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Judul Jurnal Ilmiah (Artikel) : Biomonitoring of the Application of Monoculture and Integrated Multi-Trophic Aquaculture (IMTA) Using Macrobenthic Structures at Tembelas Island, Kepulauan Riau Province, Indonesia

Nama/Jumlah Penulis : **Sapto P. Putro**, Jeanny S, Widowati, Satriyo A, Suryono/5 orang

Status Pengusul : penulis ke-1 (Author)

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- b. Nomor ISSN : 2077-1312
- c. Volume, nomor, bulan tahun : vol 8, issue 11, 942, November, 2020
- d. Penerbit : MDPI AG
- e. DOI artikel (jika ada) : 10.3390/jmse8110942
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- Ruang lingkup dan kedalaman pembahasan:**
Ruang lingkup paper berkaitan dengan penerapan biomonitoring pada kawasan budidaya, membandingkan kondisi lingkungan budidaya yang berbeda (IMTA dan Monokultur). Hubungan factor biotik dan abiotik secara khusus tidak dibahas. Kedalaman bahasan memadai, dengan beberapa pendekatan analisa. Terdapat rekomendasi sebagai outcome dari hasil kegiatan riset (Skor 10)
- Kecukupan dan kemutakhiran data/informasi dan metodologi:**
Data yang diambil representatif dan mewakili wilayah yang disampling dengan memperhatikan kaidah statistik. Analisa data dengan pendekatan metode indeks dan multivariat menggunakan struktur macrobenthos. Penekanan analisa pada perbedaan tampilan ordinasi NMDS antar lokasi, dan perbedaan taksa dominan dan dihubungkan sebagai parameter tingkat gangguan. (Skor 10)
- Kelengkapan unsur dan kualitas terbitan:**
Kelengkapan unsur memadai dan kualitas terbitan baik, dipublikasikan pada jurnal internasional bereputasi, Journal of Marine Science and Engineering, Vol 8, No. 942: 1-13. November 2020. Kualitas terbitan jurnal sangat baik, terindeks scopus dengan SJR (2019) 0.5; Q2. (skor=10,00).

Semarang, 2020
Reviewer 1


Prof. Dr. Ir. Ambariyanto, M.Sc.
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Unsur dalam paper sesuai dengan kaidah penulisan. Abstract ditulis dengan komponen lengkap, terdiri dari komponen latar belakang, tujuan, metode, hasil dan kesimpulan (skor=4,00).

2. Ruang lingkup dan kedalaman pembahasan:

Ruang lingkup pembahasan sesuai dengan wilayah kajian jurnal, dengan materi artikel berhubungan dengan komparasi kondisi lingkungan di kawasan budidaya. Kedalaman pembahasan secara ilmiah memadai dengan Sebagian besar didukung oleh referensi terkini, namun masih ditemukan referensi terbitan sebelum 2000 (skor=11,00).

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Analisa data dengan mendekatkan indeks multivariat, dan pendekatan status gangguan lingkungan dilakukan dengan pendekatan indeks, taksa dominan dan ordinnasi NMDS dan memiliki kabaruan secara keilmuan bidang ekologi perairan (skor=10,00).

4. Kelengkapan unsur dan kualitas terbitan:

Unsur dalam paper lengkap dan kualitas terbitan internasional bereputasi, terbit pada JMSE, Vol 8, No. 942: 1-13. November 2020. Kualitas terbitan jurnal baik, terindeks scopus dengan SJR (2019) 0.5; Q2. (skor=11,00).

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Biomonitoring of the application of monoculture and integrated multi-trophic aquaculture (Imta) using macrobenthic structures at tembelas island, kepulauan riau province, indonesia (Article) [\(Open Access\)](#)

Putro, S.P.^{a,b} ✉, Sharani, J.^b ✉, Widowati^c ✉, Adhy, S.^d ✉, Suryono^e ✉

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Abstract

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Sustainable aquaculture needs to be considered when it comes to the utilization of water resources. The aim of this study was to apply biomonitoring using macrobenthic structures on both spatial and temporal applications of monoculture and integrated multi-trophic aquaculture (IMTA) at Tembelas Island, Kepulauan Riau Province, Indonesia. Samples of sediment were taken from three fish farm locations, namely from an IMTA site, a monoculture site, and a reference site. Macrobenthic organisms obtained through rinsing, sieving, and sorting were then identified under a stereo-microscope. Diversity of the macrobenthic assemblages was analyzed with a Shannon-Wiener index (H'). Equitability was expressed through Pielou's evenness index. Finally, Bray-Curtis' non-metric multi-dimensional scaling (NMDS) was used for similarities derived from $\log(X+1)$ transformed macrobenthic abundance to provide a visual representation of differences in their structure between sites over time. Results showed polychaetes exhibited differences in both variation and abundance of genera between the farm and reference site. The assemblage of macrobenthos at the IMTA site consisted of 9 genera of gastropods, 3 genera of bivalves, 5 genera of polychaetes, and 2 genera of crustaceans. At the monoculture site, 12 genera of gastropods, 4 genera of bivalves, 8 genera of polychaetes, 1 genera of crustaceans, and 1 genera of ophiuroid were observed. A relatively high abundance was observed at the reference site, with 27 genera of gastropods, 11 genera of bivalves, 3 genera of polychaetes, and 1 genera of crustacean. The favorable water conditions and possible absence of waste input from aquaculture resulting in a more suitable habitat for macrobenthic life may explain this relative abundance. Some of them were recognised as opportunistic taxa, i.e., *Capitella* sp., *Heteromastus* sp., and *Lumbrineris* sp. Based on the diversity and evenness indices and the MNDS ordination, it can be concluded that the application of IMTA systems results in a suppressed or reduced potential impact on environmental disturbance due to aquacultural activities. © 2020 by the authors. Licensee MDPI, Basel, Switzerland.

Author keywords

Environmental disturbance IMTA Macrobenthic assemblages Polychaetes Sustainable aquaculture

Funding details

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(2016) *Jurnal Teknologi*

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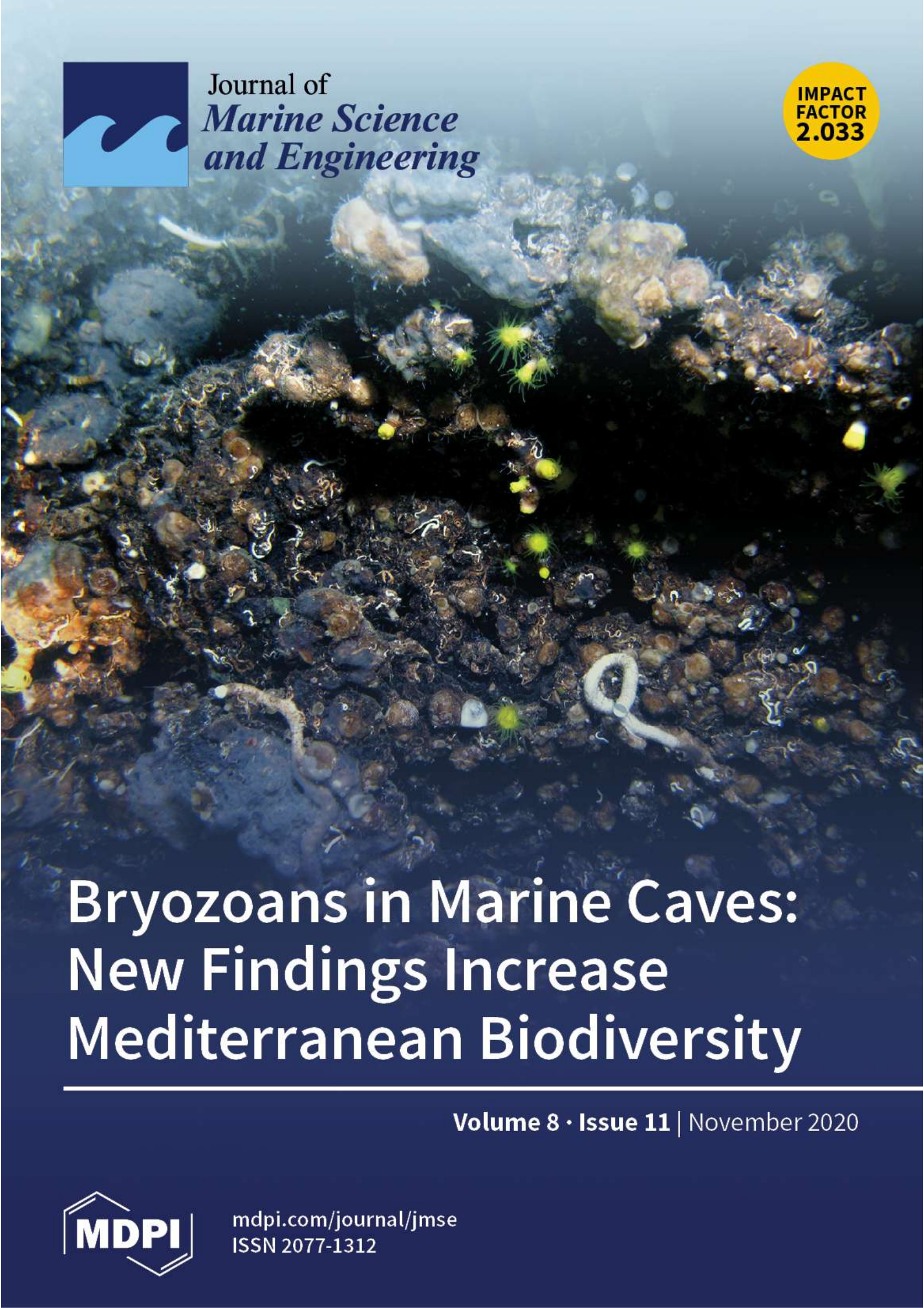
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Abstract In recent years, the development in digital technologies such as Augmented Reality (AR) and Virtual Reality (VR) has evolved rapidly. These technologies are currently in the process of creating driving change in the Cultural and Creative Industries (CCIs), representing innovative means to share [...] [Read more.](#)

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Abstract The stringent international regulations on marine emission abatement have exerted a huge push on the development of marine desulfurization and denitrification technologies. However, for the traditional vessels driven by large two-stroke diesel engines, simultaneous removal of NO_x and SO₂ is still [...]

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Biomonitoring of the Application of Monoculture and Integrated Multi-Trophic Aquaculture (IMTA) Using Macrobenthic Structures at Tembelas Island, Kepulauan Riau Province, Indonesia (</2077-1312/8/11/942>)

by Sapto P. Putro (<https://sciprofiles.com/profile/1103218>), Jeanny Sharani (<https://sciprofiles.com/profile/1212626>), Widowati (<https://sciprofiles.com/profile/author/U2hJN2FsMVBKZm45eHlRkJKMW9hMUV0bU9Hd0JLMFh2aXBKQ3FCY2VwMD0=>), Satriyo Adhy (<https://sciprofiles.com/profile/author/RStadWxhRjlaZ0JsTEIWbkdGT1RMOUNEVFZiMWNzTINCeFhyUHgzMWR2QT0=>) and Suryono (<https://sciprofiles.com/profile/author/NEl5NnRCWHdUQnQ0MGx6NllqMG05UGl1WXpPc0U5S0JraTRGbWFWbGROQT0=>)

J. Mar. Sci. Eng. 2020, 8(11), 942; <https://doi.org/10.3390/jmse8110942> (<https://doi.org/10.3390/jmse8110942>) - 19 Nov 2020

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Abstract Sustainable aquaculture needs to be considered when it comes to the utilization of water resources. The aim of this study was to apply biomonitoring using macrobenthic structures on both spatial and temporal applications of monoculture and integrated multi-trophic aquaculture (IMTA) at Tembelas Island, [...]

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Review of the Design and Technology Challenges of Zero-Emission, Battery-Driven Fast Marine Vehicles (</2077-1312/8/11/941>)

by Apostolos D. Papanikolaou (<https://sciprofiles.com/profile/1109826>)

J. Mar. Sci. Eng. 2020, 8(11), 941; <https://doi.org/10.3390/jmse8110941> (<https://doi.org/10.3390/jmse8110941>) - 19 Nov 2020

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Abstract The paper deals with a critical review of unique problems and challenges related to the design and technology of zero-emission, battery driven, fast marine vehicles. The uniqueness of the ensuing ship design problem is the request to fit maximum battery capacity and to [...]

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Article

Financial Analysis of Automated Container Terminal Capacity from the Perspective of Terminal Operating Company

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Abstract: This study examines the financial feasibility of the proper terminal capacity by each berth size of the automatic container terminal (ACT) from the perspective of Terminal Operating Company (TOC). ACT is a highly productive and eco-friendly port facility, but it requires a lot of capital investment. Thus, the investment of ACT should consider the TOC's operating profit preservation to determine the proper terminal capacity. In this study, we attempt to conduct financial analysis using the net present value method and estimate breakeven handling volume of five berth sizes (nine, five, four, three, and two berths). In particular, as the aim of this study is to propose a capacity model of ACT, the model must be able to adapt to a variety of situations reflecting the number of berths and financial discount rate. The case study focused on the new port of Busan, introducing ACT. As a result, the breakeven terminal capacity changes from 560,421 TEU of the 9-berth model to 633,102 TEU of the 2-berth model, applying a 4.5% standard discount ratio. In a sensitivity test considering the change in discount rate and the size of the berth at the same time, the net present value (NPV) has a positive value at the level of at least 550,000 TEU (nine berths and 3.5% discount rate) and up to 650,000 TEU (two berths and 5.5% discount rate). The method of optimizing financial efficiency by analyzing the appropriate loading capacity will be an important support tool in decision-making by providing the analysis results and reasonable information obtained during the analysis process to the TOC, the main stakeholder in the adoption of ACT.

Keywords: automated container terminal capacity; financial analysis; Terminal Operating Company

1. Introduction

The remarkable changes in the global port and logistics market are economies of scale due to the enlargement of ships and cost reduction through minimizing dwell time at ports [1,2]. In response to these changes, major ports in each country are improving the efficiency of port operation by introducing automated container terminal (ACT) systems [3]. ACT systems based on advanced technology are being introduced mainly in countries such as the Netherlands, Germany, USA, and China which have world-class advanced port infrastructure, and Korea is also introducing automated terminals in the new port of Busan [4].

In this context, the ACT is a terminal in which Automated Guided Vehicle (AGV) and Automated Rail Mounted Gantry Crane (ARMGC) are operated. Of the 23 automated container terminals worldwide, 12 are semi-automated and 11 are fully automated. The APMT and RWG in Rotterdam Port that opened in 2015, the LBCT that opened in 2016, the QQCTN in Qingdao Port that opened in 2017, and the 4th Yangsan Port are fully automated, showing recent trends in the types of automated terminals. The Korean government has introduced ACT for stages 2–5 and 2–6 of the new port of Busan by benchmarking the ACT already in operation.

Article

Size/Age Models for Monitoring of the Pink Sea Fan *Eunicella verrucosa* (Cnidaria: Alcyonacea) and a Case Study Application

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Abstract: The pink sea fan *Eunicella verrucosa* is a habitat-forming octocoral living in the East Atlantic and in the Mediterranean Sea where, under proper circumstances, it can form large populations known as coral forests. Although these coral forests represent vulnerable marine ecosystems of great importance, these habitats are still poorly known, and their monitoring is almost non-existent to date. For this reason, we compared two different models to infer the age of *E. verrucosa* based on nondestructive measurements of the colonies' size, in order to highlight strengths and weaknesses of the existing tools for a potential application in long-term monitoring. We also applied the two models on a case-study population recently found in the northwest Mediterranean Sea. Our results showed which model was more reliable from a biological point of view, considering both its structure and the results obtained on the case study. However, this model uses solely the height of the colonies as proxy to infer the age, while the total branch fan surface area could represent a more appropriate biometric parameter to monitor the size and the growth of *E. verrucosa*.

Keywords: Anthozoa; gorgonian; corals; coral habitat; coral forest; VME; mesophotic; modeling; biometry; Mediterranean

1. Introduction

The pink sea fan *Eunicella verrucosa* (Pallas, 1766) is an octocoral species (order Alcyonacea, family Gorgoniidae) living in the East Atlantic, from Ireland to Angola, and in the Mediterranean Sea [1–5]. This species can be found at a depth of 2 to 60 m in the Atlantic Ocean, while it can reach a depth of 200 m in the Mediterranean Sea [1,4–7]. Under proper oceanographic conditions including strong currents and temperate/cold waters, *E. verrucosa* can form large colony aggregations known as coral forests, settling on hard bottoms sometimes covered by a thin sediment veneer [5]. Similar to other animal forests (*sensu* [8]), octocoral assemblages provide biomass, structural complexity and aesthetic value to coastal communities, sustaining a rich biodiversity [5,9–17]. Coral forests, comprised of *E. verrucosa* represent a Vulnerable Marine Ecosystem (VME) because of their vulnerability to human pressures, according to the Food and Agricultural Organization (FAO) [18,19]. This vulnerability is based on the rarity, the functional significance, the fragility (both physical and functional), and the structural complexity of the coral forest, as well as the species' life-history traits (e.g., slow growth rate, late age of maturity, low or unpredictable recruitment, and extended life expectancy) that makes recovery difficult after a fishing impact. Indeed, bottom-contact fishing gears such as trawl nets, dredges, longlines, and artisanal fishing nets (e.g., gillnets and trammel nets) can have both direct and