

Sea urchin disease: Case study on Venezuelan shores

Sylvia Grune Loffler

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The prevalence of clinical signs in echinoids and other marine invertebrates has been reported since the 70's in the Caribbean sea. However, the presence of clinical signs in echinoids has not been reported in Venezuela until now. We carried out a visual census of the sand dollar population (*Mellita quinquiesperforata*) on Margarita Island and described several clinical signs observed. The clinical signs observed with higher prevalence are listed in decreasing order: Black Dots (BD), Violet Ulceration (VU), Brown Patches (BP), Green Erosion (GE), Red Dots (RD), Decolored Patches (DP), Pink Band (PB) and Black Ulceration (BU). The clinical signs with higher grade affecting the aboral surface found were VU and BU. Gram coloration of the affected test surface revealed elevated presence Gram+ cocci and bacilli. This work pretends to expand the baseline for future studies of pathologies of echinoids in the Caribbean sea, specially Venezuela. At the time no molecular studies were carried out and microbiology isolation was unsuccessful. Sand dollars (*Mellita quinquiesperforata*) can be found on sandy beaches with oxygenated water, with high concentration of calcium, potassium, sodium, phosphorus, chlorides and with low presence of organic matter. These echinoids belong to the Order Clypeasteroidea and form dense patches (sometimes barred for protection) where the adults live in the intertidal zone and juveniles live near to the shallow intertidal zone. The principal food source is infauna comprising benthic phyto and zooplankton. Echinoids have been reported to be affected by the "Black Sea Urchin disease" (1-4) "Bald Sea urchin disease" also called "Red Spot disease" (5-9). This disease is caused by bacteria (*Vibrio anguillarum* and *Aeromonas salmonicida*) (6). Bower reported that Gram-negative bacteria belonging to *Acinetobacter* spp. and *Alcaligenes* spp. were more abundant on lesion surfaces than on healthy test surfaces. Another disease reported in echinoids is the "Green Sea Urchin Amoebiasis" (10-13), affecting mainly *Strongylocentrotus droebachiensis*, this disease is caused by *Paramoeba invadens* and caused mass mortalities of this sea urchin in Nova Scotia. In the Caribbean sea, mass mortalities of *Diadema antillarum* were reported to be caused by *Clostridium perfringens* and *C. sordelli* (4). During 1983-1991 mass mortality almost extinguished these

populations affecting 98% from Panama to the Bermudas. Lessios (2) studied the recovery rate of the populations of *D. antillarum* and found only a slight recovery after the mass mortality event. Sand dollars (*M. quinquiesperforata*) express signs of stress caused by environmental changes releasing coelomic cells with violet coloration Figures 1 and 2. These cells have substances with antibiotic and antimycotic properties and are released by stress-induced effects (14,15). Further studies of the observed clinical signs of sand dollar populations have a great scientific interest since these animals are indicators of environmental changes of biotic and abiotic factors of the coast, caused by contamination and global warming which seem to promote development of these pathologies (16,17). In the Venezuelan shore have been reported disease affecting corals of the Los Roques archipelago and the National Park of Morrocoy. The signs described by several authors were yellow band and black spot syndromes, black bands, white plague and bleaching (18-21) describes six clinical signs observed in *M. quinquiesperforata* populations on Margarita Island and classifies them into levels of affection (low, regular and severe). In a more recent study the same author studied seven localities on Margarita Island and censused *M. quinquiesperforata* individual during 45 minutes in the shallow subtidal zone, all individuals were measured in length (mm) and high (mm). The objective of this census was to analyze where the higher prevalence could be observed and if there are risk factors for these populations that could be established using statistics, such as: size, dry season or wet season, beaches with touristic traffic and beaches without. The results revealed that bigger sand dollars have 4,4 times more probability to have at least one clinical sign than smaller ones (juveniles) and that in the rain season the animals have 1,8 times more probability to have clinical signs. The comparison between beaches with touristic activity and the one without, revealed that the sand dollars censused on touristic beaches have 3.25 times more probability to have at least one clinical sign than the ones censused on beaches without. These studies are first to report pathologies in sand dollars in Venezuela and the Caribbean sea. Further studies have to be made to isolate and characterize the etiological agents of these clinical signs.

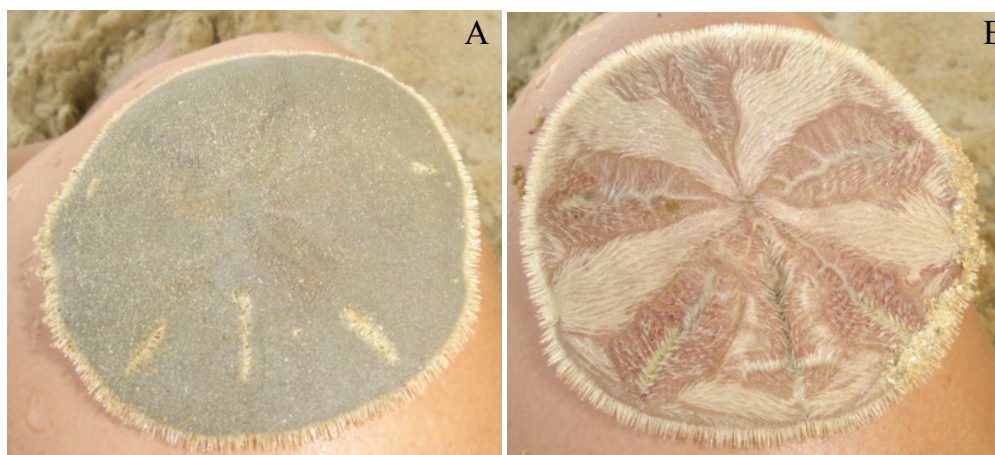


Figure 1) Image of a Sand dollar (*Mellita quinquiesperforata*) showing healthy test surface A. Aboral, B. oral

National Research Council of Argentina (CONICET), Argentina.

Correspondence: Dr. Sylvia Grune Loffler, National Research Council of Argentina (CONICET), Argentina. Telephone: 0054-11-51484481, e-mail: grune.sylvia@inta.gob.ar

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Figure 2) *M. quinquiesperforata* with Violet Ulceration (VU) on the aboral test surface

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