Egyptian Journal of Aquatic Research (2014) **40**, 71–78

National Institute of Oceanography and Fisheries

Egyptian Journal of Aquatic Research

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FULL LENGTH ARTICLE

Role of mangroves as a nursery ground for juvenile reef fishes in the southern Egyptian Red Sea

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Received 13 December 2013; revised 26 December 2013; accepted 11 January 2014
Available online 4 February 2014

KEYWORDS

Juvenile fish;
Nursery ground;
Mangroves;
Reef fishes;
Red Sea

Abstract This work aims to study the importance of mangrove area as nursery grounds for the juvenile of reef fishes in the Red Sea. Juvenile fishes were collected during three seasons in 2010 from three mangrove swamps by a beach seine net. The net was dragged on the bottom for 100 m three times. A total of 269 juvenile fishes were collected, representing 21 species in 19 families. The most abundant species formed about 86% of all collected fishes. Nine species were collected for the first time from mangrove areas in the Egyptian Red Sea. Most of the collected fishes are economically important fishes. Moreover, eleven families were belonging to coral reef fishes. The highest species richness value was recorded in Hamata mangroves. This finding showed that how mangroves could support the life history of many coral reef fishes.

Introduction

About one thousand of fish species included in 100 families live on coral reefs. The vast majority of coral-reef fishes have pelagic larva that spent in the water column away from adult habitat on the reef (Leis et al, 1996). This pelagic phase is potentially much more dispersive than the relatively sedentary adult stage (Sale, 1991). Many marine organisms have complex life histories that include distinct stages that depend on different marine habitats (Leis et al., 1996). Most marine fishes spawn 10,000 eggs to 1,000,000 small eggs (less than 1 mm) which hatch into larvae that drift in ocean currents for 1 week to several months before transforming into juveniles and entering nursery habitats. For some species these nursery habitats are the same habitats as their adults, but for most species nursery habitats are distinct (Jones, 1991; Leis et al., 1996; Rosenberg, 1982).

Juveniles are sexually immature pre-adult stages that resemble the adult morphologically, although in some cases they may exhibit different patterns of coloration. Nursery grounds are usually found near the shore (shallow water) and may be estuaries (Munro et al., 1973), insular shelves of the reef habitats, sheltered inshore areas including mud flats, sandy shores, seagrass and mangrove habitats (Ahmed, 1992). They must have certain characteristic features including abundant food supply and protection from predation.

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Peer review under responsibility of National Institute of Oceanography and Fisheries.

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http://dx.doi.org/10.1016/j.ejar.2014.01.001

It has been proved that high number of fishes and marine invertebrates depends to a large extent on mangrove habitats during the juvenile phase of their life cycles, where the mangrove prop-roots create a special underwater habitat, especially during the breeding and juvenile stages (Bennett, 1989). The availability of mangrove nursery habitat had a striking impact on the community structure and biomass of reef fish in their adult, coral reef habitat. The biomass of several species was more than doubled when the reefs were connected to rich mangrove resources (Mumby, 2005).

Despite the importance of mangroves as nursery area for life history of fishes, researches on the early stages of fishes and their biology and ecology in the Red Sea are very rare. Moreover, information on the distribution of juvenile fishes of the coral reef in the Red Sea is almost lacking. However, Ahmed (1992) studied the distribution, growth, feeding, species composition and abundance of the juvenile in the Gulf of Aqaba. Therefore, this study aims to determine the composition of juvenile fish communities inhabiting mangrove swamps in the Egyptian Red Sea, to evaluate the importance of these swamps as nursery areas for the economically important fishes and how mangroves could support the life history of reef fishes.

Materials and methods

Description of study area

This study was carried out in three coastal mangrove swamps along the Egyptian Red Sea (Fig. 1). Sharm Al-Bahary is located at 35 km south of Al-Qussier. Most of the coast of Sharm Al-Bahary is formed of medium to coarse sand while the northern part is characterized by grit stone. The tidal flat is wide, nearly horizontal and extends smoothly with very gentle slope seaward. Its bottom floor is rocky mainly from the dead coralline limestone covered with thin layer of fine sand and mud inhabited with mangrove trees. This area is very shallow and the mangrove trees were situated along the beach zone, also the area has narrow rocky tidal flat.

Qula'an is shallow with a narrow coastal area that is inhabited by mangrove trees located at 24° 21′ 33 N 35° 17′ 46°E. The tidal flat is narrow in the middle and southern parts while the northern part is sandy and inhabited with dense seagrasses cover. It extends smoothly with very gentle slope seaward.

Hamata (24°37′N and 35°28′E) in the Southern Egyptian Red Sea coast is about 70 km south of Marsa Alam (Fig. 1). It contains the best-developed stands of mangrove on the entire coast. This stand has a crescent shape, with two sandy protected shallow lagoons with muddy bottom. The lagoons are sheltered and nearly isolated from the sea.

Field work

Physico-chemical parameters of temperature and salinity, were measured by the Hydro-lab. Juvenile fishes were collected from the mangroves of Sharm Al-Bahary, Qula'an and Hamata in winter, spring and autumn. Fishes were collected by a small beach seine that was towed horizontally creeping on the

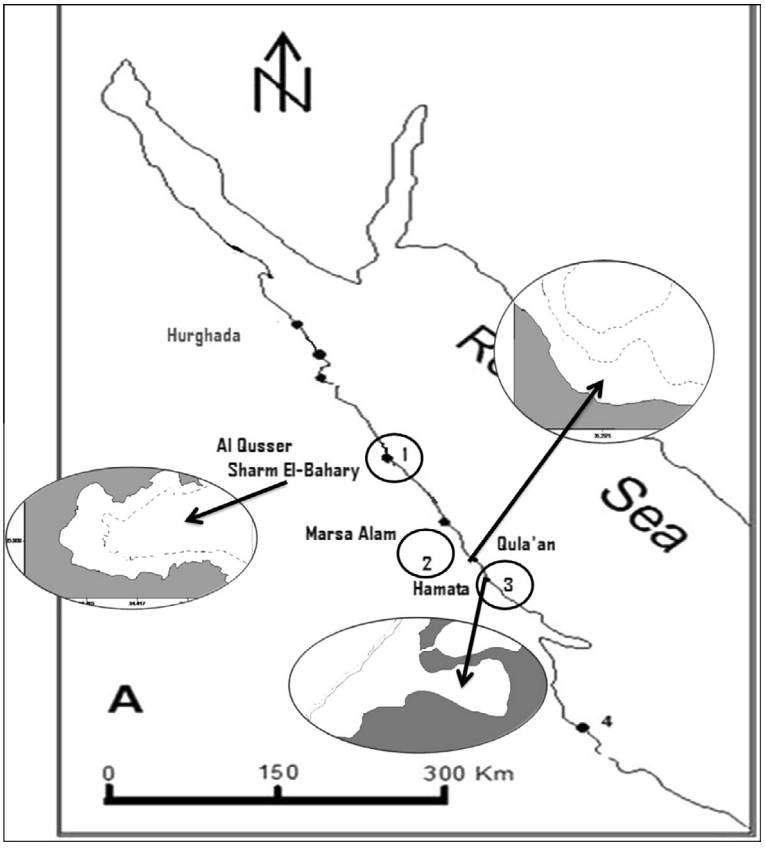

Figure 1 Location map of the Red Sea showing the sampling mangrove sites, (1) Sharm El-Bahary, (2) Qula'an and (3) Hamata.