

NOTA CORTA / SHORT NOTE

NEW RECORD OF *Phylliroe bucephala*
(GASTROPODA, NUDIBRANCHIA) IN THE
EASTERN TROPICAL PACIFIC OF COLOMBIA

Nuevo registro de *Phylliroe bucephala* (Gastropoda,
Nudibranchia) en el Pacífico oriental tropical de Colombia

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Received: 02nd February 2023. Revised: 30th March 2023. Accepted: 09th May 2023.

Associate editor: Omar Hernando Ávila-Poveda

Citation/ citar este artículo como: Jerez-Guerrero, M., Rivera-Gómez, M., Valencia, B., and Giraldo, A. (2024). New Record of *Phylliroe bucephala* (Gastropoda, Nudibranchia) in the Eastern Tropical Pacific of Colombia. *Acta Biol Colomb*, 29(2), 173-177. <https://doi.org/10.15446/abc.v29n2.106895>

ABSTRACT

Phylliroe bucephala is a nudibranch notable for having a laterally compressed body and a pelagic lifestyle. Although *P. bucephala* is widely distributed in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans, it has not been recorded in the Colombian Pacific. Here we report the presence of the species in the coastal zone of Nuquí and Pizarro, two localities of Chocó - Colombia, and describe the main characteristics of the specimens collected.

Keywords: Coastal areas, Geographical distribution, Mollusca, Taxonomy, Zooplankton.

RESUMEN

Phylliroe bucephala es un nudibranchio que se destaca por tener el cuerpo comprimido lateralmente y un estilo de vida pelágico. Aunque *P. bucephala* está ampliamente distribuido en aguas tropicales y subtropicales de los océanos Atlántico, Pacífico e Índico, no ha sido registrado en el Pacífico Colombiano. Aquí se reporta la presencia de la especie en la zona costera de Nuquí y Pizarro, dos localidades de Chocó - Colombia, y se describen las principales características de los especímenes recolectados.

Palabras Clave: Áreas costeras, Distribución geográfica, Mollusca, Taxonomía, Zooplancton.

Nudibranchs are mollusks in the class Gastropoda that include organisms without shells and that have secondary bilateral symmetry (Ruppert and Barnes, 1996). Most nudibranchs are benthonic in their adult stage; however, organisms of the family Phylliroidae are pelagic throughout their life cycle and are part of the zooplankton (Hernández and de Vera, 2010). According to Hernández and de Vera (2010) and the records in the World Register of Marine Species (MolluscaBase, 2023) only three valid species are currently accepted in the family: *Phylliroe bucephala* Lamarck, 1816, *P. lichtensteinii* Eschscholtz, 1825, and *Cephalopyge trematoides* (Chun, 1889).

Phylliroe bucephala is a holoplanktonic nudibranch known for its swimming capacity that result of its adaptation to a

pelagic lifestyle, making wave movements from right to left (Goodheart and Wägele, 2020). Moreover, *P. bucephala* is one of the few nudibranchs that exhibit bioluminescence (Goodheart and Wägele, 2020; Santhanam, 2022). *Phylliroe bucephala* is also known for its important role in the pelagic food-web because it feeds on small planktonic cnidarians and salps, and because it parasitize the jellyfish *Zanlea costata* Gegenbaur, 1857 during its juvenile stage (Santhanam, 2022).

Although *P. bucephala* is widely distributed in tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans (van der Spoel et al., 2023), it has not been recorded in the Eastern Tropical Pacific (ETP) off Colombia. Here we report the first record of the species in the Pacific coast of

Colombia and describe the main characteristics of the specimens collected. In addition, we describe the hydrographic conditions in the zone that could have enhanced the presence of the species.

Individuals of *P. bucephala* were collected in zooplankton samples in coastal waters off Nuquí and Pizarro (Chocó), ETP off Colombia, during March-April 2022 (Fig. 1a, Table 1). The samples were collected at a total of 33 stations: 18 stations in Nuquí and 15 stations in Pizarro by performing two surface tows at each station using conical plankton nets provided with Hydrobios flow meters (net diameter: 71 cm, pore size: 200 µm and 500 µm). The zooplankton samples were preserved in 4 % buffered formalin. Temperature and salinity profiles up to 70 m were taken simultaneously with a Castaway-CTD. In the laboratory, individuals of *P. bucephala* were sorted from the zooplankton samples and identified based on the descriptions by MacDonald (1856), Hernández and de Vera (2010), and van der Spoel et al. (2023). Representative individuals were photographed at the Image Laboratory of the Biology Department of Universidad del Valle (Cali, Colombia). All specimens collected are deposited in the Mollusca Collection of Universidad del Valle (Cali, Colombia).

SYSTEMATICS

Phylum Mollusca Linnaeus, 1758
Class Gastropoda Cuvier, 1795
Subclass Heterobranchia Burmeister, 1837
Order Nudibranchia Cuvier, 1817
Family Phylliroidae Menke, 1830
Genus *Phylliroe* Péron & Lesueur, 1810
Phylliroe bucephala Lamarck, 1816 (Fig. 2)

Material examined: Pizarro, Chocó, nearby the mouth of Baudó River (4°56' N, 77°23' W); 27/03/2022; 2 specimens (Table 1) UNIVALLE:CRM-UV:2022-130; *leg.* Mauricio Jerez-Guerrero, Bellineth Valencia, Mariana Rondón, Sebastián Ortiz. Nuquí, Tribugá Gulf, Chocó (5°50' N, 77°25' W); 30/03/2022-31/03/2022; 13 specimens (Table1) UNIVALLE:CRM-UV:2022-122 to UNIVALLE:CRM-UV:2022-129; *leg.* Mauricio Jerez-Guerrero, Bellineth Valencia, Mariana Rondón, Sebastián Ortiz.

Description: Body transparent, fish-shaped elongated, and compressed laterally (Fig. 2a). Head with two rhinophores and mouth in form of a short, truncated proboscis with a vertical opening (Fig. 2b). Bilobed square-shaped tail (Fig. 2c). Digestive glands (two anterior and two posterior) X-shaped (Fig. 2d). Stomach with a long intestine ending in the anus, the later located on the lateral right side of the body, towards the center (Fig. 2e).

Although zooplankton samples were also collected in Bahía Solano – Cabo Marzo (6°14'03"N, 77°24'18"W), north of Nuquí, and during November-December 2021, January-February, June, July-August, September-October, and November-December 2022, individuals of *P. bucephala* were only found in Nuquí and Pizarro during March-April 2022. The presence of *P. bucephala* in the Colombian Pacific during March was likely favored by an increase in the availability of its prey (cnidarians), whose abundance in the Colombian Pacific tends to be higher when the temperature of the water column is lower (Baldrich-Chaparro & López-Peralta, 2013). In the ETP, surface waters are characterized by warm temperatures (> 25 °C) and low salinities (< 34), values that are particularly low in the Panama Bight due to the high precipitation levels (Fiedler and Lavín, 2017).

Table 1. Collecting sites and number of specimens of *Phylliroe bucephala* sampled in the Colombian Pacific.

Locality/Site	Latitude	Longitude	Date	Mesh size (µm)	No. ind.
Pizarro	4°50'53.534"N	77°24'43.455"W	27/03/2022	200	2
	5°37'38.111"N	77°21'12.61"W	30/03/2022	500	1
	5°38'36.938"N	77°21'37.479"W	30/03/2022	500	2
	5°41'50.899"N	77°18'52.581"W	31/03/2022	200	1
	5°41'50.899"N	77°18'52.581"W	31/03/2022	500	1
	5°42'30.359"N	77°19'42.16"W	31/03/2022	500	2
	5°45'59.35"N	77°18'6.181"W	31/03/2022	500	4
	5°51'6.851"N	77°18'51.379"W	31/03/2022	500	1
	5°51'6.851"N	77°19'55.559"W	31/03/2022	500	1
Nuquí					

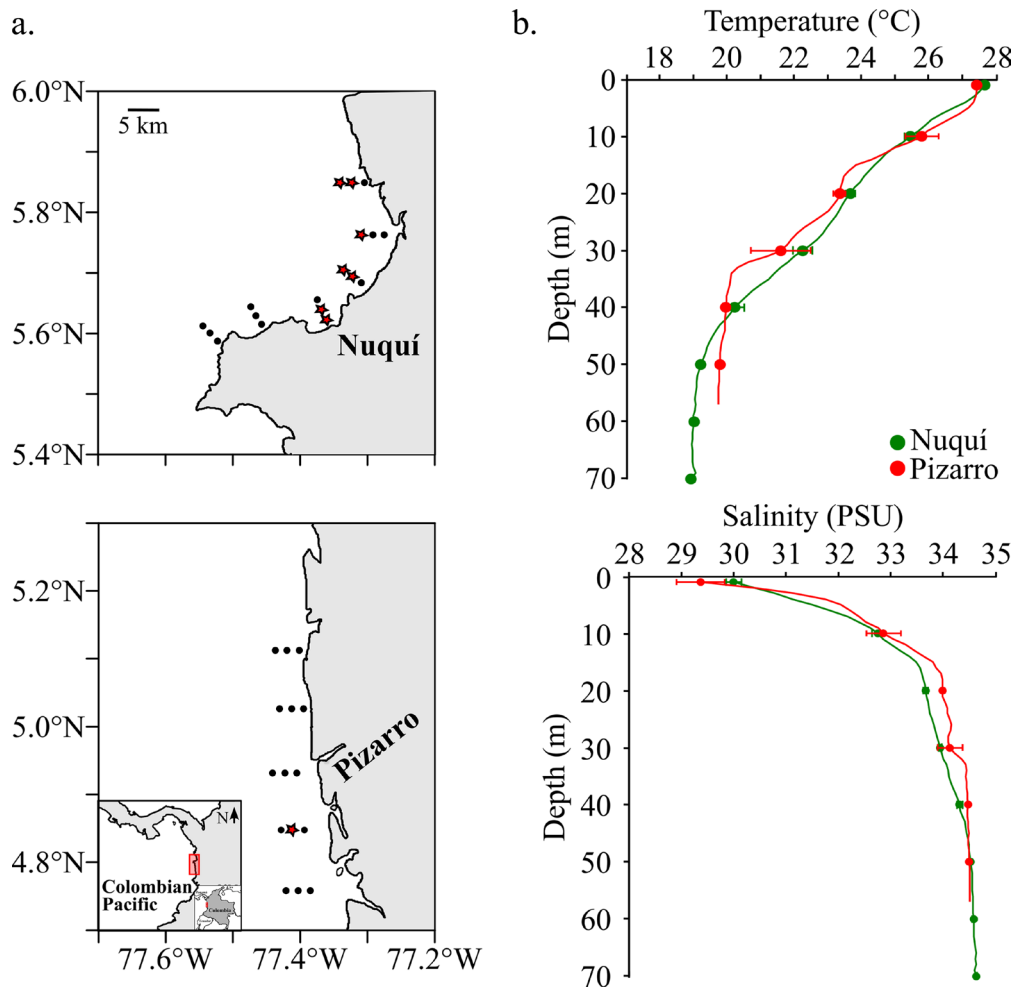


Figure 1. a. Map of the Colombian Pacific showing the location where zooplankton samples were collected in Nuquí and Pizarro (Chocó). Symbols in red indicate the stations where individuals of *Phylliroe bucephala* were present. b. Vertical distribution of the temperature and salinity in Nuquí and Pizarro ETP off Colombia, during March-April 2022. Average values and 95% confidence interval were used.

Although the water column in the Panama Bight is usually stratified with a thermocline around 50 m, the presence of the Panama wind Jet during the dry season (January-March) drives upwelling of subsurface waters, bringing colder, saltier, and nutrient-rich waters to shallower depths (D'Croz & O'Dea, 2007; Devis-Morales et al., 2008; Corredor-Acosta et al., 2020). During March-April 2022, surface temperatures in Nuquí ranged from 26.9 to 28.1 °C and surface salinities ranged from 29.3 to 31.6 UPS, whereas surface temperatures in Pizarro ranged from 27.0 to 27.8 °C and surface salinities ranged from 27.9 to 31.4 UPS (Fig. 1b). In the subsurface waters, upwelling was evident during this period at both localities, when temperatures lower than 22 °C were recorded at 30 m (Fig. 1b). Because individuals of *P. bucephala* were only recorded during the sampling campaign carried out in March, likely the upwelling favored their presence in the coastal waters of the ETP off Colombia.

Phylliroe bucephala has a broad distribution in the Atlantic Ocean. It has been reported in Florida and Bermudas (Bergh,

1871 as *P. atlantica*; Abbot, 1974), as well as in the African Atlantic (Odner, 1931; van der Spoel, 1970), particularly around the Canary Islands (Hernández and Jiménez, 1996; Hernández and de Vera, 2010). The most recent record of *P. bucephala* was of juveniles in the Syrian Mediterranean Sea (Durgham and Ikhtiyar, 2020). In the Eastern Pacific, this species has only been recorded in the Gulf of California (Mexico) by Fernández-Álamo (1997), Angulo-Campillo (2005), Angulo-Campillo et al. (2011). In the Colombian Pacific, the possible presence of the genus *Phylliroe* was reported by Kaiser and Bryce (2001) in Malpelo Island, but the authors did not confirm the identification of the species. Our study reports for the first time *P. bucephala* in the Colombian Pacific, expanding its distribution to the Eastern Tropical Pacific, approximately 4,000 km further south of the Gulf of California.

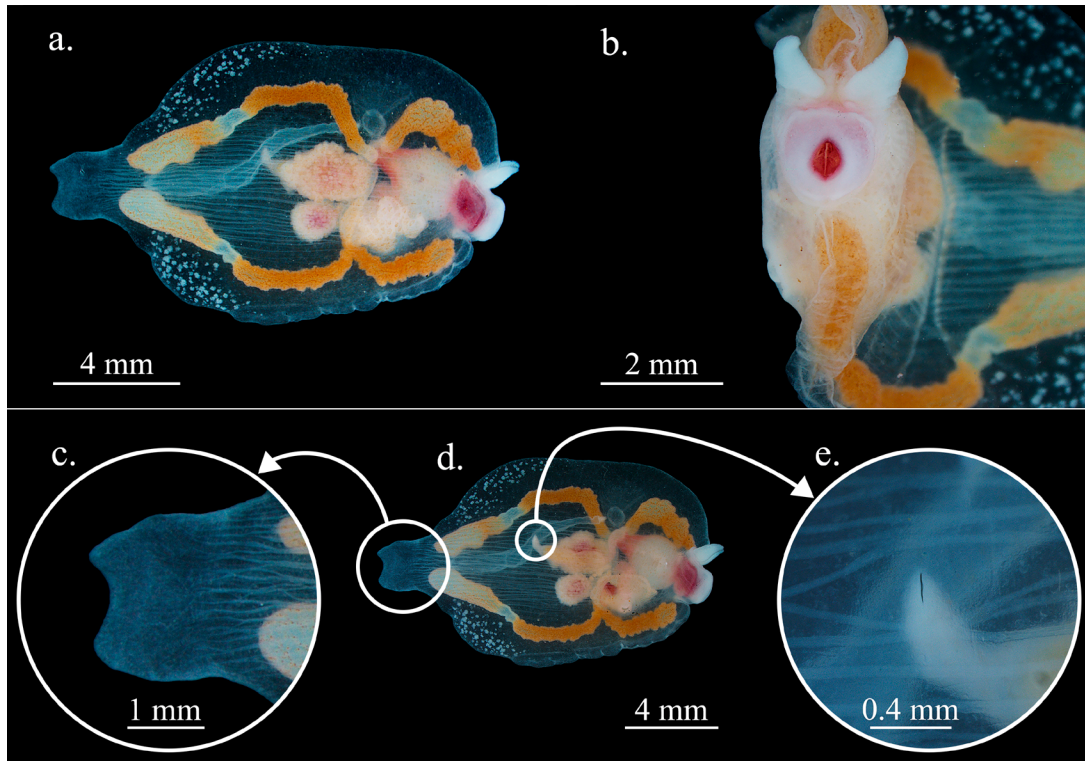


Figure 2. *Phylliroe bucephala* Lamarck, 1816. a. Left side view. b. Front view of the head. c. Bilobed square-shaped tail. d. X-shaped digestive glands (orange color). e. Position of the anus on the right lateral side, central part of the body.

AUTHORS PARTICIPATION

Mauricio Jerez-Guerrero contributed with the fieldwork, identification of the specimens, writing, and diagramming of the figures; Marisol Rivera-Gómez contributed with the fieldwork, identification of the specimens, writing, and elaboration of the maps; Bellineth Valencia contributed with the fieldwork, identification of the specimens, writing, and elaboration of the graphics; Alan Giraldo contributed with the funding acquisition, supervision, and review of the writing. All the authors read and approved the final manuscript.

ACKNOWLEDGEMENTS

We thank the logistics staff and the community of Pizarro, Nuquí, and Bahía Solano, who provided support during the sampling campaigns. We also thank to the Image Laboratory of the Biology Department of Universidad del Valle, and Juan Felipe Ortega for his support in taking the photographs. This study is part of the research project “Investigación para la sostenibilidad de la pesca artesanal del departamento del Chocó” funded by Sistema General de Regalías (Colombia) and Universidad del Valle (CI 71237).

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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