

Reef Fishes: Urgent needs for Knowledge and Management in Tropical Waters

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Open access journals allow scientific results to be visible to a large audience of scientists, managers and others [1]. In particular, open access journals allow researchers and students in developing countries to obtain scientific information.

The Journal of Marine Science: Research and Development covers, among other fields, oceans, seas, marine organisms, ecosystem dynamics and waves, as well as geology [1]. In this editorial, I would like to link the importance of research on reef fishes and their fisheries to the urgent need for the management of these stocks, focusing particularly on groupers and snappers.

Reef fishes represent integrated socio-ecological systems that include vulnerable species which are important targets in fisheries. Reef fishes are usually important as food and in economic terms. They are often one of the principal targets of small-scale fishing activity in tropical waters. Groupers are top-level predators in reef systems. These species are protogynous hermaphrodites and are monandric, with sex inversion occurring between the 9th and 16th year of age [2]. Reproductive modes appear to affect the vulnerability of species: female-first sex-changers appear to benefit, in terms of abundance, from the protection of marine habitats [3]. Coral reefs are important to tourism as well as to fisheries. It has previously been suggested that the formulation of approaches to reef management and the associated tourism and fisheries activities be based on local institutions and knowledge [4]. Such management should be embedded within the fishery, in collaboration with fishermen, in order to work towards food security, as well.

In Brazil, coastal fishermen rely on reef fishes, especially those belonging to the families Lutjanidae and Serranidae, as food and for sale in the market [5]. These coastal fishermen are active in small-scale fisheries that use, e.g., paddled and motorized canoes (or small boats), along with hooks and lines and set gillnets. Information from 14 coastal small-scale fisheries in Brazil, located from the north (Mucuripe, Fortaleza Ceará) to the south (Pântano do Sul, Florianópolis, Santa Catarina) showed a representation of 12 species of snappers (Lutjanidae), especially *Lutjanus*, and 16 species of groupers (Serranidae), especially *Epinephelus* and *Mycteroperca*, in the catches of these coastal small-scale fisheries [5]. In particular, the dusky grouper, *Epinephelus marginatus*, is a very important target species in southeast Brazil and is in high demand by restaurants [6]. However, the management of these fisheries faces challenges because managers lack information on historical catches and on the period of reproduction of the reef fish. As a result, the task of management is difficult.

An important approach to urgent management needs in the case of data-poor fisheries is to rely on local ecological knowledge (LEK) gathered in collaborative research with fishermen [7,8]. Healthy fisheries may help to reduce poverty by providing revenue, contributing to the creation of wealth and furnishing socio-economic stimulation at the community level [9]. Finally, other mechanisms for integrating fisheries into management may take the form of 'payments for environmental services' (PES) [10] in terms of defining areas or periods of fishing closures, especially in relationship to the reproductive period of the reef

fishes.

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