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Morphometry of *Pterois volitans* (Linnaeus, 1758) in the Veracruz Reef System in the Central Zone of the Gulf of Mexico

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Abstract

The invasive species *P. volitans* (Linnaeus, 1758) has presented a significant geographic advance considering its original distribution, since the Indo-Pacific it has reached the west coast of the Atlantic, including mainly the Caribbean Sea and the Gulf of Mexico. In this geographic advance, protected areas are included and it is a reference species of impact on native species. Size, weight and distribution of the lionfish were evaluated in this study, in the Veracruz Reef System, National Park of the Gulf of Mexico. In the period from May to June 2016, 30 organisms were captured, their size and weight were recorded, comparing these meristic data with previous records in the area and other sites. An average height (±SD) of 248.14±48.2mm was reported in the analysis of the results, indicating a considerable increase in the size of the species in this study. It can be inferred that *P. volitans* possess a considerable ability to adapt and behave as opportunists, and being a natural predator has allowed them to reach these sizes.

Keywords: Invasive species; *Pterois volitans*; Total length; Veracruz; Mexico

Introduction

The invasive species *P. volitans* (Linnaeus, 1758) in marine ecosystems is of international importance, since it represents competition or predation of native species, mainly in the reef areas of the Gulf of Mexico and the Caribbean Sea. Due to this situation, studies have been initiated to know the population aspects of this invasive species on the west coast of the Atlantic [1]. According to scientific reports, the first record of *P. volitans* occurred in 2009 in the Marine Protected Areas of the South-West Reef Corridor of the Gulf of Mexico [2]. Subsequently, in 2012, its presence was reported in the Lobos-Tuxpan Reef System (SALT) [3] and in the Veracruz Reef System National Park (PNSAV) [4]. In this study, size and weight of *P. volitans* from the PNSAV reefs of the central zone of the Gulf of Mexico were analyzed, comparing the length of the lionfish with previous records of the area.

Materials and Methods

Between the months of May and June 2016, 30 specimens of *P. volitans* were collected, using harpoon and basic fishing equipment, in the Veracruz Reef System National Park (PNSAV). This system is located on the central coast of the state of Veracruz (19° 16.106'N, 096°12.133'O and 19°0.520'N, 095°45.933'O). The Protected Natural Area of the PNSAV includes 28 reefs, [5-8]. The amount of specimens collected specifically in 8 out of 28 reefs were: from the northern part of the PNSAV: Gallega (1) and Galleguilla (7); from the central part: Isla Verde (6) and La Palma (4); and from the southern part: El Giote (1), La Blanca (2), Sargazo (3) and Santiaguillo (6). The collected organisms were transported in plastic containers with ice to the facilities of the Laboratory of Applied Aquaculture Research (LIAA) of the Technological Institute of Boca del Río (ITBOCA), each specimen was taken data of total length (mm) and weight (grams) identifying them following the criteria of Schultz [9].

Results and Discussion

The recorded size of the 30 specimens was 157 to 397 (248.14±48.19)mm and weight of 48 to 1063 (279.17±221.76)g. The number of specimens according to the size distribution was of: 150-200mm (1), 201-250mm (19), 251-300mm (6), 301-350mm (3) and 351-400mm (1), where the highest frequency of weight was in the range of 100 to 200g (17). The largest fish presented 397mm in length with a weight of 1063g. The record of lionfish in the northern, central and southern reefs of the PNSAV indicates that this species is already distributed throughout the marine park, and that the largest sizes are found in the deepest reefs or farthest from the line of coast. On the other hand, it is

relevant to point out that in the regional context, the size of the lionfish is increasing for coasts of Veracruz with [3,4,10,11]. Meanwhile, the size obtained in our data (248.14±48.19) is similar to those recorded in Mexico in the Gulf of Mexico and Caribbean littoral. As they are: Tamaulipas: 157mm [12]; Veracruz: 185mm [4], 92-405mm [11], 90-397mm [10]; Tabasco, 245-250mm [13]; Campeche, 365mm [14]; Yucatan, 137mm [2], 90-274mm [15], 390mm [16], 98-358mm [17]; Quintana Roo, 25-365mm [18], 150-390mm [19]. Comparatively, the length of the lionfish has records of 390mm [16], 390mm [19], 397mm [10] and a maximum of 405mm [11] next similar to the other latitudes as in the Bahamas with 420mm [20]; USA, North Carolina with 450mm [21], Florida with 474mm [16].

The above data allow us to point out that over time, larger organisms are being collected, given the invasion by *P. volitans* in the Veracruz Reef System National Park. In addition, the records in other reef systems in which *P. volitans* has been established, highlights the capacity of its success as an invasive alien species. The analysis in the distribution of this type of species provides information on the potential impacts that this species can cause, by identifying an increase in its size or weight. As a result of this phenomenon, another impact on the ecosystem can be generated, such as: the alteration in the dynamics of endemic species, which can be displaced by competition or potential prey to an organism that is opportunistic, predatory and easy to adapt, which has no physical limitations or predators, therefore represents a successful establishment in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico and recently, on the coasts of Brazil (250mm, Ferreira et al. 2015). It is necessary to continue with research studies on their invasion to the coasts of regions not officially reported, scientifically strengthen their biological and ecological characteristics, as well as the negative and positive impacts on ecosystems.

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Conflict of Interest

The authors declare no conflict of interest.

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