

Association between the polynoid *Malmgreniella variegata* (Polychaeta: Polynoidae) and *Ophionereis reticulata* (Ophiuroidea: Ophionereididae) first record to the Southeastern Caribbean

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Abstract: The worms *Malmgreniella variegata* has been found as commensal of *Ophionereis reticulata* in Florida and Belize. Here we report the association in Playa Piscina (Arapo Islands), Venezuela. Rev. Biol. Trop. 65(Suppl. 1): S85-S91. Epub 2017 November 01.

Key words: Commensalism; Scale-worm; Symbiosis; Ophiuroidea; Venezuela.

There are numerous interactions in which polychaetes are involved; more than 290 species of these annelids, belonging to 28 families, have been referred by about 700 commensal relationships with various taxa as echinoderms (36%), cnidarians (20%), polychaetes (17%), crustaceans (13%), mollusks (7%), sponges (6%), while in the other interactions (2%) involves nematodes, nemertean, echiurids, sipunculids, bryozoans, foraminifera and balanoglossids, among others (Martin & Britayev, 1998). Polynoidae family has the largest number of commensal species (55%), and has been referred by Fauchald & Jumars (1979) as a normal way of life. Many polynoid polychaetes have been reported living in close associations with other marine animals, including ophiuroids echinoderms (Millott 1953; Spooner, Wilson & Tebble 1957; Devaney 1967, 1974; Gibbs 1969, 1971, 1972; Weston 1984; Pettibone 1993; de Santa-Isabel, Pinto-Cerqueira & Souza-Alves, 1996; Granja-Fernández, Hernández-Moreno, & Bastida-Zavala, 2013). In the Caribbean Sea, this relationship between *Malmgreniella variegata* (Treadwell, 1917) and *Ophionereis reticulata* (Say, 1825), has

been recorded by Pettibone (Florida y Belize) but has never been registered for Venezuela and the southern Great Caribbean.

MATERIALS AND METHODS

This work is part of a study on the biodiversity of echinoderms of the northeastern region of Venezuela that has been done since 2014, covering eight localities from states Sucre: Quetepe (10°26'16"N - 64°01'39"W); Tunantal (10°26'39"N - 64°59'59"W); Turpialito (10°26'40"N 64°01'58"W) (Gulf of Cariaco), and Arapo island (10°15'44"N - 64°28'49"W) and Larga islands (10°21'23"N - 64°20'59"W) (Mochima National Park) and Nueva Esparta: Cubagua (10°48'14"N - 64°13'00"W) and Margarita Islands (10°57'48"N . 64°10'46"W) and Los Roques Archipelago (11°45'59"N66°36'10"W). The sampling was carried out by snorkeling in dead and live *Millepora alcicornis* Linnaeus, 1758 (Cnidaria: Hydrozoa) colonies and rocks, from 0 to 3 m depth. When the associated polynoids-ophiuroids were detected, the organisms

were carefully placed in plastic bags and transported in containers with cold seawater to the Laboratorio de Biología de Poliquetos-Instituto Oceanográfico de Venezuela. The relaxation, fixation, preservation and study of polynoids were performed according to the methodology described by Liñero-Arana & Díaz-Díaz (2011), the polychaetes specimens were identified using the Pettibone (1993) and Salazar-Silva (2006) identification keys. Ophiuroid specimens were identified according to Fell (1960) and Hendler, Miller, Pawson & Kier (1995). The ophiuroids and polynoids were deposited in the Colección de Referencia del Laboratorio de Biología de Poliquetos-Instituto Oceanográfico de Venezuela, Cumaná, Venezuela.

RESULTS

Two specimens of polychaetes identified as *Malmgreniella variegata* (Treadwell, 1917) were found associated with two specimens of the ophiuroid *Ophionereis reticulata* (Say, 1825). The association was found just in one of a total of eight localities of study. *Malmgreniella variegata* is a new record for Venezuela.

Family Polynoidae Kinberg, 1856

Genus *Malmgreniella* Hartman, 1967

Malmgreniella variegata (Treadwell, 1917)

Figures 1a-i, 2

Harmothoe variegata Treadwell, 1917:260, pi. 1: Figs. 17, 18; pi. 2: Figs. 1-3; Hartman, 1956: 251, 265, 273.

Paralepidonotus boholensis var. *curacaoensis* Horst, 1922:198.

Malmgrenia curacaoensis. Augener, 1927:45, fig. 2A-D; Kudenov, 1975:79.

Harmothoe lunulata. Millott, 1953:96, figs. 1, 2 [not Delle Chiaje, 1830].

Harmothoe sp. Hartley, 1987:156.

Malmgreniella variegata Pettibone 1993: 45-49, Figs. 28-31; de Santa Isabel et al. 1996: 137-142, Figs. 1-11; Martin & Britayev,

1998; 16, Fig. 6E; Fauchald, Granados-Barba & Solís-Weiss, 2009: 768; Salazar-Silva 2009: 458, 469, Fig. 4B; Hernández-Alcántara, Cortés-Solano, Medina-Cantú, Avilés-Díaz & Solís-Weiss, 2014: 100.

Material examined. Two specimens on *Ophionereis reticulata* from Playa Piscina, Arapo Islands (10°12'44"N-64°28'45"W), Sucre State, Venezuela (0 to 3 m depth).

Description. Two specimens complete, 14 and 18 mm long, 5 and 4 mm wide including chaetae, with 28 and 37 segments; 14 and 15 pairs of elytrae (Fig. 1a), respectively. Body elongated, flattened, broadest at midlength, gradually tapering posteriorly (Fig. 1a). Dorsum unpigmented anteriorly, posterior third with transverse diamond-shaped bands on each segment. Ventral surface with a medial longitudinal dark stripes and dark spots on each segment to bases of parapodia (Fig. 1b-c); and anteriorly on upper, lateral, and posterior lips of ventral mouth (Fig. 1b-c). Transverse ciliated bands on dorsum, two per segment, between elytophores and dorsal tubercles. Fifteen pairs of elytra, oval, without tubercles nor papillae, with microtubercles near anterior borders, absent on first and some posterior elytra, with densely pigmented in some areas, extending medially to large semilunar pigmented regions and near lateral borders (Figs. 1d-e); these covering dorsum except for few posterior segments. Prostomium bilobed with anterior lobes truncate finely speckled with brown pigment, usually more dense along posterior margin; anterior lobes triangular, lacking distinct peaks; with two pairs of small, dark eyes, anterior pair just anterior to widest part of prostomium, posterior pair near posterior border. Ceratophores of lateral antennae inserted ventrally; styles subulate, with filiform tips. Ceratophore of median antenna inserted ventrally (Fig. 1f), converging midventrally and with ciliated ridge on ventral side, and short styles; Palps smooth, evenly tapering, 2-3 times as long as prostomium with longitudinal rows of minute papillae; tentaculophores each with small projecting

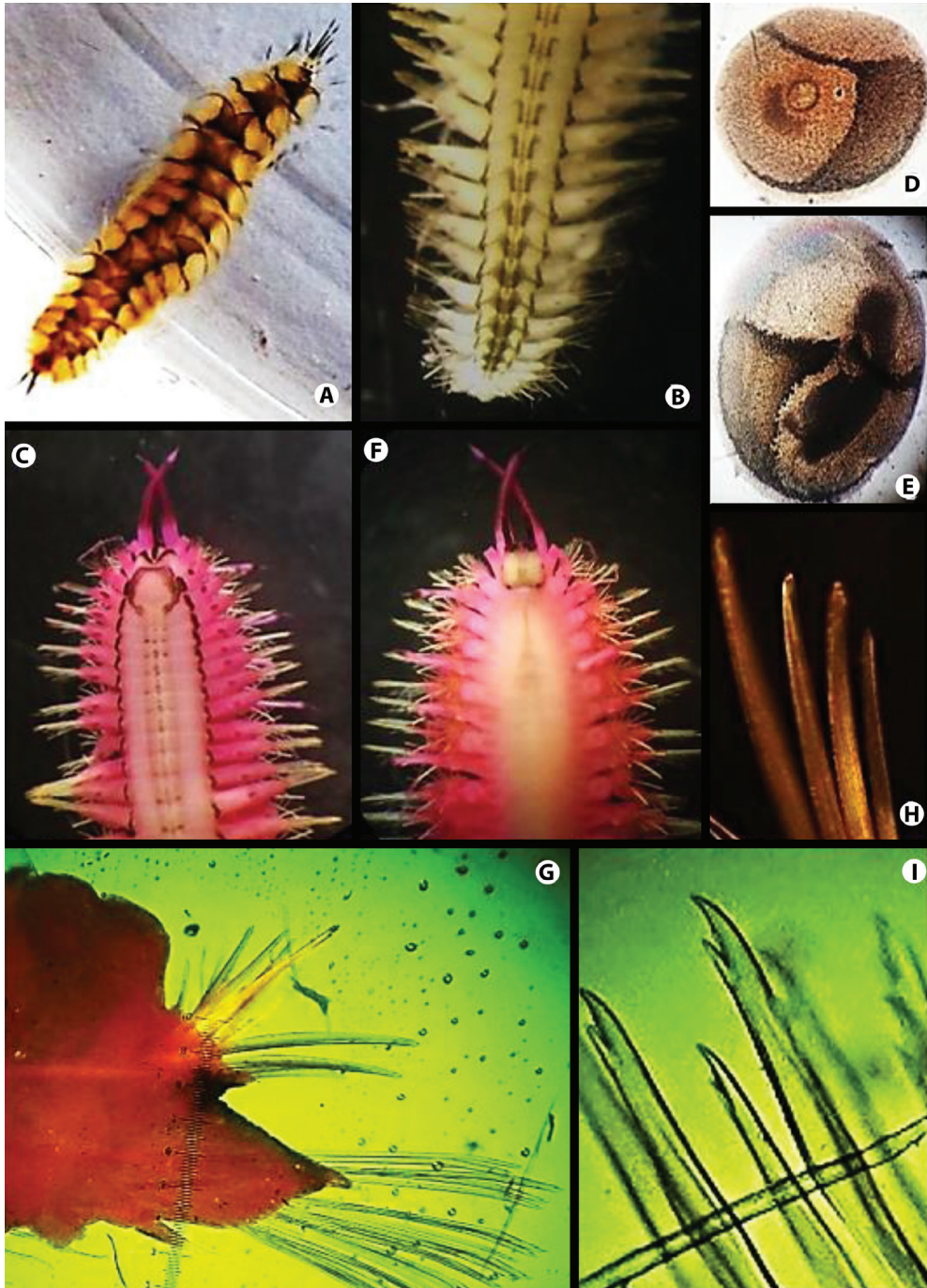


Fig. 1. *Malmgreniella variegata* a) complete specimen; b) posterior end, ventral view; c) anterior end, ventral view; f) anterior end, dorsal view; d) anterior end elytron; e) elytron from medium segment; g) parapodia elytrigerous; h) notochaetae; i) neurochaetae.

Fig. 1. *Malmgreniella variegata* a) ejemplar completo; B) extremo posterior, vista ventral; C) extremo anterior, vista ventral; F) Extremo anterior, vista dorsal; D) elytron de extremo anterior; E) elytron del segmento medio; G) parapodia elytrigerous; H) notochaetae; I) neuroquetas.

acicular lobe on inner side, without chaetae, and pair of dorsal and ventral tentacular cirri similar to median antenna; all appendages variously pigmented (Fig. 1c, f). Median antenna and tentacular cirri similar in length, slightly shorter than palps, tapering to filiform tips, sparsely papillose with short, clavate papillae. Segment two with first pair of elyrophores, biramous parapodia, and ventral cirri with large cirrophores lateral to ventral and long styles similar to tentacular cirri (Fig. 1c). Parapodia biramous, with notopodia shorter than neuropodia; notopodium rounded with projecting acicular lobe on lower side; larger neuropodium with longer subconical, prechaetal acicular lobe with bulbous or digitiform supra-acicular process, with shorter, rounded postchaetal lobe (Fig. 1g). Notochaetae numerous, forming radiating bundle, stouter than neurochaetae, with numerous, faint, close-set spinose rows, shorter notochaetae with tapered tips, longer ones with blunt tips (Fig. 1h). Neurochaetae numerous, forming fan-shape bundle, with numerous, faint, close-set spinose rows, tapering distally to slightly hooked tips, all, except for some lower shorter neurochaetae, with secondary

tooth (Fig. 1i). Dorsal cirri with cylindrical cirrophores and long styles extending beyond neurochaetae, with two dark bands near tip; dorsal tubercles nodular, ventral cirri short, tapered (Fig. 1g). Pygidium with anus between last pair of small parapodia, with pair of long anal cirri, color grading from darkly pigmented to colorless distal tips.

DISCUSSION

Ophionereis reticulata (Ophiuroidea: Ophionereididae) is one of the widely distributed species throughout the Caribbean; In Venezuela has been registered in Los Roques La Tortuga, Margarita and Cubagua island, Isla de Aves, Quetepe Beach, Tunantal Bay (Gulf of Cariaco), Mochima Bay; (Zoppi, 1967; Hernández-Ávila, 2010; Gómez-Maduro, 2012). According to Hendler et al. (1995), this species inhabits reef areas, mangroves and grassland meadows and its diet consists mainly of diatoms and algae filaments which it obtains through its tube feet.

In this study 85 specimens of *O. reticulata* were collected and only two of these were



Fig. 2. *Malmgreniella variegata* and *Ophionereis reticulata* collected in Venezuela.
Fig. 2. *Malmgreniella variegata* y *Ophionereis reticulata* recolectadas en Venezuela.

associated with the scale-worm *M. variegata*, so the prevalence of infestation (2.3%) is the lowest compared to other ophiuroid-polynoid associations, which range from 5 to 100% prevalence (Hendler & Meyer 1982; Alvà & Jangoux 1989; Martin & Britayev 1998; De Assis, Silva-Bezerra, de Brito, Isabelley-Gondim & Christoffersen 2012; Granja-Fernández et al. 2013). Some studies has referred that the observed relationship between polychaetes/ ophiuroids is not fortuitous or due to chance, but Deheyn, Watson & Jangoux (1998) pointed out that the infestation prevalences could be influenced by particular local and temporal conditions. But the data from this study are not sufficient to confirm any of these signs.

Millott (1953) described two polynoids, associated to *Ophionereis reticulata* (Say), found in sand beneath a submerged stone near Kingston, Jamaica, this polychaetes showed a color pattern matching closely that of the brittle stars (Fig. 2). Both, Millot (1953) and Pettinone (1993), reported that both *O. annulata* and *O. reticulata*, can be hosts of *M. variegata*, both ophiuroid species have similar pigmentations and color patterns and banded arms. This coloration allows them to go unnoticed in the host and is one of the aspects reported in the literature. In addition to *M. variegata* (Polynoidae), similar coloration patterns have been recorded for *Gyptis ophiocoma* (Hesionidae), *Branchiosyllis exilis* (Syllidae) and others polynoids, this camouflage capacity makes the presence of these polychaetes in the hosts almost (Handler & Meyer, 1982; Martin & Britayev, 1998).

Distribution. Intertidal to 7 meters. North-western Atlantic Ocean, off Florida, Caribbean Sea, Gulf of Mexico, Belize, Venezuela; Brazil, East Pacific Ocean, Gulf of Panama. Granja-Fernández et al. (2013) records of scale-worms specimens from Western Mexico are probably a different species of *Malmgreniella*, as well as the host ophiuroid, *Ophionereis annulata*.

RESUMEN

Asociación entre el polinóide *Malmgreniella variegata* (Polychaeta: Polynoidae) y *Ophionereis reticulata* (Ophiuroidea: Ophionereididae) primer registro en el Caribe Sudeste. El gusano *Malmgreniella variegata* fue encontrado como comensal en *Ophionereis reticulata* en Florida y Belice. Aquí reportamos la asociación en Playa Piscina (Isla Arapo), Venezuela.

Palabras clave: Comensalismo; gusano escamoso; Ophiuroidea; Simbiosis; Venezuela.

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