

# Western Indian Ocean JOURNAL OF Marine Science

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Chief Editor José Paula



**Coral reefs  
of Mauritius  
in a changing global  
climate**

# Western Indian Ocean JOURNAL OF Marine Science

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Aims and scope: The *Western Indian Ocean Journal of Marine Science* provides an avenue for the wide dissemination of high quality research generated in the Western Indian Ocean (WIO) region, in particular on the sustainable use of coastal and marine resources. This is central to the goal of supporting and promoting sustainable coastal development in the region, as well as contributing to the global base of marine science. The journal publishes original research articles dealing with all aspects of marine science and coastal management. Topics include, but are not limited to: theoretical studies, oceanography, marine biology and ecology, fisheries, recovery and restoration processes, legal and institutional frameworks, and interactions/relationships between humans and the coastal and marine environment. In addition, *Western Indian Ocean Journal of Marine Science* features state-of-the-art review articles and short communications. The journal will, from time to time, consist of special issues on major events or important thematic issues. Submitted articles are subjected to standard peer-review prior to publication.

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## Word from the Editor

The last couple of years have been a time of change for the Western Indian Ocean Journal of Marine Science. The journal has a new and more modern layout, published online only, and the editorial Board was increased to include more disciplines pertaining to marine sciences. While important challenges still lie ahead, we are steadily advancing our standard to increase visibility and dissemination throughout the global scientific community. The central objective of the journal continues focused on the Western Indian Ocean region and serving its growing scientific community.

We are pleased to start the publication of special issues of the journal, launched here with the publication of manuscripts from the University of Mauritius Research Week 2016. The special issues aim to contribute for advancing marine science in the WIO by focusing on specific themes, geographical areas or assembling contributions from scientific meetings. The editorial processes are exactly the same as for regular issues, with double peer-review, and guest editors are considered.

José Paula  
Chief Editor

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## Editorial Note • Coral reefs of Mauritius in a changing global climate

The University of Mauritius Research Week (UoM RW) has been held on an annual basis since 2007 and was organized for the 9<sup>th</sup> time from 19-23 September 2016. The Research Week is geared towards dissemination of knowledge generated through research activities at the University and by relevant stakeholders in accordance with the UoM's vision of "*Excellence in Research and Innovation*". In line with national priorities, the UoM organizes this event to provide insightful research outcomes not only for the advancement of academic knowledge, but for the benefit of the community at large, through robust policy recommendations.

Out of the multiple submissions made during the UoM RW 2016, a number of manuscripts in the field of ocean/marine sciences were selected to be published in the Western Indian Ocean Journal of Marine Science (WIOJMS), as a special issue entitled "Coral reefs of Mauritius in a changing global climate". This issue is presented in the context of Mauritius being surrounded by a beautiful but delicate coral reef ecosystem, which provides ample ecosystem services contributing to the national economy, but which is subjected to extreme climatic events. Hence, in this special issue several contributions advancing our scientific understanding for sustainable use and management of marine resources in a globally changing marine environment are articulated. The original article by Mattan-Moorgawa *et al.* investigates the photo-physiology of diseased and non-diseased corals. Coral diseases are becoming more common on reefs worldwide due to both local and global stressors. Ramah *et al.* then present a short communication related to substrate affinity by two giant clam species found on the Mauritian coral reefs. Giant clams are under threat worldwide and information on their substrate affinity and habitat aims at providing insightful information towards their sustainable management. In addition, Nandoo *et al.*, in an effort to optimize nucleic acid extraction protocols from marine gastropods, present an original article based on a comparative study using the gastropod genera *Planaxis*, *Cypraea* and *Drupella*. These marine gastropods are ecologically important for coral reefs, especially the coral-eating *Drupella*. Moreover, given the importance of intertidal molluscs, Kaullysing *et al.* document the density and diversity of the benthic molluscs while comparing sheltered and exposed coastal habitats. Appadoo & Beeltah report on the biology of *Platorchestia* sp. (Crustacea, Amphipoda) at Poste La Fayette, Mauritius. Studies on Amphipod diversity and distribution are important especially since studies on marine biodiversity are scarce around Mauritius. Another original article by Ragoonaden *et al.* analyses the recent acceleration of sea level rise in Mauritius and Rodrigues. Such studies are more important than ever in the light of a globally changing marine environment with small island states faced with issues related to rising sea level. Two field notes, based on field observations, are presented by Bhagooli *et al.*, documenting a variety of coral diseases, and *Stylophora pistillata*-like morphotypes occurring around Mauritius Island, respectively. Kaullysing *et al.* also present a field note on coral-eating gastropods observed around Mauritius.

Apart from the local contributors, international collaborators also contribute two original articles in this special issue. Casareto *et al.* characterize the chemical and biological aspects of a coral reef of Mauritius focusing on benthic carbon and nitrogen fixation. These studies related to benthic productivity are important for understanding sustainability of coral reefs and/or lagoonal fisheries. On the other hand, Tokumoto *et al.* document the first detection of membrane progesterin receptor (mPR)-interacting compounds from Mauritian coral reef and lagoonal seawater. They used cutting-edge technology to detect key regulators of reproduction in seawater. These contributions in terms of original articles, short communications, and field notes generate new scientific knowledge that may better inform policy and decision making in the field of coral reef studies and management in Mauritius, while contributing to the understanding of coral reefs in the wider Western Indian Ocean region.

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# Field observation of five *Stylophora pistillata*-like morphotypes near Mauritius Island.

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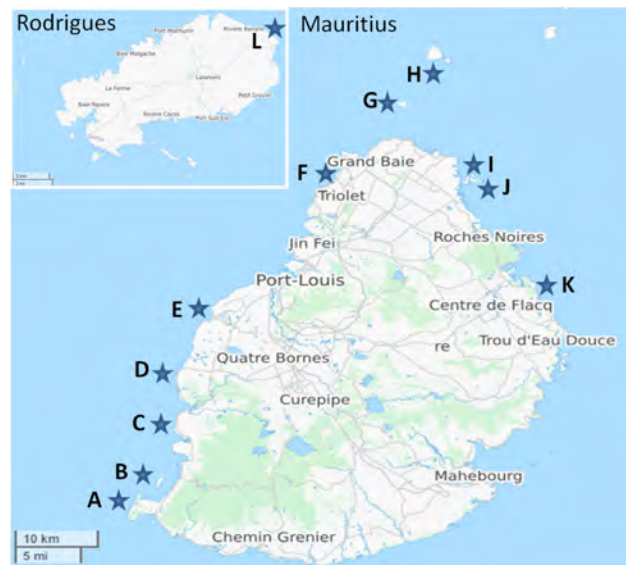
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Back in the 1970s, Faure (1977), studying the Mascarene Archipelago, mentioned *Stylophora pistillata* as occurring around Mauritius, and more recently McClanahan *et al.* (2005) found *S. pistillata* at one site around this island. However, *S. pistillata* seems very rare as it is absent from the published list of scleractinian coral species of Mauritius Island (Moothien-Pillay *et al.*, 2002). Other studies also did not find *S. pistillata* around Mauritius Island (Turner *et al.*, 2000; AFRC, 1999-2014).

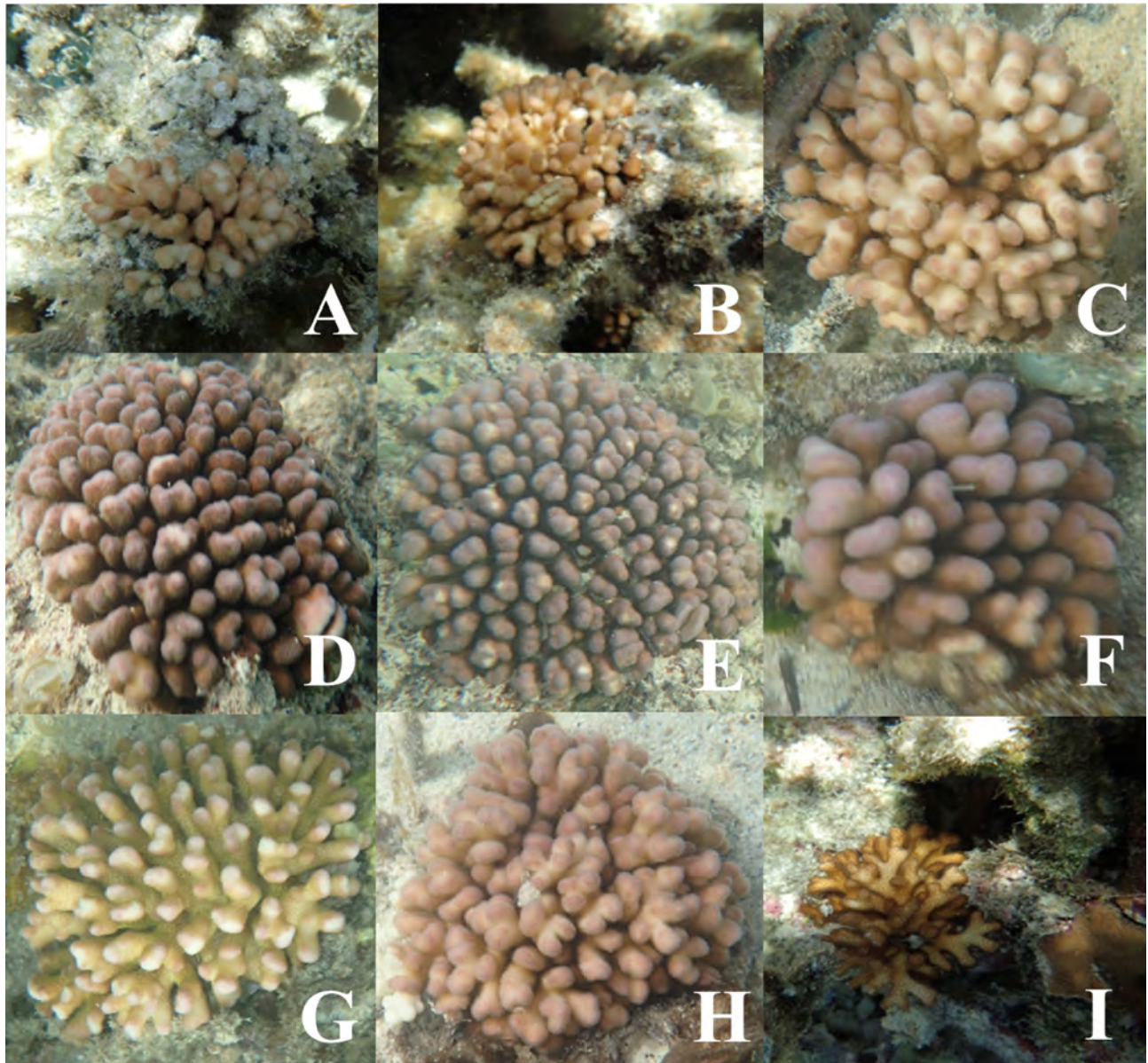
Visual surveys through snorkeling were conducted during one hour each at 3-6 stations covering coastal, lagoonal and reef flat zones at 12 sites, namely Flic en Flac, Belle Mare, Trou aux Biches, Ile d'Ambre, Ile Plate, Ile aux Bénitiers, Le Morne, Rodrigues Island (Pointe Cotton), Gunner's Point, Albion, and Black River (Fig. 1) between the years 2013 and 2016. Here we report field observation of 5 morphotypes attributable to *S. pistillata* (Fig. 2) around Mauritius Island, specifically near the two islets of Ile d'Ambre and Ile Plate. In April 2016, we found fifty-one colonies at two stations of Ile d'Ambre (19 colonies at Ilot Longue and 32 colonies at Plateau Ile aux Bernaches) ranging from 3 to 40 cm in diameter. In November 2016, thirteen further colonies ranging from 2 to 30 cm in diameter were found at one station near the shore of Ile Plate. We, therefore, propose adding *S. pistillata* to the official list of coral species known from Mauritius Island.

We tentatively grouped these colonies into five *S. pistillata*-like morphotypes. One (M1) occurred at both Ile d'Ambre and Ile Plate; three (M2, M3, and M4) were found only at Ile d'Ambre, and one fifth (M5) was observed only at Ile Plate. At Ilot longue (Ile d'Ambre)

there were 10, 2, 2, and 5 colonies belonging to morphotypes M1, M2, M3, and M4, respectively, whereas at Plateau Ile aux Bernaches (Ile d'Ambre) we found 30 and 2 colonies of morphotypes M2 and M4. Ile Plate had 8 and 7 colonies of morphotypes M1 and M5 respectively. These morphotype sightings warrant further investigations using a scanning electron microscope for micro-scale skeletal structure assessment and molecular genetic analyses to further explore the biodiversity of *Stylophora* around Mauritius Island, especially since an Indian Ocean origin



**Figure 1.** Map of Mauritius Island indicating sites surveyed for *Stylophora pistillata*. A. Le Morne, B. Ile aux Bénitiers, C. Black River, D. Flic en Flac, E. Albion, F. Trou aux Biches, G. Gunner's Point, H. Ile Plate, I. Ile d'Ambre (Plateau Ile aux Bernaches), J. Ile d'Ambre (Ilot Longue), K. Belle Mare, and L. Pointe Cotton (Rodrigues Island). Source: <https://www.openstreetmap.org>



**Figure 2.** *Stylophora pistillata*-like morphotypes - morphotype 1 (M1). A and B from Ile Plate, C from Ile d'Ambre; morphotype 2 (M2). D, E and F from Ile d'Ambre; morphotype 3 (M3). G from Ile d'Ambre; morphotype 4 (M4). H from Ile d'Ambre; and morphotype 5 (M5). I from Ile Plate.

was proposed for this genus (Flot *et al.*, 2011). Four genetic species of the coral genus *Stylophora* have been recently reported to occur in the Indo-Pacific, each of them encompassing some morphotypes attributable to the widespread morphospecies *S. pistillata* (Flot *et al.*, 2011; Keshavmurthy *et al.*, 2013), hence, some of the morphotypes we observed may correspond to distinct genetic species, a hypothesis that will require further testing using DNA sequence markers.

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