

Article

# Monthly Occurrence of Endoparasites of Chaetognaths in a Coastal System of the Mexican Central Pacific

Viridiana Plascencia-Palomera <sup>1</sup>, Carmen Franco-Gordo <sup>1,\*</sup>, Horacio Lozano-Cobo <sup>2</sup>, Israel Ambriz-Arreola <sup>1</sup>, Eduardo Suárez-Morales <sup>3</sup> and Jaime Gómez-Gutiérrez <sup>4</sup>

<sup>1</sup> Departamento de Estudios para el Desarrollo Sustentable de Zonas Costeras, Universidad de Guadalajara, Gómez Farías 82, San Patricio Melaque CP 48980, Jalisco, Mexico; vplascencia.p@gmail.com (V.P.-P.); israel.ambriz@academicos.udg.mx (I.A.-A.)

<sup>2</sup> Departamento de Hidrobiología, Universidad Autónoma Metropolitana, Unidad Iztapalapa, Av. San Rafael Atlixco No. 186, Col. Vicentina, Mexico City CP 09340, Mexico; hlozanoc21@gmail.com

<sup>3</sup> El Colegio de la Frontera Sur (ECOSUR), Unidad Chetumal, Chetumal CP 77014, Mexico; esuarez@ecosur.mx

<sup>4</sup> Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional, Av. Instituto Politécnico Nacional s/n, La Paz CP 23096, Baja California Sur, Mexico; jagomezg@ipn.mx

\* Correspondence: delcarmen.franco@academicos.udg.mx

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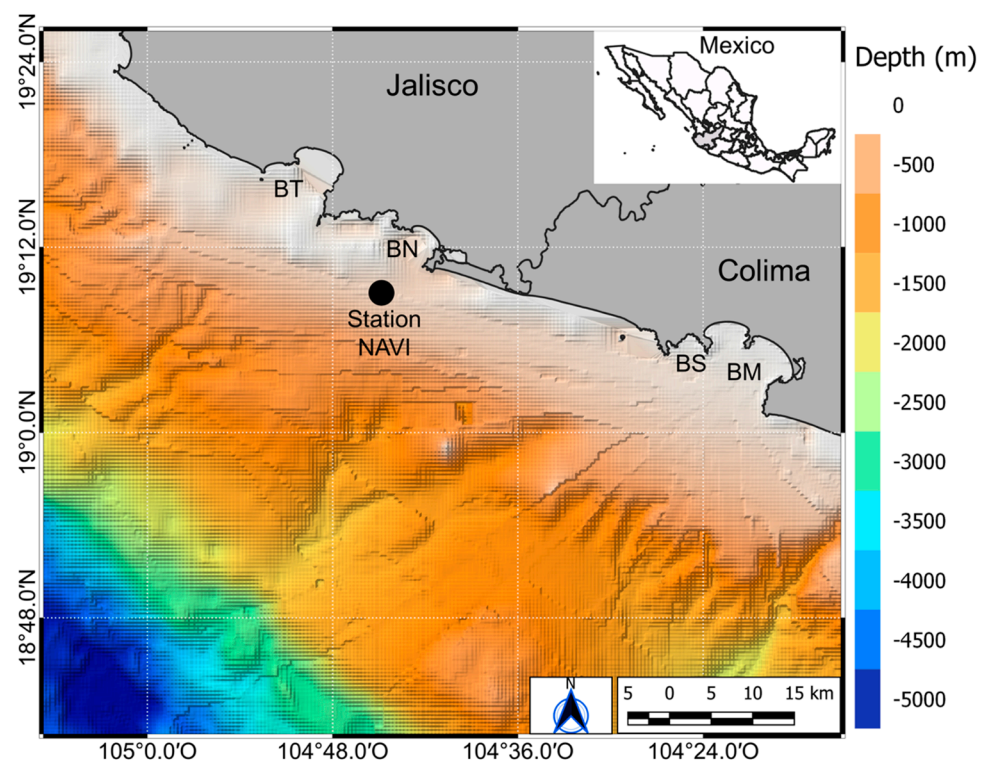
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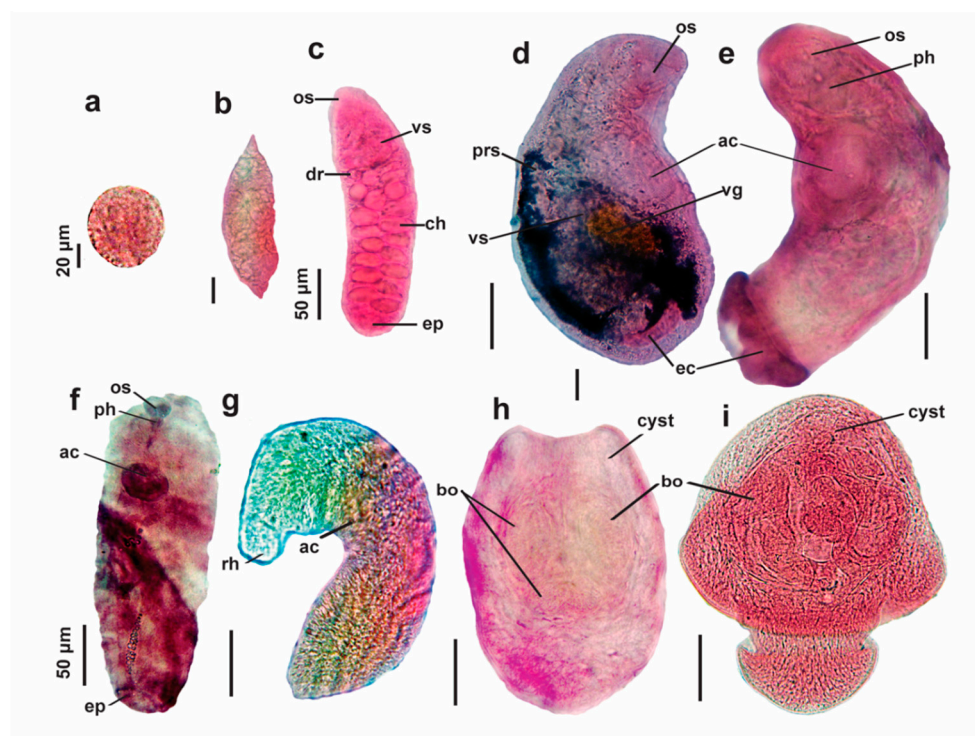
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**Figure S1.** Sampling and data collection zooplankton (Nov 2010–Dec 2011) at the NAVI Station at Navidad Bay (BN), coast of Jalisco, Mexico. BT= Tenacatita Bay, BN= Navidad Bay, BS= Santiago Bay, BM= Manzanillo Bay.



**Figure S2.** Endoparasites of chaetognaths collected during Nov 2010–Dec 2011 at the nearshore region of Navidad Bay, Jalisco, Mexico. (a) unidentified Protist sp. 1, (b) unidentified Protist sp. 2; (c) Didymozoidae gen sp. metacercariae, (d) *Parahemiurus* sp. metacercariae, (e) Hemiuridae gen sp. metacercariae, (f) Lepocreadiidae gen sp. metacercariae, (g) *Prosorhynchus* sp. metacercariae, (h) Tetraphyllidea sp. 1 metacestode, (i) Tetraphyllidea sp. 2 metacestode. Scale bar = 20 µm (a–b) and 50 µm (c–i). Abbreviations: ac = acetabulum, bo = bothrid muscular, ch = chambers caecum, dr = “Drusenmagen”, ec = ecsoma, os = oral sucker, ep = excretory pore, ph = pharynx, prs = prostatic cells, rh = rynchus, vg = vitellogenic glands, vs = seminal vesicle.

**Table S1.** Diagnostic taxonomical characteristics and mean body size (TL= total length, W= width) used to identify each type of endoparasite (9 taxa) showing the site infection of chaetognath species collected from Nov 2010-Dec 2011 in the nearshore monthly zooplankton time series located in Bahía de Navidad, Jalisco, Mexico.

Parasite/taxa	Figure S2 and Figure 2 in the text.	Mean body size (mm) TL,	Parasite diagnostic morphological features	Chaetognath (host)	Microhabitat (site of infection)	References
Protist sp. 1 (Ciliata?)	a	0.06	Spherical to oval body shape, similar to <i>Metaphrya sagittae</i>	<i>F. enflata</i> <i>S. pacifica</i> <i>P. euneritica</i>	Trunk coelom Gut Gut	Ikeda [48], Lozano-Cobo et al. [11]
Protist sp. 2	b	0.54, 0.07	Elongated cyst	<i>S. pacifica</i>	Gut	Leander [49], Théodoridès [50]
Didymozoidae sp. metacercariae	c	0.06, 0.05	Length cylindrical body, muscular acetabulum, number of chambers (6-8) of the intestinal caeca, presence of Drüsenmagen	<i>P. euneritica</i> <i>Z. bedoti</i> <i>F. hexaptera</i>	Trunk coelom Trunk coelom Trunk coelom	Gómez del Prado-Rosas et al. [38,41], Pozdnyakov and Gibson [51]
<i>Parahemiurus</i> sp. (metacercariae)	d	0.38, 0.22	Serrated tegument, ecsoma presence, oval seminal vesicle, prostatic cells in the anterior region	<i>P. euneritica</i>	Trunk coelom	Gibson [20], Gómez del Prado-Rosas et al. [37]
Hemiuridae sp. (metacercariae)	e	0.29, 0.1	Ecsoma presence	<i>Z. bedoti</i> <i>F. enflata</i> <i>F. hexaptera</i> <i>P. euneritica</i>	Trunk coelom Trunk coelom Trunk coelom Trunk coelom	Gibson [20], Gómez del Prado-Rosas et al. [37]
Lepocreadiidae sp. (metacercariae)	f	0.26, 0.1	Body elongate, tegument spinous, oral sucker subterminal, ventral sucker in the anterior region	<i>F. hexaptera</i>	Trunk coelom	Bray [21]
<i>Prosorhynchus</i> sp. (metacercariae)	g	0.32, 0.08	Body shape ellipsoid, tegument with fine spines, Rhynchus sucker-like	<i>P. euneritica</i>	Trunk coelom	Overstreet and Curran [52]
Tetraphyllidea sp. 1 (metacestode)	h	0.32, 0.27	Body globular, scolex invaginated, one muscular sucker in	<i>F. enflata</i> <i>F. hexaptera</i>	Trunk coelom and digestive track	Shimazu [52], Lozano-Cobo et al. [11]

Tetraphyllidea sp. 2 (metacestode)	i	0.19, 0.13	each bothridia and one muscular sucker in the mid- dle of the scolex	<i>Z. bedoti</i>	Trunk coelom and digestive track	Shimazu [53], Lozano-Cobo et al. [11]
			Globular body shape, scolex in- vaginated, bulb- ous zone with four thin and elongated both- ridia	<i>F. enflata</i>	Gut	

**Table S2.** Relative size relationship between Chaetognath (hosts) and their parasites collected in the coast of the Central Pacific during Nov 2010-Dec 2011. Gonad development stage was assigned using the 0-V stages classification proposed by Colman [54] and simplified to I-III (immature) and IV (mature) stages by Alvarino [55].

Chaetognath species	Gonad development stage	Total length (mm)	Parasite taxa	Parasite life stage	Total length (mm)	Parasite/host relative size (%)
<i>S. pacifica</i>	II	7.39	Protist sp. 1	-	0.07	0.7
			Protist sp. 1	-	0.20	2.7
			Protist sp. 1	-	0.08	1.1
			Protist sp. 1	-	0.06	0.8
<i>P. euneritica</i>	I	5.60	Protist sp. 2	-	0.06	1.1
<i>F. enflata</i>	II	10.23	Protist sp. 2	-	0.10	1.0
<i>S. pacifica</i>	II	9.62	Protist sp. 2	-	0.09	0.9
			Protist sp. 2	-	0.04	0.4
			Protist sp. 2	-	0.04	0.4
			Protist sp. 2	-	0.06	0.6
			Protist sp. 2	-	0.09	0.9
			Protist sp. 2	-	0.05	0.5
			Protist sp. 2	-	0.05	0.5
			Protist sp. 2	-	0.04	0.4
<i>S. pacifica</i>	II	7.60	Protist sp. 2	-	0.04	0.5
			Protist sp. 2	-	0.04	0.5
			Protist sp. 2	-	0.04	0.5
			Protist sp. 2	-	0.06	0.8
<i>F. hexaptera</i>	I	12.40	Didymozoidae sp.	Metacercariae	0.13	1.1
<i>P. euneritica</i>	I	7.27	Didymozoidae sp.	Metacercariae	0.22	3.0
<i>P. euneritica</i>	I	4.60	Didymozoidae sp.	Metacercariae	0.08	1.7
<i>P. euneritica</i>	I	6.35	Didymozoidae sp.	Metacercariae	0.61	9.6
<i>Z. bedoti</i>	I	6.96	Didymozoidae sp.	Metacercariae	0.09	1.3
			Didymozoidae sp.	Metacercariae	0.12	1.7
<i>P. euneritica</i>	II	5.48	Didymozoidae sp.	Metacercariae	0.26	4.7
			Didymozoidae sp.	Metacercariae	0.35	6.4
<i>P. euneritica</i>	II	8.03	Didymozoidae sp.	Metacercariae	0.21	2.6
<i>P. euneritica</i>	II	6.37	Didymozoidae sp.	Metacercariae	0.07	1.1
<i>P. euneritica</i>	I	6.35	<i>Parahemiurus</i> sp.	Metacercariae	0.26	4.1
<i>P. euneritica</i>	I	7.17	<i>Parahemiurus</i> sp.	Metacercariae	0.33	4.6
<i>P. euneritica</i>	I	7.96	<i>Parahemiurus</i> sp.	Metacercariae	0.38	4.8
<i>P. euneritica</i>	II	7.29	<i>Parahemiurus</i> sp.	Metacercariae	0.18	2.5
<i>P. euneritica</i>	III	6.86	<i>Parahemiurus</i> sp.	Metacercariae	0.69	10.1
<i>P. euneritica</i>	I	6.08	Hemiuridae sp.	Metacercariae	0.29	4.8
		6.08	Hemiuridae sp.	Metacercariae	0.26	4.3
<i>P. euneritica</i>	I	7.17	Hemiuridae sp.	Metacercariae	0.24	3.4
<i>Z. bedoti</i>	I	6.96	Hemiuridae sp.	Metacercariae	0.23	3.3
<i>F. enflata</i>	II	8.65	Hemiuridae sp.	Metacercariae	0.49	5.7
<i>F. hexaptera</i>	II	8.53	Hemiuridae sp.	Metacercariae	0.27	3.2
<i>F. hexaptera</i>	II	6.52	Hemiuridae sp.	Metacercariae	0.31	4.8
			Hemiuridae sp.	Metacercariae	0.22	3.4
<i>P. euneritica</i>	II	6.73	Hemiuridae sp.	Metacercariae	0.24	3.6
<i>P. euneritica</i>	II	5.93	Hemiuridae sp.	Metacercariae	0.27	4.6
<i>P. euneritica</i>	II	6.37	Hemiuridae sp.	Metacercariae	0.07	1.1

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<i>F. hexaptera</i>	II	8.53	Lepocreadiidae sp.	Metacercariae	0.26	3.1
<i>P. euneritica</i>	I	3.23	<i>Proisorhynchus</i> sp.	Metacercariae	0.32	9.9
<i>F. enflata</i>	I	3.71	Tetraphyllidea sp. 1	Metacestode	0.32	8.6
<i>F. enflata</i>	I	8.50	Tetraphyllidea sp. 1	Metacestode	0.45	5.3
<i>F. enflata</i>	I	7.25	Tetraphyllidea sp. 1	Metacestode	0.34	4.7
<i>F. enflata</i>	I	7.75	Tetraphyllidea sp. 1	Metacestode	0.13	1.7
<i>F. enflata</i>	I	9.19	Tetraphyllidea sp. 1	Metacestode	0.54	5.9
<i>F. hexaptera</i>	I	12.4	Tetraphyllidea sp. 1	Metacestode	0.30	2.4
<i>F. enflata</i>	II	4.78	Tetraphyllidea sp. 1	Metacestode	0.47	9.8
<i>F. enflata</i>	II	10.13	Tetraphyllidea sp. 1	Metacestode	0.16	1.6
<i>F. hexaptera</i>	II	7.18	Tetraphyllidea sp. 1	Metacestode	0.31	4.3
<i>Z. bedoti</i>	II	4.20	Tetraphyllidea sp. 1	Metacestode	0.30	7.1
<i>F. hexaptera</i>	I	9.54	Tetraphyllidea sp. 2	Metacestode	0.22	2.3

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**Table S3.** Prevalence values and 95% confidence intervals of the infection in five chaetognaths species of the nearshore region of Navidad Bay, Jalisco, Mexico.

Host species	Total	No. infected chaetognaths	Prevalence (%)	Mean	Median	95% Confidence interval
<i>Flaccisagitta enflata</i>	1015	8	0.79	0.4	0.399	0.0011 ± 0.0105
<i>Flaccisagitta hexaptera</i>	147	6	4.1	0.4	0.386	0.0180 ± 0.0872
<i>Parasagitta euneritica</i>	7317	16	0.2	0.5	0.5	0.0013 ± 0.0036
<i>Serratosagitta pacifica</i>	397	3	0.8	0.2	0.2	0.0021 ± 0.0221
<i>Zonosagitta bedoti</i>	6542	2	0	0.3	0.3	0.0000 ± 0.0012