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Natural history of *Mabuya affinis* • Advertisement call of the Indian Bronzed Frog • Thermoregulation and activity in captive Ground Iguanas • Herpetofauna of Zaranik Protected Area, Egypt • Combat in Bosc's Monitors • Herpetofauna of Brisbane and its suburbs

THE HERPETOFAUNA OF ZARANIK PROTECTED AREA, EGYPT, WITH NOTES ON THEIR ECOLOGY AND CONSERVATION

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SINAI is herpetologically the richest region in Egypt (Flower, 1933; Saleh, 1997), with 67 of Egypt's 110 reptile and amphibian species, or about 63% of the country's known herpetofauna. This is due in part to the peninsula's varied topography and climatic conditions and to its unique location at the juncture of three biogegraphical regions: the Saharo-Arabian, Irano-Turanian and Sudanian (Werner, 1987). Northern Sinai, where Zaranik Protected Area is located, constitutes a distinct physiographic sub-region of the peninsula. The topography in this area has a much lower profile than that of mountainous South Sinai, and extensive dune fields dominate the landscape.

Zaranik Protected Area (approx. 31°05'N 33°28'E) occupies 250 km². The main herpetofaunal habitats are undulating sand and dunes (occupying the largest area), salt marshes, beaches, and the marine waters of the Mediterranean. There are limited areas of harder substrates (coarse compacted sand), but some 20 km further inland extensive gravel plains exist. Annual rainfall ranges between 50-100 mm. Vegetation is generally sparse (5-10% coverage on average). The dominant species in the salt marshes are *Halocnemum strobilaceum* and *Salicornia europaea. Zygophyllum aegyptium* shrubs are found on higher and less saline ground. On sand dunes the prominent species are the two grasses *Stipagrostis scoparia* and *Panicum turgidum.* Other common species include *Artemisia monosperma, Retama raetam,* and *Thymelaea hirsuta.*

This paper reports general preliminary observations made during extensive herpetological studies and discusses relevant features of Zaranik's herpetofaunal communities and their conservation status.

THE HERPETOFAUNA OF ZARANIK

To date, 24 species of reptiles have been recorded from Zaranik (Table 1). No amphibians are known, although the Green Toad *Bufo viridis* could occur on a limited basis in some depressions with cultivations on the southern boundary of the Protected Area.

Fifteen species of lizards have been recorded. These include four Gekkonids: Petrie's Gecko *Stenodactylus petrii,* Elegant Gecko *S. sthenodactylus*, Turkish Gecko *Hemidactylus turcicus* and Fan-toed Gecko *Ptyodactylus hasselquistii.* The first, being cursorial and sand dwelling, is by far the most common and widespread. The latter two rupicolous geckos are recent introductions whose distribution is currently limited to a few man-made structures. This is the first report of *P. hasselquistii* from North Sinai. The species was previously known only from South Sinai and further west in Egypt (e.g. Werner & Sivan, 1994; Saleh, 1997). In fact the Zaranik animals show similarity with Nile Valley rather than South Sinai populations, indicating that probably they were carried with materials originating from the Nile Valley. The Fan-toed Gecko, *P. guttatus,* is the congener typically known from elsewhere in North Sinai. *S. sthenodactylus* is apparently rare in the Protected Area, being recorded only once in August 1999. The species is typical of hard coarse substrates but seems to penetrate the dunes in small numbers, probably along corridors of suitable habitat. Werner (1987) reports the species on coastal dunes of the Levant to a point north of Haifa.

Two Agamids are found: Savigni's Agama *Trapelus savignii,* and *Uromastyx aegyptia. Trapelus savignii* is a species of special conservation concern. The world range of this species is almost wholly restricted to northern Sinai and Zaranik Protected Area therefore provides an important conservation opportunity for this lizard. Only one record of *U. aegyptia* is known, this was of an immature animal found as a traffic casualty on the southern boundary of the Protected Area (Varty & Baha El Din, 1991).

Four lacertids are found: Saharan Fringe-toed Lizard *Acanthodactylus longipes*, Nidua Lizard *A. scuttellatus*, Bosc's Lizard *A. boskianus*, and Oliver's Lizard *Mesalina olivieri. Acanthodactylus longipes* is the most common and prominent reptile species throughout much of the Protected Area, where it shares sandy habitats with its congener *A. scutellatus*. These two very similar species partition their fairly simple habitat along spatial, thermal and temporal dimensions (Baha El Din, 1996 & in prep.). *Acanthodactylus boskianus* is found amongst dense halophytic vegetation on several small islands in Lake Bardawil within the limits of the Protected Area. The nominate subspecies (large in size, with numerous dorsals) is present here. Animals belonging to the subspecies *asper* are to be found at the eastern perimeter of the Protected Area. *Mesalina olivieri* is also strongly associated with densely vegetated microhabitats and is found in both halophytic vegetation near shores and also in dune vegetation.

Three skinks occur: Sand Fish *Scincus scincus*, Audouin's Skink *Sphenops sepsoides*, and Ocellated Skink *Chalcides ocellatus. Sphenops sepsoides* is the most common nocturnal reptile during the summer season; in winter, it is frequently observed during the day. *Scincus scincus* is diurnal, while the generalist *C. ocellatus* is mostly crepuscular.

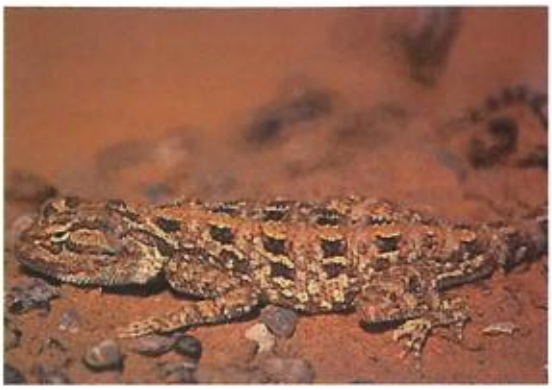
Despite it being an arboreal species the Common Chameleon *Chamaeleo chamaeleon* is widespread throughout much of the Protected Area, especially in dune areas. Here it is almost exclusively found amongst patches of desert vegetation. Infrequently individuals are found crossing open ground in haste, moving from one cluster of vegetation to another.

Varanidae is represented by the Desert Monitor, *Varanus griseus*. The species is the top diurnal terrestrial predator at Zaranik, often feeding on nestlings of breeding waterbirds on the shores of Lake Bardawil (in the summer) and on the abundant resting migrant birds (during migration seasons).

Only five species of snakes have been recorded with certainty. These are the Lesser Sand Viper *Cerastes vipera* and the four colubrids, Schokari Sand Snake *Psammophis schokari,* Diademed Sand Snake *Lytorhynchus diadema*, Clifford's Snake *Spaleorsophis diadema* and Moila Snake *Malpolon moilensis. Cerastes vipera* is the only venomous snake known in the Protected Area. Both *S. diadema* and *M. moilensis* have been recorded on single occasions at the southern boundary of the Protected Area (Varty & Baha El Din, 1991). The three other species are equally common and widespread. Both *L. diadema* and *C. vipera* are largely confined to sandy biotopes and are nocturnal. *Psammophis schockari* is diurnal and can be found in salt marshes, as well as dunes.

Four species of Chelonia have been recorded, including the highly endangered Egyptian Tortoise *Testudo kleinmanni* and three marine turtles, the Loggerhead Turtle *Caretta caretta,* Green Turtle *Chelonia mydas*, and Leather-backed Turtle *Dermochelys coriacea. Testudo kleinmanni* has become almost extinct from North Sinai, due to severe habitat degradation and intense collection pressure for the pet trade. The occurrence of the species in the Protected Area has been suspected for a long time (Baha El Din, 1994). In Spring 2000 a small and highly fragmented population was found within the limits of the Protected Area (Baha El Din *et al.* in prep.). *Caretta caretta* has recently been found to have its largest nesting site along the Egyptian Mediterranean coast near Zaranik (Waheed Salama pers. com.). *Chelonia mydas* is also believed to breed, but in smaller numbers.

Mesalina olivieri. Zaranik. All photographs by authors.



Trapelus savignii. Zaranik.

Scincus scincus. Zaranik.

Sphenops sepsoides. Zaranik.

Stenodactylus petrii. Zaranik.

Testudo klienmanni. Zaranik.

Species	Habitat 1	2	3	4	5	6	7
Stenodactylus petrii Anderson, 1896	X	X					
Stenodactylus sthenodactylus (Lichtenstein, 1823)			X				
Ptyodactylus hasselquistii (Donnodorff, 1798)					X		
Hemidactylus turcicus (Linnaeus, 1758)					X		
Trapelus savignii Duméril & Bibron, 1837	X	X	X				
Uromastyx aegyptia Forskål, 1775			X				
Chamaeleo chamaeleon (Linnaeus, 1758)	X	X	X	X			
Acanthodactylus boskianus (Daudin, 1802)			X	X			
Acanthodactylus scutellatus (Audouin, 1829)	X	X	X				
Acanthodactylus longipes Boulenger, 1918	X	X					
Mesalina olivieri (Audouin, 1829)	X	X	X	X			
Varanus griseus (Daudin, 1803)		X	X	X			
Chalcides ocellatus (Forskål, 1775)	X	X					
Sphenops sepsoides (Audouin, 1827	X	X					
Scincus scincus (Linnaeus, 1758)	X	X					
Lytorhynchus diadema (Duméril, Bibron & Duméril, 1854)	X	X					
Malpolon moilensis (Reuss, 1834)			X				
Spalerosophis diadema (Schlegel, 1837			X			X	
Psammophis schokari (Forskål, 1775)	X	X	X	X			
Cerastes vipera (Linnaeus, 1758)	X	X					
Testudo kleinmanni Lortet, 1883	X	X	X				
Caretta caretta (Linnaeus, 1758)						X	X
Chelonia mydas (Linnaeus, 1758)						X	X
Dermochelys coriacea (Vandelli, 1761)							X

1 = Dunes, **2** = Undulating sand, **3** = Harder substrates, **4** = Salt marsh, **5** = Buildings, **6** = Beach, **7** = Marine waters.

Table 1. The reptiles of Zaranik Protected Area and their habitat use.

Dermochelys coriacea was recorded only once, when an old carcass was found in 1985 (Baha El Din, 1992).

DISCUSSION

The sand dune community, comprised of 14 species (columns 1 & 2, Table 1), is the most prominent and best represented reptile community at Zaranik. Only half of the sand dune community could be considered to be composed of truly sand-dwelling or psammophilous species. These are species solely found in sandy biotopes and have morphological and behavioral adaptations for life in a sandy environment. For example, the excellent sand swimming adaptation of *S. sepsoides*, the burrowing adaptation of *L. diadema* and the sand shuffling techniques of *C. vipera*. The other half of the sand dune community at Zaranik is comprised of either generalists that have wide ecological niches (e.g. *V. griseus*) or species that exploit specific microhabitats (e.g. *C. chamaeleon),* but that may also be present in other types of habitats. Werner (1982 & 1987) made similar observations of the sand dune community in both Israel and Sinai. However, his interpretation of psammophilous species is rather liberal and includes taxa that are best

classified as generalists or vegetation dependent, e.g. *T. savignii* and *M. olivieri*, both of which are found on gravel plains, as well as dunes.

With the exception of the chelonia, most of the reptiles of the region are still common. However, populations in the Protected Area are diminishing due to continued habitat degradation. Our studies show a marked decline in populations and reduction in diversity due primarily to excessive over grazing, and cutting and clearing of vegetation for firewood and cultivation. There is an urgent need to curb and manage these ecologically disruptive practices. Outside the Protected Area some of the herpetofauna is faced by the complete loss of habitat due to rapid expansion of, particularly coastal development. Marine turtles are suffering the most as some of their prime nesting beaches are being converted to holiday resorts. In addition, unregulated quarrying and cultivation are seriously degrading some of the most important and unique habitats of the region.

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