

# DENSITY AND BIOMETRY OF THE EXPLOITED HOLOTHURIAN *HOLOTHURIA TUBULOSA* AT THE DODECANESE, SOUTH AEGEAN SEA

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## Abstract

The edible holothurian, *Holothuria tubulosa*, was studied over a two-year period at the Dodecanese, South Aegean, in order to estimate the population density and biometry. Dense populations of the species were found at 3 islands, in shallow waters and very sheltered bays, in proximity to aquacultures. The biometric variables of the studied population differed among the islands; this pattern was linked to the trophic status of each area and the local fisheries. Considering the small size of the studied population and its low density, compared with other Mediterranean sites, it seems that *H. tubulosa* has been over-exploited at the Dodecanese.

**Keywords:** *Density, Biometrics, Echinodermata, Aegean Sea*

## Introduction

The Atlanto-Mediterranean holothurian, *Holothuria tubulosa*, is among the most conspicuous benthic invertebrates in the shallow sublittoral zone [1], commonly forming dense populations in meadows and sheltered bays. It is a selective epibenthic deposit feeder, highly contributing to the recycling of bottom detritus [2]. The species is exploited in the Mediterranean, either as fishing bait or as food source [3, 4], and is currently studied for its bioactivity with promising results for the treatment of inflammatory disorders [5]. In the Aegean Sea *H. tubulosa* is harvested and utilized as fishing bait at the Dodecanese, whereas it is commercially exploited in some Turkish areas [6]. *H. tubulosa* has been well studied in the western Mediterranean and the Adriatic [2, 4, 7]. However, relevant data for the Aegean populations is missing; the existing information is limited to the geographic and bathymetric distribution of the species [1]. Taking into account the above, the aim of the present work is to contribute to the study of *H. tubulosa* population in the Dodecanese, South Aegean Sea.

## Materials and Methods

The study was conducted at the Dodecanese, South Aegean Sea, where 26 stations on nine islands were randomly located (Figure 1).

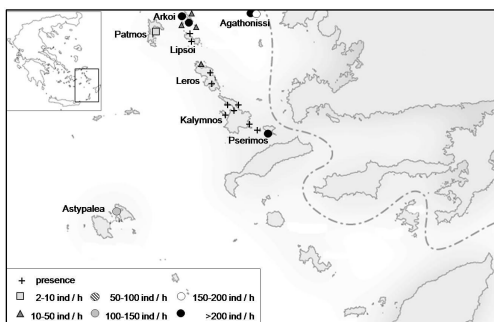


Fig. 1. Study area indicating sampling stations and relative abundance of *H. tubulosa*

Sampling, i.e. experimental fishery, was practiced by scientists and sponge fishermen by diving down to 20 m depth, in two consecutive years (2007 and 2008). 40 specimens were randomly collected from each station, in order to estimate the main biometric characteristics of the species (L = length, D = width, W = drained weight, Wg = gutted weight). Prior to biometrical analysis the specimens were relaxed in seawater containing 7.5% MgCl<sub>2</sub> at 0°C, for 24 hours, to enhance the measurements homogeneity [8]. Population density was estimated through fishing effort, according to an index of relative abundance ranging from 1 to 7. One-way ANOVA was used to test for spatial differences for the estimated biometric variables of the species.

## Results and Discussion

*H. tubulosa* was recorded at 18 stations, in shallow waters (less than 10 m depth) and in very sheltered bays, generally having low density (Figure 1). Dense populations were only observed at three islands: Agathonissi, Arko and Pserimos, where the species was found in proximity to aquacultures. A

moderate dense population was also observed in Astypalea, where sampling took place in a very sheltered bay, in which organic input accumulates. These results may be explained by taking into account the oligotrophic nature of the Dodecanese area [9], which creates constraints on the holothurians feeding. As a result, the *H. tubulosa* population can thrive only in areas with high organic inputs. Moreover, in this area the species has been harvested over a long period, a fact that also precipitates the reduction of the population density.

Overall, 350 individuals of *H. tubulosa* were measured. Their size ranged from 4.13 to 19.7 cm in length and from 1.99 to 8.6 cm in width, with a mean at 10.26 ± 2.78 cm and 3.82 ± 0.88 cm, respectively. Their biomass ranged from 29.14 to 350 g for drained and from 20.3 to 164.43 g for gutted weight, with a mean at 104.59 ± 44.7 g and 61.89 ± 23.25 g, respectively. Significant spatial differences for the biometric characteristics of the species were recorded (p<0.01) with high values at Agathonissi and low at Pserimos.

These results can be related to differences in local environmental conditions, mainly with respect to the trophic status of each area combined also with the effect of local fisheries. Unfortunately, there is no relevant data about the fishery of *H. tubulosa*. Considering the much smaller mean size, comparing to the usual one which approximates 20-25 cm in length [3], and the low density values observed, it seems that *H. tubulosa* has been over-exploited at the Dodecanese.

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