

Exploring Sheraoh Island at South-Eastern Qatar: First Distributional Records of Some Inland and Offshore Biota with Annotated Checklist

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Abstract

Sheraoh island is the most remote among Qatari islands, nearly 73.5 km south-eastern of the mainland of the peninsula. In March 2010, a preliminary general survey of the species was conducted. Observations were made partly by wading and snorkeling in the intertidal zone and partly by surveying the inland habitats. In total the 31 species were recorded, 4 species of halophyte plants: *Halopeplis perfoliata*, *Suaeda vermiculata*, *Salsola baryosoma* and *Zygophyllum qatarense*, one unexpected terrestrial mammal: the cape hare *Lepus capensis*, 2 species of visiting birds: *Motacilla flava* and *Anthus campestris* and one species of sea bird.

Phalacrocorax nigrogularis, one dolphin species: *Sousa chinensis*. The largest richness was found in the marine habitats, 3 species of sea weeds: *Colpomenia sinusa*, *Padina boergesenii* and *Sargassum boveanum*, 3 species of corals: *Anomastreaa irregularis*, *Platygyra lamellina* and *Porites harrisoni*, 2 species of nudibranchs: *Chromodoris cazae* and *Chromodoris sp. (unidentified)*, 4 crab species: Hermit crab (unidentified), *Etisus laevimanus*, *Grapsus albolineatus* and *Lambrus prensor*, 4 species of echinoderms: *Pentacentral mammillatus*, *Ophiothela venusta*, *Diadema setosum* and *Echinometra mathaei*, 5 species of bony fish: *Doryrhamphus sp. (larva)*, *Cypserulus oligolepis*, *Lethrinus nebulosus*, *Cephalopholis miniatus* and *Hemiramphus marginatus*, one species of sea snakes: *Hydrophis sp.* The most striking result is to collect an unknown nudibranch species and to report the cape hare which is unexpected inhabitant. All figures of this study are published for the first time in Qatar.

Keywords: Arabian Gulf; Qatari Islands; Sheraoh island; Marine Biota; Nudibranchs; Cape hare

Introduction

Although there is a growing number of marine ecosystem studies of Qatari waters, the islands have not received much attention. There have been a few publications on island biodiversity in the region, but with the exception of recent studies on the Qatari lizards [1] and vegetation [2], there are no (to our knowledge) first hand records of biodiversity in Sheraoh island except few observations have been recorded by some visitors [3]. Islands are important priorities for biodiversity conservation that hold more than one-fifth of the world's plant species and about one-quarter of the world's threatened mammals and one-third of the world's threatened birds [4]. In Qatar, the most prominent islands are located in the north and eastern side of Qatari peninsula. They include Rakan island, Halul island, Al-Aaliya island, Al-Saffiah island, Al-Ashat island and Sheraoh island. They play a crucial role as resting and breeding sites for different types of seabirds, nesting sites for the green and hawksbill turtles and some of them harbor coral reefs around which host a highly rich diversity of marine species. There is a growing number of studies focusing on islands biodiversity in Qatar. Vegetation (Halul island [2]), lizards (three islands were investigated: Halul, Al-Alia and Al-Saffiyah [1] and the coral reefs and associated biota of Halul and Al-Saffiyah islands [5,6]. In addition, Halul island is a very important island for nesting hawksbill turtles and different sea birds [3]. The biodiversity of Sheraoh island had never been studied and the only information available is visitor observations related to nesting activities of hawksbill turtles [3]. Thus, the current study is the first biodiversity survey of the island. There is a need of further research to help in setting a conservation agenda for the wild life of Arabian Gulf islands.

Materials and Methods

Qatari islands

The archipelago of Qatar peninsula, south of Arabian Gulf, is

located between the latitude 24° 27' and 26° 10' North and longitudes 50° 45' and 51° 40' East with an area of 11,521 km². The most prominent islands are located north, north-eastern and south-eastern sides of the peninsula. summarizes the Qatari islands with its latitudes and longitudes. The Sheraoh island is the most remote island in the southeastern side (Figure 1). It is located at the far margin of Qatari waters. The island has different biotypes including rocky shores, intertidal and subtidal sand banks, shallow lagoons and coastal sand dunes (Figures 2 and 3) (Table 1).

Two days' cruise to sheraoh island

The observations were made during 2 days' field work in March 2010. The survey was conducted partly by wading and snorkeling in the intertidal zone and by surveying the inland habitats. Two benthic samples were collected offshore. Samples were preserved in plastic collection jars containing 5% seawater-diluted formalin, brought to the laboratory, sorted, and identified. Some specimens were photographed *in situ*. All specimens were investigated by using Stereo-microscope and identified based on the available atlases, field guides and publications such as marine biota [7], sea shore organisms [8], fishes [9], halophytes [10] and corals [11,12].

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Figure 1: A satellite google map showing State of Qatar with the remote Sheraoh island: (A) encircled and (B) enlarged.



Figure 2: A shallow lagoon in Sheraoh island.



Figure 3: A rocky shore in Sheraoh island.

Results

A total of 32 species were collected/ encountered along the inland, coastal, and tidal areas of the island during the expedition with different groups and species (Table 2).

Inland assemblage

The vegetation of the island was found to be dominated by halophyte communities with *Halopeplis perfoliata* (Figure 4), *Suaeda vermiculata* (Figure 5), *Salsola baryosoma* and *Zygophyllum qatarense* (Figure 6).

• Birds

Two types of visitor birds were observed, the western yellow wagtail *Motacilla flava* (Figure 7), and Tawny Pipit *Anthus campestris* (Figure 8). A dead body of Socotra cormorant *Phalacrocorax nigrogularis* was also found (Figure 9).

• Mammals

One unexpected mammalian species, the cape hare *Lepus capensis* was seen running very fast and camouflaged under shrubs. A discovered skeleton with stiff tufts of hairs between the pads of the feet obviously indicating that the Cape hare is a common inhabitant on the island (Figure 10). A dolphin skeleton was also found with well-defined long beak and prominent teeth, the upper jaw is shorter than the lower and backbone is humped. These features characterize the endo-pacific humped back dolphin *Sousa chinensis* (Figure 11).

Coastal area assemblage

Along the coastal area, many pieces of coral skeletons were observed scattered everywhere which indicated the dominancy of three species, *Anomastreaa irregularis*, *Platygyra lamellina* and *Porites harrisoni*. The brown algae were plentiful along the coastal area and three species were dominated, *Colpomenia sinusa* (Figure 12), *Padina boergesenii* (Figure 13) and *Sargassum boveanum* (Figure 14). Rocks in the upper intertidal zone were covered by green algae (Figure 15).

Intertidal and subtidal biotopes

The assemblage of intertidal and subtidal diversity was found highly enriched by different types of marine biota.

• Echinoderms

Two sea stars were commonly observed, the large sea star *Pentacentral mammillatus* (Figure 16) and the brittle star *Ophiothela venusta* (Figure 17). Similarly, skeletons of the sea urchin *Diadema setosum* (Figure 18) and *Echinometra mathaei* were also common (Figure 19).

• Nudibranchs

Two species of nudibranchs were collected from subtidal zone, *Chromodoris cazae* (Figure 20) and un-specified nudibranch related to genus *Chromodoris* which is characterized by prominent red spots and yellow margin (Figure 21).

• Crustacea (Decapods)

The decapods *Etisus laevimanus* (Figure 22), *Grapsus albolineatus* (Figure 23) and *Lambrus prensor* (Figure 24) were common in the tidal and intertidal zones and were observed invading sandy and rocky coastal areas. Sand towers indicated presence of ghost crab (Figure 25). In addition, Hermit crabs were observed among the subtidal zone (Figure 26).

Offshore biotype

Five species of bony fish was encountered, a larval stage of pipe

Name	Latitude in Decimal Degrees	Longitude in Decimal Degrees
Rakan Island	26.175723°	51.220295°
Halul Island	25.673681°	52.410462°
Al-Aaliya Island	25.403958°	51.568908°
Al-Saffia Island	25.346331°	51.576800°
Palm Tree Island	25.339780°	51.533572°
Old Palm Tree	25.305338°	51.527821°
Banana Island	25.297635°	51.643587°
Pearl Island	25.371761°	51.559459°
Al-Ashat Island	24.751651°	51.609290°
Sheraoh Island	25.030992°	52.229545°

Table 1: The different prominent Qatari islands with latitudes and longitudes.

Collected and observed Biotypes	Related Biotypes of Arabian Gulf coasts
Phaeophyte Algae: Scytosiphonaceae - <i>Colpomenia sinusa</i> (Figure 12) Dictyotaceae - <i>Padina boergesenii</i> (Figure 13) - <i>Sargassum boveanum</i>	The 3 species of these Phaeophytes are commonly distributed in all Arabian Gulf coasts including Qatar
Halophyte plants: Chenopodiaceae - <i>Halopeplis perfoliata</i> (Figure 4) - <i>Suaeda vermiculata</i> , (Figure 5) - <i>Salsola baryosoma</i> - <i>Zygophyllum qatarense</i> (Figure 6)	The 4 species of these halophytes are dominated in all Arabian Gulf countries including Qatar
Corals: Siderastreidae - <i>Anomastreaa irregularis</i> (Figure 5) Faviidae - <i>Platygyra lamellina</i> Poritidae - <i>Porites harrisoni</i>	Commonly distributed and recorded from all AG waters including Qatar
Nudibranch Molluscans: Chromodorididae - <i>Chromodoris cazae</i> (Figure 20) - <i>Chromodoris sp.</i> (Figure 21)	<i>Chromodoris cazae</i> is commonly distributed only in waters of United Arab Emirates and Qatar. the second unidentified species is observed for the first time from Arabian Gulf waters.
Decapod Crustacea: Grapsidae - <i>Grapsus albolineatus</i> (Figure 23) Xanthidae - <i>Etisus laevimanus</i> (Figure 22) Parthenopidae - <i>Lambrus prensor</i> (Figure 24) - Hermit crab (Figure 26)	Commonly distributed in Arabian Gulf
Echinoderms: Oriasteridae - <i>Pentacentral mammillatus</i> (Figure 16) Ophiotrichidae - <i>Ophiotela venusta</i> (Figure 17) Diadematidae - <i>Diadema setosum</i> (Figure 18) Echinometridae - <i>Echinometra mathaei</i> (Figure 19)	Commonly distributed in Arabian Gulf waters
Bony Fish: Exocoetidae - <i>Cypserulus oligolepis</i> Syngnathidae - <i>Doryrhamphus sp.</i> (larva) Lethrinidae - <i>Lethrinus nebulosus</i> Serranidae - <i>Cephalopholis miniata</i> Hemiramphidae - <i>Hemiramphus marginatus</i>	Commonly distributed in Arabian Gulf waters
Reptiles: Hydrophis sp.	It common inhabitant in Arabian Gulf and Indian ocean
Birds: Phalacrocoracidae - <i>Phalacrocorax nigrogularis</i> (Figure 9) Motacillidae - <i>Motacilla flava</i> (Figure 7) - <i>Anthus campestris</i> (Figure 8)	Frequently seen
Mammals: Delphinide - <i>Sousa chinensis</i> (Figure 11) Leporidae - <i>Lepus capensis</i> (Figure 10)	<i>Sousa chinensis</i> is a common member of marine mammals fauna in the Arabian Gulf. The desert cape hare <i>Lepus capensis</i> is an unexpected inhabitant on this remote island.

Table 2: An annotated list of observed and collected Biota from Sheraoh Island, southeastern of Qatar in March 2010.

fish *Doryrhamphus sp.*, flying fish *Cypserulus oligolepis*, *Lethrinus nebulosus*, *Cephalopholis miniatus* and *Hemiramphus marginatus*. One marine reptile was also observed from the vessel, the common Arabian Gulf sea snakes, *Hydrophis sp.*

Discussion

Qatari islands are numerous, and most of them are located nearshore of the main land of the peninsula. The most remote ones are Halul and Sheraoh islands which are located at northeastern and southeastern of Qatar respectively. The islands are usually flat, made of calcareous rock and covered by sand. There is very limited information available on Sheraoh island, although, it is described as a heaven for sea birds, nesting turtles specially the hawked bill types and small fringed reefs [3]. Due to its isolation and long distance from the mainland, Sheraoh island has not been visited by many people. Only fishermen and a few others visit the islands and they typically do not stay long. It is not frequently disturbed, the island still maintains very large breeding

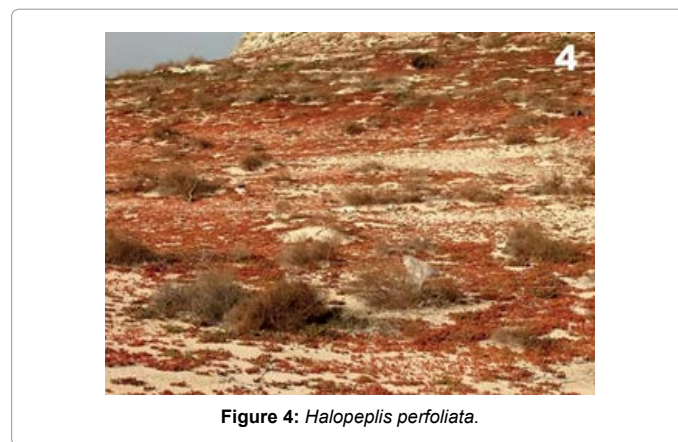


Figure 4: *Halopeplis perfoliata*.



Figure 5: *Suaeda vermiculata*.

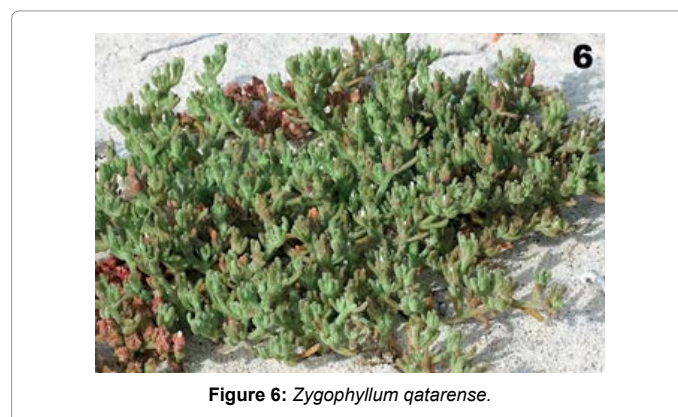


Figure 6: *Zygophyllum qatarense*.



Figure 7: *Motacilla flava*.



Figure 11: Skeleton of the humped back dolphin *Sousa chinensis*.



Figure 8: *Anthus campestris*.



Figure 12: *Colpomenia sinusa*.



Figure 9: Dead body of Socotra cormorant *Phalacrocorax nigrogularis*.



Figure 13: *Padina boergesenii*.



Figure 10: Skeleton of the cape hare *Lepus capensis*.



Figure 14: *Sargassum boveanum*.



Figure 15: Upper intertidal zone covered by green algae.

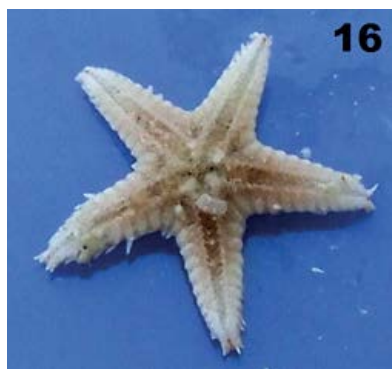


Figure 16: The large sea star *Pentacentral mammillatus*.



Figure 17: Brittle star *Ophiothela venusta*.

aggregations of seabirds and sea turtles that have been lost from the mainland and islands near the mainland.

The Arabian Gulf and Qatari islands are extremely important as nesting sites for green and hawksbill turtles. In addition, they are of international importance for seabirds that either breed on the islands or rest there during their annual migrations. The islands also host other species from different biota. The reefs around the islands host a rich diversity of marine species including algae, seagrass, coral, invertebrates, fishes, turtles, and occasionally sea snakes and marine mammals [12].

One of the most interesting species which was collected from Sheraoh' biota was one unidentified species of nudibranchs that is characterized by prominent red wide spots and yellow margin. It is

probably related to Australian species *Chromodoris splendida* [13]. No organized study of nudibranchs in Qatar has yet been undertaken, however, some collections have been reported. As far as references have revealed, 6 species have been collected from Qatari waters, *Chelidonura livida*, *Flabellina rubrolineatus*, *Chromodoris annulata*, *C. obsolete*, *C. cazae* and *C. sp16* [14-16]. *Chromodoris cazae* has only reported from Arabian Gulf, specifically from Qatar and United Arab Emirates [17].

The observations and collecting of coral skeletons and algal remains from intertidal zone indicated that there is a high diversity of corals and algae in the surrounding waters. The skeletal material of coral reefs was found covering a wide area of coastal region. The scattered skeletons



Figure 18: Skeletons of the sea urchin *Diadema setosum*.



Figure 19: *Echinometra mathaei*.



Figure 20: The nudibranch *Chromodoris cazae* which recorded only from Qatari and Emirati waters, Arabian Gulf.



Figure 21: *Chromodoris* sp. a nudibranch which have not ever seen before in Arabian Gulf waters.



Figure 25: Sand towers indicated presence of ghost crab.



Figure 22: The smooth spooner crab *Etisus laevimanus*.



Figure 26: Hermit crabs were observed among the subtidal zone.



Figure 23: The mottled crab *Grapsus albolineatus*.



Figure 24: The parthenopid crab *Lambrus prensor*.

were dominated by the brain coral *Platygyra lamellina* and *Porites harrisoni* which are the most common Arabian Gulf corals [12,18,19].

Among the more active offshore animal types are the crabs which mostly with high distribution near sand and rocky coastal areas. The rock crab *Etisus laevimanus*, the mottled crab *Grapsus albolineatus* and the parthenopid crab *Lambrus prensor* were common along the coastal area. The prominent erected sand towers of Ghost crabs also common along the coastal area [20].

We were unexpected to find a population of Cape hare *Lepus capensis* at the island. The cape hare is a common mammalian member of Arabian Peninsula including Qatar. However, its presence in a remote isolated island like Sheraoh was unexpected. The Cape hare has been recorded also from Al-Safliya island [3]. It could be interesting to study this population using DNA techniques to trace its phylogeny. This will empathize if this population was introduced to the island or if it has been isolated for a long period. As islands near the mainland are commonly disturbed by human presence, the remote and isolated Sheraoh island could be used for studies on natural ecosystem on undisturbed islands [20].

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Competing Interest

The authors declare that they have no competing interests.

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