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Nematodes from the Strait of Magellan and the Beagle Channel (Chile): description of four new species of the Comesomatidae

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Abstract

Four nematode species of the Comesomatidae from the Strait of Magellan and the Beagle Channel, Chile, are described as new to science. *Comesoma hermani* n. sp. can be separated from similar species, *Comesoma bermudense* Jensen & Gerlach, 1977, *Comesoma minimum* Chitwood, 1937 and *Comesoma chilense* Jensen & Gerlach, 1977 by the difference of body length, cephalic setae length, the ratio of the subcephalic setae to cephalic setae length and the ratio of spicule to anal body diameter. *Dorylaimopsis magellanense* n. sp. is identified by the lateral differentiation of 3–4 longitudinal rows of enlarged dots, the curved spicules are prominently jointed and with a ventral protrusion. *Hopperia beaglense* n. sp. could be easily recognised by both the rounded tail tip and anterior head end which differs from all the species of this genus except *H. dorylaimopsoides* (Allgén, 1959), which has, however, a smaller de Man ratio 'a' and reflexed ovaries. *Hopperia arntzi* n. sp. has a shorter body length which differs from the closest species, *Hopperia americana* Ward, 1984 and *Hopperia muscatensis* Warwick, 1973. Furthermore, the de Man ratio 'a' is different between our specimens and the other two species. An identification key to all known species of the genus *Hopperia* is provided.

Introduction

From 17 October to 25 November 1994 the joint Chilean–German–Italian Magellan 'Victor Hensen' Campaign was carried out. One of the objectives of the Magellan Campaign is to compare the community structures between the Magellan region and the Antarctic. This work is a part of the Magellan Campaign research focussing on the nematode species composition. Four new species of the Comesomatidae, i.e., *Comesoma hermani* n. sp., *Dorylaimopsis magellanense* n. sp., *Hopperia beaglense* n. sp. and *Hopperia arntzi* n. sp. are described in this paper. Comesomatidae are the most abundant nematodes in soft bottom sediments; in a given locality 1–3 species may represent more than 40% of the total nematode population (Jensen, 1979). Our specimens, such as *Dorylaimopsis magellanense* n. sp. and *Comesoma hermani* n. sp. are also dominant in the investigated area.

Materials and methods

Bottom samples were obtained with multicores (MUC) on the RV 'Victor Hensen' from 20 stations in the Strait of Magellan and the Beagle Channel, Chile. The water depth was between 8 and 550 m. The sediments in the Beagle Channel were very homogenous and characterised by low median grain sizes (less than 15 μm) and high silt-clay contents (> 90%). Sediment components in the Strait of Magellan were more diverse, the median grain sizes varied from 2–65 μm, the percentages of silt-clay ranged from 49–100% (Table 1).

The sediment cores were divided into the top 0–5 cm layers and the lower than 5 cm sediment layers and then fixed with warm formaldehyde to a final concentration of 4%. The nematodes were extracted by centrifugal-flotation technique and gradually transferred to anhydrous glycerine and finally mounted into permanent slides. Measurements and drawings were

made using a camera Lucida attached to a WILD Heerbrugg microscope with a 100× oil immersion objective. All the measurements are given in μm. Type specimens are deposited in the collection of Koninklijk Belgisch Instituut voor Natuurwetenchappen (KBIN) of Brussels (slide numbers RIT 590–595) and the Marine Biology Section of the University of Ghent (MBRUG) (slide numbers 10530–10552).

Abbreviations

a:	body length divided by maximum body diameter
abd:	anal body diameter
abe:	anterior body end
amph D:	amphid diameter
b:	body length divided by pharyngeal length
BL:	body length
c:	body length divided by tail length
c′:	tail length divided by anal body diameter
cbd:	corresponding body diameter
CSL:	cephalic setae length
C.V.%:	coefficient of variation
E-abe:	excretory pore from anterior body end
gub L:	gubernacular apophysis length
HD:	head diameter
M:	maximum body diameter
NR:	nerve ring from the anterior body end
ph L:	pharyngeal length
s′:	spicule length divided by anal body diameter
S.D.:	standard deviation
spic:	spicule length
sub-CSL:	subcephalic setae length
TL:	tail length
v:	vulva distance from the anterior end of body
v%:	position of vulva as percentage of body length from anterior end

Formula: Values above the line indicate the body length from abe to measured organ.

$$\frac{\text{level of cephalic setae}\quad \text{end of the pharynx}\quad \text{M(v)}\quad \text{anus}}{\text{cbd}}$$

Results

Comesoma hermani n. sp.

(Figure 1A–G)

Material and type specimens: 5 females, 5 males collected from station 864, 866 and station 877.
Holotype: $\sigma^{\prime}_1$ on the slide RIT 590; Allotype: φ_1 on the slide MBRUG 10530; Paratypes: $\sigma^{\prime}_2$–$\sigma^{\prime}_5$ and φ_2–φ_5 on the slides RIT 590 and MBRUG 10531–10536.
Type locality and habitat: See Table 1.
Etymology: The species is named after Dr Rudy Herman who took part in the Magellan Campaign.

Measurements :

Holotype : $\sigma^{\prime}_1$

$$\frac{-\ 230\ \ M\ \ 1934}{17\ \ 49\ \ 52\ \ 40}2108,\ A : 40.9,\ B : 9.1,\ C : 12.1,\ SPIC : 184$$

Allotype : φ_1

$$\frac{-\ 251\ \ V\ \ 1914}{19\ \ 54\ \ 71\ \ 37}2114,\ A : 29.6,\ B : 8.4,\ C : 10.6,\ V = 45.6\%$$

Other measurements see Table 2.

Description

Males: Body cylindrical, cuticle with transverse rows of very fine dots from head to tail, lateral differentiation with only a bit coarser punctuated pattern. Head diameter 17 μm, 35% cbd of the end of pharynx. There is a circle of six small labial papillae, and six external labial sensilla were conspicuous, four cephalic setae 13 μm long, 80% of head diameter. Following 2 μm behind the cephalic setae, arranged in a crown, four subcephalic setae are 6–7 μm long, about 46% of cephalic setae. Buccal cavity with two compartments, anterior portion cup-shaped and 5 μm wide, armed at the base with conspicuous teeth, followed a narrow posterior portion, tooth-like structure in the bottom of this portion visible. Amphid spiral, 2.5 turns and 14.5 μm wide, 75% of cbd, the anterior border of amphid 6.5 μm from the front end of head. Somatic seta 6 μm long, the group of 3 or 4 setae in the ventral side and asymmetrically two somatic setae set on the dorsal side of cervical region. Cardia small. Nerve ring 125 μm from front end of body, 60% of the pharyngeal length. Excretory pore at the level of nerve ring. Renette cell behind the cardia. Males diorchic with opposed testes. Copulatory apparatus with two equal, slender spicules, 178 (169–184) μm long, 4.4 (4.2–4.6) anal diameter or 1.0 tail length. Gubernaculum with ventral and dorsal pieces, 20–25 μm long for dorsal pieces, 15 μm for ventral piece, with dilated distal

Table 1. The location of sampling stations and some environmental features in the Strait of Magellan and the Beagle Channel.

Station	Date	Lat. S	Long. W	Depth (m)	Median (μm)	Sand %	Fine Sand %	Silt %	Clay %
840	23 Oct. 94	53°08′8	70°38′4	123	28.52	0.99	21.31	59.43	18.27
864	25 Oct. 94	53°42′6	70°48′7	550	17.19	3.35	16.8	57.86	21.99
866	25 Oct. 94	53°41′8	70°54′6	440	12.97	2.20	9.67	65.17	22.96
877	25 Oct. 94	53°41′5	70°56′5	227	55.57	–	–	–	–
1123	06 Nov. 94	54°58′7	69°01′9	219	11.18	2.00	6.02	67.65	24.33
1139	07 Nov. 94	54°55′0	68°39′2	255	11.01	3.81	2.75	71.83	21.61
1181	12 Nov. 94	55°07′0	66°55′4	110	5.29	0	0	58.89	41.11
1234	18 Nov. 94	55°00′4	66°53′6	100	8.89	0	0	70.16	29.84

Table 2. Measurements of *Comesoma hermani* n. sp. from the Strait of Magellan and the Beagle Channel.

	Male: $n=5$					Female: $n=5$				
	Min	Max	Mean	S.D.	C.V.%	Min	Max	Mean	S.D.	C.V.%
BL	1694.0	2108.0	1810.0	140.8	7.8	1861.0	2314.0	2028.8	166.5	8.2
a	30.3	40.9	34.3	3.6	10.5	24.4	36.1	30.9	3.9	12.7
b	7.6	9.1	8.2	0.5	6.4	7.9	8.6	8.2	0.3	3.3
c	9.5	12.1	10.5	0.8	7.8	10.3	12.5	11.4	0.9	7.5
HD	16.8	17.4	16.7	0.6	3.7	18.0	19.4	18.4	0.6	3.3
CSL	12.6	13.4	13.2	0.3	2.2	10.0	13.4	11.8	1.3	11.0
CSL/HD (%)	77.0	82.0	79.4	1.4	1.8	56.0	74.0	62.8	7.1	11.3
sub-CSL	6.0	6.7	6.1	0.3	4.2	6.0	6.0	6.0	0.0	0.0
sub-CSL/HD (%)	34.0	39.0	36.8	1.8	4.9	30.9	33.0	32.7	1.2	3.7
amph-abe	5.7	7.3	6.5	0.7	10.0	6.6	8.0	7.3	0.7	9.2
amph D	13.4	16.1	14.5	1.0	6.9	10.7	14.5	12.3	1.5	11.8
amph cbd	17.4	20.1	19.6	1.0	5.0	20.0	24.7	21.8	1.8	8.0
amph/cbd (%)	66.7	80.1	74.0	4.6	6.2	50.0	64.6	56.3	5.1	9.0
NR	118.0	132.0	125.0	5.0	4.0	126.0	140.0	132.5	5.0	3.8
NR/Ph (%)	55.4	59.3	57.4	1.4	2.4	52.0	59.0	54.8	2.9	5.2
ph L	199.0	229.8	221.1	10.4	4.7	237.0	270.0	247.5	12.4	5.0
ph cbd	44.0	52.8	48.6	2.7	5.6	46.2	56.0	51.8	4.1	7.9
ph L/ph cbd	4.2	4.7	4.5	0.2	4.2	4.3	5.1	4.8	0.3	5.8
E-abe	141.0	145.0	143.0	1.6	1.1	146.0	165.0	157.0	6.2	3.9
M	49.0	56.0	52.9	2.2	4.2	52.0	80.0	67.0	10.9	16.2
v						907.0	1067.0	977.0	57.4	5.9
v%						45.7	49.5	37.8	1.5	3.9
spic	169.0	183.5	178.1	5.0	2.8					
s′	4.2	4.6	4.4	0.1	2.7					
TL	158.0	178.2	172.8	6.9	4.0	154.0	200.0	179.1	15.5	8.7
abd	39.6	42.2	40.3	0.9	2.2	32.3	41.0	37.2	3.1	8.4
c′	4.0	4.5	4.3	0.2	4.6	4.3	5.7	4.9	0.6	12.3
spic/TL	1.0	1.1	1.0	0.7	0.7					

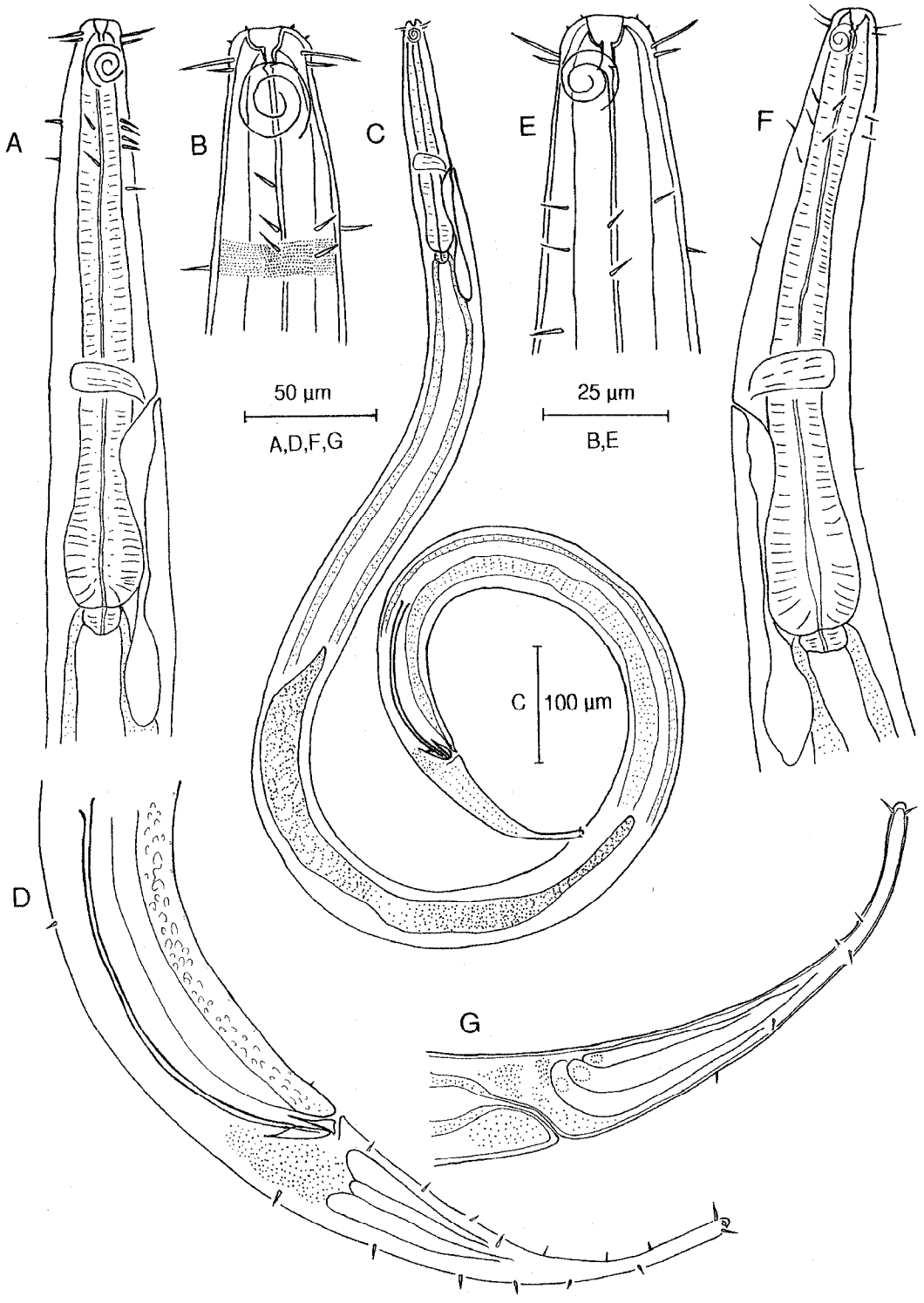

Figure 1. Comesoma hermani n. sp. A: ♂$_1$ View of pharyngeal region; B: ♂$_2$ View of anterior body end; C: ♂$_1$ Total view; D: ♂$_1$ Copulatory apparatus and tail; E: ♀$_1$ View of head region; F: ♀$_1$ View of pharyngeal region; G: ♀$_1$ Rectal region and tail.

end or a hook-like structure, encircling the spicules distally. Minute preanal papillae or supplements are difficult to account with accuracy. A pair of 2 μm long setae about 15 μm in front of the cloaca. Tail 173 μm long, 4.3 (4.0–4.5) anal diameter, the posterior third is cylindrical with swollen tip. Caudal glands observed and tree terminal setae, 6 μm long.

Females: Females appear similar to males in general characteristics, only differ from males by small amphids, which are 11–15 μm wide or 56% of cbd. The reproductive system is amphidelphic with outstretched ovaries. The vulva is situated at 46–50% of the body length. The tail about 5 × abd length.

Differential diagnosis

In having only one crown of long cephalic setae and one circle of subcephalic setae and similar de Man ratios, *Comesoma hermani* is close to *Comesoma bermudense* Jensen & Gerlach 1977, *Comesoma minimum* Chitwood 1937 and *Comesoma chilense* Jensen & Gerlach 1977. However, one can distinguish *Comesoma hermani* n. sp. form those three species by the difference of the body length, cephalic setae length, the ratio of the subcephalic setae to cephalic setae and spicule length, as well as the ratio to anal diameter.

A. Comesoma bermudense

Comesoma bermudense has larger body length (2400–3400 μm) and longer cephalic setae (27–38 μm) than *Comesoma hermani* (1700–2400 μm; 12.6–13.4 μm). The ratio of cephalic setae to head diameter of *C. bermudense* is also larger (115–140) than *Comesoma hermani* n. sp. (80). The ratio of spicule to tail length, however, *Comesoma hermani* n. sp. is larger (1.0) than that of *Comesoma bermudense* (0.5).

B. Comesoma minimum

In the ratios of spicule to the tail length and anal diameter, both *Comesoma hermani* n. sp. and *C. minimum* are extremely the same. However, *C. minimum* has smaller body length (1400–1500 μm), and distinct lateral differentiation of punctuation to differ from our specimens. Furthermore, the value of 'a' for *Comesoma hermani* n. sp. (24.4–40.9) is much higher than that of *C. minimum* (18.0–24.0).

C. Comesoma chilense

Jensen & Gerlach (1977) changed '*Comesoma minimum*' of Wieser (1954) into *Comesoma chilense*. Our specimens differ from *C. chilense* by short subcephalic setae (6 vs. 12 μm), smaller in the ratio of spicule to tail (1.0 vs. 1.6). Furthermore, no supplements in *C. chilense* differs also from *C. hermani* n. sp.

***Dorylaimopsis magellanense* n. sp.**

(Figures 2A–E and 3A-F)

Material and Type Specimens: 5 females, 5 males collected from station 840 and station 1123. Holotype: $\delta_1$on the slide RIT 595; Allotype: φ_1 on the slide MBRUG 10537; Paratypes: δ_2–δ_5 and φ_2–φ_5 on the slides RIT 595 and MBRUG 10538–10542.

Type locality and habitat: See Table 1.

Etymology: The species is named after the Strait of Magellan, the main sampling area of this Campaign.

Measurements :

$Holotype : \delta_1$

$$\frac{-\ 320\ \ M\ \ 1674}{14\ \ 70\ \ 73\ \ 53}\ 1826,\ A : 25.0,\ B : 5.7,\ C : 12.0,\ SPIC : 148$$

$Allotype : \varphi_1$

$$\frac{-\ 350\ \ V\ \ 2285}{19\ \ 78\ \ 99\ \ 61}\ 2458,\ A : 24.8,\ B : 7.0,\ C : 14.2,\ V = 50\%$$

Other measurements see Table 3.

Description

Males: Body cylindrical, widest at middle and gradually tapering towards extremities. Cuticle marked by transverse rows of fine punctuation, with lateral differentiation in the form of longitudinal rows of enlarged dots, running from about 10 μm behind the amphids with 4–5 files, in the middle body 3–4 files, then increases in 4–5 files in the anal area. The lateral differentiation about 15 μm wide at the posterior part of pharyngeal, about 12 μm wide in the middle of body, 14 μm in the anal area.

Head distinctly off set from the body by a constriction, two circles of six inner labial and six out labial papillae, four stout cephalic setae implanted near the lower end of the head portion, 7 μm long and 49% of the corresponding head diameter. Oral cavity beginning with a narrow vestibulum, followed by a 25 μm long mesostomal cavity. Three sclerotized triangular teeth at the anterior end of the pharynx. Amphids spiral, 2.75 turns, 11 μm in diameter, about 42% of corresponding body diameter, anterior border of amphids 10 μm behind the front end, or just at the level of cephalic setae.

Pharynx is slightly broaden towards posterior end. Nerve ring at the middle of pharynx (49%), the ventral

Table 3. Measurements of *Dorylaimopsis magellanense* n. sp. from the Strait of Magellan and the Beagle Channel.

	BL	a	b	c	amp/HD(%)	CSL/HD (%)	C′	spic	s′	gub L
Males: n = 5										
Mean	1945	23.9	6.4	12.4	49	42	2.9	147	2.7	51
S.D.	186	1.2	0.7	1.5	5	6	0.2	2	0.2	5
X_{min}	1708	22.0	5.7	10.4	42	35	2.6	143	2.5	46
X_{max}	2261	25.0	7.6	14.8	55	52	3.9	150	2.9	59
Females: n = 5								v%		
Mean	2206	26.8	6.7	12.9	48	41	3.3	48		
S.D.	150	1.3	0.7	2.1	3	2	0.4	1		
X_{min}	1988	24.8	5.7	10.0	43	38	3.9	46		
X_{max}	2458	28.0	7.8	16.0	50	44	2.1	50		

Table 4. Measurements of *Hopperia beaglense* n. sp. from the Strait of Magellan and the Beagle Channel.

	Male: $n = 4$					Female: $n = 5$				
	Min	Max	Mean	S.D.	C.V.%	Min	Max	Mean	S.D.	C.V.%
Bl	1547.0	1868.0	1725.0	121.6	7.0	1425.0	1854.3	1675.5	170.7	10.2
a	37.8	41.3	39.1	1.8	4.6	30.2	33.4	32.3	1.3	4.0
b	7.7	8.6	8.0	0.4	4.4	6.5	8.5	7.5	0.8	10.9
c	18.9	21.8	20.6	1.1	5.1	18.0	21.9	19.9	1.6	8.1
HD	12.0	13.4	12.4	0.6	4.9	12.0	13.4	12.8	0.7	5.1
CSL	4.7	6.0	5.4	0.5	8.6	4.7	6.7	5.8	0.8	14.4
amph-abe	4.0	6.7	5.4	1.4	25.2	4.0	6.7	5.3	1.0	18.5
amph D	9.4	12.1	10.6	1.0	9.4	8.7	10.6	9.7	0.6	6.4
amph cbd	15.4	17.4	16.6	0.7	4.4	16.8	18.8	17.3	0.7	4.3
amph/cbd (%)	56.0	69.0	64.0	4.7	7.4	46.0	62.0	56.4	5.6	9.4
NR	99.0	121.0	117.3	8.6	7.3	112.0	119.0	114.4	2.7	2.4
NR-cbd	37.0	44.9	41.9	3.0	7.2	41.0	52.3	46.5	4.6	9.9
NR/cbd	2.6	3.1	2.8	0.2	7.1	2.1	2.6	2.4	0.3	10.3
NR/ph L(%)	47.0	57.9	55.0	4.6	8.4	45.8	55.3	50.7	3.1	6.0
ph L	202.0	231.0	214.5	10.7	5.0	215.0	236.0	222.8	7.6	3.4
ph-cbd	42.2	50.2	47.2	3.0	6.4	46.0	59.4	52.4	6.1	11.7
E/abe	136.0	145.0	139.0	4.2	3.1	128.0	138.0	133.8	3.6	2.7
M	40.9	48.8	44.2	3.4	7.8	45.0	59.4	52.0	5.9	11.4
v						700.0	940.0	841.5	96.2	11.4
v%						49.0	52.0	50.2	1.1	2.2
spic	50.2	58.1	54.8	3.4	6.3					
s′	1.4	1.7	1.5	0.1	5.9					
gub L	25.1	29.0	27.7	1.6	5.7					
TL	82.0	86.0	84.0	2.0	2.4	78.0	92.0	84.0	4.7	5.6
abd	30.0	39.6	36.6	3.9	10.7	33.0	40.9	38.5	4.2	10.9
c′	2.0	2.7	2.3	0.3	11.1	2.0	2.5	2.2	0.2	8.8
Terminal setae	2.6	3.3	2.7	0.3	11.6	3.5	4.6	3.9	0.5	13.0

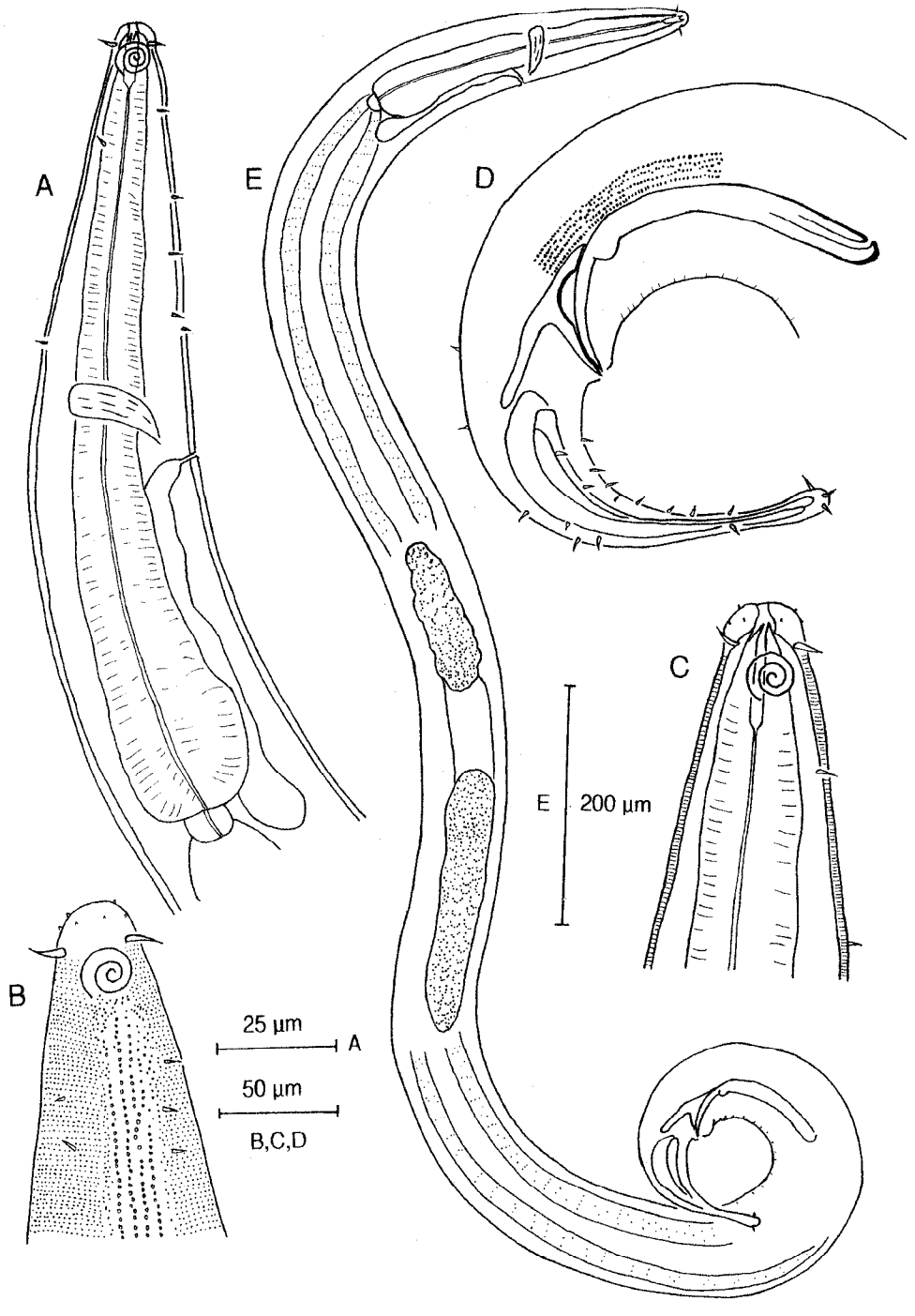

Figure 2. Dorylaimopsis magellanense n. sp. ♂1 View of pharyngeal region; B: ♂1 Surface view of anterior body end; C: ♂1 Median view of head region; D: ♂1 Copulatory apparatus and tail; E: ♂1 Total view.

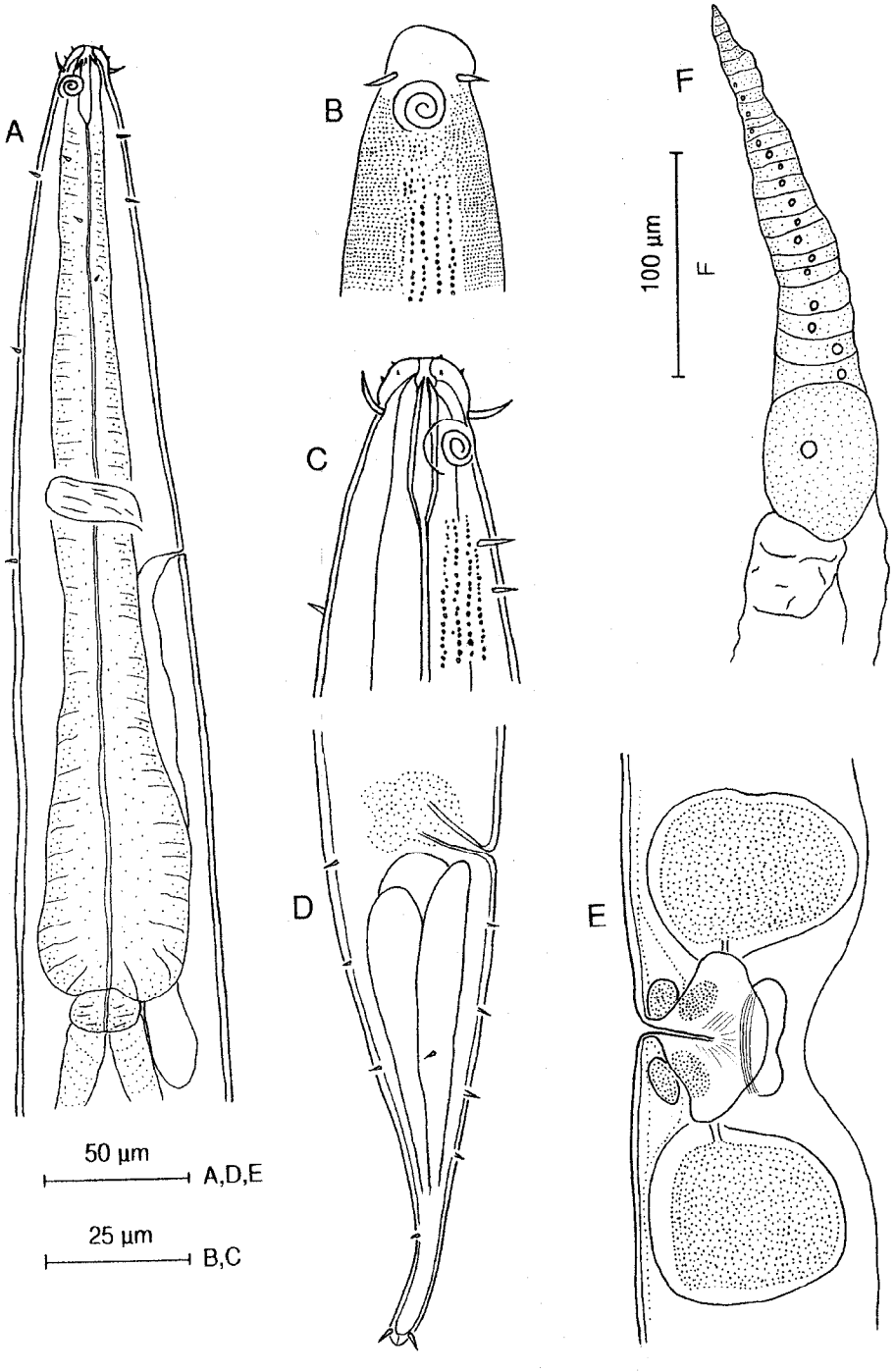

Figure 3. Dorylaimopsis magellanense n. sp. A: ♀$_1$ Median view of pharyngeal region; B: ♀$_2$ Surface view of head region; C: ♀$_1$ Median view of head region; D: ♀$_1$ Rectal region and tail; E: View of vulva region; F: ♀$_1$ Posterior gonad.

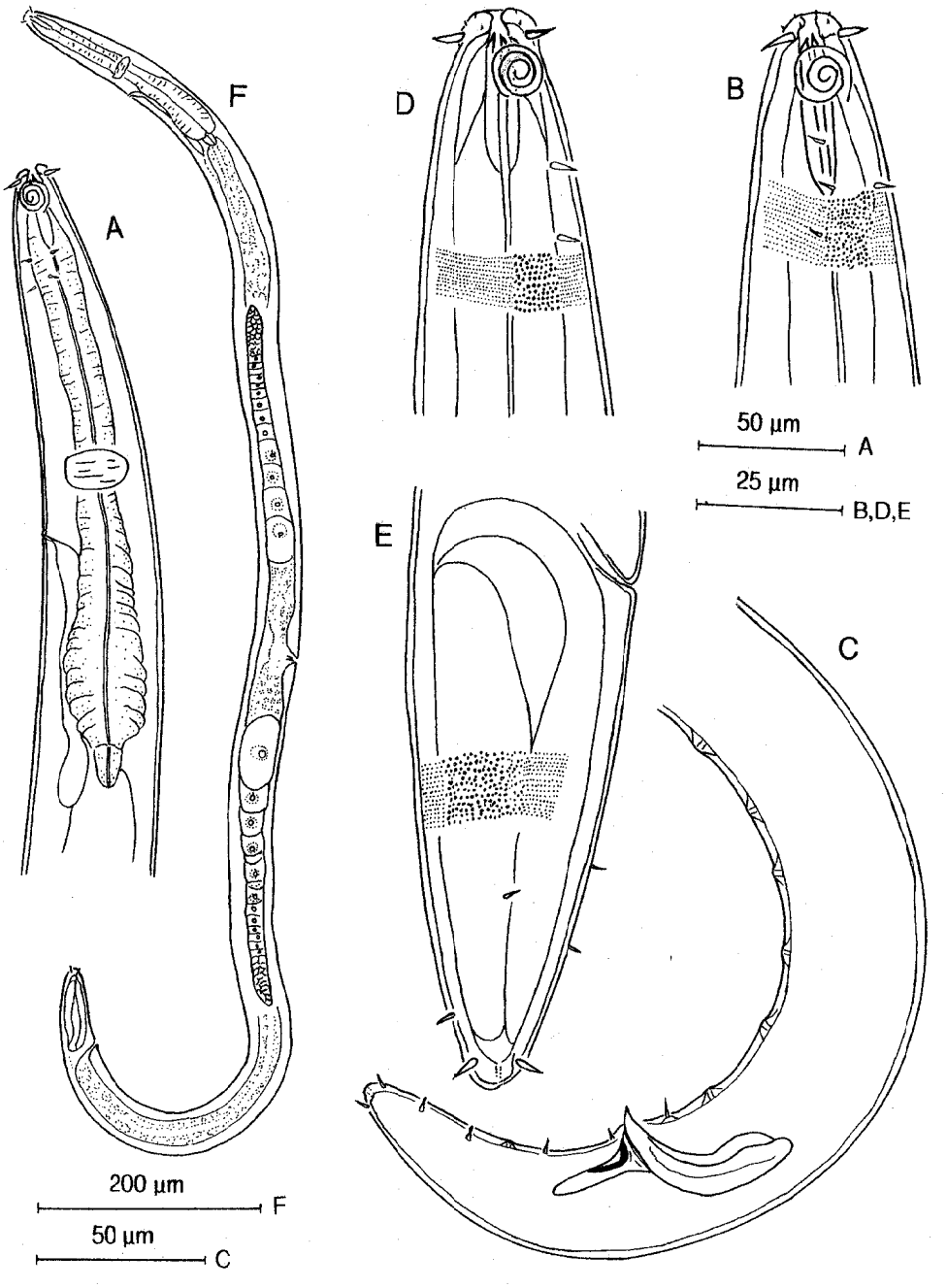

Figure 4. Hopperia beaglense n. sp. A: ♂$_1$ Median view of pharyngeal region; B: ♂$_1$ View of head region; C: ♂$_1$ Copulatory apparatus and tail; D: ♀$_1$ View of head region; E: ♀$_1$ Rectal region and tail; F: ♀$_2$ Total view.

gland extends well at cardia level, the excretory pore is opened at 53% of pharyngeal length. Cardia small.

Spicules paired, equal and curved, 147 μm (143–150 μm) long in arc, about 2.7 × abd (2.5–2.9), with a small ventral protrusion about one third from the distal end. Gubernaculum with paired long apophyses (46–59 μm) directed to the caudal. 15–17 fine tubular precloacal supplements are present but often difficult to count exactly. Testes paired, opposed and outstretched.

Tail length 157 μm, about 2.9 × abd (2.6–3.9), anterior two third of tail conical with dense subventral and dorsal setae, the last one third gradually tapering towards a cylindrical portion, tail tip swollen with three terminal setae, 9 μm long. Three caudal gland cells visible.

Females: Cuticle lateral differentiation with three longitudinal rows of dots in the middle of the body. Body length and ratios of tail length to anal diameter are larger than males. Two equal ovaries, opposed and outstretched. Vulva at 48% (46–50) of body length.

Differential diagnosis

Dorylaimopsis magellanense n. sp. has an obviously ventral protrusion in spicules which can be separated from most species of this genus (Zhang, 1992), but very similar with that of *D. punctata* Ditlevsen, 1918, and *D. metatypica* Chitwood, 1936, it can be easily identified by 3–4 longitudinal rows of dots and smaller oral opening from *D. punctata* (2 rows of dots) and *D. metatypica* (no really longitudinal rows). Besides this, *Dorylaimopsis magellanense* n. sp. is smaller than *D. punctata* in body size (♂: 1708 μm–2261 μm vs. 2484 μm–3221 μm, ♀: 1988 μm–2458 μm vs. 2567 μm–3111 μm).

***Hopperia beaglense* n. sp.**

(Figure 4A–F)

Material and Type Specimens: 5 females, 4 males collected from Station 1234 and Station 1181. Holotype: δ_1 on the slide RIT 591; Allotype: φ_1 on the slide MBRUG 10543; Paratypes: δ_2–δ_4 and φ_2–φ_5 on the slides RIT 592 and MBRUG 10544-10547.

Type locality and habitat: See Table 1.

Etymology: The species name is given after the Beagle Channel.

Measurements :

Holotype : δ_1

$-\frac{216\ M\ 1782}{12\ 48\ 46\ 37}$ 1868, A : 40.4, B : 8.6, C : 21.8, $SPIC$: 53

Allotype : φ_1

$-\frac{215\ V\ 1782}{12\ 59\ 59\ 41}$ 1794, A : 30.4, B : 8.3, C : 21.9, V = 52%

Other measurements see Table 4.

Description

Males: Body cylindrical, the part of the pharyngeal end a little wider than middle part of body length. Cuticle thick and decorated with transverse rows of punctuation. Lateral differentiation consists of larger and more widely spaced dots and terminates at the base of conical portion of the tail. The head bears one circle of six inner labial papillae and one circle of six outer labial papillae, four longer and stout cephalic setae (5 μm). A few somatic setae scattered at the borders of lateral field of cervical and tail region. The amphids describe a spiral of 3.5 turns, 10–12 μm in diameter, occupying 65% of cbd with anterior border 5μm from the front head end. Buccal cavity cylindrical and slightly cuticularized, posteriorly followed by a long heavily sclerotized tube, three solid triangular teeth set up at the anterior end of pharynx.

Pharynx is slightly broaden towards posterior end without forming a bulb. Nerve ring at the middle of pharynx. The cardia small, ventral gland cell at the level of cardia and excretory pore opening slightly behind the nerve ring.

Reproductive system consists of two testes, opposed and outstretched. The spicules paired, short and thick, 55 μm (50–58 μm) long in arc, 1.5 × abd. The gubernaculum with long apophyses (25–29 μm) caudally directed. One precloacal seta and 6 or 7 cup-shaped precloacal supplements. One supplement-like structure in the middle of ventral side of the tail.

Tail short and extremely rounded, 84 μm long and 2.3 of cbd. A pair of terminal setae (3 μm) at the rounded tail tip. Two or three prominent caudal glands.

Females: Similar to males in general characteristics, but the body diameter wider and the amphids smaller than in the males. Reproductive system amphidelphic, almost equal paired and opposed ovaries, outstretched. Vulva located at the middle of body length, but never more than 50%. Three caudal glands entirely in the tail.

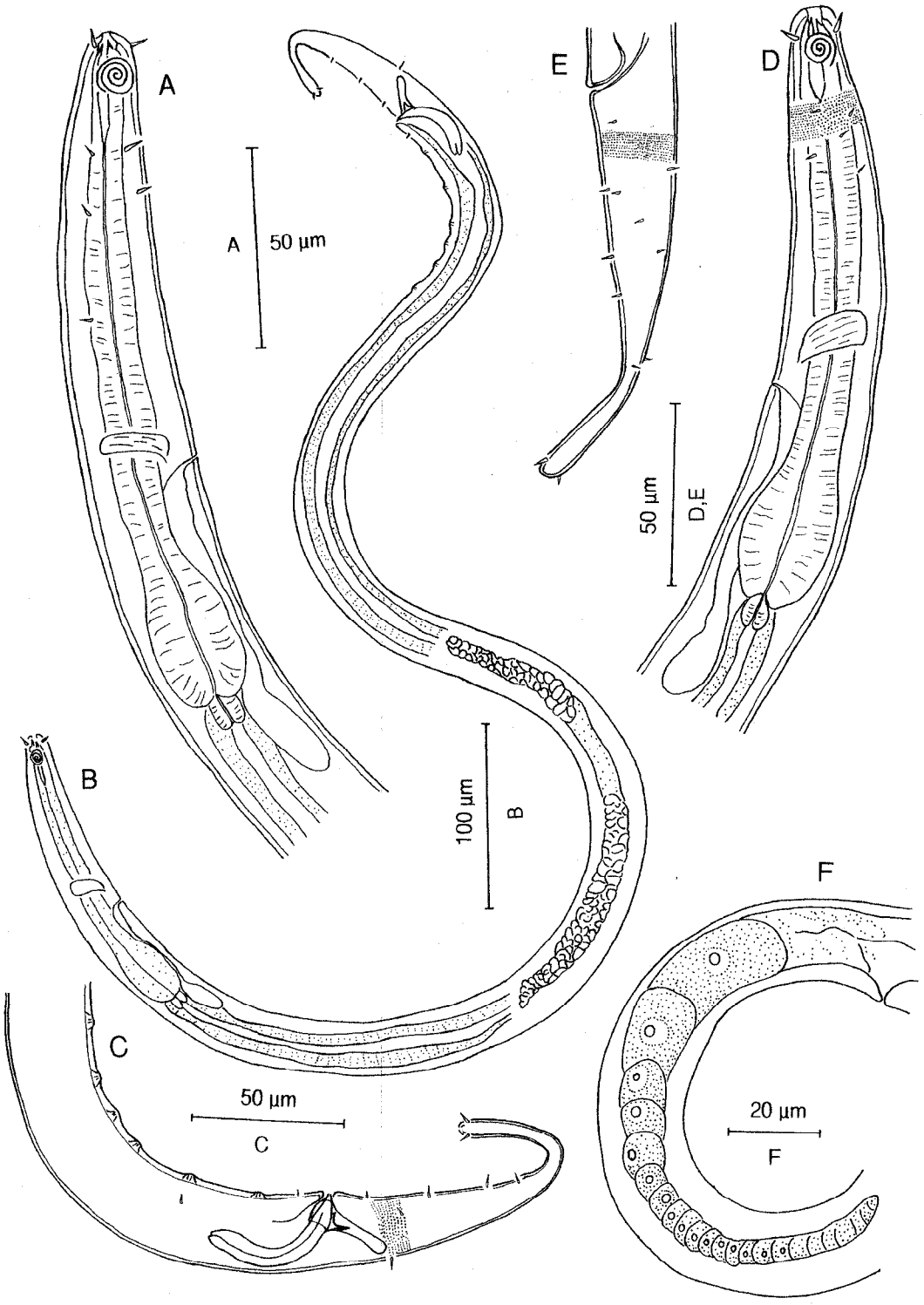

Figure 5. Hopperia arntzi n sp. A: ♂$_1$ Median view of pharyngeal region; B: ♂$_1$ Total view; C: ♂$_1$ Copulatory apparatus and tail; D: ♀$_1$ Median view of pharyngeal region; E: ♀$_1$ Rectal region and tail; F: ♀$_2$ View of posterior gonad.

Table 5. Measurements of *Hopperia arntzi* n. sp. from the Strait of Magellan and the Beagle Channel.

	Male: $n=5$					Female: $n=5$				
	Min	Max	Mean	S.D.	C.V.%	Min	Max	Mean	S.D.	C.V.%
BL	1094.0	1421.0	1236.6	118.5	9.6	1287.0	1274.0	1311.2	50.5	3.9
a	34.2	39.5	37.2	2.3	6.2	30.6	37.9	34.7	2.5	7.1
b	6.9	7.6	7.1	0.3	4.3	6.8	7.6	7.2	0.3	4.0
c	9.1	10.9	10.0	0.6	6.3	10.4	11.3	10.9	0.3	2.6
HD	12.0	14.0	13.3	0.8	6.3	12.0	14.0	13.0	0.7	5.1
CSL	5.4	6.7	6.3	0.5	8.5	5.4	7.0	6.7	0.6	9.6
amph-abe	4.7	7.4	6.1	1.4	22.3	6.0	7.0	6.8	0.4	6.4
amph D	8.7	10.7	9.8	0.8	8.5	7.0	9.4	7.7	1.0	12.9
amph-cbd	14.1	16.0	15.2	0.8	5.4	16.0	17.0	16.3	0.5	2.9
amph/cbd (%)	54.4	72.8	66.0	8.3	12.5	43.5	43.8	43.7	0.1	0.2
NR	93.7	105.0	95.2	7.4	7.8	91.0	109.0	100.1	7.3	7.3
NR/ph L (%)	52.4	59.3	56.0	2.8	5.0	51.3	60.6	54.7	3.2	5.9
ph L	158.0	187.0	173.2	10.1	5.8	169.0	197.0	183.0	10.5	5.7
ph-cbd	26.0	36.0	31.2	3.8	12.1	34.0	40.0	36.8	2.4	6.5
ph/cbd	5.1	6.8	5.6	0.6	11.3	4.2	5.2	4.9	0.4	8.3
E (%)	60.2	68.2	63.7	2.9	4.5	51.0	66.0	60.0	5.7	9.5
M	29.0	36.0	32.8	2.6	7.9	34.0	42.0	38.0	3.1	8.3
v						601.0	670.0	637.6	27.2	4.3
v%						47.7	50.0	48.6	0.8	1.7
spic	46.2	52.8	48.7	2.7	5.5					
s′	1.7	1.8	1.8	0.0	1.7					
gub L	17.1	26.0	22.0	3.0	13.6					
TL	117.0	130.0	123.0	4.4	3.6	112.0	126.0	120.4	4.8	4.0
abd	26.0	30.0	27.8	1.6	5.8	25.0	30.0	27.2	1.9	7.1
c′	4.2	4.6	4.4	0.2	3.4	4.1	4.7	4.4	0.2	4.1

Differential diagnosis

Hopperia beaglense n. sp. differs from all known *Hopperia* species by the rounded tail tip. Jensen (1979) transferred *Sabatieria dorylaimopsoides* (Allgén, 1959) to *Hopperia*, because of the structure of the buccal cavity and the type of lateral differentiation of the cuticle. *Hopperia dorylaimopsoides* has also a rounded tail tip similar to *Hopperia beaglense* n. sp. Our specimens, however, have a more rounded head and tail tip, larger value of 'a' (30–40 vs. 29–30) and outstretched ovaries differing from *H. dorylaimopsoides* in which the ovaries are reflexed.

***Hopperia arntzi* n. sp.**

(Figure 5A–F)

Material and type specimens: 5 females, 5 males collected from Station 866, 1139, 1181 and Station 1234. Holotype: $\sigma^{\prime}_1$ on the RIT 593; Allotype: φ_1 on the slide MBRUG 10548; Paratypes: $\sigma^{\prime}_2$–$\sigma^{\prime}_5$ and φ_2–φ_5 on the slides RIT 594 and MBRUG 10549–10552.

Type locality and habitat: See Table 1.

Etymology: The species name is given in honour of Prof. Wolf Arntz, the Chief Scientist of this Magellan 'Victor Hensen' Campaign.

Measurements :

$Holotype : \sigma^{\prime}_1$

$\frac{6\ \ 166\ \ M\ \ 1023}{12\ \ 29\ \ 29\ \ 26}$ 1140, $A : 39.3, B : 6.9, C : 9.7, SPIC : 46$

$Allotype : \varphi_1$

$\frac{7\ \ 180\ \ V\ \ 12.6}{14\ \ 35\ \ 35\ \ 26}$ 1327, $A : 37.9, B : 7.43, C : 11.0, V = 48\%$

Other measurements see Table 5.

Description

Males: Body evenly cylindrical, only tapering from cloacal region to the tail end. Cuticle 2 μm thick with fine punctuation. Lateral differentiation consists of slightly larger and wider spaced dots. The head bears two circles of six inner and six outer labial papillae,

four longer (6 μm) cephalic setae set up at 6–7 μm posterior from the front end. A few somatic setae scattered at the borders of lateral field of the cervical and tail region. The amphids are spiral with 3.5 turns, 10 μm in diameter, occupying 66% of cbd with anterior border 6 μm from abe. Buccal cavity cup-shaped and cuticularized followed by a narrow cylindrical portion with strongly sclerotized walls, 20 μm deep, three solid triangular teeth set up at the anterior end of this portion.

Pharynx is broadened at the posterior portion and forming a swollen end, but not a distinct bulb. Cardia longer than wide. Nerve ring at the 56% of pharynx. Ventral gland cell longer and at the posterior of cardia. Excretory pore slightly behind the nerve ring.

Reproductive system consists of two testes, opposed and outstretched. The spicules are paired, equal and arcuate, 49.0 μm (46–53μm) long in arc, 1.8 × abd. Gubernaculum has a 22 μm long apophyses with rounded ends and a conspicuous median piece. One precloacal seta present, five or six cup-shaped precloacal supplements, the distance of two posterior supplements more apart than others. Tail tapering and its distal third filiform with slightly swollen tail tip, 123 μm long, 4.4 × abd. Tail tip bearing a pair of terminal setae, 4 μm long.

Females: Similar to males, only differ from the male is the size of amphids smaller (8 μm) and 44% of corresponding body diameter. Vulva at the middle of body length (48–50%). Reproductive system amphidelphic, the ovaries paired, opposed and outstretched.

Differential diagnosis

Hopperia arntzi n. sp. is closely related to *Hopperia americana* Pastor de Ward 1984, and *Hopperia muscatensis* Warwick 1973, by the setiform third crown of cephalic setae and a swollen tail tip. *Hopperia arntzi*, however, has a shorter body than *H. americana* and *H. muscatensis*. Besides this, *Hopperia arntzi* n. sp. has higher de Man ratio 'a' (30.6–39.5) than *H. americana* (29–30), but more smaller than that of *H. muscatensis* (44). Furthermore, the ratio of head diameter to the corresponding body diameter of pharyngeal end, *Hopperia arntzi* n. sp. is larger (40%) than *H. americana* (30%). *H. muscatensis* has longer spicule (87 μm) and higher value 'c' which differing also from our specimens.

Key to all known species of *Hopperia*

1. Stoma armed with 3 teeth 2
   Stoma armed with 6 teeth .... *H. hexadentata* Hope & Zhang, 1995
2. The cephalic sense organs papilliform (< 2 μm) . 3
   The cephalic sense organs setiform (> 2 μm) ... 4
3. Spicules 52–54 μm, ovaries reflexed, tail tip filiform .... *H. massiliensis* Vitiello, 1969
   Spicules 37–44 μm, ovaries outstretched, tail tip pointed ..... *H. australis* Jensen, 1992
4. Tail tip swollen 5
   Tail not swollen 6
   Tail tip filiform, values of 'a' 40–60, spicules 1.5 × a .... *H. indiana* Muthumbi, Soetaert & Vincx, 1997
5. Spicules long, 2.5 × abd .... *H. muscatensis* Warwick, 1977
   Spicules short, < 2.0 × abd 7
6. Values of 'a' < 30, ovaries reflexed .... *H. dorylaimopsoides* (Allgén, 1959)
   Values of 'a' > 30, ovaries outstretched .... *H. beaglense*. n. sp.
7. Values of 'a' 26–30, tail 3.5 × abd .... *H. americana* Ward, 1984
   Values of 'a' 31–40, Tail 4.4 × abd .... *H. arntzi* n. sp.

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