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UNUSUAL OCCURRENCE OF PORPITA PORPITA (CNIDARIA: HIDROZOA) ON BEACHES OF THE MEXICAN CENTRAL PACIFIC, ASSOCIATED WITH THE TONGA ISLAND ERUPTION/ TSUNAMI

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Abstract: The massive presence of the hydrozoan *Porpita porpita*, better known as the Blue Button, on beaches located in the Mexican Transitional Pacific is presented as an exceptional case, as a direct consequence of the volcanic eruption in the Tonga Islands in January 2022 and the subsequent tsunami caused by it.

INTRODUCTION

The blue buttonfish *Porpita porpita* (WORMS, 2024), is a cnidarian of the Hydrozoa class that lives on the surface of the sea in the open ocean unlike the vast majority of its congeners who inhabit the seabed (benthic) [for this quality it is classified as part of the Pleuston fauna, having the particularity of being considered as a passive vagrant that depends on water currents and wind to be transported through the ocean feeding on small crustaceans that are transported by surface currents and being one of the preferred prey of the blue dragon Glaucus atlanticus (Hayward, et al. 1990).

For the above, its presence in coastal littorals is not common for a good part of the year (Deidum, 2010). In the study region it usually occurs only during periods of strong winds (April-May) or during the hurricane season (July-October).

Observations of the species. The sting of the blue buttonfish *Porpita porpita* (Fig. 1) is not powerful, but can cause mild irritation to human skin (Kenedy, 2019), (Ramanibai, et al. 2014) and its distribution has been defined as predominantly tropical. It is a marine organism consisting of a colony of hydroids that is usually found in warm, tropical or subtropical waters of the Pacific, Atlantic and Indian Oceans, as well as the Mediterranean Sea and the eastern Arabian Sea (Gul, et al, 2014) (Lilo, et al. 2019), (Deidum, 2010), (Chowdhury, et al, 2016).

However, in recent years, it has been hypothesized that due to global warming, colonies of Porpita pacifica (another name for the species) (Schuchert, 2011), Ramanabi, et al. 2014), have begun to appear in a greater number of geographical regions (Calder, 2010), (Schucher, 2011) causing minor skin lesions in bathers on tourist beaches (Oiso, et al, 2005).

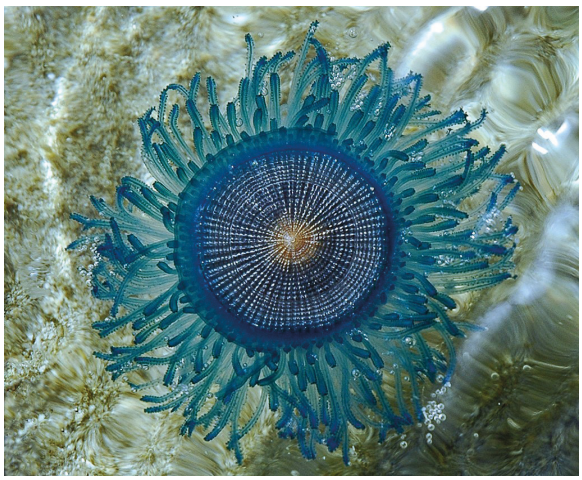

Figure 1: *Porpita porpita* (Linneo, 1758)

BACKGROUND

In December 2014, an underwater volcano in the Kingdom of Tonga in the South Pacific erupted violently, sending a large amount of steam, ash and rocks into the air, creating a cloud that reached nine kilometres in altitude (Maya, 2022).

Throughout January 2015, these ashes settled and created a new island, located between two older ones, Hunga Tonga and Hunga Ha'apai, hence it received the informal name of Hunga Tonga`Hunga Ha'apai (HTHH), with a maximum height of 150 metres above water and an extension of two kilometres (BBC News Mundo, 2022).

METHODOLOGY

To document the discovery, a photographic and video record was made on various sandy beaches in the state of Colima, Mexico. Due to the imminent risk of a tsunami, a rapid

estimate of the density of organisms was made using a 1m square frame with some repetitions, and finally, information published on the natural phenomenon by national and international media outlets was used.

RESULTS

In this particular case, an unusual arrival on the beach of a large number of *Popita porpita* individuals was detected on January 15, 2022, reaching an average density of up to 250 organisms per square meter (Fig. 2), when the presence of the two aforementioned factors (strong winds and hurricanes) is null in this region. However, what did occur on that date was the eruption of the Volcano located on Hunga Tonga`Hunga Haapi Island, located in the Polynesian Islands, which ended up disappearing after the strong volcanic eruption was recorded. The above generated a series of tsunamis in various regions of the American Pacific even though they are approximately 10,000 kilometers away (Fig. 3).

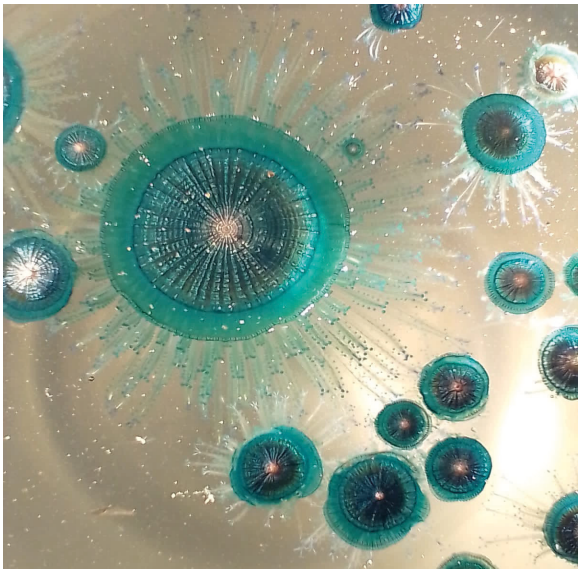

Figure 2: Massive presence of *Popita porpita*.

Figure 3: Location of the volcanic eruption and approximate distance from Manzanillo Colima, Mexico.

The approximate distance between Tonga Island and Mexico is approximately 10,000 kilometers and the tsunami took an average of 8 hours to reach its shores, registering a variation in the maximum level of up to 2.0 meters on the coast of Manzanillo, Colima at 11:56 in the morning according to the National Tide System service.

In the particular case of Manzanillo Colima and other beaches of the Mexican Central Pacific, on that date a rise in sea level of up to 2.0 meters was recorded for a few hours, which although it was not too intense, the fact was attributed as a direct consequence of the strength of the currents and the strong waves, and the consequent massive presence of this species (Fig. 4).

REGISTERED TIDES	MAXIMUM AMPLITUDE	CHECK-IN TIME
PLACE	(meters)	National Tide Service
Manzanillo, Colima	2	11.56
Lázaro Cárdenas, Michoacán	0.4	11.58
Puerto Vallarta, Jalisco	0.6	12.21
Mazatlán, Sinaloa	0.4	10.5
Zihuatanejo, Guerrero	1.19	12.21
Acapulco, Guerrero	0.95	15.05
Puerto Ángel, Oaxaca	0.7	14.52
Salina Cruz, Oaxaca	0.9	15.14
Puerto Chiapas, Chiapas	0.9	16.26
Huatulco, Oaxaca	0.9	16.26

Figure 4: Variations in the Tide caused by the tsunami in different locations in the Mexican Central Pacific.

CONCLUSIONS

Although due to security reasons (tsunami warning) it was not possible to carry out a detailed analysis of the relative density of *Porpita porpita* on various beaches, it was possible to make a photographic record of its presence on the beaches of Manzanillo, Colima, generally estimating several thousand units.

Since it is impossible to determine the distance in the ocean at which the colonies of this organism were originally found, the authors propose that the massive presence of this Cnidarian was directly related to the strong currents caused by the tsunami, since at that time its presence has never been detected due to the lack of environmental conditions already described in the summary.

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