**Range extension of *Sanopus splendidus* (Actinopterygii: Batrachoidiformes: Batrachoididae) in the Caribbean Sea**

**Extensión de rango del *Sanopus splendidus* Actinopterygii: Batrachoidiformes: Batrachoididae) en el mar Caribe**

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**ABSTRACT**

This paper records the presence of *Sanopus splendidus* Collete, Starck & Phillips, 1974, an endemic fish from the Mexican Caribbean in two sampling sites in the Costa Occidental de Isla Mujeres, Punta Cancún y Punta Nizuc National Park (Mexico). Two subjects were photographed by sport divers. This is the northernmost record of this specie in the Caribbean, broadening the known range by approximately 105 km from their type locality (Cozumel Island).

**Keywords:** splendid toadfish, new record, Mexico, endemic species, fish

**RESUMEN**

En este trabajo registramos la presencia del sapo esplendido *Sanopus splendidus* Collete, Starck & Phillips, 1974, especie endémica del Caribe mexicano en dos localidades en el Parque Nacional Costa Occidental de Isla Mujeres, Punta Cancún y Punta Nizuc (México). Buzos deportivos fotografiaron dos individuos. Este es el registro más al norte para esta especie en el Caribe y extiende su área de distribución en 105 km desde su localidad tipo (Isla Cozumel).

**Palabras clave:** sapo espléndido, nuevo registro, México, especie endémica, peces

**INTRODUCTION**

Batrachoididae is the only recorded family in the fish order Batrachoidiformes and is comprised of 23 genera and 83 validated species worldwide (Nelson *et al*. 2016). In the Western Central Atlantic, 23 species occur in seven genera (Greenfield *et al.* 2008). Most of the toadfish are benthic, are distributed in marine brackish waters and can be occasionally found in rivers, like some species from South America. These fish range from small to medium size (up to 57 cm), have a broad body and flattened head, and are often ornamented with barbels and fleshy flaps around their large mouths. They are generally dark brown with some spots on their backs (Collette, 2003, Greenfield *et al.* 2008).

The *Sanopus* genus is represented by two endemic species in the Caribbean, *Sanopus* *johnsoni* and *Sanopus* *splendidus* (Collette, 1974, Schmitter-Soto *et al.* 2000). This paper documents the presence of the splendid toadfish *S.* *splendidus* Collete, Starck & Phillips, 1974 in two sites within the Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc National Park in the Mexican Caribbean Sea, which expands their known distribution range by approximately 105 km north.

**MATERIALS & METHODS**

This report is based on the observation of two *S. splendidus* individuals, which were photographed by sport divers within the Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc National Park in the Mexican Caribbean Sea (Fig. 1). The two individuals were identified by comparing photographs to the original description (Collette, 1974) and the work of Humman and Deloach (2014). In order to obtain additional records of the organisms, several online data bases were consulted, including Fishbase (Froese & Pauly, 2017), the Global Biodiversity Information Facility (GBIF) Data Portal, Ocean Biogeographic Information System (OBIS), and Shorefishes of the Greater Caribbean online Information System (Robertson & Van Tassell, 2017), complemented with a broad literature review.

**RESULTS**

The first individual was photographed in the Herradura Reef on December 24th, 2016, at a depth of 16.7 m., hidden in a cave with a sandy bottom. The second specimen was observed and photographed on April 20th, 21st, and 22nd, 2017 in the Manchones Reef, at a depth of 9.1 m (Fig. 2). Both reefs are separated by a distance of approximately seven kilometers.

The two individuals observed had a relatively elongated scaleless body and a large, wide, and depressed head, with branched barbels and fleshy projections, especially around the lower jaw. Some of the main features that allowed their identification are as follows. Only two central barbels are branched, and the specimens have no cirrus between their eyes. The front nostrils are tubular and the gill openings are restricted to one side before the pectoral fin base. The gill plate presents two solid spines in the upper corner and one in the lower one. The head coloration is brown with white lines forming a zebra-like pattern, whereas the body is dark greyish brown with dark grey fins and broad yellowish orange and black bands, and pelvic fins are yellow. According to the literature consulted, 30 occurrences have been seen of this species (25 in Mexico and 5 in Belize) (Table 1).

**DISCUSSION**

This paper confirms the presence of *S. splendidus* in other locations of the Caribbean Sea, broadening its range extension by ~105 km north. This species has been previously recorded in only two locations within the Caribbean Sea, first in its type locality, Cozumel Island (Collete, 1974, Greenfield *et al.* 2008), and second in Glover's Reef (Belize). According to interviews to sport divers operating in the area, *S. splendidus* has been sighted in the Manchones Reef since 2009, concurring with the opening of the Submarine Art Museum. The specimen photographed in this reef lives very close to the statue known as “El Volcho” and, due to its high habitat specificity, it has become another attraction for sport divers operating in the area. In addition, the divers interviewed mentioned also spotting this fish in nearby reefs (Grampin, Cementerio de Caracoles, and Barco Hundido); however, there is no photographic evidence supporting these observations.

According to the IUCN, *S. splendidus* and *S.* *reticulatus* are endangered species (Collete *et al*. 2015) due to their restricted distribution and various human threats such as overfishing, habitat destruction, pollution, and climate change. The data in this paper suggests a wider distribution in the region, which creates the need for actions towards their conservation. This is especially necessary if we consider that the diver fishermen that fish for spiny lobster indicate they have not seen this species in their fishing areas, which are located near other protected natural areas such as Xcalak Reef National Marine Park (near Belize), Puerto Morelos Reef National Marine Park (central area), and the State of Yucatán.

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Fig 1. Map showing the records of *Sanopus splendidus* in the Mexican Caribbean Sea. Black stars indicate the new records at the Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc National Park

Fig 1. Mapa con los registros de *Sanopus splendidus* en el Mar Caribe mexicano. Las estrellas negras indican los nuevos registros en el Parque Nacional Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc

Fig. 2. *Sanopus splendidus* recorded in 2018-2019 at the Costa Occidental de Isla Mujeres, Punta Cancun y Punta Nizuc National Park. ,A) *Sanopus splendidus* recorded in 2019. B) *S. splendidus* specimen in the Manchones Reef with a total length (TL) of 25-30 cm. C) Habitat of the second individual in the Herradura Reef at 16.1 m. deep. D) *S. splendidus* specimen with a total length (TL) of 15 cm. E) Front view of individual photographed in the Herradura Reef. F) Lateral view of individual photographed in the Herradura Reef. Photos credit to Patricio Caro

Fig. 2. Registro de *Sanopus splendidus* de 2018-2019 en el Parque Nacional Costa Occidental de Isla Mujeres, Punta Cancún y Punta Nizuc. A) *Sanopus splendidus* registrado en 2019. B) Ejemplar de *S. splendidus* en Arrecife Manchones 25-30 cm de longitud total (LT). C) Hábitat del segundo individuo en Arrecife Herradura a 16.1 m de profundidad. D) Individuo de 15 cm de longitud total (LT). E) Vista frontal del individuo fotografiado en Arrecife Herradura. F) Vista lateral del individuo fotografiado en Arrecife Herradura. Créditos de fotografías: Patricio Caro

Table 1. Historical records of the splendid toadfish (*Sanopus splendidus*) along the Caribbean Sea. References: 1) Global Biodiversity Information Facility, 2) Ocean Biogeographic Information System, 3) Fishbase, 4) This paper, 5) Shorefishes of the Greater Caribbean, 6) Harborne (2000) N/A = Not available

Cuadro 1. Registros históricos del pez sapo espléndido (*Sanopus spelendidus*) en el Mar Caribe. Referencias: 1) Global Biodiversity Information Facility, 2) Ocean Biogeographic Information System, 3) Fishbase, 4) Este informe, 5) Shorefishes of the Greater Caribbean, 6) Harborne (2000) N/A = No disponible

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| **Locality** | **Site** | **Country** | **Latitude** | **Longitude** | **Depth (m)** | **Year** | **Basis of record** | **References** |
| Cozumel | N/A | Mexico | 20.36 | 87.03 | 9 | 2017 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.38 | 87.1 | N/A | 2017 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.41 | 86.81 | N/A | 2013 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.39 | 87.01 | N/A | 2013 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.4 | 87.03 | N/A | 2010 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.35 | 87.17 | N/A | 2009 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.5 | 86.96 | N/A | 2004 | Observation | 1 |
| Cozumel | N/A | Mexico | 20.42 | 86.92 | N/A | 1974 | Specimen | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | 3.75 | 1970 | Specimen | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | 3.75 | 1970 | Specimen | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | 10 | 1968 | Specimen | 1 |
| Cozumel | N/A | Mexico | 20.34 | 87.03 | N/A | 1968 | Specimen | 1 |
| Cozumel | N/A | Mexico | 20.45 | 86.89 | N/A | N/A | Specimen | 1 |
| Cozumel  | N/A | Mexico | 20.4488 | 86.8912 | N/A | 1971 | Specimen | 1 |
| Cozumel  | Palancar Reef | Mexico | 20.335 | 87.0272 | N/A | 1998 | Specimen | 1, 2 |
| Cozumel  | Punta Tunich | Mexico | 20.3963 | 87.0255 | 13.5 | 2010 | Observation | 1 |
| Cozumel  | N/A | Mexico | 20.3502 | 87.1725 | N/A | 2009 | Observation | 1 |
| Cozumel  | N/A | Mexico | 20.4992 | 86.9594 | N/A | 2004 | Observation | 1 |
| Cozumel  | N/A | Mexico | 20.3909 | 87.0052 | N/A | 2013 | Observation | 1 |
| Cozumel  | Palancar Reef | Mexico | 20.335 | 87.0272 | N/A | 1974 | Specimen | 1, 2 |
| Cozumel  | Casa Blanca | Mexico | 20.3625 | 87.0271 | 9.7 | 2017 | Observation | 1 |
| Cozumel  | N/A | Mexico | 20.4151 | 86.8143 | N/A | 2013 | Observation | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | N/A | N/A | Observation | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | N/A | N/A | Observation | 1 |
| Cozumel | N/A | Mexico | N/A | N/A | N/A | N/A | Observation | 3,5 |
| Isla Mujeres | Manchones  | Mexico | 21.2008 | 86.7273 | 10 | 2016 | Observation | 4 |
| Cancun | Herradura | Mexico | 21.134 | 86.7296 | 16.7 | 2016 | Observation | 4 |
| Glover´s Reef | N/A | Belize | N/A | N/A | N/A | N/A | Observation | 5 |
| Turneffe Atoll | N/A | Belize | N/A | N/A | N/A | 1998 | Observation | 6 |
| South Water Caye Marine Reserve | N/A | Belize | N/A | N/A | N/A | 1998 | Observation | 6 |
| Sapodilla Cayes | N/A | Belize | N/A | N/A | N/A | 1998 | Observation | 6 |
| Snake Cayes | N/A | Belize | N/A | N/A | N/A | 1998 | Observation | 6 |