

# New apodid holothurians (Holothurioidea, Apodida) from the New Caledonian continental slope collected during "BIOGEOCAL" expedition 1987

**Alexei SMIRNOV**

Zoological Institute, Russian Academy of Sciences,  
Universitetskaia nab, 1,  
Saint Petersburg, 199034, Russia

---

**KEY WORDS**  
Apodid holothurians,  
new species,  
continental slope,  
New Caledonia.

## **ABSTRACT**

This report contains a taxonomic note on the genera *Taeniogyrus* and *Trochodota* and a description of four new species of apodid holothurians, collected between 595 and 1675 m depth from the Loyalty Islands basin, New Caledonia: *Trochodota neocaledonica* n.sp., *Rynkatorpa coriolisi* n.sp., *Labidoplax georgii* n.sp., and *Prototrochus belyaevi* n.sp. Another specimen is described as *Myriotrochus* sp.

## **RÉSUMÉ**

Quatre espèces, nouvelles pour la science, d'holothuries apodes (Holothurioidea, Apodida) du bassin des îles Loyauté, Nouvelle-Calédonie sont décrites : *Trochodota neocaledonica* n.sp., *Rynkatorpa coriolisi* n.sp., *Labidoplax georgii* n.sp. et *Prototrochus belyaevi* n.sp. Un échantillon est décrit comme *Myriotrochus* sp. Les espèces ont été récoltées entre 595 et 1675 m de profondeur. Cet article contient aussi une note taxonomique sur les genres *Taeniogyrus* et *Trochodota*.

**MOTS CLÉS**  
Holothuries apodes,  
nouvelles espèces,  
talus continental,  
Nouvelle-Calédonie.

The apodous holothurians from the continental slope of central Pacific have been studied insufficiently. Only two species have been described up to date: *Myriotrochus bathibius* and *M. giganteus*. In recent papers on holothurians from the Philippines (Cherbonnier & Feral 1981) and Indonesia (Massin 1987; Massin & Darsano 1989) apodids were not recorded from the continental slope, so this collection of apodids in the New Caledonia region is of undeniable interest.

The present paper gives a description of four new species of apodid holothurians and one *Myriotrochus* sp. The holothurians were collected between 595 and 1675 m depth during the expedition "BIOGEOCAL" in New Caledonia. The expedition, on R.V. *Coriolis*, took samples South of Noumea in the Loyalty Islands basin from 7 April to 7 May 1987 (Cotillon & Monniot 1987; Richer de Forges 1990). Apodids were collected at six stations: five samples were taken by usnel box-corer and one by beam trawl. Unfortunately, all the specimens are damaged and known only from pieces of the anterior part of the body, which does not allow a complete description of morphology and anatomy. Nevertheless, the form of the calcareous ossicles, which are the main features used in apodid taxonomy, makes possible the description of new species.

#### Family CHIRIDOTIDAE Östergren, 1898

##### TAXONOMIC NOTES ON THE GENERA

*Taeniogyrus* Semper, 1868 AND  
*Trochodota* Ludwig, 1892

Among chiridotid genera only two, *Taeniogyrus* and *Trochodota*, possess a combination of wheels and sigmoids in the body wall, but the relationships between these two genera remain obscure. Clark (1907, 1921) in his revision of these genera has referred to *Trochodota* the species with "wheels not gathered in papillae, scattered in the skin, often numerous enough to be crowded into ill-defined heaps, sometimes so scattered as to be easily overlooked", whilst in *Taeniogyrus* he included the species with "wheels gathered into sharply defined papillae" (see Clark 1921: 165). Rowe (1976) restricted the genus *Trochodota* to

species with serrations on the inner margin of the wheels arranged in groups. Rowe transferred all the other species of the genus *Trochodota* to the genus *Taeniogyrus*. However, Hernandez (1981: 156, fig. 4c) has published a SEM micrograph of the wheel of *T. purpurea* (Lesson, 1830), the type species of the genus *Trochodota*, which revealed that serrations of the inner rim are continuous and do not form groups. My own studies of the wheels of *T. purpurea* confirmed the data of Hernandez. Thus, the main taxonomic character used by Rowe to define the genus is not present in the type species of this genus. In the light of present knowledge Clark's system itself needs revision. Nevertheless, I propose to use Clark's system until these two genera are revised.

In this study the following species are considered to be in the genus *Trochodota* Ludwig, 1892: *Holothuria (Fistularia) purpurea* Lesson, 1830 (type species); *Chirodota dunedinensis* Parker, 1881; *C. japonica* von Marenzeller, 1881; *C. venusta* Semon, 1887; *Taeniogyrus allani* Joshua, 1912; *Trochodota roebucki* Joshua, 1914; *T. rosea* Ohshima, 1914; *T. diasema* H. L. Clark, 1921; *T. maculata* H. L. Clark, 1921; *T. dendyi* Mortensen, 1925; *T. shepherdii* Rowe, 1976; *T. mira* Cherbonnier, 1988; *T. vivipara* Cherbonnier, 1988; *T. inexpectata* A. Smirnov, 1989 and questionably *T. havelockensis* Rao, 1975.

#### *Trochodota neocaledonica* n.sp. (Fig. 1A-C)

ETYMOLOGY. — The species is named after the New Caledonian region.

MATERIAL EXAMINED. — Holotype from New Caledonia, Loyalty Islands basin, stn KG201, 22°40'S - 166°33'E, depth 595 m, usnel box-corer, stored in the MNHN, Paris, No. EchH 8002.

##### DESCRIPTION

The holotype is a fragment of the anterior part of body, 9 mm long. Its width varies from 1 mm anteriorly to 0.7 mm posteriorly. The anterior part is swollen and curved, so that mouth is found on side of body (Fig. 1A). The skin is semi-transparent; the colour in alcohol is yellowish. Ten tentacles, strongly contracted so that four

digits are visible on only one tentacle. Details of calcareous ring are not available due to poor condition of the specimens.

Ossicles of body wall comprise sigmoids and wheels. Sigmoids (Fig. 1C) are numerous, scattered throughout body wall, but not arranged in groups or found in papillae. They are 40-90  $\mu\text{m}$

in length (mean = 71.4,  $n = 56$ , std = 9.30); small ones (40-55  $\mu\text{m}$ ) are rare. Only two wheels were found. Wheels are of typical chiridotid type with six spokes and serrations evenly distributed along inner margin (Fig. 1B). Diameter of wheels is 38 and 40  $\mu\text{m}$ . Inner rim of larger one bears forty-eight serrations.

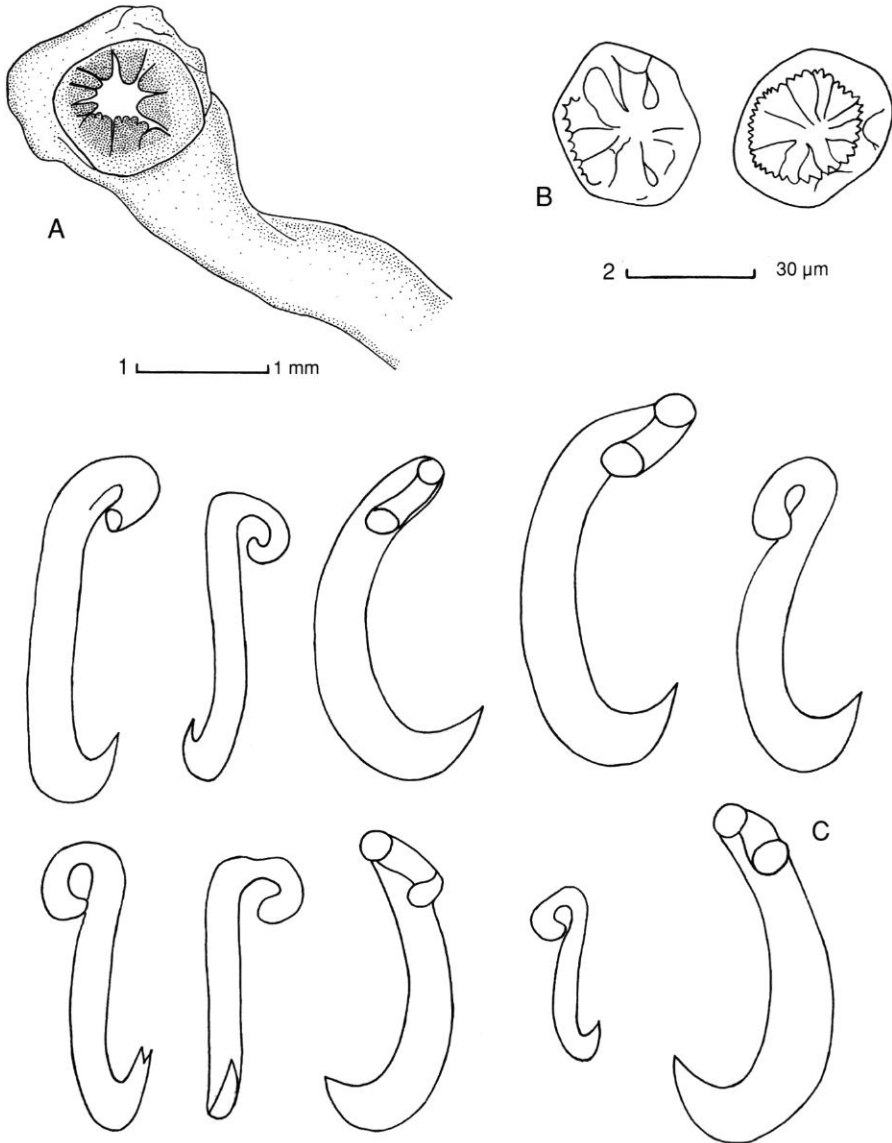


FIG. 1. — *Trachodota neocaledonica* n.sp. holotype: A, anterior part of body; B, wheels; C, sigmoid ossicles. (A = scale 1; B, C = scale 2).

TABLE 1. — Ossicle sizes of some species of the genus *Trochodota*. Values in parentheses correspond to means.

Species	Wheels diameter µm	Sigmoids length µm	Source
<i>T. allani</i> (Joshua, 1912)	33-216	120-150	Rowe 1976
<i>T. diasema</i> H. L. Clark, 1921	75-130	95-130	Clark 1921
<i>T. dunedinensis</i> (Parker, 1881)	60-160 (100)	100	Pawson 1963
<i>T. inexpectata</i> A. Smirnov, 1989	67-112 (95)	67-100 (88)	Smirnov 1989
<i>T. maculata</i> H. L. Clark, 1921	50-100 (70-80)	66-77	Clark 1921
<i>T. mira</i> Cherbonnier, 1988	48-73	96-107	Cherbonnier 1988
<i>T. neocaledonica</i> n.sp.	38-40	40-90 (71)	present paper
<i>T. venusta</i> (Semon, 1887)	<80	<100	Semon 1887
<i>T. vivipara</i> Cherbonnier, 1988	32-36	41-43	Cherbonnier 1988
<i>T. purpurea</i> (Lesson, 1830)	130-180	120-130	Pawson 1964
<i>T. roebucki</i> Joshua, 1914	80	120-140 (130)	Joshua 1914
<i>T. rosea</i> Ohshima, 1914	37-105	80-95	Ohshima 1914
<i>T. shepherdii</i> Rowe, 1976	84-216	144-190	Rowe 1976

## RELATIONSHIPS

The new species differs from *T. japonica* (von Marenzeller, 1881) and *T. dendyi* Mortensen, 1925 by lacking the groups of sigmoids occurring in papillae (see Ohshima 1913; Mortensen 1925). *T. neocaledonica* n.sp. differs from the other species of the genus by the very small number of wheels and by the size of ossicles (Table 1).

Family SYNAPTIDAE Burmeister, 1837

*Rynkatorpa coriolisi* n.sp.  
(Fig. 2A-H)

ETYMOLOGY. — The species is named after the R.V. *Coriolis*, research vessel of the BIOGEOCAL expedition.

MATERIAL EXAMINED. — Holotype from New Caledonia, Loyalty Islands basin, 12.IV.1987, stn CP232, 21°33'81S - 166°27'07E to 21°34'04S - 166°27'34E, depth 595 m, beam-trawl, stored in the MNHN, Paris, No. EchH 8006.

## DESCRIPTION

The holotype is a fragment of the anterior part of body, 8 mm long (Fig. 2A). Its width varies from 2.2 mm anteriorly to 1 mm posteriorly. The skin is semi-transparent and the colour in alcohol is yellowish. Twelve tentacles, each with one pair of small digits on the top (Fig. 2C). Calcareous ring consists of ten pieces; it has well developed muscular impressions and the radials

are perforated (Fig. 2B).

Tentacular rods lay in two rows in the outer and inner parts of tentacles, rod axis being more or less perpendicular to the tentacle axis (Fig. 2C). Rods in the digits lay parallel to digit axis (Fig. 2C). Rods from the outer part of tentacles (Fig. 2E) are the largest (75-113 µm long), often with swollen perforated ends with one to seven perforations. Rods from the inner part (Fig. 2F) are 67-82 µm in length, with ends forked or with a single perforation. Rods from digits (Fig. 2D), 55-67 µm long, are similar to rods from inner sides of tentacles.

Ossicles from body wall comprise anchors and anchor plates. Anchors (Fig. 2H) bear three to five teeth on the arms; stocks unbranched,

TABLE 2. — Parameters of anchors and anchor plates in *Rynkatorpa coriolisi* n.sp.

Parameter	Mean	Std	Min.	Max.
Anchor (n = 10)				
Length, µm	178.2	10.00	163	193
Breadth across the arm, µm	85.3	5.58	75	93
Length/breadth	2.09	0.10	1.90	2.27
Anchor plates (n = 10)				
Length, µm	137.3	14.14	117	155
Width, µm	88.9	20.48	63	125
Length/width	1.59	0.27	1.24	2.03

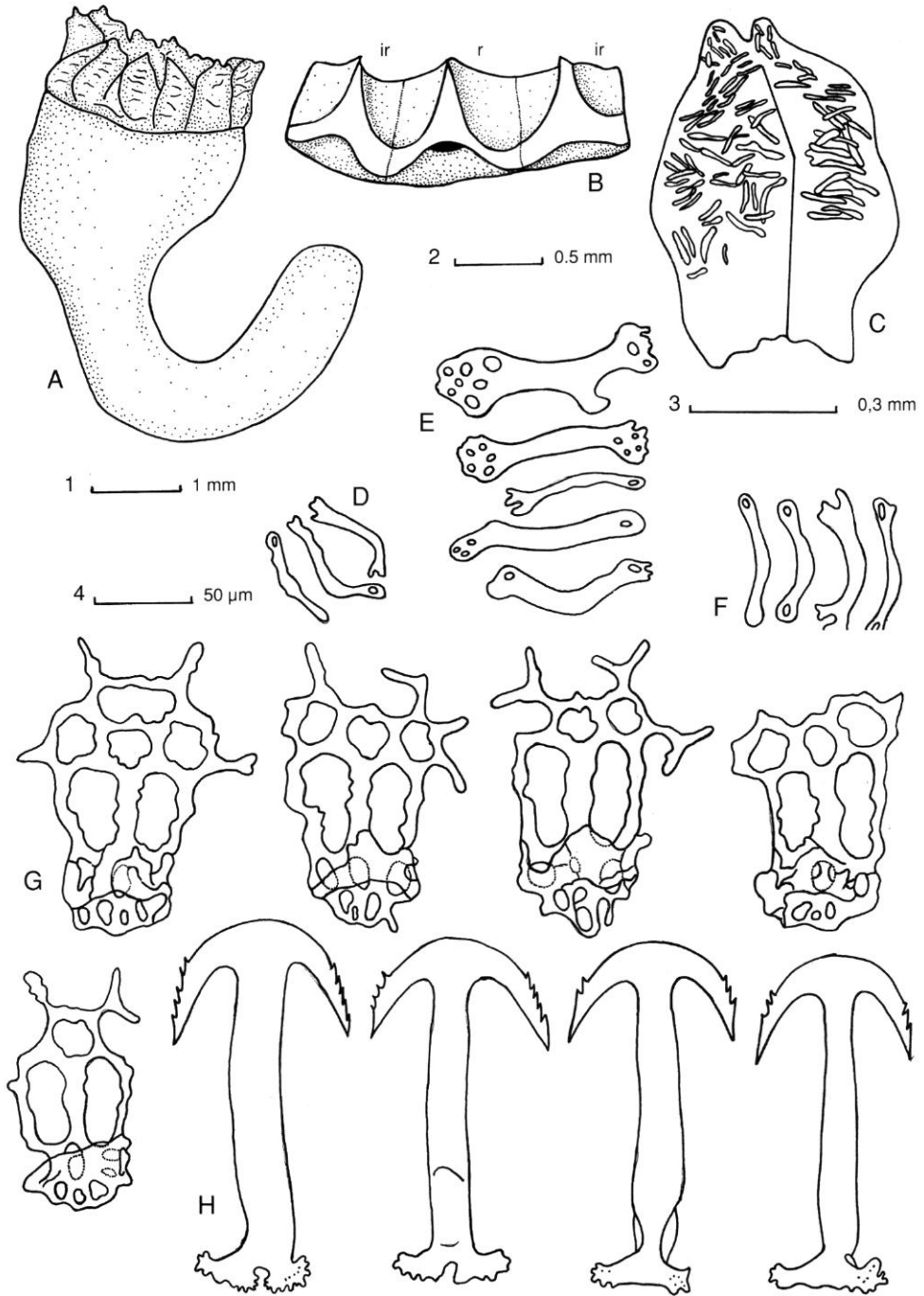


FIG. 2. — *Rynkatorpa coriolisi* n.sp., holotype: **A**, anterior part of body; **B**, pieces of calcareous ring, r = radial; ir = interradial; **C**, tentacle (left, inner part of tentacle; right, outer part of tentacle); **D**, tentacular rods from digits of tentacle; **E**, tentacular rods from outer part of tentacle; **F**, tentacular rods from inner part of tentacle; **G**, anchor plates; **H**, anchors. (A = scale 1; B = scale 2; C = scale 3; D-H = scale 4).

concave in the middle part and densely covered with teeth. The anchor plates (Fig. 2G) have very irregular outline with very long projections in upper parts. Each plate has two central holes with toothed margin and one to four smaller holes, also toothed in the upper part of the plate. Three smooth articular holes are present with bridge laying above them. There are two to four small, smooth posterior holes. Parameters of ossicles are given in the table 2.

#### RELATIONSHIPS

*R. coriolisi* is close to *R. timida* (Koehler *et* Vaney, 1905) in the form of anchor plates, but differs by having only one pair of tentacular digits compared with two pairs in the latter (Koehler & Vaney 1905). The new species distinctly differs from *R. duodactyla* (H. L. Clark, 1907) and *R. bicornis* (Sluiter, 1901), both also having only one pair of

tentacular digits (Clark 1907; Sluiter 1901), by the shape of anchors and anchor plates.

### *Labidoplax georgii* n.sp. (Figs 3A-C; 4A-D)

ETYMOLOGY. — Named in the memory of Georgii Mikhailovich Belyaev, expert on apodid holothurians and hadal fauna.

MATERIAL EXAMINED. — Holotype and paratypes from New Caledonia, Loyalty Islands basin, stored in the MNHN, Paris.

Holotype No. EcHh 8003, stn KG201, 22°40'S - 166°33'E, depth 595 m, usnel box-corer.

Paratype 1 No. EcHh 8004, stn KG219, 22°39'S - 166°34'E, depth 570 m, usnel box-corer.

Paratype 2 No. EcHh 8005, stn KG222, 22°45'S - 166°25'E, depth 1675 m, usnel box-corer.

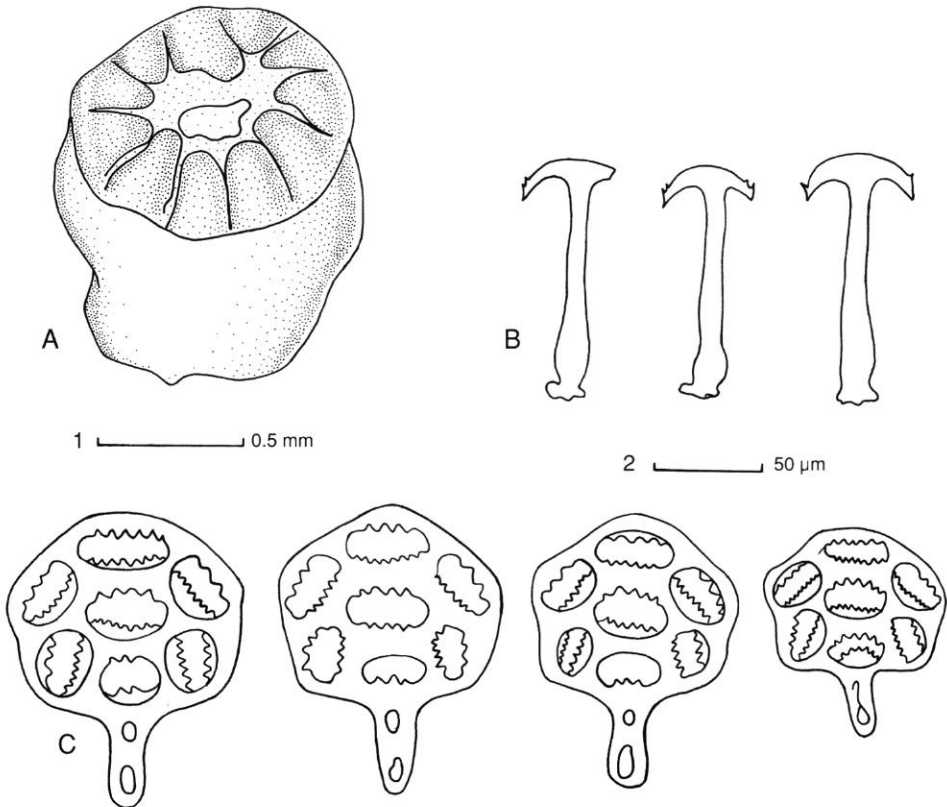


FIG. 3. — *Labidoplax georgii* n.sp., holotype: **A**, anterior part of body; **B**, anchors; **C**, anchor plates. (A = scale 1; B, C = scale 2).

## DESCRIPTION

The holotype is a fragment of the anterior part of the body, 1.3 mm long and 0.9 mm in diameter (Fig. 3A); paratype 1 (stn KG219): fragment of the anterior part of the body 1.4 mm long and 1 mm in diameter; paratype 2 (stn KG222): fragment of the anterior part of the body 1.2 mm in diameter, containing the calcareous ring only. Skin is semi-transparent and the colour in alcohol is whitish. Eleven tentacles in all three fragments. Tentacles with one terminal digit and two smaller lateral digits (Fig. 4A). In the tentacles slightly curved rods ossicles occur, 68-118  $\mu$ m

(mean = 90.7, n = 21, std = 15.54) long, slightly branched at the ends (Fig. 4B). Details of calcareous ring are not available due to poor condition of the specimens.

Ossicles in the body wall are numerous, many of them overlapping. Anchor and anchor plates typical of the genus. Completely developed anchors bear two to four teeth on the arms, the stock is slightly toothed (Figs 3B, 4D). Anchors are narrower than the anchor plates. Anchor plates (Figs 3C, 4C) have seven (one central and six peripheral) serrated holes of nearly equal size. The narrow handle has the same width in proxi-

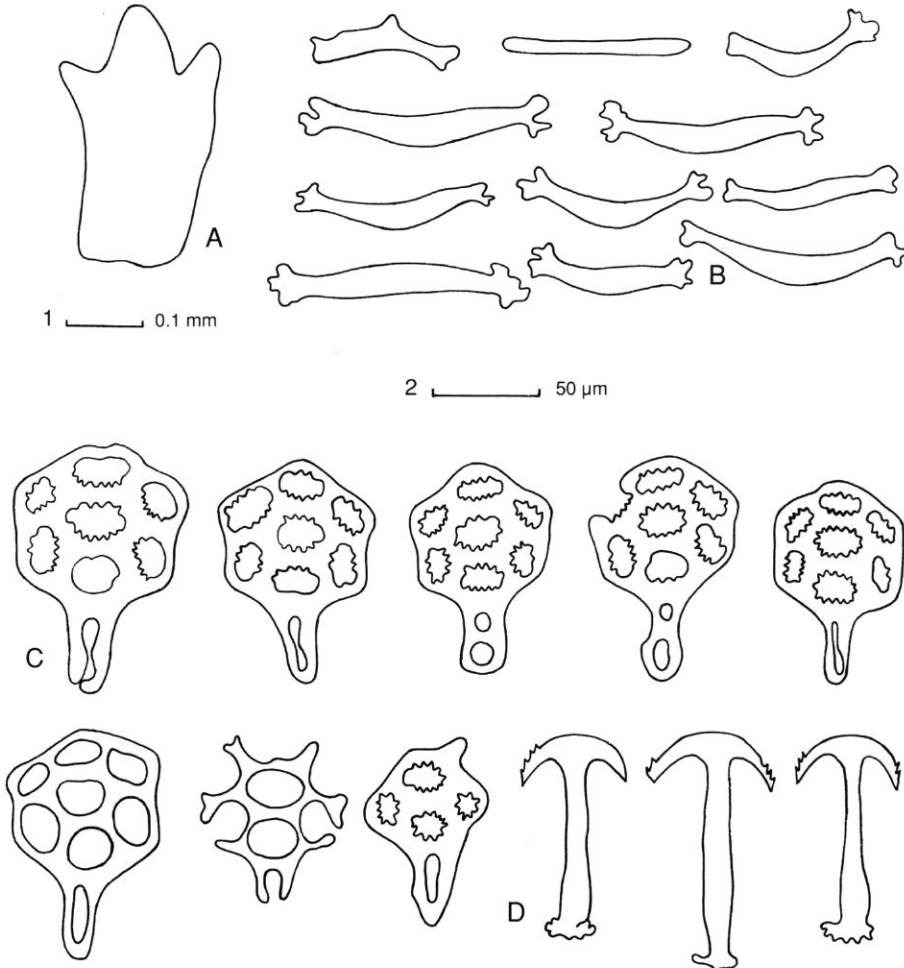


FIG. 4. — *Labidoplax georgii* n.sp., paratype 2 (No. EcHh 8005, stn KG222): A, tentacle; B, tentacular rods; C, anchor plates; D, anchors. (A = scale 1; B-D = scale 2).

TABLE 3. — Parameters of anchor and anchor plates in *Labidoplax georgii* n.sp.

Parameter	Holotype				Paratype 2 (stn KG222)				For both			
	Mean	Std	Min.	Max.	Mean	Std	Min.	Max.	Mean	Std	Min.	Max.
Anchor												
	n = 6				n = 6				n = 12			
Length, $\mu\text{m}$	110.3	16.06	87	130	97.8	7.08	90	110	104.1	13.51	87	130
Breadth across the arm, $\mu\text{m}$	43.3	8.29	32	55	52.3	3.93	50	60	47.8	7.77	32	60
Length/breadth	2.56	0.148	2.36	2.72	1.87	0.047	1.80	1.92	2.21	0.38	1.80	2.72
Anchor plates												
	n = 12				n = 12				n = 24			
Length, $\mu\text{m}$	119.3	8.14	100	132	98.4	13.69	80	120	108.8	15.32	80	132
Width, $\mu\text{m}$	91.6	5.63	80	100	66.3	8.39	53	80	79.0	14.67	53	100
Handle length, $\mu\text{m}$	38.9	4.05	30	44	39.6	4.42	32	48	39.3	4.16	30	48
Length/width	1.30	0.06	1.22	1.38	1.48	0.10	1.19	1.58	1.39	0.12	1.19	1.58
Handle length/length, %	32.6	1.68	30.0	35.0	40.5	3.73	36.1	50.0	36.5	4.94	30.0	50.0

mal and distal parts and is rounded at the proximal end. It is perforated by two holes one above the other, which can fuse to form a slit. Holes of the handle are smooth. Parameters of anchors and anchor plates of the holotype and paratype 2 are given in table 3.

#### RELATIONSHIPS

*Labidoplax georgii* n.sp. is the first species of the genus recorded in the South Pacific. The other four species of the genus *Labidoplax*, viz *L. buskii*, *L. media*, *L. southwardorum* and *L. similimedia* are distributed in the North Atlantic Ocean. *L. georgii* differs from *L. buskii* (M'Intosh, 1866) by the form of the hole of the anchor plate nearest to handle. This hole has sickle-like form and usually lacks serrations in *L. buskii* (see Clark 1924), whereas it is rounded and usually bears distinct marginal teeth in *L. georgii*. Tentacle rods in *L. buskii* are thicker and more ramified at the ends than in *L. georgii*. The new species differs from *L. media* Östergren, 1905 by having eleven tentacles with three digits (one terminal and two smaller lateral), while *L. media* has twelve tentacles with two pairs of digits. The second distinguishing feature is in the form of anchor plates and tentacular rods which are similar in *L. media* and *L. buskii* (Östergren 1905; Gotto & Gotto 1972). *L. georgii*, with its tentacles bea-

ring three digits and having rods, differs from *L. southwardorum* Gage, 1985 which has tentacles with two pairs of digits and lacks rods. The anchor plates present also some differences. In *L. southwardorum* they are narrower at the end (Gage 1985), while in *L. georgii* handles are of equal width in the proximal and distal parts. *L. georgii* differs from *L. similimedia* Gage, 1985 by having more slender and slightly ramified tentacular rods and anchors with shaft near the stock less swollen (see Gage 1985).

#### Family MYRIOTROCHIDAE Théel, 1877

##### *Prototrochus belyaevi* n.sp.

(Fig. 5A-C)

*Prototrochus* sp. juv. — Belyaev & Mironov 1982 : 90-91, figs 5b, v, g, table I, fig. 7.

ETYMOLOGY. — Named in the memory of Georgii Mikhailovich Belyaev, expert on apodid holothurians and hadal fauna.

MATERIAL EXAMINED. — Holotype and paratype from New Caledonia, Loyalty Islands basin, stored in the MNHN, Paris. Holotype No. EcHh 8007, paratype No. EcHh 8008, stn KG211, 22°42'S - 166°32'E, depth 975 m, usnel box-corer.



## DESCRIPTION

The holotype-fragment of the anterior part of the body, 0.9 mm long (Fig. 5A); the paratype-fragment of the anterior part of the body, 0.2 mm long, containing the calcareous ring only. Skin is nontransparent, the colour in alcohol is whitish.

The ten tentacles are strongly contracted so that their shape cannot be ascertained. They lack any ossicles.

Calcareous ring consists of ten pieces each with one prominent anterior process (Fig. 5B).

Numerous wheels of myriotrochid type are found in the skin (Fig. 5C). There is no clear central knob on the hub of the wheel. Wheel parameters are given in table 4.

When the wheel diameter exceeds 64  $\mu\text{m}$  the teeth are twice as numerous as the spokes. Only one wheel with eighteen spokes was found to bear thirty-five teeth instead of thirty-six. Four wheels, 53-61  $\mu\text{m}$  in diameter, have the number of teeth less than double the number of spokes.

## RELATIONSHIPS

The new species is very close to the specimen described by Belyaev & Mironov (1982) as *Prototrochus* sp. juv. Wheels in the latter also constantly have twice as many teeth as spokes. Other wheel parameters in the new species and *Prototrochus* sp. juv. are also very similar (Table 4).

The close relation between the new species and

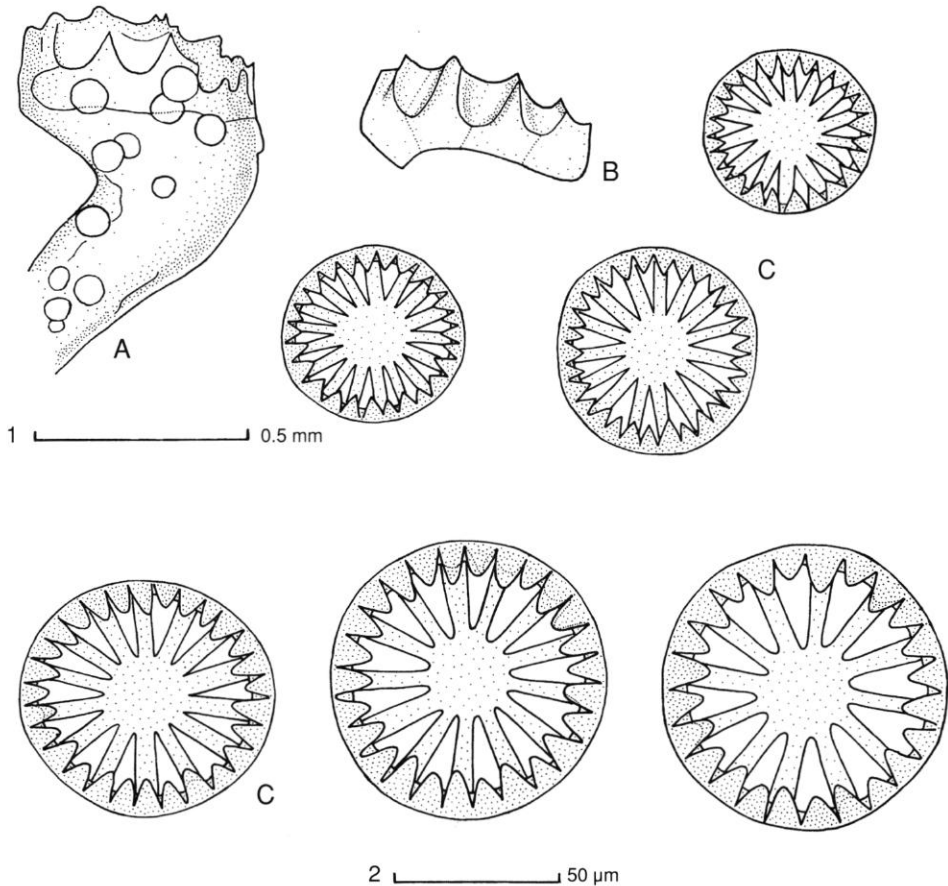


Fig. 5. — *Prototrochus belyaevi* n.sp., holotype: A, anterior part of body; B, pieces of calcareous ring; C, wheels. (A, B = scale 1; C = scale 2).

TABLE 4. — Wheel parameters in *Prototrochus belyaevi* n.sp. and *Prototrochus* sp. juv. (Belyaev et Mironov, 1982). D = diameter.

Parameter	<i>Prototrochus belyaevi</i> n.sp. (n = 26)				<i>Prototrochus</i> sp. juv. (n = 53)		
	Mean	Std	Min	Max	Mean	Min	Max
Wheel D, $\mu\text{m}$	74.4	10.46	53	90	80	62	98
Number of spokes	13.4	1.53	11	18	13.2	11	17
Number of teeth	26.2	2.45	22	35	26	22	33
Spokes/teeth, %	51.4	3.57	50	65.4	50	48	52
Hub D/wheel D, %	27.3	1.43	24.4	30.4	28	26	32

the specimen described by Belyaev & Mironov (1982) is obvious from table 4. *Prototrochus* sp. juv. (see Belyaev & Mironov 1982) can be cited as an earlier record of *Prototrochus belyaevi* n.sp. *Prototrochus* sp. juv. was dredged in the North Pacific (28°53'5N - 137°21'E) at a depth of 4000-4150 m.

*Prototrochus belyaevi* differs from other species of the genus by the constant spokes/teeth ratio = 1/2. Wheel size in *P. belyaevi* is similar with *P. meridionalis* (Salvini-Plawen, 1977), but the two species differ in the number of spokes and spokes/teeth ratio. The new species differs from the very variable *P. australis* (Belyaev et Mironov, 1981) by the larger number of spokes (see Belyaev & Mironov 1981).

***Myriotrochus* sp.**  
(Fig. 6A-C)

MATERIAL EXAMINED. — One fragment from New Caledonia, Loyalty Islands basin, stn KG228, 21°31'S - 166°24'E, depth 960 m, usnel box-corer, stored in the MNHN, Paris, No. EcHh 8009.

TABLE 5. — Wheel parameters of the *Myriotrochus* sp. (n = 46).

Parameter	Mean	Std	Min.	Max.
Wheel D, $\mu\text{m}$	66.9	5.39	59	80
Number of spokes	12.7	1.08	10	15
Number of teeth	21.8	2.22	19	30
Spokes/teeth, %	58.5	5.67	48.1	70.0
Hub D/wheel D, %	23.4	2.10	19.1	30.0
Teeth length/wheel D, %	22.3	2.06	16.7	26.5

DESCRIPTION

The fragment of anterior part of body is 1.3 mm long (Fig. 6A). Skin is transparent with intestine clearly visible. Eleven tentacles, contracted; on one of them two small digits are visible on the margin. There are no ossicles in the tentacles. Calcareous ring is very fragile, presumably due to poor fixation. Its pieces are narrow with prominent anterior processes (Fig. 6B). Ventral and dorsal parts of the ring do not differ significantly in height.

Wheels of the myriotrochid type (Fig. 6C) are numerous in the skin. Central knob on the hub of the wheel is not clearly distinguished. Wheel parameters are given in table 5.

REMARKS

*Myriotrochus* sp. is the only myriotrochid species which has eleven tentacles. However, this feature is not an obvious taxonomic character since only the single specimen has been examined.

Acknowledgements

I would like to thank Professor Dominique Doumenc and Professor Alain Crosnier for inviting me to work at the MNHN, Paris and I am very grateful for all the help provided during my work at the Laboratoire de Biologie des Invertébrés Marins et Malacologie by Dr. Nadia Ameziane and Ms. Danièle Dondon. I am also much indebted to Dr. Claude Massin (Institut Royal des Sciences Naturelles de Belgique) for revising the manuscript. This work was supported by a grant from the Ministry of Foreign Affairs of France.

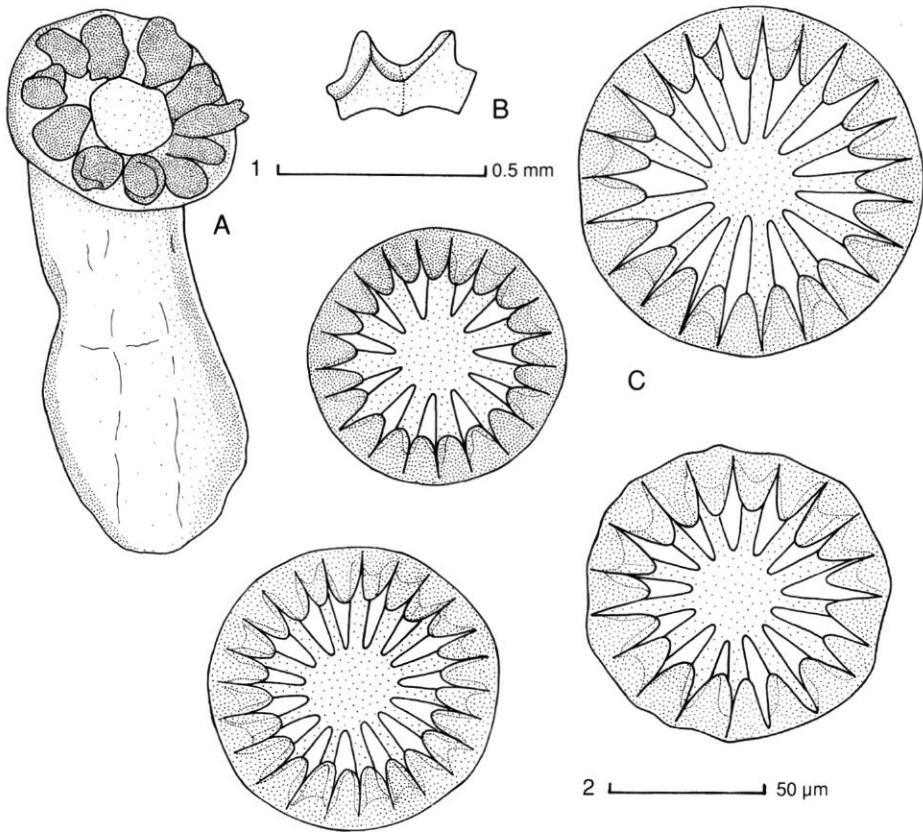


FIG. 6. — *Myriotrochus* sp.: A, anterior part of body; B, pieces of calcareous ring; C, wheels. (A, B = scale 1; C = scale 2).

## REFERENCES

- Belyaev G. M. 1970. — Ultra-abyssal holothurians of the genus *Myriotrochus* (order Apoda, fam. Myriotrochidae). *Trudy Instituta Okeanologii* 86: 458-488 [in Russian].
- Belyaev G. M. & Mironov A. N. 1981. — Some new deep-sea species of the Myriotrochidae (Holothuroidea) from the northern and south-western parts of the Pacific Ocean. *Trudy Instituta Okeanologii* 115: 165-173 [in Russian with English summary].
- 1982. — The holothurians of the family Myriotrochidae (Apoda): composition, distribution, and origin. *Trudy Instituta Okeanologii* 117: 81-120 [in Russian with English summary].
- Cherbonnier G. 1988. — Echinodermes : holothurides. *Faune de Madagascar* 70 : 1-292.
- Clark H. L. 1907. — The apodous holothurians: A monograph of the Synaptidae and Molpadiidae. *Smithsonian Contributions to Knowledge* 35: 1-231.
- 1921. — The echinoderm fauna of Torres Strait: its composition and its origin. *Papers of the Department of Marine biology of the Carnegie Institution Washington* 10: VI + 223.
- 1924. — The holothurians of the Museum of Comparative Zoology. The Synaptinae. *Bulletin of the Museum of Comparative Zoology* 65 (13): 457-501.
- Cotillon P. & Monniot C. 1987. — Biogeocal. Compte rendu de la campagne effectuée à bord du N/O *Coriolis* du 7 avril au 7 mai 1987. *Rapport IFREMER CNRS INSU PIROCEAN*, 65 p.
- Gage J. D. 1985. — New Synaptidae (Holothuroidea: Apoda) from the Rockall Trough. *Journal of the Marine Biology Association U. K.* 65 (1): 255-261.
- Gotto D. M. & Gotto R. V. 1972. — *Labidoplax media* Oestergren: a sea-cucumber new to British and Irish waters, with observational notes. *Irish Naturalist' Journal* 17 (8): 250-252.
- Hernandez D. A. 1981. — Holothuroidea de Puerto Deseado (Santa Cruz, Argentina). *Revista del Museo Argentino de Ciencias Naturales 'B. Rivadavia'*.

- Hidrobiologia* 4 (4): 151-168.
- Joshua E. C. 1914. — Holothuroidea, with descriptions of new species. *Proceedings of the Royal Society of Victoria* (N.S.) 27 (1): 1-11.
- Heding S. G. 1935. — Holothurioidea. Part I. Apoda. Molpadioidea. Gephirothurioidea. *Danish Ingolf-Expedition* 4 (9): 1-84.
- Koehler R. & Vaney C. 1905. — *Echinoderma of the Indian Museum. Holothurioidea. An account of the deep-sea Holothurioidea collected by the Royal Indian Marine Survey Ship Investigator*. Calcutta: 1-123+II.
- Mortensen Th. 1925. — Echinoderms of New Zealand and the Auckland-Campbell Islands. III-V. Asteroidea, Holothurioidea and Crinoidea. *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening* 79: 261-420.
- Ohshima H. 1913. — Synaptiden von Misaki. *Zoological Magazine Tokyo* 25: 253-266 [in Japanese with German summary].
- 1914. — The Synaptidae of Japan. *Annotationes Zoologicae Japonenses* 8: 467-482.
- Östergren H. 1905. — Zur Kenntnis der skandinavischen und arktischen Synaptiden. *Archives de Zoologie expérimentale et générale* 3 (4) : CXXXIII-CLXIV.
- Pawson D. L. 1963. — The holothurian fauna of Cook Strait, New Zealand. *Zoology Publications from Victoria University of Wellington* 36: 1-38.
- 1964. — The Holothuroidea collected by the Royal Society Expedition to Southern Chile, 1958-1959. *Pacific Science* 18 (4): 453-470.
- Richer de Forges B. 1990. — Explorations for bathyal fauna in the New Caledonian economic zone, in Crosnier A. (ed.), *Résultats des Campagnes Musorstom*, volume 6, *Mémoires du Muséum national d'Histoire naturelle* (A) 145 : 9-54.
- Rowe F. W. E. 1976. — Restriction of the chiridotid genus *Trochodota* Ludwig (1891) (Holothuroidea: Apodida), with the description of a new species from South Australia. *Transaction of the Royal Society of South Australia* 100 (4): 203-206.
- Salvini-Plawen L. V. 1977. — Caudofoveata (Mollusca), Priapulida und apode Holothurien (*Labidoplax*, *Myriotrochus*) bei Banyuls und im Mittelmeer allgemein. *Vie et Milieu* (A) 27 (1) : 55-81.
- Semon R. 1887. — Beiträge zur Naturgeschichte der Synaptiden des Mittelmeers. *Mitteilungen der zoologischen Stationen Neapel* 7: 272-300, 401-422.
- Sluiter C. Ph. 1901. — Die Holothurien der Siboga-Expedition. *Siboga-Expedition* 44: 1-142.
- Smirnov A. V. 1989. — A new species of holothurians *Trochodota inexpectata* (Synaptida, Chiridotidae) from the Simushir Island (Kuril Islands). *Zoologicheskii Zhurnal* 68 (6): 156-160 [in Russian with English summary].

Submitted for publication on 9 January 1996;  
accepted on 19 September 1996.