

## An Annotated Checklist of Amphibians and Reptiles of Margalla Hills National Park, Pakistan

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**Abstract.-** An updated checklist of amphibians and reptiles that occur in the Margalla Hills National Park (MHNP) is provided. The information provided is based on the collections and observations made in the field from 2003 to 2009. Due to its geographic position of being situated at the junction of high mountains in the north and the southern plains, the park exhibits a diverse herpetofauna. So far, forty one species have been identified as occurring in the park, including nine species of amphibians and 32 species of reptiles. Three species of lizards viz., *Laudakia agrorensis*, *Asymblepharus himalayanus*, and *Ophisops jerdonii* are being reported for the first time from this park.

**Key words:** Reptiles, amphibians, herpetofauna, biodiversity, Himalaya, Pakistan.

### INTRODUCTION

The Margalla Hills National Park (MHNP), encompassing an area of 17,386 hectares, was established in 1980 (UNDP/IUCN/MINFA/CDA, 1991) for the protection, conservation and management of the wildlife inhabiting this area. It is an extension of the Islamabad Wildlife Sanctuary that includes the Shakar Parian Hills and Rawal Lake. Despite its small size, the fauna of the Margalla Hills is quite diverse, probably due to its rich variety of habitats including thick vegetation cover and steep hillsides that provide shelter to animals. Moreover, the area constitutes a transitional zone between the high mountains to the north and plain areas to the south. The Margalla Hills are low foothills of the Himalaya and provide a corridor for many Himalayan species to disperse as far south as the Kala Chitta Hills.

The climate is typical for semi-arid areas in the region having moderate summer and winters. The overall climate is temperate, monsoonic and sub-humid. The mean maximum winter temperature is 21°C, the mean minimum of 1.6°C, with the lowest temperatures often falling below 0°C. Snow occurs occasionally. The hottest months are May and June, where the mean maximum is 41°C, recorded in June. The monsoon begins in July, with

a resultant amelioration of the harsh weather. The mean monthly rainfall for the monsoon season (July-September) is 254 mm with the maximum rainfall in the month of August. The mean relative humidity for the same period varies between 59 and 67%.

The Margalla Hills vegetation is largely the result of the monsoon, and the foothills flora is mostly tropical in origin (Shinwari and Khan, 1998). The people of the park cultivate *Dalbergia sisso* (Sheesham) for timber wood, while the main fruits are apple, peach greengage, almond, apricot, walnut, mulberry, and *Eriobotrya* (lukat). The main crops cultivated in the area are wheat, maize and mustard. The common trees of the park are *Acacia catechu*, *Acacia nilotica*, *Acacia modesta*, *Bauhinia variegata*, *Butea monosperma*, *Cassia fistula*, *Ficus carica*, *Olea ferruginea*, *Pinus roxburghii* and *Quercus leucotrichophora*. The most common shrubs are *Carissa opaca*, *Calotropis procera*, *Dodonaea viscosa* and *Justicia adhatod*. *Allium jacquemontii*, *Arundo donax*, *Cannabis sativa*, *Centaurea iberica*, *Geranium ocellatum*, *Hibiscus caesius*, *Pennisetum orientale*, *Saccharum spontaneum*, *Tulipa stellata* and *Typha elephantine* are widespread herbs (Shinwari and Khan, 1998).

The Soan and Korang rivers or their tributaries traverse the Margalla Hills National Park. These provide drainage for Murree, Kahuta, Margalla Hills, Rawat, Lehtrar and Panjar in their upper reaches. As the Soan river lies in the vicinity of the three large metropolitan areas, viz., Murree,

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Islamabad and Rawalpindi, this entire area, therefore, has endured tremendous ecological pressure from urbanization, industrialization, human population, excessive use of water, river diversion, fragmentation of aquatic habitats, impoundment, soil erosion due to deforestation, and water pollution as a result of municipal garbage and industrial waste. All of these factors have adversely affected the aquatic and terrestrial ecology and associated biodiversity.

The park itself lies at the junction of Potwar Plateau and northern mountainous region of Pakistan. It mostly represents arid sub-tropical zone with tropical deciduous forests, where the most common plant species are *Acacia modesta*, *Cassia fistula*, *Ficus carica*, *Dodonea viscosa* and *Zizyphus mauritania*. The arid subtropical habitats of the area are characterized by rocky and hilly terrain of less than 1000 m elevation. This varied habitats in terms of altitudinal and precipitation ranges and other environmental and topographic features, create an ideal setting for the high diversity of amphibians and reptiles.

A broad view of the herpetofauna of Pakistan has been given by Boulenger (1890), Minton (1966), Mertens (1969), Baig (1997), Baig *et al.* (2008) and Khan (2004, 2006). In Northern Pakistan, however, the main emphasis has been given to the Potwar Plateau and Azad Kashmir (Baig, 1998, 2001; Khan, 1979). Both these areas harbor high reptilian diversity due to the unique topography and other ecological factors (Baig, 1998). The Margalla Hills National Park, like the Potwar Plateau and Azad Kashmir, also has a distinct altitudinal range and relatively high precipitation.

A relatively high diversity that overlaps with the faunas of the northern regions and the Potwar Plateau is expected in the Margalla Hills National Park. Despite previous attempts by earlier workers confusion persisted about the actual number of amphibians and reptiles found in this region (Baig, 1998, 2001; Khan, 1979). This situation called for a comprehensive survey of the herpetofauna of the park area to better understand the species composition and their habitat associations so that a comprehensive management plan could be prepared for the conservation of this vital component of Pakistan's biodiversity.

## MATERIALS AND METHODS

Twenty-eight field surveys were conducted, spanning a period of seven years (2003-2009), at various localities that include selected representative habitats of Margalla Hills National Park. Observations and collections were made at night and during the day to maximize the documentation of the herpetofauna. Active searching was carried out at all study sites with a focus on suitable microhabitats for both diurnal and nocturnal species. The study area was subdivided into nine zones, *viz.*, Zone 1 (settlements), Zone 2 (cultivated land), Zone 3 (cultivated land, degraded land/cultivation/ scattered settlements), Zone 4 (degraded forest at lower elevation), Zone 5 (higher altitude degraded forest and ridges), Zone 6 (invasive species *Broussonetia papyrifera* dominated habitat), Zone 7 (subtropical pine forest), Zone 8 (sub-tropical semi-evergreen forest) and Zone 9 (Rawal Lake). Each zone was then actively surveyed for suitable microhabitats for both amphibians and reptiles (stones, pond embankment, crevices, leaf litter/debris, rotten logs) and potential amphibian breeding sites (marsh, small water pools, and water channels). These sites were extensively searched for eggs and tadpoles of amphibians in aquatic habitats or the presence of the amphibians and reptiles hiding. In winter, these surveys were conducted prior to the onset of the hibernation period of amphibians and reptiles, mostly in October and November. Most winter surveys were restricted to the period before dusk, as low night time temperatures limit the activity of most amphibians and reptiles. Night surveys within the study sites were conducted using boots, hand lamps and powerful torches to avoid dangerous snakes. Passive signs of the presence of amphibians and reptiles, such as body impressions, tail drags or footprints, faecal pellets, tracks, dens, hiding places or egg laying excavations, were also utilized to determine the local distribution and rough population density of the amphibian and reptilian fauna.

Collecting by bare hands, with long forceps or snake clutches were the usual means for collection. However, larger species, such as monitor lizards and rock-agamas, were captured with noose traps or other appropriate techniques. Snakes, especially venomous species, were caught with snake clutches or sticks.

“Scoop nets” were used in shallow water and “cast nets” in larger bodies of water for the collection of aquatic reptiles and amphibians (Baig *et al.*, 2008). Frogs and toads were collected efficiently at breeding sites by listening for their mating calls (Roy and Elepfandt, 2008).

Diurnal species were photographed in the field while the nocturnal species were brought to the base camp and photographed on the subsequent day. Voucher specimens were injected and preserved in 10 % formalin solution or 50-70 % alcohol and then transported to Pakistan Museum of Natural History (PMNH) laboratory to ascertain their identification using keys (Minton, 1966; Khan, 2003, 2006). All catalogued specimens are housed in PMNH. Generic assignment of amphibian and reptilian species is made consistent with the latest available systematics used in the following two web sources <http://research.amnh.org/vz/herpetology/amphibia/index.php> and <http://www.reptile database.org>, respectively.

## RESULTS AND DISCUSSION

Nine species of amphibians and 32 species of reptiles were recorded from Margalla Hills National Park (Table I, Appendix I). Following is the annotated list of amphibians and reptiles.

### Amphibia

#### *Anura (frogs and toads)*

The amphibian fauna of Pakistan is represented by 21 species allocated to the families Ranidae, Microhylidae, Bufonidae and Megophryidae. The first three families are represented in Margalla Hills National Park, whereas a single species of megophriid frog is restricted to the Deosai Plateau in Pakistan. Nine species belonging to eight genera occur in the Park.

#### 1. Ranidae

Skittering frog, *Euphlyctis cyanophlyctis* (Schneider, 1799).

Indian cricket frog/Marshy frog, *Fejervarya limnocharis* (Granvenhorst, 1829).

Tiger frog/Bull frog, *Hoplobatrachus tigerinus* (Daudin, 1802).

Murree hill frog, *Nanorana vicina* (Stoliczka, 1872).

Indian burrowing frog, *Sphaerotheca*

*breviceps* (Schneider, 1799).

The distribution of these ranid frogs is documented in older literature but *Nanorana vicina* has recently been re-discovered after 130 years since its initial description (Baig, 2002). *Euphlyctis c. cyanophlyctis* is one of the most widely distributed Oriental frogs. *Fejervarya limnocharis* is mainly distributed in the sub-Himalayan portions of Pakistan, and southward into the Potwar Plateau. *Sphaerotheca breviceps* is reported from Himalayan foothills and has a spotty distribution in the riparian systems of Punjab Province (Khan, 1976), desolate parts of the Cholistan Desert (Khan, 1985), and the Hab and Malir river valleys (Minton, 1962, 1966).

#### 2. Microhylidae

Short-ant frog, *Microhyla ornata* (Duméril & Bibron, 1841)

Narrow-mouthed balloon frog, *Uperodon systoma* (Schneider, 1799)

Previously, the Microhylidae was thought to be represented in Pakistan by a single species, but Baig and Gvozdik (1998b) recorded *Uperodon systoma* from Islamabad.

#### 3. Bufonidae

Marbelled toad/Indus valley toad, *Duttaphrynus stomaticus* Lütken, 1862.

Hazara toad/Asian garden toad, *Duttaphrynus melanostictus* (Schneider, 1799).

*Duttaphrynus stomaticus* is widely distributed throughout the Indo-Pakistan region. A taxonomic study on this species suggests the partition of the Indus Valley population into five separate populations, though none are worthy of subspecific recognition (Auffenberg and Rehman, 1997). *Duttaphrynus melanostictus hazarensis* was recently described by Khan (2000) from District Hazara, NWFP, Alpine Punjab and Azad Kashmir.

### Reptilia

#### I. Testudines (turtles/tortoises)

#### 1. Trionychidae

Indian Soft-shell turtle, *Nilssonina gangeticus* (Cuvier, 1825).

**Table I.- Distribution of the Herpeto-fauna in Margalla Hills National Park on the basis of their preferred habitat/ zone (+= species present, -= species not observed/collected).**

S. No.	Scientific Name	Distribution in								
		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9
1	<i>Duttaphrynus stomaticus</i>	+	+	+	+	-	+	-	-	+
2	<i>Duttaphrynus melanostictus</i>	-	-	-	+	+	+	-	+	+
3	<i>Hoplobatrachus tigerinus</i>	+	-	-	+	+	-	-	-	+
4	<i>Euphlyctis cyanophlyctis</i>	-	+	+	-	+	-	-	-	+
5	<i>Fejervarya limnocharis</i>	+	+	-	-	+	-	-	-	-
6	<i>Nanorana vicina</i>	-	-	-	-	-	-	+	+	-
7	<i>Sphaerotheca breviceps</i>	+	-	-	+	-	-	-	-	-
8	<i>Microhyla ornata</i>	+	-	-	+	+	-	-	-	-
9	<i>Uperodon systoma</i>	-	-	-	-	-	-	-	+	-
10	<i>Pangshura smithii smithii</i>	-	-	-	-	-	-	-	-	+
11	<i>Nilssonia gangeticus</i>	-	-	-	-	-	-	-	-	+
12	<i>Lissemys punctata andersoni</i>	-	-	+	-	-	-	-	+	+
13	<i>Saara hardwickii</i>	+	-	+	+	-	-	-	-	-
14	<i>Eublepharis macularius</i>	-	-	-	+	-	-	-	+	-
15	<i>Calotes versicolor farooqi</i>	+	+	+	+	+	+	-	+	+
16	<i>Laudakia agorensis</i>	-	-	-	-	-	-	-	+	-
17	<i>Hemidactylus flaviviridis</i>	+	+	+	-	-	-	-	-	+
18	<i>Hemidactylus brookii</i>	+	-	-	+	+	-	-	-	+
19	<i>Cyrtopodion scabrum</i>	-	-	+	+	+	-	-	-	+
20	<i>Acanthodactylus cantoris</i>	-	-	+	-	-	-	-	-	-
21	<i>Ophisops jerdonii</i>	-	-	+	+	-	+	-	+	+
22	<i>Eutropis dissimilis</i>	-	-	+	+	-	+	-	+	-
23	<i>Eurylepis taeniolatus</i>	-	+	+	+	-	-	-	-	+
24	<i>Asymblepharus himalayanus</i>	-	-	-	+	-	-	+	+	-
25	<i>Varanus bengalensis</i>	+	+	+	+	-	+	-	+	+
26	<i>Myriopholis macrorhynchus</i>	-	-	+	-	-	-	-	-	+
27	<i>Ramphotyphlops braminus</i>	-	-	+	-	-	-	-	-	+
28	<i>Typhlops porrectus</i>	-	+	+	-	-	-	-	-	-
29	<i>Amphiesma stotatum</i>	-	+	-	+	+	-	+	+	-
30	<i>Boiga trigonata</i>	-	-	-	+	+	-	-	+	+
31	<i>Platyceps rhodorachis rhodorachis</i>	-	-	-	-	+	-	+	+	-
32	<i>Platyceps ventromaculatus ventromaculatus</i>	-	-	+	-	+	-	-	+	-
33	<i>Psammophis schokari</i>	-	-	+	-	-	+	-	-	-
34	<i>Ptyas mucosus</i>	+	+	+	+	+	+	-	+	+
35	<i>Spalerosophis atriceps</i>	-	-	-	+	+	-	+	-	-
36	<i>Xenochrophis piscator</i>	-	+	-	+	+	+	+	+	+
37	<i>Bungarus caeruleus</i>	+	+	-	+	+	+	-	+	+
38	<i>Naja naja</i>	-	+	+	+	+	+	-	-	+
39	<i>Naja oxiana</i>	-	-	-	+	+	+	+	+	+
40	<i>Echis carinatus sochureki</i>	-	+	-	+	+	+	+	+	+
41	<i>Daboia russelii</i>	-	+	-	+	+	+	-	-	+

Indian flap-shell turtle, *Lissemys punctata andersoni* (Webb, 1980).

2. *Geomydidae*

Brown river turtle, *Pangshura smithii smithii* (Gray, 1863).

The testudines is represented by the families Trionychidae and Geomydidae in the park. Turtles generally avoid swift mountain streams and rivers and are therefore more common in riverine situations in the lowlands. As the northern limit of the park is mainly mountainous, their distribution is

**Appendix I:**

**A consolidated list of all the species collected during the study period along with their museum catalog numbers. Species not included were not collected, only observed.**

Sr. No.	Species	Material examined PMNH No.
1	<i>Bufo stomaticus</i>	1153-54, 1169-1175, 1199, 102,
2	<i>Duttaphrynus melanostictus</i>	141, 142, 617, 673
3	<i>Hoplobatrachus tigerinus</i>	1325
4	<i>Euphlyctis cyanophlyctis</i>	101, 103-106
5	<i>Fejervarya limnocharis</i>	618-620, 616
6	<i>Nanorana vicina</i>	1087
7	<i>Sphaerotheca breviceps</i>	1127
8	<i>Microhyla ornate</i>	1303-1309
9	<i>Uperodon systoma</i>	460
11	<i>Nilssonia gangeticus</i>	1891
14	<i>Eublepharis macularius</i>	45
15	<i>Calotes versicolor farooqi</i>	384, 413, 1947
16	<i>Laudakia agorensis</i>	1911
17	<i>Hemidactylus flaviviridis</i>	256, 395, 746, 1260, 1428, 1429, 1575, 1581-1583, 1884, 1974
18	<i>Hemidactylus brookii</i>	255, 789, 790, 1865-68, 1882-83, 1885, 1896, 1914-1917, 1948, 1972-73, 1976, 1985
20	<i>Acanthodactylus cantoris</i>	851-854
21	<i>Ophisops jerdonii</i>	1730
22	<i>Eutropis dissimilis</i>	368, 369, 863, 864, 1443, 1732
23	<i>Eurylepis taeniolatus</i>	1442
25	<i>Varanus bengalensis</i>	49, 77, 254, 806, 807, 849, 1457
27	<i>Ramphotyphlops braminus</i>	387, 1912
28	<i>Typhlops porrectus</i>	1899, 1949
30	<i>Boiga trigonata</i>	18, 938, 1869-70
32	<i>Platyceps ventromaculatus ventromaculatus</i>	498
33	<i>Psammophis schokari</i>	918
34	<i>Ptyas mucosus</i>	257, 744, 805, 808, 865, 866, 1091, 1296, 1890, 1933, 1937, 1956-57, 1883
36	<i>Xenochrophis piscator</i>	941, 1895, 1975, 1980
37	<i>Bungarus caeruleus</i>	495, 745, 964, 1871, 1981
38	<i>Naja naja</i>	1444, 1961
41	<i>Daboia russelii</i>	1971

largely restricted to the park's southern margin, provided other physical and ecological factors permit. *Nilssonia gangeticus*, *Lissemys punctata andersoni* and *Pangshura smithii smithii* are plentiful in the riparian systems of the upper and lower Indus valleys and frequent muddy ditches, lakes, and marshes with considerable marginal vegetation. The Soan and Korang rivers and their various tributaries harbor a very large populations of these species.

II. *Sauria (Lizards)*

Six of the seven lizard families recorded from Pakistan occur in Margalla Hills National Park, viz., Eublepharidae, Gekkonidae, Agamidae, Lacertidae, Varanidae, and Scincidae. The Chameleonidae is restricted to extreme southeastern Sindh Province. Lizards are the second most dominant group of the herpetofauna in the park, represented by 13 species belonging to 12 genera.

1. *Eublepharidae*

Fat-tailed gecko, *Eublepharis macularius* (Blyth, 1854)

Börner (1976, 1981) described several subspecies and forms, but these are treated as a single taxon herein. It inhabits rocky or stony terrain, mudflats with sparse grass and bushes, in mesic to xeric conditions. This lizard is increasingly exploited in the illegal pet trade.

2. *Agamidae*

Farooq's garden lizard, *Calotes versicolor farooqi* (Auffenberg and Rehman, 1995).

Agrore valley rock agama, *Laudakia agorensis* (Stoliczka, 1872).

Spiny-tailed ground lizard, *Saara hardwickii* (Gray, 1827).

This is the most conspicuous group of diurnal lizards in the park. *Saara hardwickii* is a characteristic diurnal ground lizard of vast tracts of hard soil with moderate to sparse xerophytic vegetation. It avoids stony and sandy areas. Hawks, owls, jackals, and foxes are its major predators. It is extensively utilized in laboratory

settings including dissections in vertebrate anatomy classes in colleges and schools. Moreover, its oil (fat) is believed to have aphrodisiac and medicinal properties, for which it is killed in large numbers (Vyas, 1990; Khan, 1991). *Laudakia agorensis* can be seen basking in rocky areas of the park. *Calotes versicolor farooqi*, an alpine subspecies of the widespread typical form, is the only most abundant and true arboreal agamid species in the area.

### 3. Gekkonidae

Keeled rock gecko, *Cyrtopodion scabrum* (Heyden, Rüpell, 1827)

Spotted/Brook's house gecko, *Hemidactylus brookii* Gray, 1845

Yellow-bellied house gecko, *Hemidactylus flaviviridis* Rüpell, 1835

The Gekkonidae is not well represented in the study area when compared to other parts of Pakistan. Both the house geckos are confined to relatively lower elevations, around the human habitations, whereas, the rock gecko inhabits dry stony hillsides with typically sparse xerophytic vegetation. However, the later species is also found in buildings.

### 4. Lacertidae

Indian fringe-toed sand lizard, *Acanthodactylus cantoris* Günther, 1864

Punjab snake-eyed lacerta/Rugose spectacled lacerta, *Ophisops jerdonii* Blyth, 1853.

Lacertids are mainly distributed in the arid Potwar Plateau in Pakistan. However, *Acanthodactylus cantoris* can be seen along the sandy patches of rivers and their tributaries, while *Ophisops jerdonii* has been collected from Shakarparian, Islamabad.

### 5. Scincidae

Striped grass skink, *Eutropis dissimilis* (Hallowell, 1857).

Yellow-bellied mole skink, *Eurylepis taeniolatus taeniolatus* Blyth, 1854

Himalayan ground skink, *Asymblepharus himalayanus* (Günther, 1864).

Among the skinks found in Margalla Hills National Park, *Asymblepharus himalayanus*

attains the highest elevation. During the summer season, the agile movements of scincids can only be observed in grassy fields.

### 6. Varanidae

Bengal monitor, *Varanus bengalensis* (Daudin, 1802).

This family is represented in Pakistan by three species, but only *Varanus bengalensis* has been recorded from the park. This lizard is widely distributed, even above 1200m in elevation.

### III. Serpentes (Snakes)

The snakes of Margalla hills National Park are represented by five families, viz., Leptotyphlopidae, Typhlopidae, Boidae, Colubridae, Elapidae, and Viperidae and is more diverse than the other groups of reptiles with 17 species belonging to 15 genera.

#### 1. Leptotyphlopidae

Beaked thread snake, *Myriopholis macrorhynchus* (Jan, 1862)

These are small snakes, with vermiform bodies covered with cycloid imbricate polished scales of uniform size and small, barely visible eyes. A single species is found in this part of Pakistan. Hahn and Wallach (1998), while commenting on Old World leptotyphlopids, did not include Pakistan in the range of this species.

#### 2. Typhlopidae

Brahminy blind snake, *Ramphotyphlops braminus* (Daudin, 1803).

Slender blind snake, *Typhlops porrectus* Stoliczka, 1871.

Typhlopids are specialized, diminutive, burrowing snakes leading secretive, fossorial lives. They have a cylindrical body with an almost uniform diameter throughout. Khan (1998) believed that *Typhlops porrectus* (extralimital) is confined to the eastern Himalayas, so he proposed that the Pakistan populations are better assigned to other species of *Typhlops*. *Ramphotyphlops braminus* is almost cosmopolitan in its distribution. According to Wallach (2000), inadequate diagnoses and descriptions, conflicting data, and variable or vague taxonomic characters, the systematic status of three new taxa of Khan

(1999c,d) including *T. m. madgemintonae*, *T. m. shermani*, and *T. ahsanuli* are uncertain and they are all placed *incertae sedis* within the Typhlopidae until the type material can be examined. Unfortunately, none of the holotypes are presently deposited in an appropriate institution. Further, Wallach found that the names of the above three taxa, as proposed, are incorrect original spellings and are corrected. *Typhlops ductuliformes* Khan was shown to be a synonym of *Typhlops porrectus* Stoliczka. Only two species of genus *Typhlops* are known from Pakistan. Sharma (1982) reported *Rhinotyphlops acutus* from Surendranagar District, Gujarat, India. This locality is within 200 km of Thar Parkar, Pakistan and the species may eventually be found in this part of Pakistan.

### 3. Colubridae

Buff-striped keelback, *Amphiesma stolatum* (Linnaeus, 1758).

Common Indian cat snake, *Boiga trigonata* (Schneider, 1802).

Cliff racer, *Platyceps rhodorachis rhodorachis* (Jan, 1865).

Plains racer, *Platyceps ventromaculatus ventromaculatus* (Gray, 1834).

Afro-Asian sand snake, *Psammophis schokari* (Forskål, 1775).

Rat Snake or Dhaman, *Ptyas mucosus* (Linnaeus, 1758).

Royal snake, *Spalerosophis atriceps* (Fischer, 1885).

Checkered keelback water snake, *Xenochrophis piscator* (Schneider, 1799).

Colubrids are advanced snakes and occur nearly worldwide, although marginally in Australia. They family constitutes almost two thirds of the living snakes. They occupy a wide spectrum of habitats from tropical and temperate forests to deserts and have fossorial to arboreal habits. Eight species belonging to seven genera are so far reported from Margalla Hills National Park. *Boiga trigonata* is a rear-fanged venomous snake, but it is not generally dangerous to humans, while the remaining species are non-venomous.

### 4. Elapidae

Indian or common krait, *Bungarus caeruleus* (Schneider, 1801).

Black cobra, *Naja naja* (Linnaeus, 1758).

Brown cobra/Oxus cobra, *Naja oxiana* (Eichwald, 1831).

This family of venomous snakes has permanently fixed fangs. Two genera are recorded from Pakistan viz., *Bungarus* and *Naja*. *Bungarus caeruleus* frequents open grassland, semi deserts with alluvial soil and is reported from throughout Punjab including the alpine area, Khyber Pakhthunkhwa, Azad Kashmir, Sindh, and southern Balochistan.

### 5. Viperidae

Sochurek's saw-scaled viper, *Echis carinatus sochureki* (Stemmler, 1969).

Russell's chain viper, *Daboia russelii* (Shaw and Nodder, 1797).

These medium-sized snakes have broad heads, distinct from the neck, and stocky bodies with short tails that taper abruptly. Of the five genera occurring in Pakistan, two are found in the park. *Daboia russelii russelii* frequents grasslands, cultivated fields, saltbush scrubs and the margin of the marshes. It is most frequently found when the lowland is flooded. *Echis carinatus sochureki*, on the other hand, occurs on rocky, sandy, and alluvial soils with vegetation varying from sparse xerophytes to moderately dense grass and scrub.

## CONCLUSIONS

The herpetofauna of Margalla Hills National Park reflects its transitional position between the hilly areas in the north and plain areas in the south. As a result, species of dry and arid habitats, such as *Saara hardwickii* and *Echis carinatus sochureki*, as well as species found in the conifer forest, like *Asymblepharus himalayana*, are represented. The park is the northernmost distributional limit of some plain species, viz., *Saara hardwickii*, *Eublepharis macularius*, *Hoplobatrachus tigerinus*, *Echis carinatus sochureki*, and *Daboia russelii*. Similarly, the park represents the southernmost limit of some Himalayan species viz., *Laudakia agrorensis*, *Naja oxiana* and *Asymblepharus himalayanus*. The highest elevations where amphibians and reptiles are found here corresponds to the subtropical pine forests.

*Nanorana vicina* occurs at the highest elevations for frog species within the park area.

The frog, *Uperodon systoma* had only been reported from Islamabad in Pakistan (Baig and Gvozdik, 1998) and its presence in the Margalla Hills National Park has been confirmed during this study. The lizard species, *Asymblepharus himalayanus*, *Laudakia agrorensis* and *Ophisops jerdonii* were reported for the first time from the park.

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