

TESTING THE HABITAT HARSHNESS HYPOTHESIS IN TROPICAL ECOSYSTEMS: REPRODUCTIVE BIOLOGY OF THE SURF CLAM *DONAX STRIATUS* LINNAEUS, 1767 (BIVALVIA, DONACIDAE) ON THREE BRAZILIAN SANDY BEACHES WITH CONTRASTING MORPHODYNAMICS

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ABSTRACT

The 'habitat harshness hypothesis' (HHH) predicts that (i) at the community level, reflective beaches will exhibit lower species richness, diversity and abundance while (ii) at the population level, they will be characterised by lower abundance, growth, fecundity, reproductive output and higher mortality rates. In order to test the HHH in tropical environments the reproductive biology of *Donax striatus* is being studied histologically, comparing populations from three Brazilian sandy beaches with contrasting morphodynamics (dissipative, intermediate and reflective) over the period of 24 months. For comparisons between the poorly studied tropical *D. striatus* and well-known temperate Argentinean *D. hanleyanus* and Namibian *D. serra* we are incorporating results from our former works.

Keywords: Sandy beach ecology, HHH, Reproduction biology, Brazil

INTRODUCTION

Recent investigations in temperate areas suggest that populations co-occurring on sandy beaches with a range of contrasting morphodynamics do not conform consistently to the HHH predictions (GÓMEZ & DEFEO 1999; VELOSO & CARDOSO 2001; DEFEO & MARTÍNEZ 2003; DEFEO & GÓMEZ 2005; HERRMANN *et al.* 2010). Because of this contradiction, the present work is testing the HHH in tropical ecosystems at population level, comparing the reproductive biology of *Donax striatus* Linnaeus, 1767 from three Brazilian sandy beach communities with contrasting morphodynamics.

MATERIALS AND METHODS

For histological examinations a total of 35 *D. striatus* clams, covering the full range of anterior-posterior shell length, are collected monthly from the three sandy beaches with contrasting morphodynamics. Surf clams with severed adductor muscles are fixed in Bouin's solution for two hours, then transferred into 70 % ethanol and later processed in the laboratory. For histological examinations gonadal tissue of *D. striatus* are prepared and processed using standard histological methods i.e. embedding in paraffin, sectioning at 5 µm and staining with hematoxylin-eosin (following HOWARD *et al.* 2004). Gonads are examined using a light microscope and designated to one of five developmental stages (sexual rest, pre-active, active, spawning and cytolysed). Images of each sample are captured using a digital camera and processed using the imaging software AxioVision (2010).

PRELIMINARY RESULTS

Qualitative descriptions of histological preparations of *D. striatus* gonad tissue were used to assess five gametogenic phases: stage 0 (rest), stage I (pre-active), stage II (active), stage III (spawning) and stage IV (cytolysed). Furthermore histological examinations demonstrated that sex ratios did not significantly deviate from 1:1. No case of hermaphroditism was found until now. Oocyte size ranges from 2 to 70 µm. Preliminary results of testing the HHH in tropical ecosystems comparing the reproductive biology of the surf clam *D. striatus* will be available on the COLACMAR conference and presented at the author's panel.

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