

Amphibians and reptiles of the Suez Canal University campuses, Egypt

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ABSTRACT – A herpetological survey was carried out on campuses of the Suez Canal University (SCU) located in the Suez Canal zone (Port Said, Ismailia and Suez) and North Sinai (Al-Arish). Research Center in St. Catherine and the university rest house at Sharm Ash-Sheikh, both in southern Sinai were also checked. A total of 21 herpetofaunal species was recorded during the period 1999–2007, including two amphibians and nineteen reptiles (14 lizards and 5 snakes). The largest number of species was recorded on the campus of Al-Arish, comprising one toad and 12 reptile species. This was followed by the number of herpetofauna inhabiting the Ismailia campus. Distribution of amphibians and reptiles on campuses of the Suez Canal University according to habitat was analyzed. The impact of the change in campus structure on the herpetofaunal community is also discussed.

THE Suez Canal University was founded in 1976, when the region of Suez Canal and Sinai were seeking to meet the needs of the community and the aspirations of their citizens for education and development. Suez Canal University was inaugurated with five faculties, but has grown to encompass twenty-four faculties distributed in four governorates, Bur Saïd (Port Said), Al-Isma'ileyya (Ismailia), As-Suways (Suez) and North Sinai. In addition, the university has specialized research centers in the cities of Sharm Ash-Sheikh and St. Catherine in South Sinai. In 2006–2007 academic year, the university enrolled 47784 undergraduate students.

Herpetological studies at Suez Canal University started two decades ago when the Al-Arish campus was surveyed. Lizards were frequently observed on buildings, fences and on the ground, snakes were captured from cultivated fields, and at night, frogs and geckos were heard calling. Ghobashi et al. (1990) reported one species of amphibian, eight species of lizards and one snake from the Al-Arish campus out of 21 species reported from the Al-Arish area. At that time, the campus consisted of a few buildings and a small garden, in an area of sparse desert vegetation and a few trees. Later, ecological studies were carried out on the commonest lizards on the Al-Arish (Ibrahim, 2002 & 2007) and Ismailia (Ibrahim, 2004) campuses, respectively. However, the total number of herpetofaunal species inhabiting

university campuses and their distribution remain little known.

The objectives of this study are: (1) to compile a checklist of amphibians and reptiles inhabiting Suez Canal University and Research Centers as a guide for students and researchers, and (2) to study the impact of the short-term changes on the structure of our university campuses on the herpetofaunal community.

MATERIALS AND METHODS

Study site. Observations were made on the Suez Canal University campuses sporadically from 1999–2007, and on the Al-Arish campus from 1987–2007.

1- *Al-Arish Campus* (31° 08' 04'' N, 33° 49' 41'' E) occupies a total area of 0.36 km² and is surrounded by walls. There are 32 buildings of different ages and sizes and one building under construction on campus. Natural vegetation is very sparse, mainly composed of *Artemisia monosperma*. There are also fruit and olive fields, ornamentals and green houses for edible vegetables, and large trees such as *Eucalyptus globosus*, *Casuarina equisetiforme*, *Salix tetrasperma* and *Ficus retusa*. The campus is approximately 57% green area, 34.7 % desert and 8.3% buildings.

2- *Port Said Campus.* The campus includes five faculties distributed in Port Said City (31° 15' 55''

N, 32° 17' 85" E) and Port Fouad City east of the Suez Canal (31° 14' 73" N, 32° 18' 90"). The latter is the largest, occupying about 0.12 km² with seven buildings, a dormitory and two other buildings under construction. The green area is about 20% of the total area of campus. This campus was visited only during summer.

3- *Ismailia Old Campus* (30° 36' 19" N, 32° 18' 22" E). The campus occupies 0.5 km² with 24 buildings (2–15 m high). The whole complex is surrounded by a brick wall. Buildings and fences take up approximately 51% of the total campus area. Vegetation on campus is well-formed and covers about 15% of the campus area. The cultivated plants on the Old Campus include mostly ornamental trees, herbs and native plants.

4- *Ismailia New Campus* (30° 38' 32" N, 32° 16' 17" E) was constructed on an area of about 1 km² in the Ismailia desert and includes 10 faculties, in addition to administration buildings and dormitories. These collectively have more than 60 buildings and annexes of 2–10 m height, in addition to six buildings under construction. These buildings occupy about 23% of the total area of campus; the green occupies at least 30% of the campus and has ornamentals, green houses, orchards in addition to a herbarium.

5- *Suez Old Campus* (29° 58' 33" N, 32° 31' 67" E) is a small campus, occupying about 0.05 km² and consisting of two faculties. A few trees are found on campus. This site was surveyed throughout the year.

6- *Suez New Campus* (29° 59' 73" N, 32° 29' 98" E) was established on an area of about 0.35 km² on the Suez-Cairo desert highway in 2002. It consists of three faculty buildings, two dormitory buildings with two other buildings under construction. Buildings collectively occupy about 20% of the total area of campus. The green area is very small (less than 5%); most of the campus is firm reddish sand desert. The campus was visited throughout the year.

7- *St. Catherine Research Center* (28° 33' 11" N, 33° 56' 51" E) is situated at the mouth of Wadi Al-Arba'ien near St. Catherine monastery and occupies about 243 m² in an extremely arid zone, with a few planted trees. This campus was visited in March, May and July.

8- *Sharm Ash-Sheikh Rest-house* (27° 51' 48" N, 34° 18' 04" E): was visited once during April.

Sampling methods. Lizards were captured by hand and with rubber bands by day and night. Snakes were captured by hand while surveying and by grounds workers and some were collected by students. Verbal reports are not included in this report.

RESULTS

A total of 21 herpetofaunal species were sampled on the university campuses, including two toads, 14 lizards and five snakes (Table 1). Pictures of living amphibians and reptiles are provided in figures 1–15. The Al-Arish campus had the highest number of reptiles (13 species) followed by the Ismailia New Campus. The following is a checklist of amphibians and reptiles inhabiting the university campuses with ecological notes when available.

CLASS: AMPHIBIA

Order: Anura

Family: Bufonidae

(1) *Bufo regularis* (Reuss, 1834); Egyptian toad. Figure 1. This toad is most common on the Ismailia Old Campus and Port Said Campus. As a result of greening the new campus at Ismailia, populations of this toad have been observed in different places, around buildings and heard calling in cultivated areas.

(2) *Bufo viridis viridis* (Laurenti, 1768); Green toad. Figure 2. This is a common species in North Sinai. A fairly small population was found around an old well on Al-Arish campus. The numbers of this toad seem to have been decreasing due to the increase in campus constructions.

CLASS: REPTILIA

Order: Squamata

Suborder: Sauria

Family: Agamidae

(3) *Laudakia stellio* (Linnaeus, 1758); Starred agama. Figure 3. On the Al-Arish campus, the subspecies is assigned to *vulgaris*. It is diurnal, heliophilous and active almost the entire year. In summer and early autumn, these lizards exhibited a bimodal activity pattern, extending their activity as the day lengthened. Activity peaked in May and

Species	Ismailia Old Campus	Ismailia New Campus	Suez Old Campus	Suez New Campus	Port Said Campus	Al-Arish Campus	St. Catherine Research Center	Sharm Ash-Sheikh Resthouse
<i>Bufo regularis</i>	*	*			*			
<i>Bufo viridis viridis</i>						*		
<i>Acanthodactylus boskianus</i>						*		
<i>Acanthodactylus scutellatus</i>						*		
<i>Mesalina olivieri</i>						*		
<i>Cyrtopodion scabrum</i>				*				
<i>Hemidactylus flaviviridis</i>			*	*		*		
<i>Hemidactylus turcicus</i>	*	*		*	*	*		
<i>Ptyodactylus guttatus</i>							*	
<i>Ptyodactylus hasselquistii</i>								*
<i>Tarentola a. annularis</i>	*	*						
<i>Stenodactylus sthenodactylus</i>						*		
<i>Laudakia stellio</i>						*	*	
<i>Chalcides ocellatus</i>	*	*	*		*	*		
<i>Mabuya quinquetaeniata</i>	*	*						
<i>Chamaeleo chamaeleon</i>	*	*				*		
<i>Coluber rhodorhachis</i>							*	
<i>Platyceps rogersi</i>				*				
<i>Psammophis schokari</i>	*					*		
<i>Psammophis sibilans</i>						*		
<i>Spalerosophis diadema</i>	*	*				*		
Total	8	7	2	4	3	13	3	1

decreased in August. Daily and seasonal activity patterns of males did not differ from those of females. The percentage of lizards that perched in direct sunlight or in shade differed seasonally and fluctuated with air temperatures. These lizards used all available microhabitats on campus, but were found most frequently on fences and on the ground. Adults occupied higher perches than juveniles and subadults. Lizards were found in areas of both sparse and dense plant cover, but showed no preference for any particular plant.

A single individual was seen on the stony fence surrounding the Research Center at St. Catherine area during May 2001. The right and left transverse rows on dorsum have large scales with small scales in between.

Family: Gekkonidae

(4) *Cyrtopodion scabrum* (Heyden, 1827); Keeled-skinned gecko. This gecko is very common on building walls and on the ground on the Suez New Campus, in sympatry with *Hemidactylus turcicus* and *H. flaviviridis*. It seems to be most active in summer. Many gravid females with two eggs shimmering through the skin were observed during June. On 25 June 2007, a nest of eight eggs (one smashed) was found under debris

Table 1. Amphibians and reptiles recorded in the Suez Canal University campuses.

near the Faculty of Education building. In captivity, two eggs hatched on 8 July and one on 22 July, the hatchlings were more brightly colored than adults and measured 19 and 20 mm SVL. After 3 days, one of these geckos developed ecdysis.

(5) *Hemidactylus flaviviridis flaviviridis* (Rüppell, 1835); Indian leaf-toed gecko. This gecko is common on the Suez campuses. One lizard was observed running on the ground during the day on 11 February 2000 on the Suez Old Campus. On the Al-Arish campus, only a single young specimen was recorded during 2000. Another individual was observed at the university rest house at Al-Arish near campus during 2002. In the Ismailia Governorate, these lizards were active from March through November with activity peak in summer. Individuals were generally more active during the period from sunset to midnight than from midnight to sunrise. Diurnal activity of this species was evident in most seasons. *H. flaviviridis* is a sit-and-wait forager, with Lepidoptera and Diptera as the most important food items. The breeding season

extends from early March to the end of May. The smallest adult male measured 60 mm SVL. Testicular size and mass considerably declined during summer. Gravid females appeared in spring and early June. Juveniles appeared at the end of June and were abundant through July.

(6) *Hemidactylus turcicus turcicus* (Linnaeus, 1758); Turkish gecko. On the Al-Arish campus, these lizards were often encountered on fences and buildings from March to November and on warm nights in winter. Activity generally started after complete darkness and displayed a unimodal activity pattern, but varied seasonally. Lepidopterans were the most important food items volumetrically. Food types differed according to habitat type. The reproductive season extended from March through August. The first reproductively active females appeared in March and the last in August. Testes of adult males were enlarged from March to July with maximum size and mass during May and minimal during August.

(7) *Ptyodactylus guttatus* (Heyden, 1827); Spotted fan-toed gecko. This gecko is common in St. Catherine Research Center (1500 m above sea level). Several individuals were observed during May when they appeared immediately after dark.

(8) *Ptyodactylus hasselquistii hasselquistii* (Donndorff, 1798); Fan-toed gecko. Figure 4. This species is frequently observed on the Rest house buildings in Sharm Ash-Sheikh. A few individuals were captured, with obvious reddish and white marbling on the head.

(9) *Tarentola annularis annularis* (Geoffroy De St. Hilaire, 1827); White-spotted gecko. Figure 5. This gecko is very common on the Ismailia campuses. It is active throughout the year, with a peak in autumn. In hot months, it showed an irregular activity pattern, while in other months a unimodal one. *T. annularis* is an opportunistic sit-and-wait predator, feeding upon a wide variety of prey primarily cockroaches and grasshoppers, but plant materials and spiders were also found in stomachs. These lizards occasionally showed an active foraging behavior and a tendency to cannibalism. They used different microhabitat types but, as a scansorial gecko, were mainly found on walls and fences. Some lizards occupied the same perches

for weeks or months. The breeding season mainly extended from March through July. In this season, the smallest gravid female measured 69 mm SVL and the smallest adult male with enlarged testes measured 60 mm SVL.

(10) *Stenodactylus sthenodactylus* (Lichtenstein, 1823); Elegant gecko. Figure 6. These were uncommon, reported only from the Al-Arish campus. A nocturnal gecko, it commences activity immediately after sunset. During the day, it could be found under stones, leaf litter or garbage. This gecko seems to have disappeared or become very rare on campus.

Family: Lacertidae

Three species of lacertid lizards were only found on the Al-Arish campus. They are:

(11) *Acanthodactylus boskianus* (Daudin, 1802); Bosc's fringe-toed lizard. This lizard was found in firm sand with sparse vegetation. Construction and cultivation of a vast area of campus has resulted in the reduction of habitats of this species, so that it is now rare on campus.

(12) *Acanthodactylus scutellatus* (Audouin, 1809); Nidua lizard. Figure 7. This species was observed in soft sandy areas of campus. The lizards showed a unimodal activity during most months of the year, but in June, bimodal activity pattern was documented. Basking usually occurred between 07:00 h and 12:00 h, and between 15:00 h and 20:00 h. Lizards assumed both sit-and-wait and actively foraging strategies. Coleoptera; larvae, Hymenoptera and plant materials were the main food items in lizard stomachs. Males and females of SVL 40–50 mm consumed prey items of 2–3 mm and 1–2 mm respectively.

(13) *Mesalina olivieri* (Audouin, 1829); Oliver's lizard. Although not uncommon, this lizard has become very rare. In the Al-Arish desert, activity of these lizards peaked during spring and decreased during summer. Lizards commenced activity after 08:00 h and ended about 19:00 h, showing an irregular daily activity rhythm in most months. Basking took place between 08:00–11:00 h and 16:00–19:00 h. Although activity was affected by soil temperature, some individuals were observed running on the ground when soil temperature reached 51.8°C in July. The most



Figure 1. *Bufo regularis*. All photographs © A. Ibrahim.



Figure 2. *Bufo viridis viridis*.



Figure 3. *Laudakia stellio*.



Figure 5. *Tarentola annularis*.



Figure 4. *Ptyodactylus guttatus*



Figure 6. *Stenodactylus sthenodactylus*.



Figure 7. *Acanthodactylus scutellatus*.



Figure 8. *Chalcides ocellatus*.



Figure 9. *Chamaeleo chamaeleon*.



Figure 10. *Platyceps saharicus*.



Figure 11. *Platyceps rogersi*.



Figure 12. *Psammophis sibilans*.

important food items taken by these lizards were Hemiptera, spiders, Hymenoptera, and Coleoptera. This terrestrial lizard was observed climbing bushes during the day and occasionally resting on vegetation during night. Lizards were mainly observed in direct sunlight; however, a few individuals were deployed in plant shade.

Family: Scincidae

(14) *Chalcides ocellatus ocellatus* (Forsskål, 1775); Ocellated skink. Figure 8. This skink was common in green areas on Port Said, Ismailia and Al-Arish campuses, usually observed during morning hours, especially from 09:00 to 11:00 h. Part of a dead lizard (including the head) was found on the Suez New Campus under debris in June 2007.

(15) *Trachylepis quinquetaeniata* (Lichtenstein, 1823); Bean skink. Figure 13. This lizard was observed almost all year on the Ismailia campuses. No data on the ecology of this skink in the Suez Canal zone are available.

Family: Chamaeleontidae

(16) *Chamaeleo chamaeleon musae* (Steindachner, 1900); Chameleon. Figure 9. Several individuals were captured on the Al-Arish campus. These chameleons were strictly diurnal, arboreal and camouflaged. A total of 65 chameleon observations were made over a year. Of these, only eight were active during the day from March through July, the remainder were found on trees during the night. Chameleons of different age groups did not assume different heights on trees whilst observed active during the day or inactive during the night. Meanwhile, juveniles did not differ significantly from adults or subadults in assuming different heights on trees.

Suborder: Serpentes

Family: Colubridae

(17) *Platyceps saharicus* (Schätti & Mc Carthy, 2004); Saharan cliff racer. Figure 10. Only once was a single snake of this species captured while entering one of the Research Center's rooms at St. Catherine area in July 2001.

(18) *Platyceps rogersi* (Anderson, 1893); Spotted racer. Figure 11. A freshly road-killed snake of this species was found at the front of the faculty of education building on the Suez New Campus in



Figure 13. *Mabuya quinquetaeniata*.



Figure 14. *Psammophis schokari*.



Figure 15. *Spalerosophis diadema*.

May 2007.

(19) *Psammophis schokari schokari* (Forsskål, 1775); Schokari sand snake. Figure 14. Several individuals were collected from cultivated areas on the Al-Arish campus during the study period. One individual was found beneath some garbage in May 1999. Another snake was caught while basking at 11:00 h in June 2001. A dead snake was

found on the Ismailia Old Campus.

(20) *Psammophis sibilans sibilans* (Linnaeus, 1758); African beauty snake. Figure 12. A single adult male was captured by a student from inside a building on the Al-Arish campus during May 2007.

(21) *Spalerosophis diadema cliffordi* (Schlegel, 1837); Clifford's snake. Figure 15. This snake was most common on the Al-Arish and Ismailia campuses, in sandy areas, cultivated farms, and orchards. A large number were captured from Al-Arish in different months of the year except during winter. In June 2007, a shed skin was collected from an underground electricity box on the Ismailia New Campus.

DISCUSSION

The herpetofaunal survey found a diversity of species on Suez Canal University campuses. This diversity is probably due to the species richness in these areas and to the variety of habitats available. In North Sinai and the Suez Canal region, university campuses were generally constructed outside of town on desert plains with natural vegetation. Enclosing each campus with a brick wall may have isolated the existing reptiles within a specific range.

The reptile species reported herein are known to occur in the Suez Canal zone and Sinai (Werner, 1982, Ghobashi et al., 1990, Saleh, 1997, Ibrahim, 2005, Baha El Din, 2006), except for three species which are recorded for the first time from Al-Arish City and the Suez Canal zone. (1) One specimen of the Indian Leaf-toad gecko, *Hemidactylus flaviviridis* was collected on the Al-Arish campus; this species is thought to have been introduced to the area which would extend its range by 160 km from Qantara East (Ibrahim, 2003) to Al-Arish. (2) The African beauty snake, *Psammophis sibilans* was recently discovered on the Al-Arish campus. This specimen may have been translocated from outside Al-Arish City with animal fodder or garden materials, or may have come from a grainery about 500 m from campus where two individuals were captured a few years ago (Adel Ibrahim, unpublished data). Baha El-Din (2006) reported this species from Wadi Al-Arish just

south of Al-Arish City. (3) The Spotted racer, *Platyceps rogersi* was found on the Suez New Campus. This snake is known to inhabit hilly areas, gravel plains, rocky plateaus and sandy areas of the Eastern Desert and Sinai (Baha El-Din, 2006).

The Egyptian toad, *Bufo regularis*, is believed to have been introduced or to be a recent migrant to the university campuses because of the increase in green spaces and a continuous water supply. At the Suez New Campus, no anurans were found as most of the campus is still desert with very few green patches. In the future, it is expected that, *B. regularis*, which is the commonest frog in the Suez Canal area (Ibrahim, 2005), will be found on the Suez New Campus.

The high incidence of reptiles on the Al-Arish campus compared to the other campuses may be attributed to the species diversity of reptiles already found in the area, especially around dwelling species. The presence of scattered boulders and ruins of man-made structures has encouraged scansorial species such as the Turkish gecko, *Hemidactylus turcicus* and the Starred agama, *Laudakia stellio* to flourish. The degradation of reptile habitats on the Al-Arish campus is slow so that a vast area of the campus has retained its natural vegetation. These factors, plus public awareness, may play a role in maintaining a high number of reptile species.

The changes in the structure of campus by continuous construction and forestation seem to have had both positive and negative impacts on the herpetofaunal community structure. For example, on the Al-Arish campus, the lacertids have been negatively affected, simply because of the degradation and diminution of their habitats. No quantitative data on how the species have been affected are available, but the number of these lizards has obviously been decreased (person. observ.). It is expected that the Elegant gecko (*Stenodactylus sthenodactylus*) on the Al-Arish campus as well as Spotted racer (*Platyceps rogersi*) on the Suez New Campus will disappear when their habitats are entirely destroyed due to campus construction.

By contrast, such species as *Laudakia stellio*

and *Hemidactylus turcicus* are positively affected due to presence of their suitable habitats. Similarly, *Bufo regularis* is increasing dramatically on the Ismailia New Campus. The continuous increase in green farms has encouraged some lizards and snakes including the chameleon (*Chamaeleo chamaeleon*) and Clifford's snake (*Spalerosophis diadema*) to flourish. A considerable number of the latter were captured by workers during the past few years. Availability of food particularly insects and rodents encountered on university cultivated areas may attract this species as well.

No taxonomic problems were found among the university reptile species. However, there was a variation in lizard morphology (scalation or coloration) between some lizards inhabiting the Suez Canal University and Sinai. For example, *Laudakia stellio* in South Sinai differs morphologically than its conspecific *L. stellio vulgaris* in North Sinai. According to Lachman *et al.* (2006), the southern agamid may be assigned to subspecies *salehi*. Also, the taxonomy of the Turkish gecko, *Hemidactylus turcicus* in Sinai and the Canal region needs verification.

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