70. fig. 2r; Corbera and Cardell, 1995.

Material: site C, 1 ♂ ad.

**Remarks:** *I. rhodaniensis* differs from the other species of the genus present in the western Mediterranean in that it has two aesthetascs in the terminal article of the first antenna, it has no sternal process, and it has a serrated dorsal edge of the carapace (Fig 4). *Iphinoe crassipes crassipes* and *Iphinoe serrata* also have two terminal aesthetascs in the first antenna but the adult male of the former has an unarmed dorsal edge of the carapace (Corbera, 1994), while the males of *I. serrata* have a sternal process. According

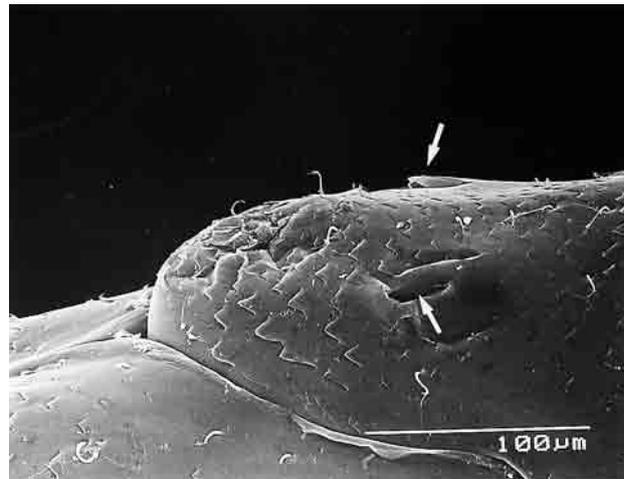


FIG. 8. – *Iphinoe rhodaniensis* Ledoyer, 1965. Adult male. SEM microphotograph of the eyelobe showing a pair of small teeth.

to Ledoyer (1965) pre-adult males of *I. rhodaniensis* have two small serrations above the eyelobe; these were also observed, albeit much smaller, in the adult male found in the Medes Islands.

*Distribution:* *I. rhodaniensis* is present in the western Mediterranean, Gulf of Lyons (Ledoyer, 1965, 1968, 1983), Fos Bay (Macquart-Moulin, 1991), and Barcelona (Corbera and Cardell, 1995); its distribution has been associated with areas enriched with organic matter. The presence of *I. rhodaniensis* in this area may be explained by the closeness of the mouth of the river Ter as well as by the large quantity of organic matter which the islands' large colony of *Larus cachinnans* contributes to the marine environment.

## DISCUSSION

Of the 17 species found in the Medes Islands two are new to the Spanish coasts; the rest make up 41% of all species recorded to date on the Spanish Mediterranean coast between 0 and 50 metres (Corbera, 1995).

The differences in species dominance at Site C, where *Nannastacus unguiculatus* is more abundant than *Cumella limicola*, may be due to two causes. First, site C is in one of the most exposed parts of the archipelago, which may favour *N. unguiculatus* over *C. limicola* owing to lower sedimentation, as has recently been observed in Algeciras Bay (Alfonso *et al.*, 1996). On the other hand, this site was always sampled last and given that *N. unguiculatus*'s nocturnal migration is at a slightly different time than that of *C. limicola*, especially during the summer (Macquart-Moulin, 1991), this may have affected the results by increasing the dominance of *N. unguiculatus*.

The results are very similar both quantitatively and qualitatively to those obtained by artificial-light nocturnal fishing in Banyuls and Port Vendres (Fage, 1932, 1933; Table 3). The most important differences may be seen in the species of the genus *Iphinoe*, although given the difficulty which this genus presents and the fact that the Mediterranean species were not well differentiated yet, it is very probable that both samplings would be more similar. Moreover, among the specimens of Fage's collec-

TABLE 3. – Comparative results of nocturnal captures of cumaceans obtained in the western Mediterranean by different methods. \* 1-10 ind. \*\* 11-100 ind.; \*\*\* 101-1000 ind.; \*\*\*\* 1001-10000 ind.; \*\*\*\*\* > 10000 ind.

locality author sampling method	Banyuls (Fage, 1933) Fishing under artificial-light	Marseille (Macquart-Moulin, 1991) Plankton net	Medes Islands Present study Artificial-light epibenthic traps
<i>Vaunthompsonia cristata</i>	***	***	**
<i>Cumopsis goodsir</i>			*
<i>Cumopsis longipes</i>		**	
<i>Bodotria scorpoides</i>	***	**	***
<i>Bodotria arenosa</i>	* (1)	**	**
<i>Bodotria gibba</i>		*	
<i>Eocuma ferox</i>	***	**	*
<i>Eocuma sarsi</i>		*	
<i>Iphinoe trispinosa</i>	*** (2)		
<i>Iphinoe doumae</i>		**	**
<i>Iphinoe maculata</i>		*	*
<i>Iphinoe tenella</i>	*	**	**
<i>Iphinoe acutirostris</i>		*	*
<i>Iphinoe inermis</i>	**		
<i>Iphinoe rhodaniensis</i>			*
<i>Nannastacus unguiculatus</i>	****	****	****
<i>Scherocumella longirostris</i>	*	****	**
<i>Cumella limicola</i>	****	*****	*****
<i>Cumella pygmaea</i>		****	****
<i>Campylaspis legendrei</i>		*	
<i>Pseudocuma longicorne</i>	**	**	**
<i>Pseudocuma simile</i>	*	**	*
<i>Pseudocuma ciliatum</i>	*		
<i>Diastylis rugosa</i>	*	*	*
<i>Diastylis doryphora</i>		*	
<i>Diastylodes bacescoi</i>		*	

(1) Although Fage (1933) does not cite this species, Le Loeuff and Intès (1977) cite it as *Bodotria* sp. coming from that author's samples

(2) Samples classified as *Iphinoe trispinosa* by Fage (1933) very probably belong to other species of the genus, which had not then been described.

tion classified as *Bodotria scorpioides* Le Loeff and Intès (1977) found some examples which they described as *Bodotria* sp., but which this work proposes belong to *Bodotria arenosa leloeuffi* ssp. nov.

All species obtained in the Medes Islands are extremely similar to nocturnal plankton found in the Gulf of Lyons (Macquart-Moulin, 1991) (Table 3). Of the 20 species recorded at Marseille Station 1, fourteen have also been identified in the Medes Islands; *Cumopsis longipes*, absent from the Medes Islands, seems to be replaced by *C. goodsir*; three other species are represented in Marseille by only a single specimen each. As for quantities, both sites are dominated by the four species of the family Nanastacidae, and among them *Cumella limicola* stands out notably.

The great similarity between these two localities, where two different sampling methods were used, seems to indicate, as Fage (1923) observed, that the use of artificial-light traps for the capture of cumaceans affects those that are active during the night and which also appear in plankton samples, for which reason the bias due to the sampling system seems to be unimportant.

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