

# A new operculate cumacean genus (Bodotriidae, Vaunthompsoniinae) from deep waters of New Caledonia

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Corbera J. 2006. — A new operculate cumacean genus (Bodotriidae, Vaunthompsoniinae) from deep waters of New Caledonia. *Zoosystema* 28 (2): 325-330.

## ABSTRACT

A new genus and species of bodotriid cumacean, *Scyllarocuma mclaughlinae* n. gen., n. sp., are described from deep waters south of New Caledonia. Along with three other known genera, this new genus belongs to a group of operculate cumaceans. In all these genera an operculum closes the cavity between the infero-lateral folds of the carapace. *Scyllarocuma* n. gen. differs from other genera of this group in that the operculum is formed exclusively by the basis and ischium of the first pereopod, the exopod of the second pereopod is rudimentary, and the uropod endopod is one-articulated. Swimming and feeding behaviours are hypothesized based on morphological characteristics.

## KEY WORDS

Crustacea,  
Cumacea,  
Bodotriidae,  
deep sea,  
tropical Pacific Ocean,  
new genus,  
new species.

## RÉSUMÉ

*Un nouveau genre de cumacé operculé (Bodotriidae, Vaunthompsoniinae) des eaux profondes de Nouvelle-Calédonie.*

Un nouveau genre et une nouvelle espèce de cumacé bodotride, *Scyllarocuma mclaughlinae* n. gen., n. sp., sont décrits des eaux profondes du sud de la Nouvelle-Calédonie. Ce nouveau genre appartient à un groupe de cumacés chez lesquels un opercule ferme la cavité entre les deux replis inférolatéraux de la carapace. *Scyllarocuma* n. gen. se différencie des trois autres genres de ce groupe par le fait que l'opercule est formé exclusivement par le basis et l'ischion du premier périopode; en outre l'exopode du second périopode est rudimentaire et l'endopode de l'uropode uniarticulé. Sur la base de sa morphologie, des hypothèses sur les comportements de cet animal concernant sa natation et son alimentation sont proposées.

## MOTS CLÉS

Crustacea,  
Cumacea,  
Bodotriidae,  
eaux profondes,  
océan Pacifique tropical,  
genre nouveau,  
espèce nouvelle.

## INTRODUCTION

According to Hale (1944) three cumacean genera, *Gephyrocuma* Hale, 1936, *Pomacuma* Hale, 1944, and *Zenocuma* Hale, 1944, are characterized by having the first pair of pereopods and third maxilliped expanded to form an operculum which closes the cavity between the infero-lateral folds of the carapace.

The seven known species in these three genera have a brush of long plumose or microsetulated setae on the propodus and dactylus of the first pereopod. Hale (1944) suggested that this brush is used for a system of feeding similar to that of porcellanid crabs and non-parasitic cirripeds. All of these species live at depths shallower than 100 m, and prefer sediment mainly composed of sand or coarse sand, where they can burrow quickly (Hale 1943).

The study of the deep water cumacean fauna from New Caledonia based on collections obtained during the BIOCAL cruise revealed a specimen that represents a new genus and species of operculate cumacean. This new genus and species are described herein.

## MATERIAL AND METHODS

The specimen was collected during the French campaign BIOCAL (Richer de Forges 1990) at 650 m depth using a Warén dredge (DW). For morphological observations the specimen was partially dissected, some appendages decalcified in lactic acid, stained with Clorazol black, mounted in Fauré medium, and then sealed with nail varnish. Drawings were prepared using a camera lucida on an Olympus microscope. The terminology follows Bacescu & Petrescu (1999). The specimen remains deposited in the Muséum national d'Histoire naturelle, Paris (MNHN).

## SYSTEMATICS

Family BODOTRIIDAE Scott, 1901

Subfamily VAUNTHOMPSONIINAE Sars, 1878

### NOMENCLATORIAL REMARKS

The Principle of Priority rules that Vaunthompsoniidae Sars, 1878 has precedence over Bodotriidae

Scott, 1901 when the two names are considered synonyms. The valid name for the family should thus be Vaunthompsoniidae Sars, 1878, with Bodotriinae subordinated at subfamily rank. However, ever since Hale (1944) treated the two names as confamilial, Bodotriidae has been treated as the valid name at family rank, with the senior name Vaunthompsoniinae subordinated at subfamily rank. This was clearly wrong under the 1st, 2nd and 3rd editions of the *Code*. Under the current 4th edition (ICZN 1999), Art. 35.5 rules that "If after 1999 a name in use for a family-group taxon [...] is found to be older than a name in prevailing usage for a taxon at higher rank in the same family-group taxon [...] the older name is not to displace the younger name". After having consulted with colleagues in the community of cumacean systematists, we maintain here Bodotriidae as the valid name at family rank.

### Genus *Scyllarocuma* n. gen.

TYPE SPECIES. — *Scyllarocuma mclaughlinae* n. sp.

ETYMOLOGY. — From the Greek *Skillaros*, referring to its resemblance to the slipper lobsters (Decapoda, Scyllaridae), and *Cuma*, meaning embryo or larva and from which the order name derives.

DIAGNOSIS. — Pseudorostral lobes flattened dorsoventrally, meeting in front of the frontal lobe, eyes absent. First pedigerous segment not visible. Exopods of third maxilliped and first pereopod developed, but rudimentary on second to fourth pereopods. Basis and ischium of first pereopod expanded laterally to form operculum fully covering mouth appendages. Pleon reduced, shorter than carapace length. Uropod endopod one-articulated.

### REMARKS

In the three previously known operculate genera of the subfamily Vaunthompsoniinae, the operculum is formed by the expansions of the first pereopod as well as those of the third maxilliped (Hale 1936, 1944) (Table 1). However, in *Scyllarocuma* n. gen. the operculum is formed exclusively by the expansions of the basis and ischium of the first pereopod. Moreover, *Scyllarocuma* n. gen. has the first pedigerous segment not visible, the exopod of the second pereopod reduced, and the endopod of the uropod one-articulated.

TABLE 1. — Comparison of selected characters of the four operculate Vaunthompsoniinae genera.

	<i>Gephyrocuma</i> Hale, 1936	<i>Zenocuma</i> Hale, 1944	<i>Pomacuma</i> Hale, 1944	<i>Scyllarocuma</i> n. gen.
Total length (mm)	2.3-3.1	14.5	8.0-9.0	8.1
Longest article of antenna 1 peduncle	first	first	first	second
Eyes	present	present	present	absent
Cephalothorax-pleon ratio	> 1	< 1	< 1	>> 1
Basis of maxilliped 3	expanded and produced distally	expanded and produced distally	expanded laterally	without expansions
First pedigerous somite	visible	visible	visible	not visible
Exopod on pereopod 2	developed	developed	developed	rudimentary
Ischium of pereopod 2	free	free	free	fused
Exopod on pereopod 3	rudimentary	developed	developed	rudimentary
Uropod endopod	2-articulated	2-articulated	2-articulated	1-articulated

*Scyllarocuma mclaughlinae* n. sp.  
(Figs 1; 2)

HOLOTYPE. — New Caledonia. BIOCAL, stn DW 36, 23°08.64'S, 167°10.99'E, 650 m, 29.VIII.1985, 1 immature ♀ 8.5 mm total length, partially dissected in one slide (MNHN-Cu 1057).

ETYMOLOGY. — This species is named after Patsy A. McLaughlin, in recognition of her valuable contribution to the knowledge of cirripeds and anomurans.

DESCRIPTION OF IMMATURE FEMALE

Carapace 0.4 times total length, smooth; pseudorostral lobes meeting in front of frontal lobe, flattened and expanded laterally, and reaching anterolateral angles; antennal notch absent; frontal lobe without eye. First pedigerous somite not visible externally; second to fourth pedigerous somites almost fused dorsally, with well developed pleural plates. Pleon reduced, shorter than carapace length. Well developed exopods on third maxilliped and first pereopod, rudimentary exopods on second to fourth pereopods.

First antenna geniculate, second article of peduncle longer than first and three times as long as third; main flagellum two-articulated. Basis of third maxilliped shorter than rest of limb, with small simple setae on inner and outer margins as well as distal ventral face; ischium fused with basis; merus very short; carpus longer than propodus with five pappose setae on inner margin and several small simple setae on the outer; propodus with six long setae on inner margin, and

several long simple setae and one pappose seta on outer margin; dactylus shorter than half length of propodus, with six acuminate setae of different length on tip. First pair of pereopods strongly modified forming operculum fully closing cavity between lateral folds of carapace; basis progressively expanded from proximal to terminal part, first article of exopod also slightly expanded; ischium very short between articulations, with basis and merus but greatly expanded laterally and distally forming a square plate that covers rest of appendage; merus short; carpus robust with some serrations on proximal inner margin; propodus also robust, as long as carpus, with brush of long micropectinated setae; dactylus rudimentary. Second pereopod with two-articulated exopod, basis shorter than length of two following segments combined; ischium fused with basis; merus and carpus of similar length, with acuminate setae on distal corners; propodus short; dactylus twice length of propodus, with three acuminate setae on tip. Third pereopod with two-articulated exopod; basis of similar length to merus, with few pappose setae; ischium very short, with two long simple setae; merus with three long simple setae on distal third; carpus shorter than merus, slightly produced distally, with five long curved simple setae; propodus small with distal long simple seta. Uropod as long as last two abdominal somites; peduncle as long as wide; endopod one-articulated, twice as long as peduncle, with small simple seta terminally; exopod two-articulated, longer than endopod, with two simple setae terminally.

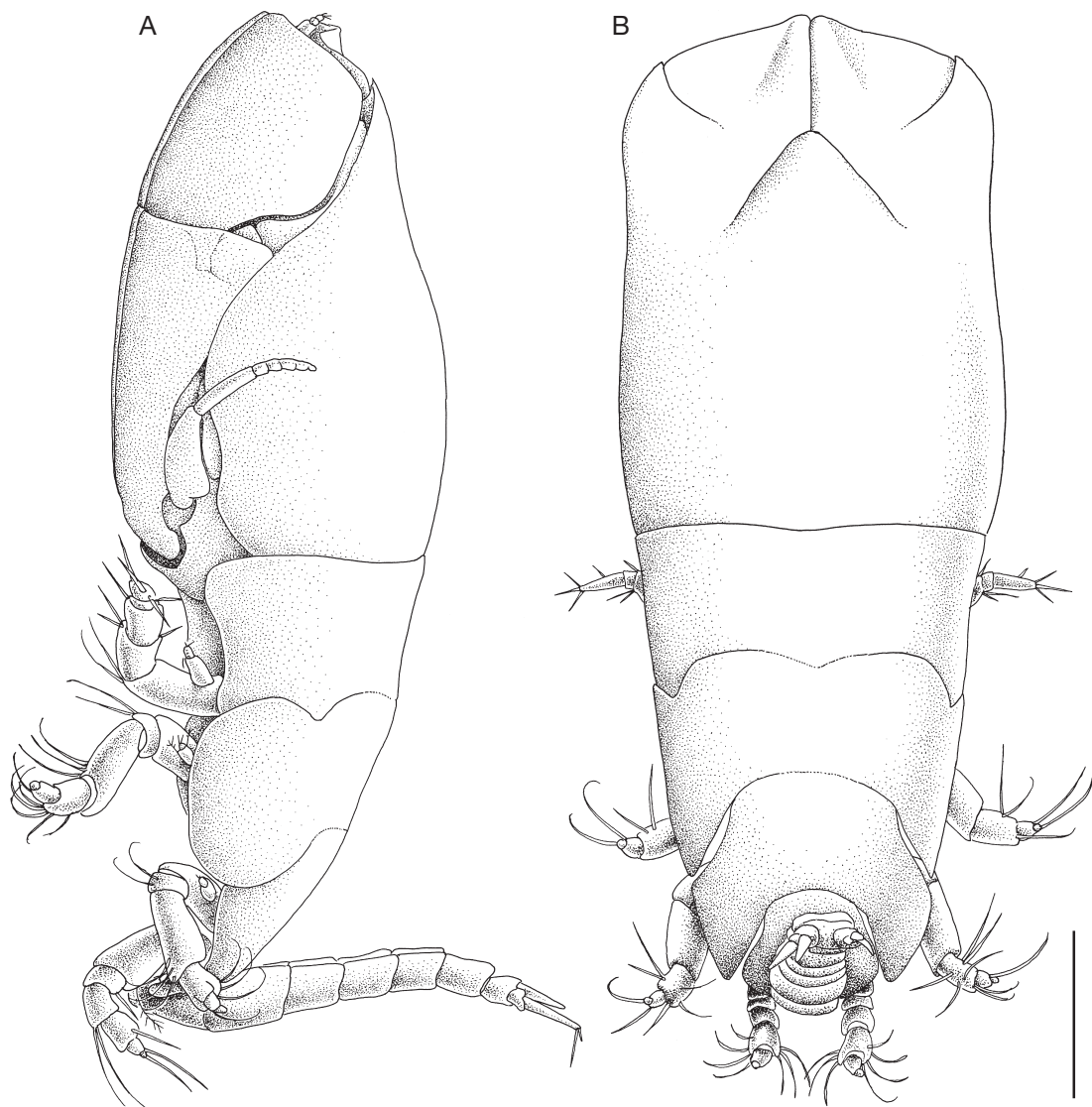


FIG. 1. — *Scyllarocuma mclaughlinae* n. gen., n. sp., holotype immature ♀ (MNHN-Cu 1057): **A**, whole animal in lateral view, note the position of abdomen in straight angle; **B**, whole animal in dorsal view. Scale bar: 1 mm.

## DISCUSSION

Although cumaceans are benthic organisms that burrow into the sediment, they also display swimming behaviour (Foxon 1936). Some littoral species perform circadian vertical migrations (Macquart-Moulin 1991) and swimming activity has also been

reported for deep water species (Cartes & Sorbe 1997; Corbera 2000).

Cumaceans may swim by three different methods (Foxon 1936; Hale 1943): 1) by vibratory movements of the exopods of the thoracic appendages; 2) by rapid flexure of the pleon; and 3) by movements of pleopods (only males of some families are

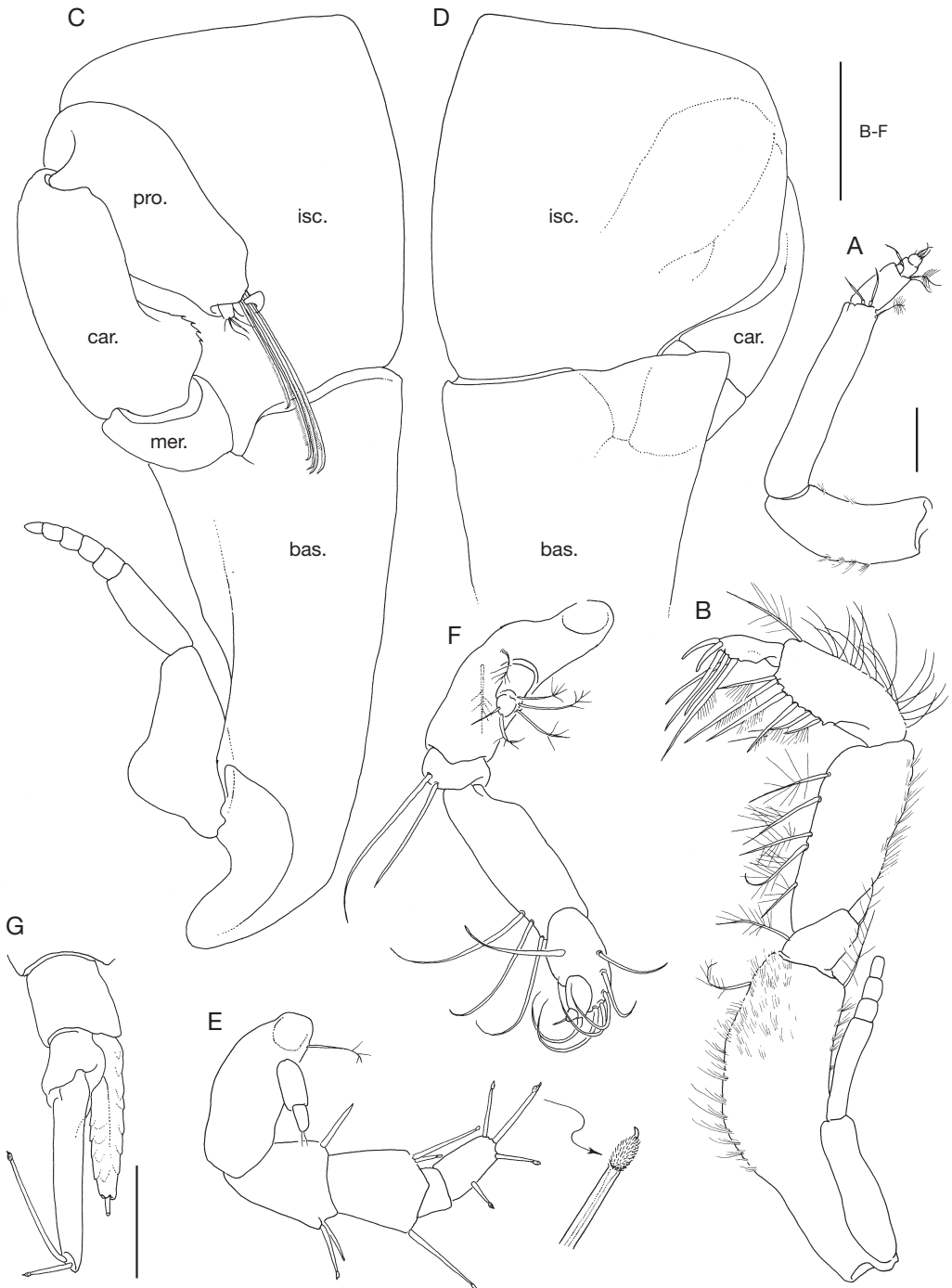


FIG. 2. — *Scyllarocuma mclaughlinae* n. gen., n. sp., holotype immature ♀ (MNHN-Cu 1057): **A**, antenna 1; **B**, maxilliped 3; **C**, internal view of pereopod 1; **D**, external view of pereopod 1; **E**, second pereopod; **F**, third pereopod; **G**, uropod. Abbreviations: **bas.**, basis; **car.**, carpus; **isc.**, ischium; **mer.**, merus; **pro.**, propodus. Scale bars: A, G, 0.2 mm; B-F, 0.5 mm.

provided with pleopods). Sometimes two methods are combined to obtain a greater speed. Reduction in the development of exopods and in the length of pleon suggests that *Scyllarocuma* n. gen. has little swimming ability and could progress on the sediment by skipping, similarly to what has been described for *Gephyrocuma* (Hale 1943).

Little is known about the feeding of cumaceans. In most cases they have been considered to be deposit feeders (Dennell 1934), but a few genera of the family Nannastacidae, such as *Campylaspis* Sars, 1865, have mouth appendages provided with spines and teeth, suggesting predatory behaviour (Bacescu & Petrescu 1999). Foxon (1936) described how sand-dwelling cumaceans grasp the sand-grains, and the study of stomach contents of some species (Blazewicz-Paszowycz & Logowski 2002) confirmed that detritus is an important component of the diet. The same work pointed out that shallow water species consume mainly epipelagic food while deep water species feed mostly on pelagic sedimented particles. The morphology of *Scyllarocuma* n. gen. does not seem to be compatible with these patterns of feeding. The powerful musculature of the carpus and propodus of the first pereopod could permit prolonged rhythmic movement of these two articles allowing the capture of suspended particles by the brush of setae on the tip of the propodus, as has been suggested in other operculate genera (Hale 1944). Brush of setae on the propodus of first pereopod was also described for few non-operculate genera such as *Heterocuma* Miers, 1879, *Gynodiastylis* Calman, 1911 and *Axiogynodiastylis* Gerken, 2001, and the same feeding method was also suggested for two of them (Gerken 2001). Thus, a small group of cumaceans could be considered as suspension feeders.

### Acknowledgements

The author is very grateful to Bertrand Richer de Forges (IRD, Nouméa) and Alain Crosnier (MNHN) on offering him the opportunity to study a very interesting collection of cumaceans – including the specimen described herein – collected during the French cruises in the economic area of New Caledonia. Thanks are also due to Les Watling and an anonymous reviewer for constructive comments on the manuscript.

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Submitted on 10 August 2005;  
accepted on 16 November 2005.