

## Diversity and distribution of sea slugs (Mollusca: Gastropoda: Heterobranchia) in two sites of the Caribbean coast of Honduras

Verónica CAVIEDES<sup>1</sup>, Yolanda E. CAMACHO-GARCÍA<sup>2,3</sup>, Juan Lucas CERVERA<sup>4</sup> and Juan Carlos CARRASCO<sup>2,5</sup>

(1) *Instituto Tecnológico Superior de Tela, Universidad Nacional Autónoma de Honduras. Calle contiguo a Aldeas SOS, Barrio Venecia, 31301 Tela, Atlántida, Honduras*

(2) *Centro de Investigación en Ciencias del Mar y Limnología, Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica*

(3) *Centro de Investigación en Estructuras Microscópicas (CIEMIC), Universidad de Costa Rica, Apdo. 11501-2060, San Pedro de Montes de Oca, San José, Costa Rica*

(4) *Instituto Universitario de Investigación Marina (INMAR), Campus de Excelencia Internacional del Mar (CEI•MAR), Universidad de Cádiz. Av. República Saharaui, s/n, 11510, Puerto Real, España*

(5) *Fundación para la Investigación, Estudio y Conservación de la Biodiversidad (INCEBio), 33011, Residencial Jamil, Tela, Honduras*

*Corresponding author: veronica.caviedes@unah.edu.hn*

**Abstract:** Although several studies on the marine heterobranch gastropod fauna have been conducted in the Caribbean region, there is still a lack of knowledge on this group in Honduras. This study presents a checklist of “sea slug” species (Mollusca: Gastropoda: Heterobranchia) resulting from a series of samples taken at two very shallow areas in the Caribbean coast of Honduras, the Blanca Jeannette Kawas Fernández National Park and the Chachaguala Lagoon, located in the Cuyamel-Omoa National Park. A total of 194 specimens were collected and identified. They belong to 30 species, in 5 orders, 14 of which represent new records for Honduras. The present study increased the number of sea slugs known in the Caribbean coasts of Honduras to 93 species, and increased the degree of knowledge of marine heterobranchs of this region.

**Résumé :** *Diversité et distribution des limaces de mer (Mollusca : Gastropoda : Heterobranchia) dans deux sites de la côte caribéenne du Honduras.* Bien que plusieurs études sur la faune de gastéropodes marins hétérobranchés aient été menées dans la région des Caraïbes, il existe encore un grand déficit de connaissances pour ce groupe sur les côtes du Honduras. Cette étude présente une liste d’espèces de “limaces de mer” (Mollusca : Gastropoda : Heterobranchia), issue d’une série d’échantillonnages effectués dans deux zones très peu profondes de la côte caraïbe du Honduras, le Parc National Blanca Jeannette Kawas Fernández et la Lagune de Chachaguala, située dans le Parc National Cuyamel-Omoa. Au total, 194 spécimens ont été collectés et identifiés. Ils appartiennent à 30 espèces, comprenant 5 ordres, 14 d’entre elles représentant de nouveaux signalements pour le Honduras. Cette étude porte le nombre de “limaces de mer” connues le long des côtes caraïbes du Honduras à 93 espèces, et augmente le degré de connaissance de la faune hétérobranche marine de cette région.

**Keywords:** Sea slugs • Heterobranchia • Caribbean Sea • Honduras • Biodiversity

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## Introduction

There are approximately 6,000 species of “sea slugs” (marine heterobranchs) (Behrens & Hermosillo, 2005; Yonow, 2008) within the Gastropoda class, with the Caribbean being one of the richest areas for these mollusks in the entire Atlantic Ocean (Valdés et al., 2006; García & Bertsch, 2009; Camacho-García et al., 2014; Goodheart et al., 2016). Recent studies related to different groups of marine heterobranchs have been carried out in countries of the Central American isthmus such as Costa Rica and Panama, or have included material from this region, reporting a total of 202 species (Camacho-García et al., 2014; Carmona et al., 2014a; Goodheart et al., 2015a, b & 2016; Krug et al., 2016; Padula et al., 2016; Valdés et al., 2006 & 2017). However, there is a great gap in the knowledge of this group in Honduras. Valdés et al. (2006) and Charteris (2012) cited a total of 79 species only for Bay Islands, without considering other areas of the Caribbean Honduras, nor the Pacific (Gulf of Fonseca). Although these species are listed in identification guides, there are no specific studies about sea slugs in Honduras. The present study increases the knowledge of marine heterobranch fauna of the Caribbean coast of Honduras thanks to material collected in two locations, the Blanca Jeannette Kawas Fernández National Park and the Chachaguala Lagoon, located in the Cuyamel-Omoa National Park.

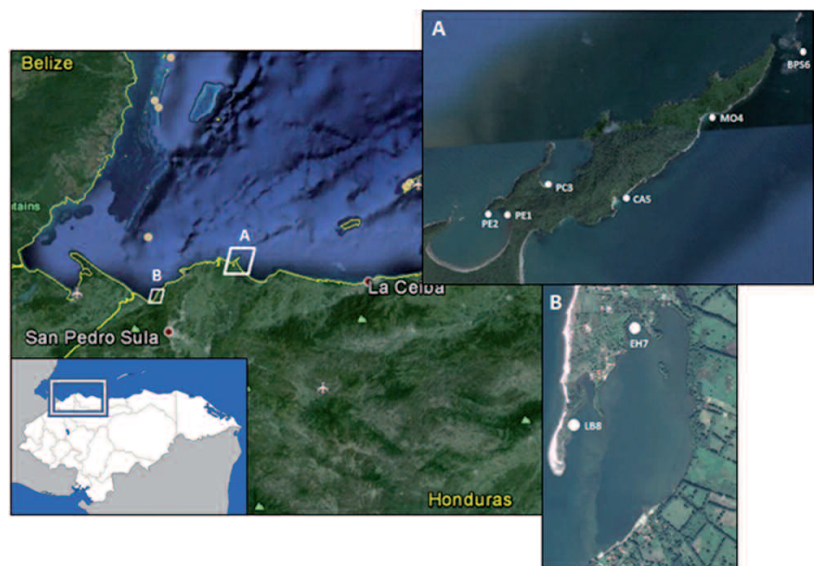
## Material and Methods

The study area included two sites of the northern coast of Honduras, the Blanca Jeannette Kawas Fernández National Park (PNJK) and the Chachaguala Lagoon (CHA) (Fig. 1). Samples were collected at 8 different sites, 6 of which are located in the PNJK and 2 in the CHA. Sampling locations were chosen according to the heterogeneity of the habitat and for the best sampling opportunity. Table 1 shows some physical-chemical variables taken during the samplings and that characterize the sites. The two Chachaguala localities are enclosed in a bay protected by a sandy bank. The PNJK localities, such as Puerto Escondido and Puerto Caribe, are bays protected by rocky promontories, with the sites of Mohabay and Cocalito being transitional zones between the calcareous beach and the reef. The localities of the PNJK are all bordering a rocky peninsula linked to the continent through a complex tombolo.

Fourteen samplings were conducted between June and September 2015, and between April and May 2016. Sampling was carried out by two different methods: a) directly through apnea diving, and b) indirectly through the collection of preferential substrates, mainly algae, for later observation in the laboratory. The organisms were photographed, identified, measured alive, relaxed in a solution of  $MgCl_2$ , and preserved in 95% alcohol, or fixed in 4% formalin and subsequently preserved in 70% alcohol. Taxonomic identification was based on external color and morphology, using for this purpose the appropriate references, such as Valdés et al. (1996, 2006 & 2017), Padula (2008), Ornelas-Gatdula et al. (2012), Zamora-Silva & Ortigosa (2012), Camacho-García et al. (2014), Carmona et al. (2014b), Caballer et al. (2015), Goodheart et al. (2015a & 2015b), among others. The samples were deposited at the Museo de Historia Natural de la Universidad Nacional Autónoma de Honduras in San Pedro Sula city (UNAH-VS). Specimens were collected with a research permit from Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF) with resolution number MP-083-2015.

## Results

A total of 194 specimens were collected, belonging to 5 orders, 14 families and 30 species (Table 2), increasing the number of sea slugs known in the Caribbean of Honduras to 93 species. Fourteen species are new records for Honduras: *Oxynoe azuropunctata* K.R. Jensen, 1980, *Elysia cf. canguzua* Er. Marcus, 1955, *Ercolania viridis* (A.



**Figure 1.** Sampling areas. **A.** Punta Sal Peninsula, located in the PNJK. **B.** Chachaguala lagoon.

**Table 1.** Sampling localities and main characteristics.

Location name	Station code	Predominant substrate	Coordinates	Temperature (°C)	Depth (m)
<b>1. Jeannette Kawas National Park (PNJK)</b>					
Puerto Escondido	PE1	Sandy with seagrass ( <i>Thalassia testudinum</i> and <i>Halodule</i> sp)	15°54'38.13"N 87°37'48.51"W	30.95	0.80
Puerto Escondido	PE2	Rocky	15°54'39.80"N 87°37'52.29"W	30.4	1
Puerto Caribe	PC3	Rocky with seagrass ( <i>T. testudinum</i> )	15°54'47.86"N 87°37'32.04"W	31.4	1.30
Mohabay	MO4	Rubble of coral and reef	15°55'13.67"N 87°36'28.29"W	30.9	1
Cocalito	CA5	Rubble of coral and reef	15°54'42.84"N 87°37'06.16"W	31.15	1.30
Boya	BPS6	Buoy fouling located on reef	15°55'44.19"N 87°35'53.02"W	30.9	0.30
<b>2. Chachaguala Lagoon (CHA)</b>					
Hoyo	EH7	Sandy-muddy with seagrass ( <i>Halophila baillonis</i> )	15°42'49.9"N 88°06'14.26"W	31.14	120
Barra	LB8	Sandy with seagrass ( <i>H. baillonis</i> )	15°42'33.88"N 88°06'33.11"W	30.03	60

Costa, 1866), *Ercolania* cf. *fuscata* (Gould, 1870), *Placida kingstoni* T.E. Thompson, 1977, *Caliphylla mediterranea* A. Costa, 1867, *Caliphylla* sp., *Stylocheilus striatus* (Quoy & Gaimard, 1832), *Dolabrifera ascifera* (Rang, 1828), *Crosslandia* cf. *daedali* Poorman & Mulliner, 1981, *Favorinus auritulus* Er. Marcus, 1955, *Tenellia* sp., *Spurilla dupontae* Carmona, Lei, Pola, Gosliner, Valdés & Cervera, 2014, and *Spurilla* cf. *sargassicola* Bergh, 1871.

## Systematics

### CEPHALASPIDEA Fischer, 1887

Family Haminoeidae Pilsbry, 1895

#### *Haminoea elegans* (Gray, 1825)

(Fig. 3A)

#### Synonyms

*Bulla elegans* Gray, 1825; *Bulla guildingii* Swainson, 1840; *Bulla diaphana* Gould, 1852; *Haminoea taylorae* Petuch, 1987.

#### Material

CHA (EH7): 14 specimens (UVS-I 00239, UVS-I 00240, UVS-I 00242, UVS-I 00246, UVS-I 00248, UVS-I 00249, UVS-I 00251, UVS-I 00252, UVS-I 00254, UVS-I 00255, UVS-I 00256, UVS-I 00257, UVS-I 00258, UVS-I 00259), L: 10-35 mm. CHA (LB8): 1 specimen (UVS-I 00267), L: 18 mm.

#### Known distribution

EUA: Florida, Louisiana, Texas; Mexico: Veracruz, Campeche, Yucatan, Quintana Roo; Belize, Honduras, Costa Rica, Panama, Trinidad & Tobago, Colombia, Curaçao, Bonaire, Venezuela, Bermudas, Cuba, Cayman Islands, St. Croix, Virgin Islands, Martinique, St. Lucia, St. Vicente & the Grenadines, Grenada, Jamaica, Puerto Rico, St. Tomas, St. Cruz; Brazil: Alagoas (Vokes & Vokes, 1983; Valdés et al., 2006; de la Cruz & González-Gándara, 2006; Zamora-Silva & Ortigosa, 2012). Martinez & Ortea (1997) consider *H. elegans* as an amphiatlantic specie, however, this has not yet been confirmed by molecular studies.

#### *Haminoea antillarum* (d'Orbigny, 1841)

(Fig. 3B)

#### Synonyms

*Bulla antillarum* d'Orbigny, 1841; *Bulla (Haminea) cerina* Menke, 1853; *Haminea guadaloupeensis* G.B. Sowerby II, 1868.

#### Material

PNJK (CA5): 1 specimen (UVS-I 00152), L: 3 mm. Subtidal 1 m depth.

#### Known distribution

EUA: Florida, Texas; Mexico: Veracruz, Campeche, Quintana Roo; Honduras, Costa Rica, Panama, Colombia, Curaçao, Bonaire, Venezuela, Bermudas, Cuba, Cayman Islands, Jamaica, Puerto Rico, Virgin Islands, St. Cruz;

**Table 2.** List of species and presence of sea slugs recorded in the Jeannette Kawas National Park (PNJK) and the Chachaguala lagoon (CHA). Note: ° New records for Honduras (present study), + Species recorded by Valdés et al. (2006), ^ Species recorded by Charteris, 2012.

Recorded species	PNJK					CHACHAGUALA			Records
	PE1	PE2	PC3	MO4	CA5	BPS6	EH7	LB8	
<b>Cephalaspidea</b>							*	*	+
<i>Haminoea elegans</i>									
<i>Haminoea antillarum</i>					*				+
<i>Bulla occidentalis</i>	*						*		+
<i>Navanax gemmatus</i>	*		*	*	*				+
<b>Sacoglossa</b>									
<i>Oxynoe antillarum</i>		*	*						+^
<i>Oxynoe azuropunctata</i>		*	*	*					°
<i>Elysia crispata</i>			*	*	*				+^
<i>Elysia ornata</i>	*								^
<i>Elysia cf. canguzua</i>			*						°
<i>Elysia velutinus</i>			*		*				+
<i>Ercolania viridis</i>	*								°
<i>Ercolania cf. fuscata</i>	*								°
<i>Placida kingstoni</i>		*				*			°
<i>Cyerce antillensis</i>			*		*				+
<i>Caliphylla mediterranea</i>			*						°
<i>Caliphylla</i> sp.			*						°
<b>Aplysiida</b>									
<i>Aplysia dactylomela</i>			*	*	*				+^
<i>Aplysia fasciata</i>	*		*						^
<i>Bursatella leachii pleii</i>	*						*	*	^
<i>Stylocheilus striatus</i>	*								°
<i>Dolabrifera ascifera</i>				*					°
<b>Pleurobranchida</b>									
<i>Pleurobranchus areolatus</i>				*					^
<b>Nudibranchia</b>									
<i>Dendrodoris krebsii</i>				*					+^
<i>Crosslandia cf. daedali</i>						*			°
<i>Favorinus auritulus</i>	*								°
<i>Noumeaella kristenseni</i>	*								+
<i>Phidiana lynceus</i>				*					^
<i>Tenellia</i> sp.	*								°
<i>Spurilla dupontae</i>	*								°
<i>Spurilla cf. sargassicola</i>					*				°

Grenada, Guadeloupe; Brazil: Pernambuco, Rio de Janeiro, São Paulo, Rio Grande do Sul (Andrews, 1971; Ekdale, 1974; García-Cubas et al., 1990; Valdés et al., 2006; de la Cruz & González-Gándara, 2006; Rosenberg et al., 2009; Zamora-Silva & Ortigosa, 2012).

Family Bullidae Gray, 1827

***Bulla occidentalis*** A. Adams, 1850  
(Fig. 3C)

*Synonyms*

*Bulla media* Philippi, 1847; *Bulla rubiginosa* Gould, 1852; *Bulla (Bullea) nux* Menke, 1853; *Bulla (Bullea) sulcata* Menke, 1853; *Bulla amygdala* Pilsbry, 1895.

*Material*

PNJK (PE1): 1 specimen (UVS-I 00115), L: 5 mm. CHA, Hoyo (EH7): 2 specimens (UVS-I 00244, UVS-I 00253),

L: 35-40 mm. CHA (LB8): 2 specimens (UVS-I 00270, UVS-I 00271), L: 20-22 mm.

#### Known distribution

EUA: Florida, Texas; Mexico, Belize, Honduras, Costa Rica, Panama, Colombia, Bahamas, Antillas, Venezuela, Cuba, Jamaica, Puerto Rico, Virgin Islands, Barbuda, Antigua, St. Vicente & the Grenadinas, Trinidad, Surinam, Brazil and Uruguay (Valdés et al., 2006; Malaquias & Reid, 2008; Zamora-Silva & Ortigosa, 2012).

Family Aglajidae Pilsbry, 1895  
*Navanax gemmatus* (Mörch, 1863)  
 (Fig. 3D)

#### Synonyms

*Doridium gemmatum* Mörch, 1863; *Doridium punctilucens* Bergh, 1893; *Chelidonura evelinae* Er. Marcus, 1955; *Chelidonura evelinae dica* Marcus & Marcus, 1970.

#### Material

PNJK (PE1): 3 specimens (UVS-I 00122, UVS-I 00134, UVS-I 00135), L: 35-40 mm. PNJK, Puerto Caribe (PC3): 1 specimen (UVS-I 00162), L: 18mm. PNJK (MO4): 11 specimens (UVS-I 00150, UVS-I 00172, UVS-I 00173, UVS-I 00199, UVS-I 00200, UVS-I 00201, UVS-I 00202, UVS-I 00203, UVS-I 00204, UVS-I 00205, UVS-I 00206), L: 15-38 mm. PNJK (CA5): 1 specimen (UVS-I 00222), L: 5 mm.

#### Known distribution

Caribbean and Western Atlantic, from Florida to Brazil (São Paulo) (Ornelas-Gatdula et al., 2012).

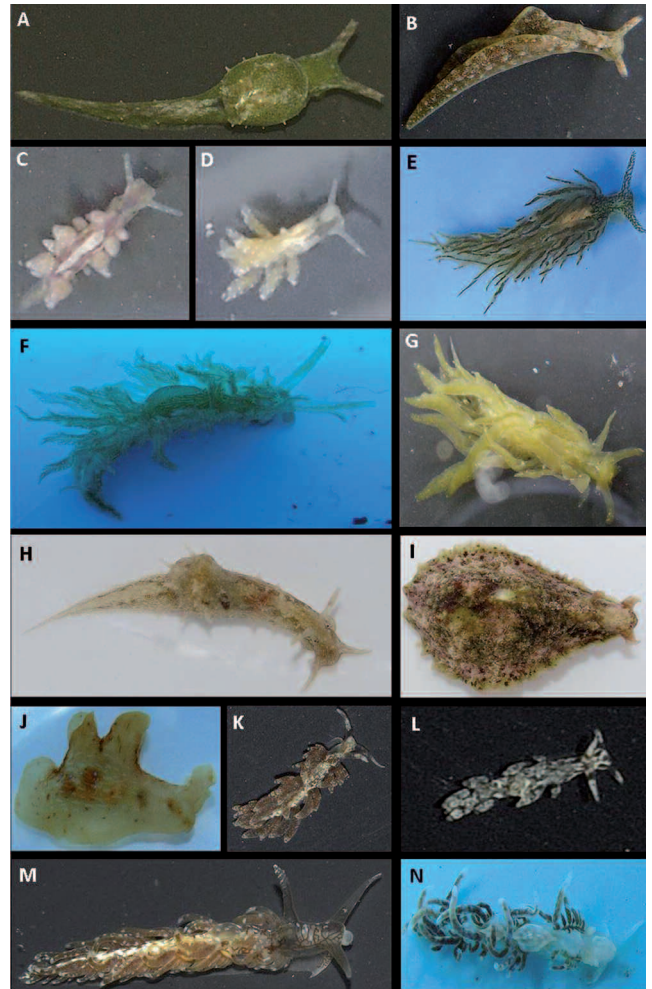
**SACOGLOSSA Von Ihenring, 1876**  
 Superfamily OXYNOOIDEA  
 Family Oxynoidae Stoliczka, 1868  
*Oxynoe antillarum* (Mörch, 1863)  
 (Fig. 2A)

#### Synonyms

*Oxynoe aguayoi* Jaume, 1945.

#### Material

PNJK (PE2): 7 specimens (UVS-I 00118, UVS-I 00120, UVS-I 00132, UVS-I 00133, UVS-I 00138, UVS-I 00140, UVS-I 00142), L: 10-20 mm. PNJK (PC3): 2 specimens (UVS-I 00220, UVS-I 00224), L: 6 mm. On *Caulerpa racemosa* (Forsskål) J.Agardh, 1873.



**Figure 2.** New records of sea slugs in the PNJK. **A.** *Oxynoe antillarum* (UVS-I 00132, L: 12 mm). **B.** *Elysia* cf. *canguzua* (UVS-I 00232, L: 8 mm). **C.** *Ercolania viridis* (UVS-I 00178, L: 3 mm). **D.** *Ercolania* cf. *fuscata* (UVS-I 00179, L: 3mm) **E.** *Placida kingstoni* (UVS-I 00212, L: 7 mm). **F.** *Caliphylla mediterranea*. **G.** *Caliphylla* sp. **H.** *Stylocheilus striatus* (UVS-I 00123, L: 27 mm). **I.** *Dolabrifera ascifera* (UVS-I 00166, L: 30 mm). **J.** *Crosslandia* cf. *daedali*. **K.** *Favorinus auritulus* (UVS-I 00130, L: 10 mm). **L.** *Tenellia* sp. **M.** *Spurilla dupontae*. **N.** *Spurilla* cf. *sargassicola*.

#### Known distribution

Caribbean and from Florida to Brazil (São Paulo) (Valdés et al., 2006; Padula, 2008).

*Oxynoe azuropunctata* K.R. Jensen, 1980  
 (Fig. 3E)

#### Material

PNJK (PE2): 2 specimens (UVS-I 00131, UVS-I 00139), L: 7-15 mm. PNJK, Puerto Caribe (PC3): 10 specimens

(UVS-I 00091, UVS-I 00105, UVS-I 00191, UVS-I 00192, UVS-I 00218, UVS-I 00219, UVS-I 00221, UVS-I 00225, UVS-I 00226, UVS-I 00227), L: 3-20 mm. PNJK (MO4): 2 specimens (UVS-I 00101, UVS-I 00171), L: 3-20. On *C. racemosa*.

#### Known distribution

Florida, Belize, Bahamas, Puerto Rico, Virgin Islands (Valdés et al., 2006).

Superfamily PLAKOBRANCHOIDEA Gray, 1840

Family Plakobranchidae Gray, 1840

*Elysia crispata* Mörch, 1863

(Fig 3F)

#### Synonyms

*Elysia (Tridachia) crispata* Mörch, 1863; *Tridachia schrammi* (Mörch, 1863); *Elysia verrilli* Pruvot-Fol, 1946; *Elysia (Elysiopterus) pruvotfolae* Er. Marcus, 1957; *Tridachia whiteae* Er. Marcus, 1957; *Elysia clarki* Pierce, Curtis, Massey, Bass, Karl & Finney., 2006.

#### Material

PNJK (MO4): 9 specimens (UVS-I 00092, UVS-I 00093, UVS-I 00116, UVS-I 00167, UVS-I 00170, UVS-I 00174, UVS-I 00190, UVS-I 00195, UVS-I 00197), L: 15-50 mm. PNJK (PC3): 14 specimens (UVS-I 00094, UVS-I 00095, UVS-I 00096, UVS-I 00097, UVS-I 00098, UVS-I 00106, UVS-I 00107, UVS-I 00108, UVS-I 00109, UVS-I 00110, UVS-I 00111, UVS-I 00161, UVS-I 00164, UVS-I 00184), L: 30-55 mm. PNJK (CA5): 1 specimen (UVS-I 00148), L: 30 mm.

#### Known distribution

Western Atlantic and Caribbean sea (Valdés et al., 2006; de la Cruz-Francisco & González-Gándara, 2006; Zamora & Ortigosa, 2012; Krug et al., 2016).

*Elysia ornata* (Swainson, 1840)

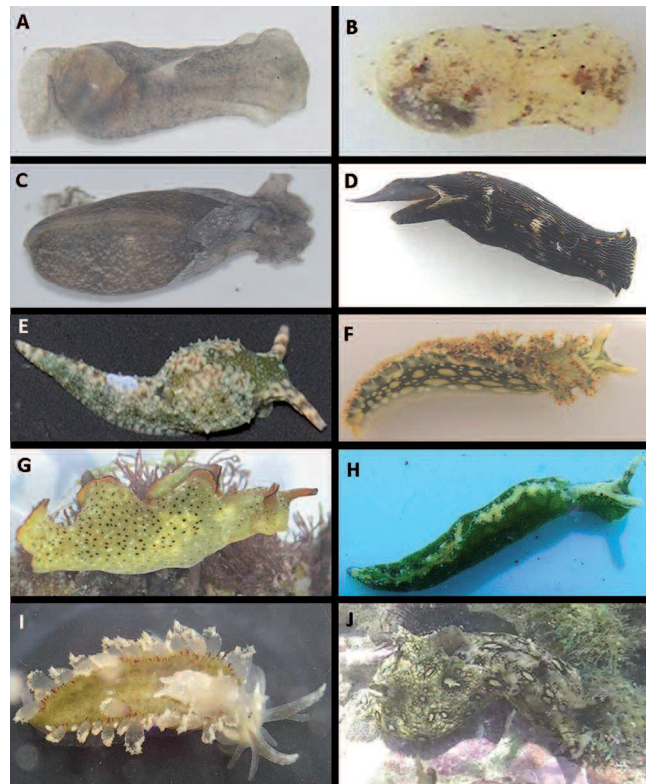
(Fig. 3G)

#### Synonyms

*Thallepous ornatus* Swainson, 1840; *Pterogasteron marginatum* Pease, 1871.

#### Material

PNJK (PE1): 3 specimens (UVS-I 00102, UVS-I 00119, UVS-I 00141), L: 25 mm. On *C. racemosa* and on *Bryopsis plumosa* (Hudson) C.Agardh, 1823.



**Figure 3.** Some of the species found in the PNJK and the Chachaguala lagoon. **A.** *Haminoea elegans* (UVS-I 00248, L: 25 mm). **B.** Juvenile of *Haminoea antillarum* (UVS-I 00152, L: 3 mm). **C.** *Bulla occidentalis* (UVS-I 00244, L: 40 mm). **D.** *Navanax gemmatus*. UVS-I 00172, L: 15 mm. **E.** *Oxynoe azuropunctata* (UVS-I 00131, 15 mm). **F.** *Elysia crispata* (UVS-I 00174, L: 40 mm). **G.** *Elysia ornata* (UVS-I 00119, L: 25 mm). **H.** *Elysia velutinus* (UVS-I 00223, L: 10mm). **I.** *Cyerce antillensis* (UVS-I 00233, L: 15 mm). **J.** *Aplysia dactylomela* (UVS-I 00168, L: 90 mm).

#### Known distribution

Circumtropical and the Western Atlantic (Valdés et al., 2006), Discovery Bay (Jamaica) (Krug et al., 2016) and Azores (Borges et al., 2010).

*Elysia cf. canguzua* Er. Marcus, 1955

(Fig. 2B)

#### Synonyms

*Elysia purchoni* Thompson, 1977; *Elysia eugeniae* Ortea & Espinosa, 2002.

#### Material

PNJK (PC3): 1 specimen (UVS-I 00232), L: 8 mm. On *Dictyota* sp.

*Morphological comments*

Body translucent, with a dark green color given by the numerous dark green internal and external specks. Internally, orange spots throughout the body that extend to the end of the rhinophores. External red dots throughout the body give a velvety look. White spots formed by small ones on the sides. A transparent strip goes from the pericardium to the end of the body. No blue dots have been observed and due to the absence of this characteristic, until molecular studies can be carried out, we consider it more prudent to leave the species under a status “to be confirmed”.

*Known distribution*

Florida, Costa Rica, Brazil (São Paulo) (Valdés et al., 2006; Krug et al., 2016).

*Elysia velutinus* Pruvot-Fol, 1947  
(Fig. 3H)

*Material*

PNJK (CA5): 5 specimens (UVS-I 00153, UVS-I 00223, UVS-I 00234, UVS-I 00235, UVS-I 00236), L: 3-10 mm. PNJK (PC3): 1 specimen (UVS-I 00238), L: 8 mm. On *Dictyota* sp.

*Morphological comments*

Body green with small and darker dots green and brown. Opaque white band and something bright from the end of the rhinophores, passing the edge of the parapodia to the end of the body.

*Known distribution*

From Florida to Brazil (Valdés et al., 2006; Camacho-García et al., 2014).

Superfamily LIMAPONTIOIDEA Gray, 1847  
Family Limapontiidae Gray, 1847  
*Ercolania viridis* (A. Costa, 1866)  
(Fig. 2C)

*Synonyms*

*Embletonia viridis*, A. Costa, 1866; *Embletonia nigrovittata* A. Costa, 1866; *Embletonia funerea* A. Costa, 1867; *Ercolania pancerii* Trinchese, 1872.

*Material*

PNJK (PE1): 8 specimens (UVS-I 00144, UVS-I 00178, UVS-I 00207, UVS-I 00181, UVS-I 00182, UVS-I 00208, UVS-I 00209, UVS-I 00210), L: 2-4 mm.

*Known distribution*

North Carolina, Florida, Costa Rica, Cayman Islands, Puerto Rico, Jamaica, Virgin Islands, Bermuda, Brazil (Valdés et al., 2006) and Cabo Verde (Rolán, 2005).

*Ercolania* cf. *fuscata* (Gould, 1870)  
(Fig. 2D)

*Synonyms*

*Stiliger fuscatus* Gould, 1870; *Stiliger vanellus* Er. Marcus, 1957.

*Material*

PNJK (PE2): 3 specimens (UVS-I 00114, UVS-I 00179, UVS-I 00211), L: 2-3 mm.

*Morphological comments*

Body fully translucent, with internal dark brown spots along the back, from the front to the end. Cerata externally covered with small bright white spots. Due to lighter tone as compared to *Ercolania fuscata*, we considered to leave the specimens under a status “to be confirmed”.

*Known distribution*

Nova Scotia, New Hampshire, Massachusetts, New York, New Jersey, Virginia, Florida, Curaçao, Jamaica, Puerto Rico, Brazil (Valdés et al., 2006).

*Placida kingstoni* T.E. Thompson, 1977  
(Fig. 2E)

*Synonyms*

*Hermaea kingstoni* (T.E. Thompson, 1977)

*Material*

PNJK (BPS6): 1 specimen (UVS-I 00099), L: 4 mm. PNJK (PE2): 5 specimens (UVS-I 00212, UVS-I 00213, UVS-I 00214, UVS-I 00215, UVS-I 00216), L: 5-7 mm. The specimen UVS-I 00099 was found on a biofouling community growing in a diving buoy, and composed of the bivalves *Pteria*, *Mytilus*, and *Crassostrea*, as well as tubeworms, cirripeds, and algae such as *Bryopsis plumosa*.

*Known distribution*

Florida, Costa Rica, Jamaica, Martinique, Bermudas (Valdés et al., 2006).

Family Caliphyllidae Tiberi, 1881  
*Cyerce antillensis* Engel, 1927  
(Fig. 3I)

*Synonyms*

*Cyerce habanensis* Ortea & Templado, 1988.

*Material*

PNJK (PC3): 2 specimens (UVS-I 00233, UVS-I 00237), L: 10-15 mm. PNJK (CA5): 1 specimen (UVS-I 00228), L: 7 mm. On *Laurencia papillosa* (C.Agardh) Greville, 1830.

*Known distribution*

Florida, Mexico, Belize, Honduras, Costa Rica, Curaçao, Bermuda, Cayman Islands, Cuba, Bahamas, Jamaica, Puerto Rico, Virgin Islands, Barbados and Tobago (Valdés et al., 2006; Camacho-García et al., 2014) and Azores (Borges et al., 2010).

***Caliphylla mediterranea*** A. Costa, 1867  
(Fig. 2F)

*Synonyms*

*Beccaria tricolor* Trinchese, 1870

*Material*

PNJK (PC3): 1 specimen (UVS-I 00230), L: 18 mm. Subtidal 1-2 m depth, on *Bryopsis plumosa*.

*Known distribution*

Amphiatlantic distribution. However, a comparison of material from both sides of the Atlantic will be necessary in order to confirm the status of this specie. West Atlantic: From Florida to Brazil (Valdés et al., 2006).

***Caliphylla*** sp.  
(Fig. 2G)

*Material*

PNJK (PC3): 1 specimen (UVS-I 00231), L: 16 mm. On *B. plumosa*.

*Morphological comments*

Body of translucent light green color. Pulsating pericardium transparent greenish. White content inside the back from the head to the end of the body. Small bright white motes throughout the body. Cerata elongated, some exceeding body length. Thin tail, sometimes looking like hook-shaped. A reticular formation can be observed throughout the body. Bifurcate rhinophores. The main difference between this species and *Caliphylla mediterranea* is the elongated shape of the cerata (Valdés et al., 2006; Camacho-García et al., 2014).

*Known distribution*

This species is reported from Tobago and Costa Rica (Valdés et al. 2006; Camacho-García et al., 2014). According to these authors, this is probably an undescribed species.

**APLYSIIDA Lamarck, 1809**

Family Aplysiidae Lamarck, 1809

***Aplysia dactylomela*** Rang, 1828  
(Fig. 3J)

*Synonyms*

*Tethys dactylomela* Rang, 1828; *Aplysia protea* Rang, 1828; *Aplysia tigrina* Rang, 1828; *Aplysia radiata* Ehrenberg, 1831; *Aplysia scutellata* Ehrenberg, 1831; *Aplysia ocellata* d'Orbigni, 1839; *Aplysia fimbriata* Adams & Reeve, 1850; *Aplysia schrammi* Deshayes, 1857; *Syphonota viridescens* Pease, 1868; *Aplysia angasi* Sowerby II, 1869; *Aplysia aequorea* Heilprin, 1888; *Tethys panamensis* Pilsbry, 1895; *Aplysia benedicti* Eliot, 1899; *Aplysia megaptera* A.E. Verrill, 1900; *Tethys megaptera* A.E. Verrill, 1900; *Aplysia velifer* Bergh, 1905; *Aplysia operta* Burne, 1906; *Aplysia odorata* Risbec, 1928; *Aplysia annulifera* Thiele, 1930; *Aplysia bourailli* Risbec, 1951.

*Material*

PNJK (PC3): 1 specimen (UVS-I 00163), L: 70 mm. PNJK (MO4): 1 specimen (UVS-I 00168), L: 90 mm. PNJK (CA5): 1 specimen (UVS-I 00149), L: 30 mm.

*Known distribution*

Western Atlantic from Florida to Brazil, Eastern Atlantic and the Mediterranean sea (Valdés et al., 2006; Zamora-Silva & Ortigosa, 2012; Alexander & Valdés, 2013, Valdés et al., 2013).

***Aplysia fasciata*** Poirret, 1789  
(Fig. 4A)

*Synonyms*

*Aplysia brasiliiana* Rang, 1828; *Aplysia gracilis* Eales, 1960; *Aplysia lobiancoi* Mazzarelli, 1890; *Aplysia marmorata* Blainville, 1823; *Aplysia neapolitana* Delle Chiaje, 1824; *Aplysia radiata* Crouch, 1826; *Aplysia vulgaris* Blainville, 1823; *Aplysia willcoxi* Heilprin, 1887; *Aplysia winneba* Eales, 1957; *Laplysia alba* Cuvier, 1803; *Laplysia camelus* Cuvier, 1803; *Laplysia fasciata* Poirret, 1789.

*Material*

PNJK (PE1): 1 specimen (UVS-I 00121), L: 23 mm. PNJK (PC3): 2 specimens (UVS-I 00103, UVS-I 00104), L: 80



mm. Subtidal 1-2 m. The specimen of PE1, was on *Hypnea* sp.

#### Known distribution

Temperate and tropical Atlantic, and from France to Angola (Rolán, 2005; Valdés et al., 2006).

#### ***Bursatella leachii pleii*** (Rang, 1828) (Fig. 4B)

#### Synonyms

*Bursatella lacinulata* Gould, 1852; *Aclesia africana* Engel, 1926; *Aclesia glauca* Cheeseman, 1879; *Aclesia ocelligera* Bergh, 1902; *Aclesia rosea* Engel, 1926; *Aplysia bursatella* Rang, 1834; *Notarchus brevipes* Hägg, 1904; *Notarchus cirrosus* Stimpson, 1855; *Notarchus intrapictus* Cockerell, 1893; *Notarchus laciniatus* Rüppell & Leuckart, 1830; *Notarchus leachii* (Blainville, 1817); *Notarchus villosus* O'Donoghue, 1929; *Ramosaclesia rex* Allan, 1932.

#### Material

CHA (EH7): 5 specimens (UVS-I 00241, UVS-I 00243, UVS-I 00245, UVS-I 00247, UVS-I 00250), L: 6-18 mm. CHA (LB8): 23 specimens (UVS-I 00261, UVS-I 00262, UVS-I 00263, UVS-I 00264, UVS-I 00265, UVS-I 00266, UVS-I 00268, UVS-I 00269, UVS-I 00272, UVS-I 00273, UVS-I 00274, UVS-I 00275, UVS-I 00276, UVS-I 00277, UVS-I 00278, UVS-I 00279, UVS-I 00280, UVS-I 00281, UVS-I 00282, UVS-I 00283, UVS-I 00284, UVS-I 00285, UVS-I 00286), L: 18-95 mm. PNJK (PE1): 11 specimens (UVS-I 00154, UVS-I 00155, UVS-I 00156, UVS-I 00157, UVS-I 00158, UVS-I 00159, UVS-I 00160, UVS-I 00176, UVS-I 00177, UVS-I 00180, UVS-I 00188), L: 45-90 mm. Material referring to the morphotype (Fig. 4.C): CHA (LB8): 1 specimen (UVS-I 00260), L: 65 mm. PNJK (PE1): 2 specimens (UVS-I 00183, UVS-I 00185), L: 65-80 mm.

#### Known distribution

Circumtropical region (Valdés et al., 2006) and some subtropical and temperate regions. Reported in the Mediterranean sea for its introduction through the Suez Canal. Invasive in the Mediterranean sea (Ibáñez-Yuste et al., 2012; Özvarol, 2014; González-Wangüemert et al., 2014).

#### Remarks

Aggregations of individuals were observed in CHA and PNJK (PE1), showing active detritivore feeding behavior from mid-May to the end of August. This type of behavior has already been observed in New Zealand, Australia, Turkey, Italy, Malta, Spain and Puerto Rico (Ramos et al.,

1995; Zenetos et al., 2004; Ibáñez-Yuste et al., 2012; Özvarol, 2014; González-Wangüemert et al., 2014). This feeding behavior is also reported for a morphotype found in the aggregation areas of *B. leachii pleii* of CHA and PNJK, which stands out from the rest due to its black and light mottled color.

#### ***Stylocheilus striatus*** (Quoy & Gaimard, 1832) (Fig. 2H)

#### Synonyms

*Aplysia striata* Quoy & Gaimard, 1832; *Notarchus polyomma* Mörch, 1863; *Aclesia polyomma* Mörch, 1863.

#### Material

PNJK (PE1): 10 specimens (UVS-I 00113, UVS-I 00123, UVS-I 00124, UVS-I 00125, UVS-I 00126, UVS-I 00127, UVS-I 00128, UVS-I 00129, UVS-I 00136, UVS-I 00175), L: 8-27 mm. On *Hypnea* sp.

#### Known distribution

Cosmopolitan, Western Atlantic (from Florida to Brazil), including the Caribbean sea (Rolán, 2005; Valdés et al., 2006; Zamora-Silva & Ortigosa, 2012).

#### ***Dolabrifera ascifera*** (Rang, 1828) (Fig. 2I)

#### Synonyms

*Aplysia ascifera* Rang, 1828; *Aplysia dolabrifera* Rang, 1828; *Dolabrifera cuvieri* H.A. Adams, 1854; *Dolabrifera maillardii* Deshayes, 1863; *Dolabrifera sowerbyi* Reeve, 1868; *Dolabrifera nicaraguana* Pilsbry, 1896; *Dolabrifera swiftii* Pilsbry, 1896; *Dolabrifera virens* A.E. Verrill, 1901.

#### Material

PNJK (MO4): 3 specimens (UVS-I 00166, UVS-I 00196, UVS-I 00198), L: 30-50 mm.

#### Known distribution

Western Atlantic, from Florida to possibly Brazil (Mexico, Jamaica, Venezuela, Florida, US Virgin Islands and French Guiana) (Valdés et al., 2017).

#### **NUDIPLEURA Wägele & Willan, 2000** PLEUROBRANCHIDA Pelseneer, 1906 Family Pleurobranchidae Gray, 1827 ***Pleurobranchus areolatus*** Mörch, 1863 (Fig. 3D)

*Synonyms*

*Pleurobranchus atlanticus* Abbott, 1949; *Pleurobranchus crossei* Vayssière, 1896; *Pleurobranchus evelinae* Thompson, 1977; *Susania gardineri* White, 1952; *Pleurobranchus reesi* White, 1952; *Pleurobranchus emys* Ev. Marcus, 1984.

*Material*

PNJK (MO4): 2 specimens (UVS-I 00165, UVS-I 00169), L: 4-38-mm.

*Known distribution*

Venezuela, Jamaica, St Thomas, Aruba, St Martin, Brazil, Panama, Mexico, Costa Rica, Bahamas, Puerto Rico and Bermuda (Valdés et al., 2006; Goodheart et al., 2015a & b).

*Remarks*

Recent molecular and morphological studies conducted by Goodheart et al. (2015a & b) indicated that the names *Pleurobranchus crossei*, *Pleurobranchus evelinae* and *P. areolatus* correspond to individuals with different chromatic patterns of the same species.

**NUDIBRANCHIA Blainville, 1814**

DORIDINA Odhner, 1934

Family Dendrodorididae O'Donoghue, 1924

*Dendrodoris krebsii* (Mörch, 1863)

(Fig. 4E)

*Synonyms*

*Doris krebsii* Mörch, 1863; *Doridopsis subpellucida* Abraham, 1877; *Doridopsis atropos* Bergh, 1879; *Doridopsis krebsi pallida* Bergh, 1879.

*Material*

PNJK (MO4): 4 specimens (UVS-I 00100, UVS-I 00117, UVS-I 00151, UVS-I 00189), L: 55-60 mm.

*Known distribution*

From Georgia to Brazil (Valdés et al., 1996 & 2006).

**CLADOBRANCHIA Willan & Morton, 1984**

Superfamily DENDRONOTOIDEA Allman, 1845

Family Scyllaeidae Alder & Hancock, 1855

*Crosslandia* cf. *daedali* Poorman & Mulliner, 1981

(Fig. 2J)

*Material*

PNJK (BPS6): 1 specimen (UVS-I 00193, L: 25 mm). In dive buoy biofouling.

*Morphological comments*

Body translucent with greenish-brown coloration. Under the dissecting microscope, it was possible to observe the whole body covered with a kind of very fine and translucent fluff. A line of bright blue spots on both sides of the body. Interior with some vesicles with a brownish content.

*Known distribution*

In the Eastern Pacific, from Baja California to Costa Rica (Camacho-García et al., 2005); Western Atlantic (Costa Rica) (Valdés et al., 2006). We agree with the provisional identification of this species by Valdés et al. (2006) in Manzanillo (Costa Rica), although comparative molecular studies of Caribbean material attributed to *C. daedali* should be carried out.

Superfamily AEOLIDIOIDEA, Gray, 1827

Family Facelinidae Bergh, 1889

*Favorinus auritulus* Er. Marcus, 1955

(Fig. 2K)

*Material*

PNJK (PE1): 5 specimens (UVS-I 00112, UVS-I 00130, UVS-I 00145, UVS-I 00187, UVS-I 00217), L: 1-10 mm.

*Known distribution*

From Florida to Brazil (Valdés et al., 2006).

*Noumeaella kristenseni* (Ev. Marcus & Er. Marcus, 1963)

(Fig. 4F)

*Synonyms*

*Mordilla kristenseni* Ev. Marcus & Marcus, 1963.

*Material*

PNJK (PE1): 1 specimen (UVS-I 00186), L: 9 mm.

*Known distribution*

According to Valdés et al. (2006), it has only been registered in Florida and Honduras.

*Phidiana lynceus* Bergh, 1867

(Fig. 4G)

*Synonyms*

*Phidiana selenciae* Bergh, 1879; *Phidiana brevicauda* Engel, 1925.

*Material*

PNJK (MO4): 1 specimen (UVS-I 00194), L: 13 mm.

*Known distribution*

Pacific ocean; Eastern Atlantic: Ghana and Canary Islands; Western Atlantic: Florida, Mexico (coast of Yucatán and Veracruz), Costa Rica, Colombia, Venezuela, Bahamas, Jamaica, Virgin Islands, St. Martin, Guadeloupe, Martinique, St. Lucia, St. Vincent and the Grenadines, Barbados, Curaçao, Aruba, Bonaire and Brazil (Keen, 1971; Bertsch, 1979; Skoglund, 2002; Valdés et al., 2006; García-García et al., 2009; Sanvicente-Añorve et al., 2012; Padula et al., 2012; Vital et al., 2015).

Family Fionidae Gray, 1857

*Tenellia* sp.  
(Fig. 2L)

*Material*

PNJK (PE1): 1 specimen (UVS-I 00143), L: 3 mm.

*Morphological comments*

Body elongated and translucent, with white and grayish pigmentation on the back. Opaque white pigmentation in the anterior dorsal part, between the rhinophores and the labial palps. The latter, elongated and translucent with white coloration from the middle towards the ends. Cerata elongated, thicker in the middle and narrow at the ends, translucent with a white band in half.

*Remarks*

The specimen does not coincide exactly with any of the specimens described for the Caribbean.

Family Aeolidiidae Gray, 1827

*Spurilla dupontae* Carmona, Lei, Pola, Gosliner, Valdés & Cervera, 2014  
(Fig. 2M)

*Material*

PNJK (PE1): 1 specimen (UVS-I 00137), L: 17 mm.

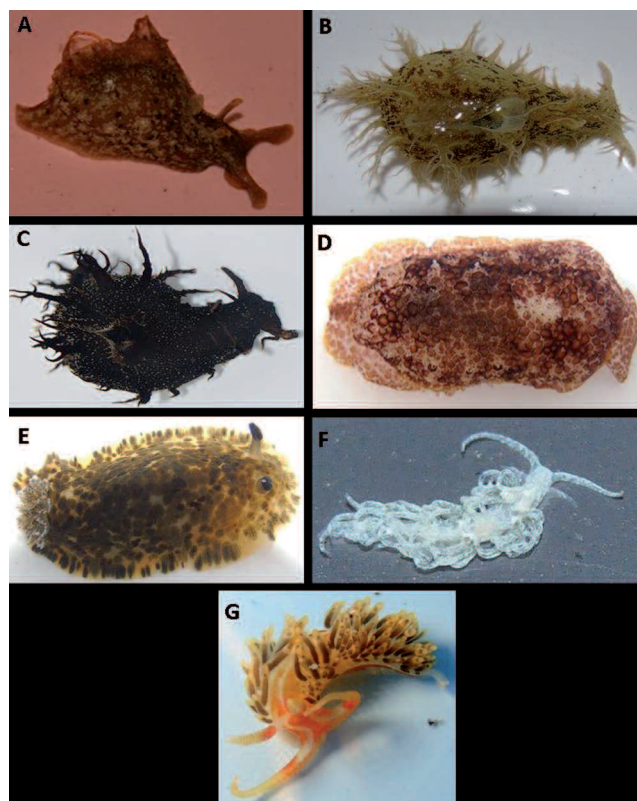
*Known distribution*

Only reported for Stocking Island, Bahamas (Carmona et al., 2014b).

*Spurilla* cf. *sargassicola* Bergh, 1871  
(Fig. 2N)

*Material*

PNJK (CA5): 1 specimen (UVS-I 00229), L: 10 mm.



**Figure 4.** Some of the species found in the PNJK and the Chachagualla lagoon. **A.** *Aplysia fasciata* (UVS-I 00121, L: 23 mm). **B.** *Bursatella leachii pleii* (UVS-I 00160, L: 62 mm). **C.** *Bursatella leachii pleii*, Morphotype (UVS-I 00260, L: 65 mm). **D.** *Pleurobranchus areolatus* (UVS-I 00165, L: 38 mm). **E.** *Dendrodoris krebsii* (UVS-I 00189, L: 55 mm). **F.** *Noumeaella kristenseni* (UVS-I 00186, L: 9 mm). **G.** *Phidiana lynceus* (UVS-I 00194, L: 13 mm).

*Morphological comments*

Body light brown in color almost salmon, with a velvety aspect. Body covered with transparent and bright white flecks, extending along the surface of the cerata. Dorsum opaque white along the back from the front to the end, wider in the middle section where cerata are absent. Cerata curled, with a dark brown color. Ringed rhinophores, with 10 lamellae. Since our specimen lacks the brownish/greenish inner reticulation described by Carmona et al. (2014b) for *S. sargassicola*, further material and molecular studies would be needed in order to confirm its taxonomic status.

*Known distribution*

Bahamas, Sargasso Sea and México (Sanvicente-Añorve et al., 2012; Carmona et al., 2014b).

## Discussion

A total of 79 species of “sea slugs” have been reported so far for Honduras by Valdés et al. (2006) and Charteris (2012). In the present study we report a total of 30 species, 14 of which are new records for Honduras. Thus, the general knowledge for the Caribbean side of the country is extended to 93 species. In comparison with the species of “sea slugs” found in other countries of Central America, 72 for the Caribbean coast of Costa Rica (Camacho-García et al., 2014), and 82 for Bocas del Toro, Panama, (Goodheart et al., 2016), 13 species of the 30 found in this study are not reported in these previous works for this region. These species are: *Bulla occidentalis*, *Oxynoe azuropunctata*, *Elysia velutinus*, *Ercolania viridis*, *Ercolania* cf. *fuscata*, *Caliphylla* sp., *Aplysia fasciata*, *Crosslandia* cf. *daedali*, *Favorinus auritulus*, *Noumeaella kristenseni*, *Tenellia* sp., *Spurilla dupontae*, *Spurilla* cf. *sargassicola*. Some of these species, like *Crosslandia* cf. *daedali*, *Spurilla dupontae* and *Caliphylla* sp., have been reported in a few sites of the Mesoamerican region and the Caribbean. Therefore, our records extend their distribution range in this region. However, further anatomical and molecular studies of *C.* cf. *daedali*, including *C. mediterranea*, will be necessary to confirm the amphiatlantic distribution of this species. Similar studies are also required to better assess the status of the particular morphotype of *B. leachii pleii* that was found in aggregations in Puerto Escondido and Chachaguala Lagoon, and which stands out from the rest of individuals due to its black and light mottled color.

Based on the total number of marine heterobranch mollusks in the Caribbean, of the 340 species reported by Valdés et al. (2006), Camacho-García et al. (2014), Carmona et al. (2014b), Goodheart et al. (2015a & 2016) and Krug et al. (2016), Honduras currently has 93 species, i.e. 27.35%. This percentage however does not correspond to the biodiversity of the entire Caribbean coast of the country, given that only the Bay Islands National Marine Park, PNJK and the Chachaguala lagoon have been explored so far. Therefore, it is necessary to expand the exploration to more areas of both the Caribbean and Pacific (Gulf of Fonseca) coasts of Honduras. More sampling efforts are necessary in order to increase the actual number of species recorded in the country, as well as further, molecular and anatomical studies of some of the species reported here to confirm their taxonomic status.

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