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## New species of *Hatschekia* (Copepoda: Siphonostomatoida) from the gills of South Pacific fishes

J.B. Jones\* and P. Cabral\*\*

Five new species of *Hatschekia* are described from the gills of teleost fishes. From a coral reef at Rangiroa, French Polynesia: *Hatschekia napoleoni* from *Cheilinus undulatus*; *H. manea* from *Scarus gibbus*; *H. becuni* from *Sphyræna forsteri*; and *H. girelli* from *Thalassoma fuscum*. From deeper water (200-300m) around the New Zealand coast: *H. squamata* from *Paratrachichthys trailli*.

Cinq espèces nouvelles du genre *Hatschekia*, parasites branchiaux récoltés sur des Téléostéens, sont décrites. Quatre d'entre elles proviennent de l'atoll de Rangiroa, Polynésie française; il s'agit de : *Hatschekia napoleoni* parasite de *Cheilinus undulatus*; *H. manea* parasite de *Scarus gibbus*; *H. becuni* parasite de *Sphyræna forsteri* et de *H. girelli* parasite de *Thalassoma fuscum*. La dernière espèce, *H. squamata* a été trouvée sur *Paratrachichthys trailli* en eau profonde (200-300 m) au sud de la Nouvelle-zélande.

*Keywords:* taxonomy, Copepoda, parasites, French Polynesia, New Zealand

### INTRODUCTION

The majority of the 75 species of the copepod genus *Hatschekia* live as parasites on the gills of tropical or subtropical fishes. The genus was revised by Jones (1985) who provided a key to 68 described species. Not included in that key were *H. argyrops*, *H. flatti*, and *H. sigani* all described by UmaDevi & Shyamasundari (1980). *Hatschekia affluens* and *H. amphiprocesa* were subsequently described by Romero & Kuroki (1986), and *H. nohu* and *Hatschekia* sp. by Villalba (1986).

This paper describes five new species from reef fishes, four from Rangiroa, Tuamotu Archipelago, French Polynesia, and one from New Zealand.

The host fishes from the Tuamotu Archipelago were caught by longline or by spear fishing in the lagoon or near the reef. The gills were dissected immediately at the laboratory and examined with a stereo-microscope. New Zealand fish were caught by the research trawler *James Cook*, and the gills were excised and preserved in formalin (10%) for subsequent laboratory examination. Copepods were stored in 70% alcohol, dissected and examined in Berlese mountant, and were drawn with the aid of a camera lucida.

The specimens from French Polynesia have been deposited at the Muséum National D'Histoire Naturelle, Paris (MNHN); the New Zealand specimens are deposited at the New Zealand National Museum, Wellington (NZNM).

### SYSTEMATICS

Family Hatschekiidae Poche, 1902

*Hatschekia napoleoni* n.sp. (Figs. 1a - 2a)

#### Material examined

Holotype female, 4 paratype females from the gills of *Cheilinus undulatus* Rüppell

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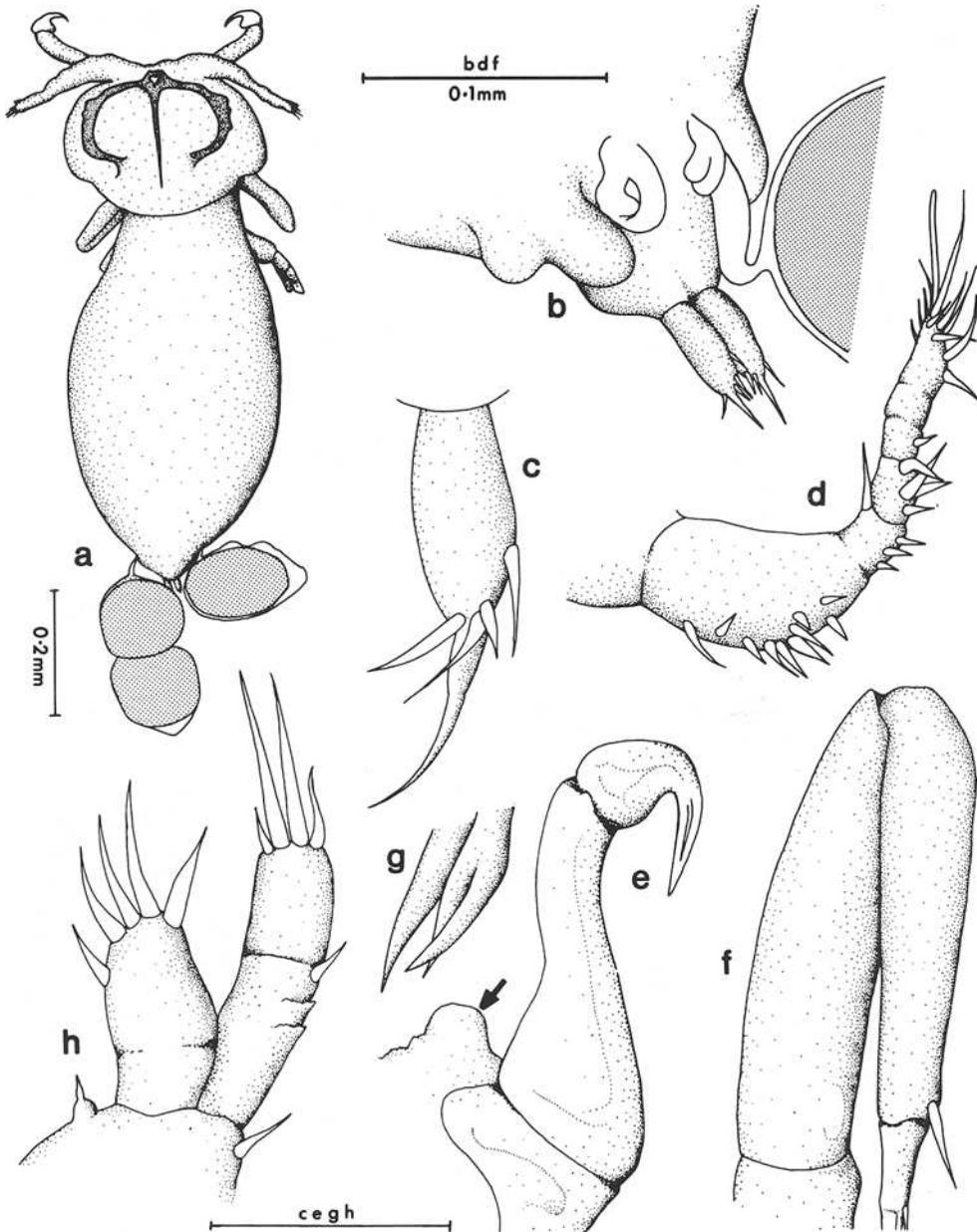


Fig. 1 – *Hatschekia napoleoni* n. sp., female. a. dorsal view; b. posterior including abdomen; c. uropod; d. antennule; e. antenna, (arrow = parbasal papilla); f. maxilla; g. maxillule; h. leg 1.

(Labridae) caught at Rangiroa, Tuamotu Archipelago, French Polynesia, 12 Apr. 1986. Catalogue numbers of holotype MNHN Cp 353, paratypes MNHN Cp 354.

Total length. 0.75- 0.80 mm

**Description**

*Type Female* Cephalothorax wider than long (0.24 by 0.32 mm) with prominent bulges on

lateral margins and convex posterior margin (Fig. 1a). Dorsal surface of cephalothorax reinforced with sclerotised ridge along midline dividing anteriorly to curve back around lateral margins. Trunk plump, ovate, with well-developed bilobed projections on either side of abdomen (Fig. 1b). Small semi-circular abdomen fused to trunk, bearing elongate uropods (Fig. 1c). Eggstrings with a maximum of two eggs per string.

Antennule (Fig. 1d). Obscurely five or six-segmented. Basal segment 40% total length of appendage. Antenna (Fig. 1e) three-segmented. Basal segment unornamented; second an elongate shaft, widest at base, tapering to midpoint (width at base 2.7 times as wide as at midpoint). The shaft of the antenna is 0.18 mm long, 0.7 times length of cephalothorax. Surface with sensory pits (not illustrated). Terminal segment a stout curved claw. Parabasal papillae are small irregular lobes, easily overlooked (arrow, Fig. 1e). Mandible styliform with two teeth. Maxillule (Fig. 1g) biramous, endopodite represented by two setiform projections, the exopodite by a single setiform projection. Maxilla (Fig. 1f) subchelate. Basal segment stout; lacertus sturdy and unarmed, slightly shorter than brachium; brachium length 0.087 mm, 5 times width, with short seta at distal end of inner margin; terminal bifid claw short, moderately curved, with short seta at midlength.

Legs 1 and 2 (Figs. 1h, 2a) biramous. Sympod of first leg with process at medial side of endopodite, both sympods with lateral seta. Rami two-segmented with folds of cuticle giving margins a serrated appearance; armature:

	exopodite	endopodite
Leg 1	1, 4	0, 5
Leg 2	1, 4	1, 5

Interpodal bars unornamented. Leg 3 (only found on one specimen) consists of a solitary seta. Leg 4 is absent.

*Male* Not found.

### Remarks

From the key provided in Jones (1985), this copepod would be identified as *H. parva* Pearse, 1951 from the gills of the labrid *Lachnolaemus maximus* (Walbaum). It differs from that species in having a much elongated cephalothorax, different shaped processes on the postero-lateral margins of the trunk, and a quite differently proportioned antenna and maxillule. Not included in the key, but also possessing posterior processes on the trunk is *H. amphiprocessa* Romero & Kuroki, 1986 from *Paralabrax humeralis* (Val.) which, however, differs from the species described here in that the trunk posterior processes are not bilobed, it is a very different size (2 - 2.4 mm), and there are a larger number of setae on the terminal elements of both rami of legs 1 and 2.

The differences between the specimens from French Polynesia and all other described *Hatschekia* are therefore sufficient to establish a new species.

### Etymology

The name "*napoleoni*" is taken from the local French name for the host fish.

*Hatschekia manea* n.sp. (Figs. 2b - 3a)

### Material examined

Holotype female, 2 paratype females from the gills of *Scarus gibbus* Rüppell (Scaridae) caught at Rangiroa, Tuamotu Archipelago, French Polynesia, 9 Nov. 1985. Catalogue numbers of holotype MNHN Cp 355, of paratypes MNHN Cp 356.

Total length. 2.45, 2.45 mm.

### Description

*Type Female* (Fig. 2b). Cephalothorax 0.37 mm wide by 0.28 mm long, lateral margins

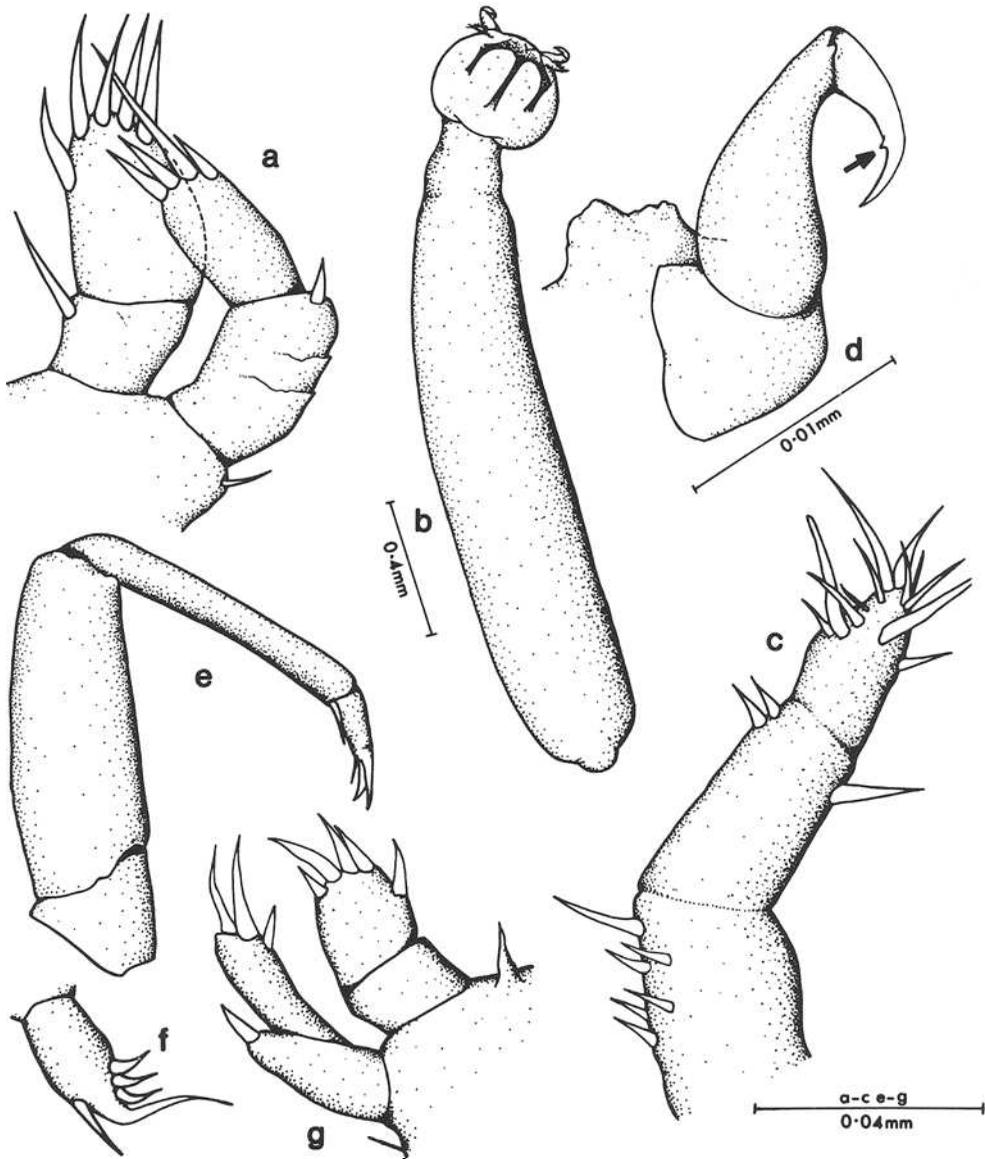


Fig. 2 – *Hatschekia napoleoni* n. sp., female. a. leg 2. *Hatschekia manea* n. sp., female. b. dorsal view; c. antennule; d. antenna (arrow = spine on claw); e. maxilla; f. uropod; g. leg 1.

smoothly rounded, posterior margin convex. Dorsal surface reinforced by sclerotised ridge along midline dividing anteriorly to curve back around lateral margins. Trunk 2.1 mm long by 0.37 mm wide, no posterior projections. Hemispherical abdomen fused to trunk, bearing uropods (Fig. 2f).

Antennule (Fig. 2c) shorter than antenna and obscured in dorsal view. Three or four-segmented, segments partially fused. Antenna (Fig. 2d) three-segmented. Basal segment

unornamented; shaft length 0.122 mm, 0.4 times length of cephalothorax, tapering and unornamented but covered with sensory pits (not illustrated). Terminal claw length 0.070 mm with tiny secondary spine (arrow, Fig. 2d). Parabasal papilla a multi-lobate swelling just posterior to antenna. Mandible with only two teeth on shaft. Maxillule biramous, reduced to two papillae, one with one short seta, one with two setae. Maxilla (Fig. 2e) basal segment stout, lacertus sturdy and unarmed, brachium length 0.055 mm, slightly shorter than lacertus, length 8 times width.

Legs 1 and 2 (Figs. 2g, 3a) biramous, sympod of first leg with process at medial side of endopodite, both sympods with lateral seta. Rami two-segmented with folds of cuticle giving margins a serrated appearance. Armature:

	exopodite	endopodite
Leg 1	1, 3	0, 5
Leg 2	1, 2	1, 4

Interpodal bars unornamented. Legs 3 and 4 absent.

*Male* Not found.

### Remarks

Only *H. leptoscari* Yamaguti, 1939 has previously been reported from Scaridae, and that differs from the new species in the armature of the legs (exopodite leg 1= 1,5; exopodite leg 2= 1,3).

This species is one of a group of *Hatschekia* characterised by an elongated trunk lacking any small knobs or conical outgrowths on the postero-lateral margins, and having a two-segmented leg 2 exopodite with armature 1,2.

It is possible to distinguish the new species from the other five members of this group (*H. affluens* Romero & Kuroki (1986); *H. argyrops* UmaDevi & Shyamasundari (1980); *H. pseudolabri* Yamaguti (1953); *H. sigani* UmaDevi & Shyamasundari (1980); and *H. teuthidis* Yamaguti (1954)) on the setation of the other rami, the relative length of the antennal claw to that of the shaft, and the total length (Table 1).

### Etymology

We propose to call the new species *Hatschekia manea* from “manea”, the local name for the fish host.

*Hatschekia becuni* n.sp. (Figs. 3b - 3h)

### Material examined

Holotype female, 2 paratype females from the gills of a young *Sphyræna forsteri* Cuvier (Sphyrænidae) caught at Rangiroa, Tuamotu Archipelago, French Polynesia, 22 Nov. 1985. Catalogue numbers of holotype MNHN Cp 359, paratypes MNHN Cp 360.

Total length 1.4- 1.6 mm

### Description

*Type Female* (Fig. 3b). Cephalothorax wider than long (0.18- 0.20 times 0.40- 0.45) with straight anterior margin, curved lateral and posterior margins. Dorsal surface reinforced with sclerotised ridge along midline. Trunk rounded in cross-section, length 1.2- 1.5 mm, with constriction 0.5 mm behind neck, no posterior lobes or projections. Abdomen fused with trunk, uropods (Fig. 3c) small with length 1.4 times width. Antennule (Fig. 3d) apparently six-segmented, segmentation obscure. Antenna (Fig. 3e) with small basal segment; shaft 0.17 mm long, 0.9 times length of cephalothorax (measured from anterior edge of cephalothorax to posterior of midline ridge). Antenna shaft with sensory pits over surface (not illustrated). Terminal claw strongly recurved. Parabasal papilla represented by small irregular lobes posterior to antenna. Mandible styliform with four teeth. Maxillule biramous, each ramus

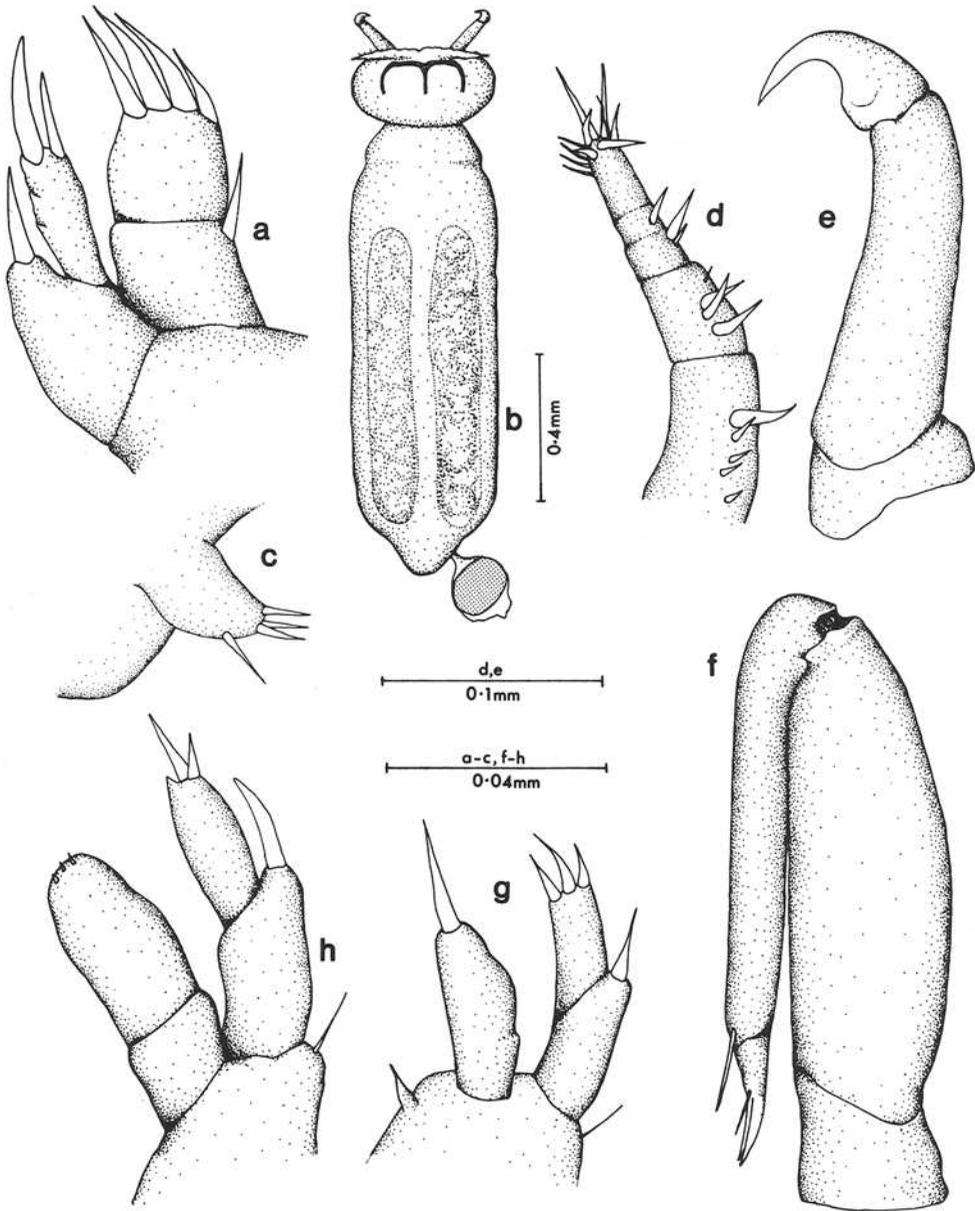


Fig. 3 – *Hatschekia manea* n.sp., female. a. leg 2. *Hatschekia becuni* n. sp., female. b. dorsal view; c. uropod; d. antennule; e. antenna; f. maxilla; g. leg 1; h. leg 2.

extended into two setiform projections. Maxilla (Fig. 3f), lacertus sturdy and unarmed, brachium slightly shorter than lacertus, length 0.08 mm, 9 times width.

Legs 1 and 2 (Figs. 3g,h) biramous, sympod of first leg with process at medial side of endopodite, both sympods with lateral seta. Rami two-segmented with folds of cuticle giving

Table 1 – Comparison of the diagnostic features of the 5 *Hatschekia* species which lack outgrowths on the postero- lateral margins of the trunk, but which have a leg 2 exopodite of armature 1,2.

Species	Leg 1		Leg 2		Total length (mm)	Antennal ratio#	Teeth on mandible
	exp.	end.	exp.	end.			
<i>H. affluens</i>	1,3	0,2	1,2	2	0.97 - 1.29	1.5:1	0
<i>H. argyrops</i>	1,4	0,5	1,2	1,4	1.60 - 1.77	2:1	?
<i>H. pseudolabri</i>	1,4	0,2	1,2	0,2	1.1- 1.8	2:1	4
<i>H. sigani</i>	1,4	0,5	1,2	1,4	1.20 - 1.47	2.5:1	?
<i>H. teuthidis</i>	1,4	0,1 to 3	1,1+spine	0,4	0.4- 1.05	?	0
<i>H. manea</i>	1,3	0,5	1,2	1,4	2.45	1.7:1	2

# = ratio of length of shaft to that of the terminal claw.

exp. = exopodite.

end. = endopodite.

margins a serrated appearance. Armature:

	exopodite	endopodite
Leg 1	1, 3	0, 1
Leg 2	1, 2	0, 3 tiny spinules

Interpodal bars unornamented. Legs 3 and 4 absent.

*Male* Not found.

### Remarks

*Hatschekia sphyraeni* Pillai, 1964 and *H. amplicapa* Pearse, 1951 are the only two species of *Hatschekia* so far found on Sphyraenidae. *H. sphyraeni* is easily recognised from the three setae on the papilla representing leg 3, and the unusual antenna bearing a long spine below the terminal claw. *Hatschekia amplicapa* is smaller than the new species and differs from it in the shape of the cephalothorax, the proportions of the antenna, and in having 3rd and 4th legs.

From the key in Jones (1985), the species from French Polynesia keys out as one of three other species, all of which have 3 setae on the exopodite of leg 1. They are *H. breviramus* Lewis, 1967; *H. ovalis* Bassett-Smith, 1898; and *H. teuthidis* Yamaguti, 1954. It may also be confused with *H. affluens* Romero & Kuroki, 1986 and *H. nohu* Villalba, 1986. It can be separated from these five on the endopodite setation (table 2).

### Etymology

We propose to call the new species *H. becuni* from the French name for the fish host.

*Hatschekia girelli* n.sp. (Figs. 4a - 4g)

### Material examined

*Holotype female* 2 paratype females from the gills of *Thalassoma fuscum* (Lacépède) (Labridae) caught at Rangiroa, Tuamotu Archipelago, French Polynesia, 22 Nov. 1985. Catalogue numbers of holotype MNHN Cp 357, paratypes MNHN Cp 358.

Total lengths 1.25 1.32 1.32 mm.

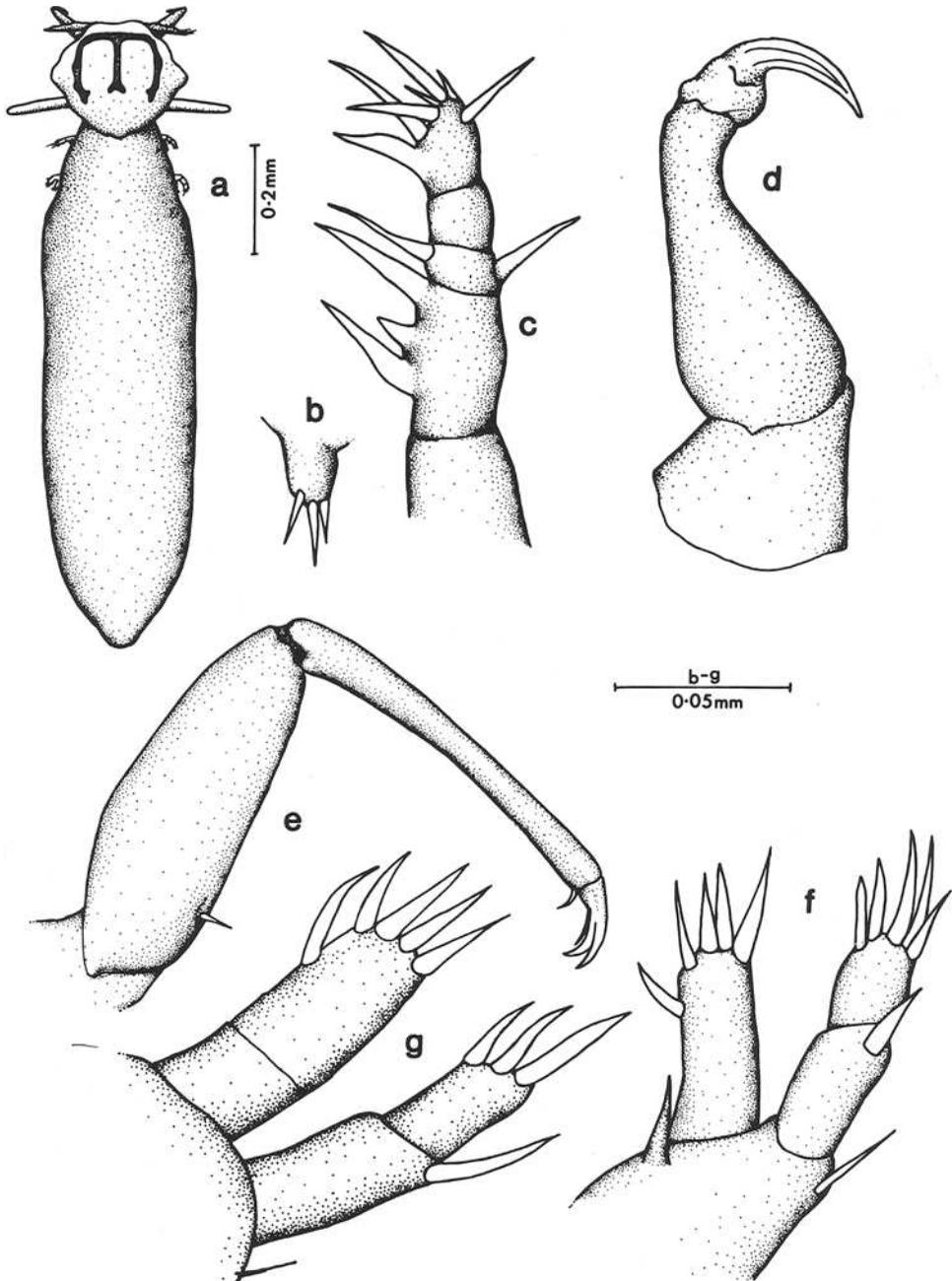


Fig. 4 – *Hatschekia girelli* n. sp., female. a. dorsal view; b. uropod; c. antenna; d. antennule; e. maxilla; f. leg 1; g. leg 2.

### Description

*Holotype female* Cephalothorax longer than wide (0.20 mm x 0.22 mm). Lateral margins with prominent lateral lobes in dorsal aspect (Fig. 4a). Dorsal surface of cephalothorax reinforced with sclerotised ridge along midline dividing anteriorly into two arms curving back around lateral margins. Narrow neck expands into swollen elongate trunk 1.14 mm

Table 2 – Endopodite setation of the five *Hatschekia* species similar to *H. beccuni*.

Species	Leg 1	Leg 2
<i>H. affluens</i>	0, 2	0, 2
<i>H. breviramus</i>	0, 2	1, 3
<i>H. nohu</i>	0, 2	0, 2
<i>H. ovalis</i>	0, 2	0, 1 or 2
<i>H. teuthidis</i>	1, 3	0, 4
<i>H. beccuni</i>	0, 1	0, 3 minute spinules.

long. Postero-lateral margins of trunk without lobes or projections, hemispherical abdomen fused to trunk. Uropods (Fig. 4b) small 0.15 mm x 0.02 mm and apparently with only three terminal setae.

Antennule (Fig. 4c) obscurely six-segmented, sparse setation but with large setae. Antenna (Fig. 4d) three-segmented. Basal segment squat, unornamented. Shaft 0.09 mm long, 0.42 x cephalothorax length. Widest near base (0.04 mm), tapering anteriorly, Claw relatively small, recurved. Parabasal papilla a small lobe behind antenna. Mandible without teeth. Maxillule biramous, reduced to two papillae, one with one, one with two setae. Maxilla (Fig. 4e) basal segment stout, lacertus same length as brachium, sturdy and bearing basal seta. Brachium length 0.10 mm, 9.5 times width.

Legs 1 and 2 biramous (Figs. 4f, 4g), sympod of first leg with process at medial side of endopodite, both sympods with lateral seta. Rami two-segmented with folds of cuticle giving margins a serrated appearance. Armature:

	exopodite	endopodite
Leg 1	1, 5	0, 5
Leg 2	1, 3	0, 5

Interpodal bars unornamented. Legs 3 and 4 absent.

*Male* Not found.

### Remarks

The species of *Hatschekia* which most closely resembles this copepod is *H. labracis* (van Beneden, 1871) from fishes of the genera *Labrus* and *Crenilabrus* (*H. labracis* was redescribed by Kabata (1979)). Other species of *Hatschekia* which may be confused with the copepod described here all lack the lateral lobes on the cephalothorax. This group, all of which are reported to have 5 setae on the terminal segment of the leg 1 exopodite, includes *H. argyrops* UmaDevi & Shyamasundari (1980), *H. elongata* Redkar Rangnekar & Murti, 1950; *H. pagrosomi* Yamaguti, 1939; *H. sigani* and *H. tenuis* (Heller, 1865). The new species can be easily distinguished from all these on the cephalothorax lobes and on the setation of the legs (Table 3). We propose to call it *H. girelli* after the French name “girelle” for the host.

*Hatschekia squamata* n.sp. (Figs. 5a - 5i)

### Material examined

Nineteen females from gills of *Paratrachichys trailli* caught by R.V. James Cook, 3 Jun. 1984 at 37° 59.1' S 173° 59.0' E, depth 260 m. Deposited as syntypes in NZNM (Z. Cr. 6411). Three females from the gills of *Paratrachichthys trailli* (Hutton) caught by F.V. Akebono Maru, 14 Nov. 1986, 47° 54.1' S 166°25.2' E, depth 212 m.

Total length 2.51 - 2.85 mm (n=10) from cephalothorax to posterior edge of trunk extensions.

**Description**

*Female* (Fig. 5a). Cephalothorax dorsoventrally flattened with expanded frontal and lateral margins obscuring all sign of appendages in dorsal view. Second pedigerous segment discernable in some individuals, with swollen lateral wings of segment forming a slight rearward extension of the cephalothorax (Fig. 5b). Trunk also dorsoventrally flattened, with large but thin wing-like expansions of the trunk. Trunk width (including wings) 2.14-2.40 mm (n=10). Abdomen hemispherical, one-segmented. Uropods small 0.01 x 0.02 mm bearing 5 setae (Fig. 5c).

Antennule (Fig. 5d) almost completely fused, with only two or perhaps three segments discernable. Setation much reduced.

Antenna (Fig. 5e) three-segmented. Basal segment stout, unornamented. Shaft 0.045 mm long, 0.9 times cephalothorax length. Claw stout, recurved and unornamented. Parabasal papillae not found. Mandible with 5 teeth. Maxillule (Fig. 5g) reduced to two papillae, each with two setiform extensions. Maxilla (Fig. 5f) with small basal segment, sturdy lacertus of the same length as the brachium, bears small seta. Brachium length 8.5 X width.

Legs 1 and 2 biramous (Figs. 5h, 5i). Sympod of first leg with slender seta-like process at medial side of endopodite, both sympods with lateral seta. Rami two-segmented, first legs much smaller than second legs.

Armature :

	exopodite	endopodite
Leg 1	1, 6	0, 6
Leg 2	1, 6	0, 6

Interpodal bars unornamented, legs 3 and 4 absent.

*Male* Not found.

**Remarks**

There are two described species of *Hatschekia* which are dorso-ventrally flattened: *H. foliolata* Redkar Rangnekar & Murti, 1950 from *Nemipterus* (Nemipteridae) and *H. flatti* UmaDevi & Shyamasundari, 1980 from *Johnius sp.* (Sciaenidae). The New Zealand species is unique in body form and can readily be distinguished from both these species in that the trunk, with the thin lateral extensions, is almost as wide as it is long.

Table 3 – Comparison of the diagnostic features of *H. elongata*, *H. pagrosomi*, *H. tenuis* and *H. labracis* with those of *H. girelli* ('+' = present, '-' = absent).

	<i>Hatschekia elongata</i>	<i>H. pagrosomi</i>	<i>H. tenuis</i>	<i>H. labracis</i>	<i>H. girelli</i>
Definite lobes on cephalothorax	-	- <sup>1</sup>	-	+ <sup>2</sup>	+
Lobes on trunk	-	-	-	+	-
Exopodite L1	1, 5	1, 5	1, 5	1, 6	1, 5
Exopodite L2	1, 5	1, 4	1, 5	1, 5	1, 3
Endopodite L1	0, 5	0, 4	1, 4	0, 6	0, 5
Endopodite L2	0, 4	1, 3	1, 5	1, 5	0, 5
Claw-like process on antennule	-	-	-	+	-

1 see Roubal *et al.* (1983) for description.

2 see Kabata (1979) for description.

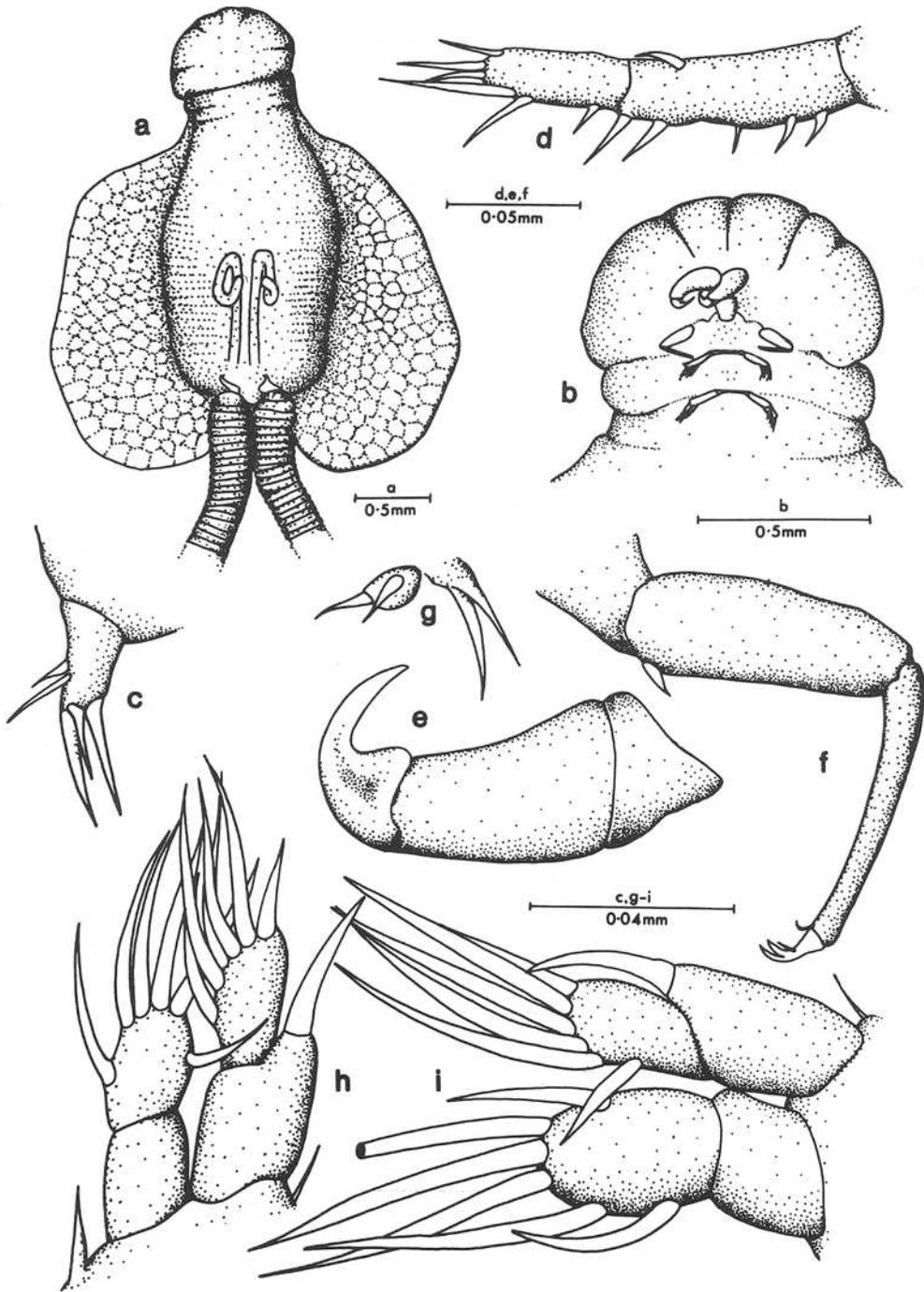


Fig. 5 – *Hatschekia squamata* n. sp., female. a. dorsal view; b. detail, ventral view of cephalothorax; c. uropod; d. antennule; e. antenna; f. maxilla; g. maxillule; h. leg 1; i. leg 2.

The specific name chosen refers to the scale like appearance of the copepod on the gills of the host fish.

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