
ECOLOGY AND CONSERVATION OF THE HERPETOFAUNA OF EL OMAYED PROTECTED AREA, EGYPT

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Abstract

This study was carried out in El Omayed Protected Area at the Western Coastal Desert of Egypt. The present survey of the herpetofauna comprise 30 species (one amphibian species and 29 reptilian species) belonging to 25 genera and 11 families. *Bufo viridis viridis* was the only recorded amphibian species. From reptiles, 18 species of lizards, 9 species of snakes, and 2 species of Testudines were recorded. No endemic species were found in the study area. About half of the recorded species (43%) are threatened by different degrees and in argent need of special management; Threats to the populations of herpetofauna of the study area and conservatory recommendations were listed.

Key Words: Ecology, conservation, herpetofauna, reptile, amphibians, El Omayed, Protected Area, Egypt.

Introduction

Since the beginning of humanity, people have been concerned about their environment and especially its ability to provide them with food, water, and other resources. As our numbers have grown and our technology has developed, we have become increasingly concerned about the impact we are having on our environment (Hunter, 1996).

Modern technology has given humans greatly increased power over nature. This power has done nothing to reduce human dependence on biological diversity, which simply means the wealth of life forms found on earth: Millions of different plants, animals, and micro-organisms, the genes they contain and the intricate ecosystems they form.

Recently, studies on the biodiversity received a great interest. Reptiles are one of the most important taxa especially in hot countries, which are considered a bioindicator, to changes in environment and climate (Lambert, 1984).

Despite many years of zoological research in Egypt, ecology and distribution of many Egyptian amphibians and reptiles are poorly known. Available distribution and data in most cases based on few collection localities giving only an approximate picture of the actual distribution of most species (Saber, 1994 a).

Amphibians and reptiles are found on all continents except the Antarctic. Oceans are also inhabited by a few turtles and snakes (Mertens, 1960). They play a very important role in the efforts to conserve biological diversity world-wide. They account for about one quarter of all known vertebrate species. They are important in terms of aesthetic and cultural interest, as well as their significance to science. They also have a great economic value (Mittlermeier, et al., 1992). Unfortunately, in conserving the herpetofauna, very significant obstacles may be faced. In particular, many species do not have a very positive image in the mind of the general public, mainly because one group of reptiles (snakes) is extremely unpopular with the world at all.

One of the most effective strategies of conservation of biodiversity is establishing of effectively managed protected area. The idea that some places should be protected goes back at least 3000 years to Ikhnaton, king of Egypt, (Alison, 1981).

In 1986 El Omayed was declared protected area. It is a UNESCO- MAB biosphere reserve. The area is poorly studied especially the herpetofauna.

The aim of this study is first, to elaborate a summary of what's locally present, in order to establish a reference baseline. Second, is to provide the elements of basic analyses important for setting action priorities for protection and sustainable conservation management.

Materials & Methods

The Study area

El Omayed Protected Area

The study area is located at the western coastal desert of Egypt between the following co-ordinates: Latitude North 30° 44' 45"- 30° 49' 40" and longitude East 29° 09' 45" - 29° 12' 53". The reserve belongs to Matrouh Governorate, 83 km west of Alexandria. It is characterised by the presence of prominent ridges running parallel to the coast which provides an evidence of the successive positioning of the coast. The location of the study sites are shown on the map (Fig.1).

There are five main habitat types at the area: Coastal calcareous dunes, Inland ridges, Saline marshy depressions, non-saline depressions and Inland plateau.

The region is characterised by the presence of two distinct seasons. A cool and rainy season from November to February, temperature ranges from 9.5 to 14.5° C, and a hot and dry season from June to August, the temperature ranges from 27.6 to 30.8° C. September, October, March, April and May are transitional months with moderate climate (Michael et al, 1992). The locations of the study sites are shown in (Table 1)

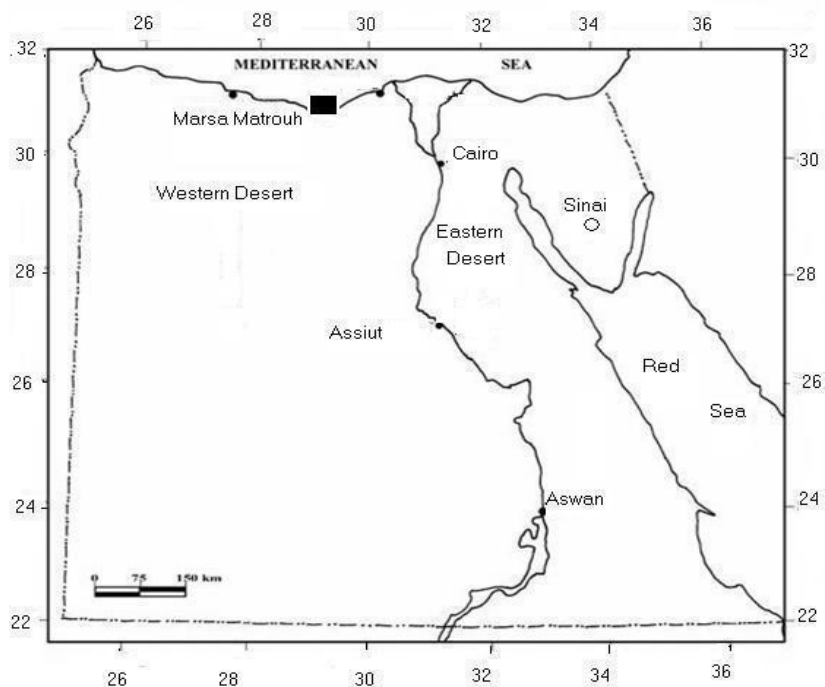


Fig. (1) Map of Egypt showing the study area

Individuals were identified using standard keys (Anderson, 1898; Flower, 1933; Marx, 1968; Leviton et al., 1992; Schleich et al., 1996, Saleh, 1997, and Baha El Din 2006).

Based on the available information, the status of each of herpetofaunal species of the area is estimated according to the IUCN 2004 and IUCN 2005.

Results

Species composition:

The studied Protected Area, El Omayed is surveyed for amphibians and reptiles. A total of 30 species (one amphibian species and 29 reptilian species) were recorded belonging to 26 genera and 11 families. Reptiles comprise 18 species of lizards, 9 species of snakes and 2 species of Testudines.

Family Gekkonidae is the most diverse family in the study area; it is represented by 6 species belonging to 4 genera. Family Lacertidae comes next with 4 species representing 2 genera. Coluberidae is the most diverse family of snakes; it is represented by 9 species belonging to 7 genera.

.Table (1).The sampling sites and their various biotopes in El Omayed protected area

Site (1)	30° 44' 38" N 29° 09' 59" E		Building site (khashm El-Eish ridge)
Site (c)	30° 46' 10" N 29° 11' 79" E		The core Zone with wild vegetation
Site (2)	30° 44' 06" N 29° 11' 41" E		North west of Core Zone dense wild vegetation and cultivated fig trees and watermelon
Site (3)	30° 44' 09" N 29° 11' 41" E		West of Core Zone dense wild vegetation and cultivated fig trees and watermelon
Site (4)	30° 44' 52" N 29° 11' 25" E		Sandy area with dense vegetation and <i>Tamarix</i>
Site (5)	30° 44' 02" N 29° 11' 25" E		Rocky area
Site (6)	30° 44' 02" N 29° 11' 00" E		The southern border of the protected area.
Site (7)	30° 48' 29" N 29° 11' 32" E		Salts marsh habitat with some vegetation and remains of human activities.
Site (8)	A	30° 44' 18" N 29° 08' 24" E	An area with old building of quarrying activities
	B	30° 44' 43" N 29° 08' 45" E	Sandy area with dense vegetation
Site (9)			The northern slope of Khashm El Aish ridge , with wild vegetation and cultivated fig trees
Site (10)	A	30° 46' 20" N 29° 17' 16" E	Khashm El Aish
	B	30° 46' 09" N 29° 17' 19" E	Middle Khashm El Aish with sparse vegetation
	C	30° 45' 95" N 29° 17' 24" E	Khashm El Aish,, an area of quarrying activites) the eastern border of the protected area).
Site (11)	30° 45' 32" N 29° 12' 22" E		Khashm El Aish, east of the building area , an elevated area with water well and little vegetation .

Sampling methods:

Amphibians and reptiles distribution and abundance in twelve surveying sites of various biotopes in El Omayed presented in (Tab.1), representing mostly the study area were determined by on-the ground sampling efforts. The survey was performed by different methods. Pit-fall trapping is effective method for fossorial species or for land moving lizards or even viprid snakes. Since pit-fall traps could not effectively sample some species, other methods were used. Nocturnal species could be found by following their tracks to their daytime hiding places, such as in holes, under stones or burrows. They could usually be seen by looking for them after dark using an ordinary torch especially for wall geckoes. Diurnal lizards and snakes were collected by catching directly with hands. Amphibians were collected in their suitable habitat by hand or hand-net. Some ecological data were collected as microhabitat, date, time of the day and weather.

Systematic list for the recorded species**Class: Amphibia****Order: Anura****Family: Bufonidae****Genus: *Bufo* Laurenti, 1768*****Bufo viridis viridis* Laurenti, 1768.****Common name:** Green Toad**Range:** Europe, North Africa, westward to Mongolia and Tibet.**Occurrence in the study area:** Site (7).**Habitat:** It prefers open landscapes, near water sources, but it is very resistant to draught and salinity.**Ecology:** Nocturnal except during the mating period.**Status:** Fairly common and widespread. It is classified as Least Concern by IUCN (2004)-----
Class: Reptilia**Order: Squamata****Suborder: Sauria****Family: Agamidae****Genus: *Laudakia* Gray, 1845*****Laudakia stellio stellio* (Linnaeus, 1758)****Common name:** Starred Agama

Range: Southeast Europe, Asia Minor and Turkish Island to Syria, Lebanon, Palestine, Northern Iraq, Northern Sinai and Lower Egypt.

Occurrence in the study area: One specimen was seen on heaps of broken rocks (site, 10 c). **Habitat:** Rocky surfaces and walls of old buildings.

Ecology: Strictly nocturnal, insectivorous. It is often arboreal when large trees are available. It refuges into crevices or climb up high on walls or trees. This species performs behavioural means to regulate its body temperature (Saber, 1989)

Status: The main threat to this species is commercial over exploitation. In the study area, this species is near threatened in Egypt; the main reason is the destruction of suitable habitat by quarrying. It is classified as Least Concern by IUCN (2005)

Genus: *Trapelus* Cuvier, 1816.

Trapelus mutabilis Merrem, 1820.

Common name: Changeable Agama.

Range: North Africa from Tunisia to Egypt west of the Nile.

Occurrence in the study area: Sites (1, 10 b and 11).

Habitat: Vegetated sand or gravel desert

Ecology: A diurnal species, very tolerant to heat and hunger, avoid overheating in plants' shadow or by climbing on branches or rocks, feeds on a wide spectrum of insect species.

Status: Widespread and common, threatened by intensive commercial collection. This species is near threatened in Egypt; it is classified as Least Concern by IUCN (2005)

Family: Gekkonidae

Genus: *Hemidactylus* Oken, 1817.

Hemidactylus turcicus (Linnaeus, 1758).

Common name: Turkish Gecko; Warty Gecko; Mediterranean Gecko.

Range: North Africa.

Occurrence in the study area: Site (7).

Habitat: It is mostly found on rocks and it also frequents walls of old buildings. It was found in the study area hidden under stones in destroyed building in salt marsh habitat.

Ecology: It occurs mostly in contact with human settlement. In Egypt, it is the most house gecko. For more details see (Saber, 1999a).

Status: Very common. It is classified as Least Concern by IUCN (2005)

Genus: *Stenodactylus* Fitzinger, 1826.

Stenodactylus mauritanicus Guichenot, 1850

Common name: Northern Elegant Gecko.

Range: Mauritania to north-western Egypt.

Occurrence in the study area: from site (1).

Habitat: Mesic coastal semi-desert, vegetated sand and gravel plains.

Ecology: Strictly nocturnal and ground-dwelling gecko.

Status: Not evaluated.

***Stenodactylus petrii* Anderson, 1896.**

Common name: Petries' Gecko.

Range: Egypt westward to Libya, Tunisia and Algeria and eastward to Sinai and Palestine.

Occurrence in the study area: Sites (C, 2, 3 and 8 b).

Habitat: Sandy desert especially among dunes and phytogenic mounds.

Ecology: The author studied it in Wadi El Raiyan Protected Area, and it was found strictly nocturnal, active through spring, summer and autumn, but its activity ceases during winter. It feeds on a large spectrum of invertebrates mainly insects.

Status: Fairly common, but localized. This species is near threatened in Egypt; it is classified as Least Concern by IUCN (2005)

***Stenodactylus sthenodactylus sthenodactylus* (Lichtenstein, 1823).**

Common name: Elegant Gecko.

Range: North Africa south to Senegal, northern Nigeria and Eritrea with an isolated population around Lake Rodolph, also Palestine and Jordan

Occurrence in the study area: Site (10 a)

Habitat: Gravel, rock or sand desert and near cultivated areas.

Ecology: Nocturnal, but can be seen at day-time especially at cold weather, ground-dwelling, widespread in a variety of desert habitat.

Status: Very common. It is classified as Least Concern by IUCN (2005)

Genus: *Tarentola* Gray, 1825.

***Tarentola mauritanica mauritanica* Linnaeus, 1758.**

Common name: Moorish Gecko.

Range: Egypt west to Morocco and Western Sahara, and Canary and Madeira Islands.

Occurrence in the study area: In EL Omayed Protected Area from sites (1 and 8 a).

Habitat: Rock cliffs, stone heaps, stone walls, buildings and tree trunks.

Ecology: Mainly nocturnal but can also be seen active during daytime. This species was found to be arboreal on *Acacia radiana* in Westm Desert (Nour El-Din, 1977). It

feeds on insects and small vertebrates. Schleich *et al.*, (1996) mentioned that a gecko of this species was found feeding a solpugid of size much bigger than its own head.

Status: Thousands of individuals are exported every year. This species is near threatened in Egypt; it is classified as Least Concern by IUCN (2005)

Genus: *Tropicolotes* Peters, 1880.

***Tropicolotes tripolitanus* (Peters, 1880).**

Common name: Tripoli Gecko.

Range: Egypt west to Tunisia.

Occurrence in the study area: Sites (1, 2, 3, 8 a and 10 a).

Habitat: Rock, gravel and sand desert.

Ecology: A nocturnal species feeding on small insects. It is usually found under stones or other objects in the desert.

Status: It is classified as Least Concern by IUCN (2005)

Family: Lacertidae

Genus: *Acanthodactylus* Fitzinger, 1834.

***Acanthodactylus boskianus asper* (Daudin, 1802).**

Common name: Bosc's Lizard.

Range: Widespread throughout North Africa and Southwestern Asia.

Occurrence in the study area: Site (10).

Habitat: Sparely vegetated areas with gravel and stones but less often sand.

Ecology: A diurnal species feeds on a variety of food items. detailed information are found in Sadek (1992), Bashandy *et al.*, (1994), Saber *et al.*, (1994) and Saber (1999B).

Status: Very common. It is classified as Least Concern by IUCN (2005)

***Acanthodactylus longipes* Boulenger, 1918.**

Common name: Long-Footed fringe-toed Lizard.

Range: Northern Africa, Central and Western Sahara.

Occurrence in the study area: Sites (C, 2, 3, 4, 8 b, and 9).

Habitat: Loose sandy desert.

Ecology: A diurnal and insectivorous species, agile, refuges between roots of plants.

Status: Very common. It is classified as Least Concern by IUCN (2005)

***Acanthodactylus scutellatus scutellatus* (Audouin, 1829).**

Common name: Nidua Lizard.

Range: North Africa to Southwestern Asia.

Occurrence in the study area: Sites (C, 1, 2, 3, 4, 6, 8 b, and 10).

Habitat: Open sandy desert.

Ecology: A diurnal species feeds on small insects. For more information see Saber (1989).

Status: Very common. It is classified as Least Concern by IUCN (2005)

Genus: *Mesalina* Gray, 1838.

Mesalina olivieri (Audouin, 1829).

Common name: OLiver's Lizard.

Range: North Africa to South western Asia.

Occurrence in the study area: Sites (10).

Habitat: It was on stony plateau of sandy or rocky areas with light vegetation.

Ecology: A diurnal, insectivorous, escape to hide between vegetation.

Status: The main threat to this species in the study area is the limited distribution and habitat destruction. This species is near threatened in Egypt; it is classified as Least Concern by IUCN (2005)

Family: Scincidae

Genus: *Chalcides* Laurenti, 1763.

Chalcides ocellatus ocellatus (Forskal, 1775).

Common name: Eyed Skink; Ocellated Skink.

Range: North Africa to South- eastern Europe and South- western Asia.

Occurrence in the study area: Site (6).

Habitat: Sandy desert. It may inhabit also banks of irrigation canals.

Ecology: It is crepuscular, semifossorial, living under sand or dead vegetation. It can sand-swim with a great speed to avoid danger. Prefers a mosaic of open ground for basking and dense vegetation for hiding.

Status: Common and widespread. It is classified as Least Concern by IUCN (2005)

Genus: *Eumeces* Wiegmann, 1834

Eumeces schneiderii (Daudin, 1802).

Common name: Gold Skink; Orange-tailed Skink.

Range: North Africa and west Asia.

Occurrence in the study area: Sites (C, 2, 3, 4 and 8 b).

Habitat: Sandy desert with dense vegetation.

Ecology: A diurnal, but spends the hottest hours of the day in its burrow. It digs burrows between the roots of the vegetation.

Status: Vulnerable in Egypt, The main threat to this species is commercial over exploitation. It is classified as Least Concern by IUCN (2005)

Genus: *Scincus Laurenti*, 1768

Scincus scincus scincus (Linnaeus, 1758).

Common name: Sandfish.

Range: North- eastern Africa.

Occurrence in the study area: Site (4).

Habitat: Sandy desert, preferable where accumulations of loose drifting sand with rich vegetation, often around roots.

Ecology: Fossorial, sand swimming species.

Status: Common and widespread. It is classified as Least Concern by IUCN (2005)

Genus: *Sphenops Wagler*, 1830.

Sphenops sepsoides (Audouin, 1827).

Common name: Audouin's Sand-skink.

Range: North Africa to South- west Asia.

Occurrence in the study area: Sites (c, 2, 3, 4 and 8b).

Habitat: Fine sand desert and sand dunes.

Ecology: A sand-dwelling, fossorial species, digs mainly around plant roots , locate insects on the sand and move about on the surfaces.

Status: Fairly common. It is classified as Least Concern by IUCN (2005)

Family: Varanidae

Genus: *Varanus* Merrem, 1820.

Varanus griseus griseus (Daudin, 1803).

Common name: Desert Monitor; Gray Monitor.

Range: North Africa and South- west Asia.

Occurrence in the study area: Sites (C, 1, 2, 3, 4, 8 b and 9)

Habitat: sandy desert.

Ecology: A diurnal carnivorous species feeds mainly on lizards and rodents. It has a large home range.

Status: In Egypt, it is Vulnerable. The main threat to this species is man since Bedouins thinking that this species milks their sheep and goats causing severe harm to them, plus commercial over exploitation. It is classified as Least Concern by IUCN (2005)

Family: Chamaeleontidae

Genus: *Chamaeleo* Laurenti, 1768

Chamaeleo chamaeleon chamaeleon Linnaeus, 1758.

Common name: Common Chamaeleon; European Chamaeleon.

Range: South Europe, North Africa, and South- west Asia.

Occurrence in the study area: Sites (2, 3 and 9) .

Habitat: Vegetated desert area with bushes or trees.

Ecology: Arboreal, found on trees and bushes. When food becomes scarce they move away, even on the ground.

Status: In Egypt, it is vulnerable. It is classified as Least Concern by IUCN (2005)

Suborder: Serpents**Family: Boidae.**

Genus: *Eryx* Daudin, 1803.

Eryx jaculus jaculus (Linnaeus, 1758).

Common name: Javelin Sand-Boa.

Range: Northcentral Africa, eastward into South- Western Asia to Caspian Sea.

Occurrence in the study area: It was recorded from the study area (Saleh and Saber, 1992 and Saleh, 1997).

Habitat: Sandy areas near cultivated land.

Ecology: A strictly nocturnal snake feeding mostly on ground dwelling geckoes.

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Status: In Egypt, it is critically endangered. It is classified as Least Concern by IUCN (2005)

Family: Coluberidae**Genus: *Lytorhynchus* Peters, 1863.**

Lytorhynchus diadema (Dumeril, Bibron and Dumeril, 1854).

Common name: Diademed Sand-snake.

Range: North Africa and South- west Asia.

Occurrence in the study area: Sites (C, 2, 3 and 4).

Habitat: Loose sandy areas.

Ecology: It is essentially nocturnal, but may become crepuscular in colder weather. It is assumed that it digs for lizards hidden in the sand.

Status: Lower Risk (least concern).

Genus: *Macroprotodon* Guichenot, 1850.

Macroprotodon cucullatus (Geofroy, 1827).

Common name: Mediterranean Hooded Snake.

Range: Southern Europe, Northern Africa and extreme South- western Asia.

Occurrence in the study area: Ourselves did not collect any specimen of this species from the study area, but I examined two specimens said to be collected by snake hunters from Omayed without specific **locality**. Mechael *et al.*, (1992), Saleh (1997), Saleh and Saber (1992) recorded this species from Omayed.

Habitat: Sandy areas with dense vegetation in the Mediterranean coast belt.

Ecology: Mainly crepuscular and nocturnal. Feeding mainly on lizards, small rodents and some cases of cannibalism were recorded (Schleich *et al.*, 1996).

Status: In Egypt, it is endangered. It is classified as Least Concern by IUCN (2005).

Genus: *Molpolon* Fitzinger, 1826.

Malpolon moilensis (Reuss, 1834).

Common name: Moila Snake.

Range: North Africa and south- west Asia.

Occurrence in the study area: This species was recorded by the author from El Hammam just 40km east of El Omayed Protected Area, some evidence from the snake hunters give an indication to the probability of the occurrence of this species in the area.

Habitat: Vegetated sandy desert.

Ecology: A diurnal snake, but becomes crepuscular in hotter weather. It feeds on lizards, snakes, small birds and rodents. An effect of bite on human is more serious than other colubrid snakes.

Status: It is classified as Least Concern by IUCN (2005).

***Malpolon monspessulanus insignita* (Geoffroy St. Hilaire, 1809).**

Common name: Montplier Snake.

Range: North Africa and south- west Asia.

Occurrence in the study area: Some specimens were examined collected from El Omayed and from El Dabaa just west El Omayed. Michael et al., (1992) recorded this species from Omayed.

Habitat: Semidesert, sandy areas of northern coast around vegetated salt marshes and cultivated land.

Ecology: Diurnal, but crepuscular and nocturnal activity during the hottest months. Feeds on a variety of food items including lizards snakes birds and rodents. Cannibalism case was recorded in captivity in surprising fashion by taking the prey from its tail. Activity pattern and thermal ecology in thermal gradient were studied (Saber and Abd Al Rahiem, 2003).

Status: Lower Risk (least concern).

Remarks: This species is threaded by overexploitation. It is classified as Least Concern by IUCN (2005).

Genus: *Platyceps* Blyth 1860

Platyceps rogersi (Anderson, 1893).

Common name: Spotted racer.

Range: Libya, Egypt, Palestine, Jordan , western Iraq and northern Saudi Arabia.

Occurrence in the study area: Site (1).

Habitat: Stony or sandy desert.

Ecology: Diurnal change to nocturnal activity during the hottest months. One specimen was found active at the study area at 9 o'clock at night on August 15th in sandy vegetated habitat. It feeds mainly on lizards.

Status: Fairly common. It is classified as Least Concern by IUCN (2005).

Genus: *Psammophis* Fitzinger, 1826.

Psammophis schokari schokari (Forsskal, 1775).

Common name: Schokari Sand Snake.

Range: North Africa, eastward through Iran, into arid west Pakistan and India.

Occurrence in the study area: Sites (1 and 2)

Habitat: Sandy desert with vegetation.

Ecology: Diurnal animals, very quick moving; often climb in bushes. Feeding mainly on lizards especially *Acanthodactylus*.

Status: It is classified as Least Concern by IUCN (2005).

Genus: *Spalerosophis* Jan, 1865.

Spalerosophis diadema cliffordii (Schlegel, 1837).

Common name: Clifford' Snake; Clifford's Royal Snake.

Range: North Africa south to Sudan east to Sinai, Palestine, Jordan, Syria, Iraq, Arabia and western Iran.

Occurrence in the study area: Sites (1 and 9)

Habitat: Sandy and stony desert.

Ecology: Nocturnal or crepuscular. Feeds on lizards and small rodents and birds.

Status: It is classified as Least Concern by IUCN (2005).

Family: Viperidae

Genus: *Cerastes* Laurenti, 1768.

Cerastes vipera Laurenti, 1768.

Common name: Lesser Cerastes Viper.

Range: North Africa.

Occurrence in the study area: Sites (C, 2, 3, 4, 5, 6 and 9).

Habitat: Sandy desert particularly sand dune areas.

Ecology: Nocturnal. Feeding on lizards, rodents and small birds.

Status: It is classified as Least Concern by IUCN (2005).

Order: Testudines

Family: Testudinidae

Genus: *Testudo* Linnaeus, 1758.

Testudo kleinmanni Lortet, 1883.

Common name: Egyptian Tortoise; Leith's Tortoise.

Range: North- western Libya, eastward to Sinai and south Palestine.

Occurrence in the study area: Mediterranean Coastal Desert near El Omayed (Marx, 1968 and Saleh, 1997). We have not obtained any evidence about the occurrence of this species in the area.

Habitat: Sandy desert.

Ecology: A diurnal species with two peaks of activity time, in the morning and in the late afternoon. It feeds on leaves, stems and flowers of plants.

Status: It is classified as Critically Endangered by IUCN (2005).

***Caretta caretta* (Linnaeus, 1758).**

Common name: Loggerhead Turtle.

Range: African Mediterranean Coasts, Indian and Atlantic Oceans.

Occurrence in the study area: Tracks at the Western Mediterranean Coast (Mohammed Al Esawy, personal communication).

Habitat: wide migrations in oceans, but also entering river mouths, lagoons and salt marshes.

Ecology: It is omnivorous turtle feeds on sponges, jelly fish, mollusc, tunicates, crustaceans, fish and also sea weeds.

Status: Threatened because of loss of nesting habitats, often caught incidentally in shrimp trawls while feeding on sea bottom. It is classified as Endangered by IUCN (2005).

Discussion

This survey indicates that there are no endemic species of amphibians or reptiles present within El Omayed protected area. Two species, *Eryx jaculus jaculus* (Linnaeus, 1758), *Testudo kleinmanni* Lortet, 1883 are critically endangered, and *Caretta caretta* (Linnaeus, 1758) and *Macroprotodon cucullatus* (Geofroy, 1827) are endangered, representing 13% of the total species of this area.

Six species (20%), *Laudakia stellio stellio* (Linnaeus, 1758), *Mesalina olivieri* (Audouin, 1829), *Eumeces schneiderii* (Daudin, 1802), *Varanus griseus griseus* (Daudin, 1803), *Chamaeleo chamaeleon chamaeleon* Linnaeus, 1758, and *Eumeces schneiderii* (Daudin, 1802) are vulnerable. Three species (10%) are near threatened, *Trapelus mutabilis* Merrem, 1820, *Stenodactylus petrii* Anderson, 1896, *Stenodactylus mauritanicus* Guichenot, 1850, and *Tarentola mauritanica mauritanica* Linnaeus, 1758. This indicates that 13 species (43%) need special management, while, the rest (57%) are widespread species. Comparing the present result with the only previous extensive herpetological survey of the area (Michael, et al., 1992), in which 18 species were recorded from the study area, the present study added 18 species to that of the previous one. Six species were not recorded during the present survey while were recorded in Michael et al., (1992) survey. These species are *Gymnodactylus saaber* (= *Cyrtopodion scaber*), *Agama agama spinosa*, *Acanthodactylus paradalis*, *Eremias guttulata* (= *Mesalina guttulata*), *Mabuia quiquetaeniata* and *Coluber florulentus* Geoffroy, 1827 (Table 2).

Table(2): Comparison between the present surveys of El Omayed protected area with the Michael et al, (1992).

No	Species	Michael et al., (1992).	Present study
1	<i>Bufo viridis viridis</i> Laurenti , 1768	-	+
2	<i>Agama agama spinosa</i> Gray ,1831	+	-
3	<i>Laudakia Stellio Stellio</i> (Linnaeus,1758)	+	+
4	<i>Trapelus mutabilis</i> Merren ,1820	-	+
5	<i>Cytropodion scaber</i> (Heyden, 1827)	+	-
6	<i>Hemidactylus turcicus</i> (Linnaeus,1758)	-	+
7	<i>Stenodactylus mauritanicus</i> Guichenot, 1850	-	+
8	<i>Stenodactylus petrii</i> Anderson,1896	-	+
9	<i>Stenodactylus stenodactylus stenodactylus</i> (Lichtenstein,1823)	-	+
10	<i>Tarentola mauritanica mauritanica</i> Linnaeus,1758	-	+
11	<i>Tropicolotes troplitanus</i> (Peters,1980)	-	+
12	<i>Acanthodactylus boskianus asper</i> (Daudin,1802)	+	+
13	<i>Acanthodactylus longipes</i> Boulenger,1918	-	+
14	<i>Acanthodactylus Pardalis</i> (Lichtenstein,1823)	+	-
15	<i>Acanthodactylus scutellatus scutellatus</i> (Audouin,1829)	+	+
16	<i>Mesalina guttulata guttulata</i> (Lichtenstein,1823)	+	-
17	<i>Mesalina oliviera</i> (Audouin,1829)	-	+
18	<i>Chalcides ocellatus ocellatus</i> (Forsk. ,1775)	+	+
19	<i>Eumeces schneiderrii</i> (Daudin,1802)	+	+
20	<i>Mabuya quinquetaeniata</i> (Fitzinger,1826)	+	-
21	<i>Scincus scincus scincus</i> (Linnaeus,1758)	+	+
22	<i>Sphenops sepsoides</i> (Audouin,1827)	+	+
23	<i>Varanus griseus</i> (Daudin,1803)	-	+
24	<i>Chamaeleo chamaeleon chamaeleon</i> Linnaeus,1758	+	+
25	<i>Eryx jaculus jaculus</i> (Linnaeus,1758)	-	+
26	<i>Platyiceps rogersi</i> (Anderson, 1893).	-	+
27	<i>Platyiceps florulentus</i> (Geoffroy, 1827)	+	-
28	<i>Lytrohynchus diadema</i> (Dumeril,Bibron and Dumeril, 1854)	-	+
29	<i>Macroprotodon cucullatus</i> (Geoffroy, 1827).	+	+
30	<i>Malpolon moilensis</i> (Reuss,1834)	-	+
31	<i>Malpolon monspessulna insignita</i> (Geoffroy St.Hilaire,1809)	+	+
32	<i>Psammophis schokari schokari</i> (Forsskal,1775)	+	+
33	<i>Spalerosophis diadema cliffordii</i> (Schlegel,1837)	+	+
34	<i>Cerastes vipera</i> Laurenti , 1768	-	+
35	<i>Testudo kleinmanni</i> Lortet ,1883	-	+
36	<i>Caretta caretta</i> (Linnaeus,1758)	-	+

The herpetofauna is more diverse in El Omayed Protected Area that lies in one of the richest herpetofauna of all surveyed habitat types in Egypt (Saleh, 1993). The

present study revealed that, the major threats to the herpetofauna of the study area are:

1- Habitat destruction, degradation, alteration, and contamination: Natural habitats are under increasing pressure from growing human populations and from unsound development projects, such as: Coastal habitats are being destroyed by major hotels and tourist projects, road construction and beachfront lighting often prevents hatchlings sea turtles from successfully departing their natal beach, or adults from emerging to nest. This affects greatly the population of *Caretta caretta* in the area. Sandy habitats suffer from some agricultural activities which bring other in the form of pesticides and herbicides, simplifying the complexity of the ecosystem by cultivating one species and removing the other wild vegetation, plus the problems of irrigation projects. Stony habitats suffer from uncontrolled quarrying activities, this habitat is the most preferable habitat of *Laudakia stellio stellio* in El Omayed, this species also suffers from commercial over exploitation.

Habitat destruction in the area must have contributed to the great decline in the population of the endangered species especially the critically endangered Egyptian Tortoise *Testudo kleinmanni*.

2- Commercial exploitation: The most significant threat facing herpetofauna in the area is the uncontrolled commercial exploitation, which affects practically all species. This activity has reached a considerable level in recent years and is posing a real threat to the survival of several species.

3- Environmental pollution: Human activities result to some pollutants, particularly that caused by pesticides is probably affecting aquatic or semiaquatic forms, solid waste which can be a danger, such as plastic bags .

4- Overgrazing: by sheep which is wide spread in the area.

5- Indirect threats: introduced species such as feral cats and dogs, which affect the population of amphibians and reptiles by predation. One of the most threats of the herpetofauna is man because many species of amphibians and reptiles have a very negative image in the mind of the general public.

* Prevention all kinds of habitat destruction in the area especially breeding habitats for sea turtles.

* Prevention all kinds of commercial exploitation in the study area and in the adjacent area at least to some period till proper evaluation of the status of these taxa will be performed. In this respect, it is necessary to rehabilitate the traditional reptile hunters to alter their activities (Consultation of socioeconomic specialists is necessary). They may be play roles as rangers, guides or guards or others.

- * Captive breeding programme and reintroduction of some endangered species:
Suggested priority to the critically endangered Egyptian Tortoise *Testudo kleinmanni*. The core area of El Omayed Protected Area or the adjacent sites are proposed to be the breeding center.
- * Sustainable utilization: More efforts are also needed to apply the principles of conservation biology to move towards the sustainable utilization of amphibian and reptilian resources. Projects such as this not only contribute to the survival of certain species, they also provide strong economic justification for conserving the entire ecosystem, and they improve the standard of living of local people living in this region.
- * Conservation education: We need more conservation education and public awareness activities focusing on amphibians and reptiles, and demonstrating their aesthetic, economic, and scientific values to local people and to the country at large.
- * Training: An emphasis on graduate-level training is needed. Professionally trained conservationists are needed in governmental decision-making posts, parks and protected-areas management, and for the growing, local non-governmental conservation organisation. Professionally trained biologists should lead the way in assessing biodiversity and inspiring others to join in conservation activities and professions. The main center of the protected area of El Omayed may be the principal center of both public awareness and training activities.
- * More systematic research and basic taxonomic work, and more ecological, demographic and behavioural research are needed to help us develop strategies for conserving amphibians and reptiles, especially the most endangered species. In addition, more widespread application of scientific knowledge and techniques to conservation is needed.

Greene (1994) reported that systematic and natural history is essential research priority in conserving biodiversity. He also added that biotelemetry permits repeated location of snakes, facilitating previously impossible behavioural studies and thus laying the ground work for effective management. This technique is greatly recommended, It was effective in studying behavioural thermoregulation for indoor animals (Saber, 1994b)

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الملخص العربي

بيئة وصون الزواحف والبرمائيات في محمية العميد بمصر

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تم إجراء هذا البحث في محمية العميد والتي تتبع محافظة مطروح الكيلو 83 غرب محافظة الإسكندرية . البيئات الرئيسية لمنطقة الدراسة تم وصفها بيئيا، وكذلك حصر الزواحف والبرمائيات التي تعيش بها. لم تنل محمية العميد الدراسة الكافية خاصة في مجال الزواحف والبرمائيات، لذا كانت أهمية الدراسة الحالية.

اشتملت الدراسة الحالية على حصر للزواحف والبرمائيات التي تقطن محمية العميد - محافظة مطروح . فقد تم تسجيل (30) نوعا من البرمائيات والزواحف: نوع واحد من طائفة البرمائيات و 29 نوعا من طائفة الزواحف تتبع 25 جنسا و 11 فصيلة. بالنسبة للزواحف فقد اشتملت على 18 نوعا من السحالي و 9 أنواع من الثعابين ونوعين من السلاحف. وفي هذه الدراسة تم حصر التهديدات التي يتعرض لها زواحف وبرمائيات المنطقة كما تم وضع التوصيات الهامة للحفاظ على هذه الأنواع.