

Euapta godeffroyi (Holothuroidea: Synaptidae): Filling the distribution gap between Mexico and Costa Rica, eastern tropical Pacific

Euapta godeffroyi (Holothuroidea: Synaptidae): Completando su distribución entre México y Costa Rica, Pacífico oriental tropical

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ABSTRACT

One specimen of the sea cucumber *Euapta godeffroyi* (Semper, 1868) is reported from La Entrega reef (15°44'34" N, 96°07'35" W), Southern Mexican Pacific. The specimen was observed feeding late at night, supporting the nocturnal habits of this species which is a deposit feeder. No specimens of this species had been previously reported for the area extending from Isla Isabel, Mexico (21°51'43" N, 105°53'28" W) to Golfito, Costa Rica (8°37'02" N, 83°09'01" W); the new record fills part of its distribution gap in the eastern tropical Pacific.

Key words: Coral reef, distribution, eastern tropical Pacific, *Euapta godeffroyi*, Mexico.

RESUMEN

Se registra la presencia del pepino de mar *Euapta godeffroyi* (Semper, 1868) en el arrecife La Entrega (15°44'34" N, 96°07'35" W), en el Pacífico sur mexicano. El organismo fue observado alimentándose durante la noche, lo cual sustenta los hábitos nocturnos de esta especie, que se alimenta filtrando el sedimento depositado en el fondo marino. No había reportes previos de la especie en el área comprendida entre isla Isabel, México (21°51'43" N, 105°53'28" W) y Golfito, Costa Rica (8°37'02" N, 83°09'01" W); el nuevo registro completa el vacío de distribución de esta especie en el Pacífico oriental tropical.

Palabras clave: Arrecife de coral, distribución, *Euapta godeffroyi*, México, Pacífico oriental tropical.

Among the Holothuroidea, the genus *Euapta* Östergren, 1898 is characterized by a calcareous ring without noticeable anterior projections, and by anchor-plates that do not abruptly contract at the posterior end but with a large, smooth hole on either side. They occur in shallow water and upon or near reefs in tropical areas (Clark, 1907). Only six known species of these apodous holothurians have been recorded in the world's oceans: *E. lappa* (J. Müller, 1850), *E. polii* (Ludwig, 1875), *E. magna* Heding, 1928, *E. tobagoensis* Heding, 1928, *E. tahitiensis* Cherbonnier, 1955, and *E. godeffroyi* (Semper, 1868), being the latter the only species recorded in the eastern tropical Pacific (Ríos-Jara *et al.*, 2008; Alvarado *et al.*, 2010).

Euapta godeffroyi was originally described from Samoa as *Synapta godeffroyi* (Semper, 1868) and has a wide geographic distribution in the Indo-Pacific region: Red Sea, Seychelles, Zanzibar, Madagascar, Mauritius, South Africa, India, Maldives Islands, New Caledonia, Cocos Keeling Islands, Philippines, Palau Islands, China, Vietnam, Guam, Indonesia, Papua New Guinea, Fiji Islands, Comoro Islands, Australia, Hawaiian Islands, and Easter Island (Massin, 1999). In the eastern tropical Pacific, the species has been reported from several localities: Gulf of California, Baja

California Sur, Mexico: Ensenada Blanca, isla Danzante, isla San José, isla Espíritu Santo, isla Roca Partida, isla El Gallo, Punta Colorada, bahía de La Paz, la Gaviota, Punta Perico, Cabo Pulmo (Solís-Marín *et al.*, 2009; Cintra-Buenrostro *et al.*, 1998; Holguín-Quiñones *et al.*, 2000); Nayarit, Mexico: isla Isabel (Ríos-Jara *et al.*, 2008); provincia de Puntarenas, Costa Rica: Golfito (Alvarado *et al.*, 2010; Alvarado J.J., unpublished data); and Gulf of Chiriquí, Panama: Uva Reef, Coiba Island (Glynn *et al.*, 2008; Alvarado *et al.*, 2010; Alvarado J.J., unpublished data).

A late night visual prospection of marine invertebrate organisms was conducted in La Entrega reef, Oaxaca, Mexico (15°44'34'' N, 96°07'35'' W) in August 2011. Prospection was conducted by digital video censuses only, with no collection of organisms. La Entrega reef is a protected area located at the western end of the Gulf of Tehuantepec, in an area known as Bahías de Huatulco. The reef is composed of 11 reef-forming species (Reyes-Bonilla *et al.*, 2005), and in virtue of its size, coral cover and extension, the reef is considered one of the best developed in western Mexico. Recently, due to intense public use, dredging since the early 1990's, and recurrent natural disturbances (ENSO), La Entrega is considered to be a severely disturbed coral system (López-Pérez & Hernández-Ballesteros, 2004).

One individual of *E. godeffroyi* was observed late at night in an anchorage surrounded by a monogeneric patch of *Pocillopora* at 5 m depth. The organism was actively feeding on deposited particles. This living specimen was approximately 60 cm in length, frequently contracting and expanding. Its color was creamy-white with transversal and brownish regularly spaced stripes on the dorsal side and uniformly light creamy-white (lighter than the general body color) on the ventral side. Five bright yellow longitudinal bands with a middle black line ran along the whole body's length. The tentacles were grayish (Fig. 1). This color pattern is quite characteristic of this species and has been recurrently men-

tioned by distinct authors in different geographic areas (*e.g.* Clark, 1907). We only used overall morphology and the color pattern to identify the organism nevertheless there are other morphological characteristics (see Semper, 1868; Massin, 1999; Solís-Marín *et al.*, 2009) usually considered to distinguish the species.

Euapta godeffroyi inhabits the intermareal zone to about 80 m depth (Solís-Marín *et al.*, 2009), and is associated with sand, seagrass beds, rock (pebbles), calcareous material, coral rubble, and coral reefs (Fisher, 1907; Xiaoping *et al.*, 2006). Since 2003 diurnal censuses have been conducted periodically in Guerrero and Oaxaca's reef systems in the tropical Mexican Pacific, but without further record of this species. The late night record in La Entrega reef supports that *E. godeffroyi* is active and visible only at night as previously reported by Massin (1996) and Conand *et al.* (2010). The only other *Euapta* observed at night is *E. lappa*. A dietary analysis, conducted by Hammond (1982), demonstrated that the stomach of this species is completely full at night, suggesting a nocturnal feeding activity. We observed *E. godeffroyi* actively feeding on deposited particles by extending their bucal tentacles into the sediment, thus confirming that the species is a deposit feeder as suggested by Glynn (2008).

Present report implies a range extension of almost 1300 km south of its nearest known locality in Mexico (isla Isabel, 21°51'43'' N, 105°53'28'' W) (Ríos-Jara *et al.*, 2008) and almost 1500 km north of its nearest locality in Central America (Golfito, Costa Rica; 8°37'02'' N, 83°09'01'' W) (Alvarado *et al.*, 2010; Alvarado J.J., unpublished data). The absence of records of this species between isla Isabel and Golfito is probably related to the lack of nocturnal surveys in reefs and coral reefs habitats, which are commonly found throughout. The known distribution of *Euapta godeffroyi* in eastern tropical Pacific reef areas (Cortés, 2003; Alvarado *et al.*, 2010), and future nocturnal prospection might indicate that *E. godeffroyi* could be more abundant in Mexico,



Figure 1. *Euapta godeffroyi* observed at night in the coral reef system of La Entrega, Oaxaca, Mexico in eastern tropical Pacific (Photo: V. Antonio-Pérez).

Nicaragua, Costa Rica, Panama, Colombia, and Ecuador than previously thought.

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REFERENCES

- ALVARADO, J. J., F. A. SOLÍS-MARÍN & C. G. AHEARN. 2010. Echinoderm (Echinodermata) diversity in the Pacific coast of Central America. *Marine Biodiversity* 40: 45-56.
- CINTRA BUENROSTRO, C. E., H. REYES BONILLA & O. ARIZPE COVARRUBIAS. 1998. Los equinodermos (Echinodermata) del arrecife de Cabo Pulmo, Pacífico de México. *Revista de Biología Tropical* 46 (2): 341-344.
- CLARK, H. L. 1907. The apodous holothurians. A monograph of the Synaptidae and Molpadiidae. *Smithsonian Contributions to Knowledge* 35: 1-231.
- CONNAND, C., F. MICHONNEAU, G. PAULAY & H. BRUGGEMANN. 2010. Diversity of the holothuroid fauna (Echinodermata) at La Reunion (Western Indian Ocean). *Western Indian Ocean Journal of Marine Science* 9 (2): 145-151.
- CORTÉS, J. (ED.). 2003. *Latin American coral reefs*. ELSEVIER, Hungary. 497 p.
- FISHER, W. K. 1907. The holothurians of the Hawaiian Islands. *Proceedings of the United States National Museum* 32 (1555): 637-744.
- GLYNN, P. W. 2008. Food-web structure and dynamics of Eastern Tropical Pacific coral reefs: Panama and Galápagos Islands. In: McClanahan, T. R. & G. M. Branch (Eds.). *Food webs and the dynamics of marine reefs*. Oxford University Press, New York, pp. 185-208.
- GLYNN, P. W., I. C. ENOCHS, J. E. MCCOSKER & A. N. GRAEFE. 2008. First record of a pearlfish, *Carapus moulani*, inhabiting the aplousid opisthobranch mollusc *Dolabella auricularia*. *Pacific Science* 62 (4): 593-601.
- HAMMOND, L. S. 1982. Patterns of feeding and activity in deposit-feeding holothurians and echinoids (Echinodermata) from a shallow back-reef lagoon, Discovery Bay, Jamaica. *Bulletin of Marine Science* 32 (2): 549-571.
- HOLGUÍN-QUIÑONES, O. E., H. WRIGHT-LÓPEZ & F. SOLÍS-MARÍN. 2000. Asteroidea, Echinoidea y Holothuroidea en fondos someros de la Bahía de Loreto, Baja California Sur, México. *Revista de Biología Tropical* 48 (2): 749-757.
- LÓPEZ-PÉREZ, R. A. & L. M. HERNÁNDEZ-BALLESTEROS. 2004. Coral community structure and dynamics in the Huatulco area, Western Mexico. *Bulletin of Marine Science* 75 (3): 453-472.
- MASSIN, C. 1996. The holothurians of Easter Island. *Bulletin de l'Institut royal des Sciences naturelles de Belgique* 66: 151-178.
- MASSIN, C. 1999. Reef-dwelling Holothuroidea (Echinodermata) of the Spermonde Archipelago (South-West Sulawesi, Indonesia). *Zoologische Verhandelingen (Leiden)* 329: 1-144.
- REYES-BONILLA, H., L. E. CALDERÓN-AGUILERA, G. CRUZ-PIÑÓN, P. MEDINA-ROSAS, R. A. LÓPEZ-PÉREZ, M. D. HERRERO-PÉREZ, G. E. LEYTE-MORALES, A. L. CUPUL-MAGAÑA & J. D. CARRIQUIRY-BELTRÁN. 2005. *Atlas de los corales pétreos (Anthozoa: Scleractinia) del Pacífico Mexicano*. CICESE/CONABIO/CONACYT/UDG-CUCOSTA/UMAR, Guadalajara. 124 p.
- RÍOS-JARA, E., C. M. GALVÁN-VILLA & F. A. SOLÍS-MARÍN. 2008. Echinoderms of the National Park Isla Isabel, Nayarit, Mexico. *Revista Mexicana de Biodiversidad* 79: 131-141.
- SEMPER, C. 1868. *Reisen im Archipel der Philippinen. Holothurien. 2. Wissenschaftliche Resultate*. Verlag von Wilhelm Engelmann, Leipzig. 288 p.
- SOLÍS-MARÍN, F. A., J. A. ARRIAGA-OCHOA, A. LAGUARDA-FIGUERAS, S. C. FRON-TANA-URIBE & A. DURÁN-GONZÁLEZ. 2009. *Holothuroideos (Echinodermata: Holothuroidea) del Golfo de California*. CONABIO/ICMyL, UNAM, México. 177 p.
- XIAOPING, H., H. LIANGMIN, L. YINGHONG, X. ZHANCHOU, C. W. FONG, H. DAOJIAN, H. QUIUYING, H. HUI, T. YEHUI & L. SHENG. 2006. Main seagrass beds and threats to their habitats in the coastal sea of South China. *Chinese Science Bulletin* 51(2): 136-142.

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