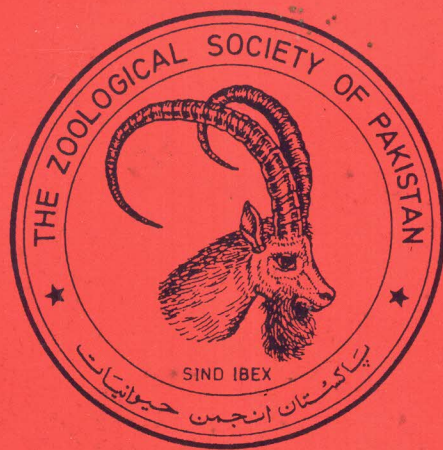


Pakistan Journal of Zoology Supplement Series

Number 4, pp. 1-14, March 2004

CHECKLIST AND KEY TO THE AMPHIBIA, CHELONIA AND CROCODYLIA OF
PAKISTAN

MUHAMMAD SHARIF KHAN



Published by

THE ZOOLOGICAL SOCIETY OF PAKISTAN

Editor-in-Chief

MUZAFFER AHMAD

Department of Zoology, University of the Punjab, Lahore

Editor

ABDUL RAUF SHAKOORI

School of Biological Sciences, University of the Punjab, Lahore

In pursuance of the decision of the Zoological Society of Pakistan taken in its General Body Meeting held on 17-3-2001, the *Supplement Series* of the *Pakistan Journal of Zoology* has been started. It will contain large articles like monographs, checklists, catalogues, reviews, etc. Each issue will contain a single article. The price of the publication will vary with the size of the article.

Subscription Price

Price of Numbers 4 - 6, 2004

Surface Mail:	US \$ 35.00 each issue
Air Mail:	US \$ 40.00 each issue
Single issue:	Rs. 300.00 each issue

Computerized Typography & Printed by: **Amjad Ali**

**CHECKLIST AND KEY TO THE AMPHIBIA, CHELONIA
AND CROCODYLIA OF PAKISTAN**

MUHAMMAD SHARIF KHAN

Herpetological Laboratory, 15/6 Darul Sadar North,
Rabwah-35460, Pakistan

PAKISTAN JOURNAL OF ZOOLOGY SUPPLEMENT SERIES
Number 4, 2004
Pages 1-14

Published by

THE ZOOLOGICAL SOCIETY OF PAKISTAN

Checklist and Key to the Amphibia, Chelonia and Crocodylia of Pakistan

MUHAMMAD SHARIF KHAN*

Herpetological Laboratory, 15/6 Darul Sadar North, Rabwah 35460, Pakistan

CONTENTS

Abstract	1
Introduction	1
Amphibia.....	2
Family Bufonidae.....	2
Family Microhylidae.....	4
Family Ranidae.....	5
Chelonia	8
Family Cheloniidae.....	8
Family Dermochelyidae.....	9
Family Teastuidinidae.....	10
Family Trionychtiidae.....	10
Crocodylia.....	11
Family Crocodylidae.....	11
Family Gavialidae.....	12
References.....	12

Abstract.- Checklist and key to the amphibians, chelonians and crocodiles of Pakistan is presented, with notes on their distribution in and outside Pakistan. Included in the checklist are 25 species and subspecies of the Amphibia, 5 species of sea and 8 of freshwater turtles, two species of land tortoise and two species of crocodiles. A key to the amphibian tadpoles found in the waters of Pakistan is also given.

Key words: Amphibia, Chelonea, Crocodylia, checklist, key, Pakistan.

INTRODUCTION

Boulenger's volume in the "Fauna of British India" series, best records the scientific interest which amphibians, and reptiles attracted before 1890. By that time almost all major species of these animals from Indo-Pakistan subcontinent had been discovered and described. Boulenger's (1920) monograph on family Ranidae of the south-east Asia, best records the wealth of knowledge on the subject which had accumulated by that time. Smith (1931) revised chelonian part of Boulenger's 1890 volume. After a long gap of time, Minton (1962) published his herpetological studies and ushered new era for herpetological studies in Pakistan. It was soon followed by Merten's 1969a,b, 1971,

1972, 1974 publications. Later extensive taxonomic work has been carried on amphibians, resulting in description and record of several new species thus adding considerably to the faunal list of Pakistan (Dubois and Khan, 1979; Baig and Gvozdk, 1998; Stock *et al.*, 1999; Khan, 1968, 1972, 1974, 1976, 1985, 1986, 1997a,b, 2000a; Khan and Ahmed, 1987; Khan and Baig, 1988; Khan and Tasnim, 1987, 1989).

Several publications have appeared on Pakistani amphibians and crocodiles (Minton, 1966; Mertens, 1969a; Khan and Mirza, 1976; Das, 1991), and new additions have been made to the faunal list of Pakistan (Mertens, 1969b; Webb, 1980), and considerable new data on ecology, reproduction and distribution of these animals have accumulated.

Amphibians, turtles and crocodiles are wetland animals. The hydrology and river system of the Indus Valley present ideal habitat to these animals. With recent extensive canalisation in the Indus Valley, amphibian habitat has been extended

*Present address: Apt # A17 151-S. Bishop Ave. SECANE, PA 19018, USA. Email: typhlops99@hotmail.com

considerably, now they abound in the areas where they were once scarce. While chelonians and crocodiles tell different story. About two centuries ago they abounded in the Indus water courses. As forests along water courses were felled due to human onslaught, crocodiles, due to large size, were easy to spot and were targeted, they failed to survive against human intervention. Now they are almost completely exterminated from the rivers and lakes in the Indus Valley. Few are stated to be surviving in lakes in lower Sindh and Hab River along Makran coast, Southern Baluchistan (Khan, in press; Minton, 1966; Mertens, 1969a). However, turtles managed to survive in the wetlands against high odds because of their smaller size, agility, sneaky habits and aquatic retreat. They are wide ranging and are carried far and wide in the Indus Valley by regular yearly flooding water of the rivers. Visits of sea turtles form a regular yearly feature along beaches, feeding and laying eggs along the Pakistan coastline, they rarely invade rivers. While one of the two tortoises, recorded from Pakistan, frequents lower Indus Delta, the second frequents the Baluchistan highlands.

The following checklist includes all amphibians, chelonians and crocodiles so far recorded from Pakistan. Easy to use, identification keys for species are provided. Identification key for amphibian tadpoles found in Pakistan is also provided. For explanation of the morphological terms used in the keys, readers are advised to refer for amphibians to Khan and Tasnim (1987) and for chelonians Khan and Tasnim (1990). In the checklist type locality and notes on distribution of each species, in and outside Pakistan, are given. To facilitate further taxonomic studies on amphibians and chelonians, pertinent publications on the subject are referred to in the references section.

In the checklist all taxonomic categories are alphabetically arranged, without any phylogenetic significance.

Pakistani amphibians belong to three families Bufonidae, Microhylidae and Ranidae. The number of species has steadily increased in all taxonomic groups from Minton (1966) 7 species, Mertens (1969a) 14 Khan (1980) 18, and Khan (in press) 24 species. While 15 Pakistani chelonian species belong to 5 families: Cheloniidae, Dermochelyidae,

Emydidae, Testudinidae and Trionychidae, the crocodiles belong to two families: Crocodylidae and Gavialidae, each with a single species.

AMPHIBIA

Key to amphibian families in Pakistan

1. Parotid gland present Bufonidae
No parotid gland 2
2. Pupil vertical Microhylidae
Pupil horizontal Ranidae

Family BUFONIDAE

Genus *Bufo* Laurenti, 1768

(Represented by 10 species and subspecies in Pakistan)

Key to toads of genus *Bufo* in Pakistan

1. Head with cranial crests 2
Head without cranial crests 3
2. Only supra orbital crest present, tympanum indistinct
..... *Bufo himalayanus*
Canthal, supraorbital, postorbital and orbitotympanic crests present, tympanum distinct *Bufo melanostictus*
3. Tympanum distinct 4
Tympanum indistinct *Bufo surdus*
4. Tibial gland absent 5
Tibial gland present 6
5. Dorsum with green pattern 7
Dorsum uniformly olive *Bufo olivaceus*
6. Tarsal fold indicated by a weak spinulated line
..... *Bufo stomaticus*
A distinct tarsal fold present *Bufo latastei*
7. Dorsal pattern of scattered green spots
..... *Bufo viridis zugmayri*
Dorsal pattern of coalesced green blotches 8
8. Dorsal pattern of longitudinal stripes, three on each side ..
..... *Bufo siachenensis*
Dorsum heavily green with occasional light spots of original body colour *Bufo pseudoraddei pseudoraddei*

Bufo himalayanus Günther

1864. *Bufo melanostictus* var. *himalayanus* Günther,
Rept. Br. India: 422.

Type locality

Sikkim and Nepal.

Distribution in Pakistan

Recorded from the Himalayas at 2000-3500m of elevation from Azad Kashmir, Hazara Division, North-Western Frontier Province (NWFP).

Distribution outside Pakistan

Southern slopes of the Himalayas in Tibet (China), north-western Yunnan (China), Nepal, and Sikkim.

***Bufo latastii* Boulenger**

1882. *Bufo latastii* Boulenger, *Cat. Batr. Sal.*: 294.

Type locality

Ladakh, north-eastern Pakistan.

Distribution in Pakistan

In Pakistan this toad has been recorded from Ladakh in Baltistan between 2600 and 3000 m of elevation.

Distribution outside Pakistan

Occupied Kashmir, Nepal, north Indian Punjab.

***Bufo melanostictus* Schneider**

1799. *Bufo melanostictus* Schneider, *Hist. Amph.*, 1: 216.

Type locality

India.

Distribution in Pakistan

Widely distributed in north-eastern parts of Pakistan (Rawalpindi, Islamabad, Azad Kashmir and North Western Frontier Province). Its Pakistani population has recently been described as a new subspecies.

Distribution outside Pakistan

One of the most common and widely distributed toads in South-east Asia. Its range include south-western and southern China (including Taiwan) from Nepal to Sri Lanka, Andaman Is., and Sumatra, Java, Borneo, and Bali. extends throughout northern and peninsular India).

***Bufo melanostictus hazarensis* Khan**

2001. *Bufo melanostictus hazarensis* Khan, *Pakistan J. Zool.*, **33**: 297.

Type locality

Ooghi, Manshera, and Datta, Hazara Division, NWFP, Pakistan.

Distribution in Pakistan

Restricted to the alpine Punjab, District Hazara, eastern NWFP, and Azad Kashmir.

***Bufo olivaceus* Blanford**

1874. *Bufo olivaceus* Blanford, *Ann. Mag. nat. Hist.*, **14**: 35.

Type locality

Dasht, Baluchistan.

Distribution in Pakistan

Recorded from the extreme western parts of Baluchistan.

Distribution outside Pakistan

Recorded from south-eastern Iran.

***Bufo siachinensis* Khan**

1997. *Bufo siachinensis* Khan, *Pakistan J. Zool.*, **29**: 43-48.

Type locality

Shinu village, on the left bank of the River Shyok, 140 km east of Skardu, at the foot of Siachen Glacier, Baltistan, north-eastern Pakistan.

Distribution in Pakistan

It is as yet known only from its type locality.

***Bufo stomaticus* Lütkin**

1863. *Bufo stomaticus* Lütkin, *Vidensk. Meddel. Naturhist. Foren. Kjobenhavn*, **14**: 305.

Type locality

Assam, western Himalayas, India.

Distribution in Pakistan

Widely distributed throughout the Indo-Pakistan subcontinent. It is collected from upper and lower Indus Valleys, Baluchistan, from plains to an elevation of 1800 m in the northern and western hilly tracts of Pakistan.

Distribution outside Pakistan

From Bangladesh through the Ganges Plain, peninsular India, Afghanistan, Iran, and Muscat.

Bufo surdus Boulenger

1891. *Bufo surdus* Boulenger, *Ann. Mag. nat. Hist.*, 7: 282.

Type locality

Baluchistan, Pakistan.

Distribution in Pakistan

A little known species. Reported from western Baluchistan and around Quetta.

Distribution outside Pakistan

Widely distributed in southern Iran and adjacent Iraq.

Bufo pseudoraddei pseudoraddei (Mertens)

1971. *Bufo viridis pseudoraddei* Mertens, *Senckenb. Biol.*, 52: 7-15.

1999. *Bufo pseudoraddei pseudoraddei* Stock, Schmid, Steinlein, Grosse, *Ital. J. Zool.*, 66: 221-226.

Type locality

Mingora, Swat, Pakistan.

Distribution in Pakistan

Known from Mingora, Swat, Pakistan.

Bufo pseudoraddei baturae Stock, Schmid, Steinlein, Grosse

1999. *Bufo pseudoraddei baturae* Stock, Schmid, Steinlein, Grosse, *Ital. J. Zool.*, 66: 221-226.

Type locality

Hunza River, north of Passu River, Gilgit Agency, Baltistan, north-eastern Pakistan.

Distribution in Pakistan

Passu, Swat, Karakoram Range, Gilgit Agency, Baltistan, Pakistan.

Bufo viridis zugmayeri Eiselt and Schmidler

1973. *Bufo viridis zugmayeri* Eiselt and Schmidler, *Ann. naturhist. Mus. Wien.*, 77: 206-207.

Type locality

Peshin, south-eastern Baluchistan, Pakistan.

Distribution in Pakistan

Quetta, Chagai, Baluchistan, Pakistan.

Family MICROHYLIDAE

(Family Microhylidae is represented in Pakistan by 2 genera, *Microhyla* and *Uperodon*)

Key to frogs of family Microhylidae in Pakistan

1. Tongue elliptical; a dermal ridge between internal naris; adult does not exceeds 30 mm in body length; body dorsum with elongated light brown large branched blotch .
..... *Microhyla ornata*
Tongue oval; a pair of tubercles between internal naris; adult size 50-60 mm; dorsum with brown reticulation *Uperodon systoma*

Genus *Microhyla* Tschudi, 1828***Microhyla ornata*** (Dumeril and Bibron)

1841. *Engystoma ornatum* Dumeril and Bibron, *Erpet. Gen.* 8: 745.

1882. *Microhyla ornata* Boulenger, *Cat. Batr. Sal. Br. Mus.*: 165.

Type locality

Malabar Coast, India.

Distribution in Pakistan

Widely distributed in Azad Kashmir, and Indus Valley in Pakistan.

Distribution outside Pakistan

Widely distributed in south-east Asia: from the Malay Peninsula, Siam, southern China, Cambodia, Burma, Nepal, Kashmir, Sri Lanka, and throughout India.

Genus *Uperodon* Dumeril and Bibron, 1841

Uperodon systoma (Schneider)

1799. *Rana systoma* Schneider, *Hist. Amphib.*, 1: 144.

1931. *Uperodon systoma* Parker, *Archo. zool. Ital.*, 16: 1243.

Type locality

Carnatic, Biligiriranga Hills, Mysore, Madras, India.

Distribution in Pakistan

Rare frog in Pakistan, collected from the foot of Shakarparian Hills, Islamabad.

Distribution outside Pakistan

Widely distributed in southern and eastern India, extending into northern Sri Lanka.

Family RANIDAE

(Family Ranidae is represented by 6 genera and 10 species in Pakistan)

Key to species of frogs of family Ranidae of Pakistan

1. Tympanum indistinct.....2
Tympanum distinct.....3
2. Body dorsum with thick, broken longitudinal folds
.....*Nanorana pleskei*
Body dorsum smooth with a few tubercles on flanks
.....*Paa vicina*
3. Toes 1/2 webbed4
Toes extensively webbed5
4. Habitus toad-like, inner metatarsal tubercle shovel-shaped.....*Tomopterna breviceps*
Habitus frog-like, inner metatarsal tubercle elongate5
5. First finger hardly extending beyond second; tibio-tarsal joint reaching to anterior border of eye or a point between eye and tip of snout.....*Limnonectes syhadrensis*
First finger longer than second; tibio-tarsal joint reaching

tympanum or naris.....*Limnonectes limnocharis*

6. Body dorsum pustulate.....7
Body dorsum with longitudinal folds
.....*Hoplobatrachus tigerinus*
7. Nuptial spines on at least first two fingers.....8
No nuptial spines.....*Euphlyctis cyanophlyctis*
8. Pustules large, multispinulate; belly spiny
.....*Paa sternosignata*
Pustules small, unispinulate; belly spineless9
9. Spinules on longitudinal ridges*Paa hazarensis*
Spinules on pustules.....*Paa barmoachensis*

Genus *Euphlyctis* Fitzinger, 1843

Euphlyctis cyanophlyctis cyanophlyctis (Schneider)

1799. *Rana cyanophlyctis* Schneider, *Hist. Amphib.*, I: 137.

1985. *Euphlyctis cyanophlyctis* Poynton and Broadley, *Ann. Natal Mus.*, 26: 124, by implication.

Type locality

Eastern India.

Distribution in Pakistan

Almost throughout Pakistan, below 1800m.

Distribution outside Pakistan

Most widely distributed Oriental frog. Extends from Thailand to Nepal, throughout India, Sri Lanka. It extends westward to Iran, Afghanistan and Arabia. Two races have been described from Pakistan:

Euphlyctis cyanophlyctis seistanica (Nikolsky)

1900. *Rana seistanica* Nikolsky, *Ann. Mus. Zool. Acad. Sci. St. Petersburg*, iv, 1899: 375-418.

Type locality

Seistan.

Distribution in Pakistan

Seistan, along the Pakistan-Afghanistan-Iran border.

Distribution outside Pakistan

Along Iran and Afghanistan border.

Euphlyctis cyanophlyctis microspinulata Khan

1997. *Euphlyctis cyanophlyctis microspinulata* M. S. Khan, *Pakistan J. Zool.*, **29**: 107-112.

Type locality

Khuzdar, south-east Kalat Division, Baluchistan, Pakistan.

Distribution in Pakistan

Widely distributed in Jhelum, Waziristan, and Baluchistan.

Distribution outside Pakistan

Extends in Afghanistan.

Genus *Hoplobatrachus* Peters, 1863

Hoplobatrachus tigerinus (Daudin)

1802. *Rana tigerinus* Daudin, *Hist. Nat. Rainettes* 1802, *Hist. Nat. Rain. Gren. Crap.*: 42.

1992. *Hoplobatrachus tigerinus* Dubois, *Bull. mens. Soc. Linn. Lyon*, **61**: 315.

Type locality

Bengal, India.

Distribution in Pakistan

Common frog of the Indo-Gangetic plains, not extending into Baluchistan.

Distribution outside Pakistan

Reported from Afghanistan close to the Khyber Pass. Nepal and India; Sri Lanka; introduced in Madagascar.

Genus *Limnonectes* Fitzinger, 1843

Limnonectes limnocharis (Boie)

1835. *Rana limnocharis* Boie, in: Wiegmann, *Nova Acta Acad. Leop. Carol.*, **17**, Pt.1:255.

1987. *Limnonectes limnocharis* Dubois, 1987 "1986", *Alytes*, **5**: 61.

Type locality

Java.

Distribution in Pakistan

Distributed in the sub-Himalayan parts of Pakistan, descending into Potwar Tableland to most of the Punjab plains and some of the lower Indus Valley where it is scarcer.

Distribution outside Pakistan

Widely distributed in south-east Asia: China (Taiwan, Sichuan, and south of Chuanche [=Yangtze] River and north to Shandong) to Nepal, India, Sri Lanka, southern Japan, Philippines, Greater Sunda Is., and the Lesser Sundas as far east as Flores.

Limnonectes syhadrensis (Annandale)

1919. *Rana syhadrensis* Annandale, *Rec. Indian Mus.*, **16**:123.

1987. *Limnonectes syhadrensis* Dubois, 1987 "1986", *Alytes*, **5**: 61.

Type locality

Bombay Presidency, between 300 and 500 m in southern India.

Distribution in Pakistan

In most of its range in Pakistan it occurs sympatric with *Limnonectes limnocharis*, which becomes scarcer in the lower Indus Valley where *Limnonectes syhadrensis* is dominant.

Distribution outside Pakistan

Widely distributed throughout southern India.

Genus *Nanorana* Günther, 1836

Nanorana pleskei Günther

1896. *Nanorana pleskei* Günther, *Ann. Mus. Zool., Acad. Sci. Imp. St. Petersburg*, **1**: 207.

Type locality

Sungpan and Inkuan, Khan Mountains, Szechwan, China.

Distribution in Pakistan

Collected from the Himalayas between 3000 and 3500 m, ranges from Azad Kashmir.

Distribution outside Pakistan

North-western Yunnan, western Sichuan, and south-eastern Gansu, China.

Genus *Paa* Dubois, 1975

Paa barmoachensis (Khan and Tasnim)

1989. *Rana barmoachensis* Khan and Tasnim, *J. Herpetol.*, **23**: 419-423.

Type locality

Barmoach, Goi Madan, Azad Kashmir.

Distribution in Pakistan

Collected from Aram Bari, Tatta Pani, Charnali, and Kotli, all in District Kotli, Azad Kashmir.

Paa hazarensis (Dubois and Khan)

1979. *Rana hazarensis* Dubois and Khan, *J. Herpetol.*, **13**: 403-410.

1992. *Paa hazarensis* Dubois, *Bull. Mens. Soc. Linn. Lyon*, **61**: 320.

Type locality

Datta, District Manshera, Pakistan.

Distribution in Pakistan

Known from Hazara Division, NWFP, Pakistan.

Paa sternosignata (Murray)

1885. *Rana sternosignata* Murray, *Ann. Mag. nat. Hist.*, **16**: 120.

1992. *Paa sternosignata* Dubois, *Bull. Mens. Soc. Linn. Lyon*, **61**: 319.

Type locality

Karachi and Quetta, Baluchistan, Pakistan.

Distribution in Pakistan

Collected from Quetta and Mastung, Baluchistan.

Distribution outside Pakistan

Reported from Afghanistan between 1800-2000 m of elevation.

Paa vicina (Stoliczka)

1872. *Rana vicina* Stoliczka, *Proc. Asiatic Soc. Bengal, Calcutta* **1872**: 124-131.

1992. *Paa vicina* Dubois, *Bull. Mens. Soc. Linn. Lyon*, **61**: 320.

Type locality

Murree, alpine Punjab, Pakistan.

Distribution in Pakistan

Murree, alpine Punjab, Pakistan and bordering Azad Kashmir.

Genus *Tomopterna* Dumeril and Bibron, 1841

Tomopterna breviceps Schneider

1799. *Rana breviceps* Schneider, *Hist. Amphib.*: 140.

1938. *Tomopterna breviceps* Deckert, *Sber. Ges. naturf. Freunde Berl.*, **1938**: 142.

Type locality

India.

Distribution in Pakistan

Widely distributed in the sub-Himalayan hill tracts and Salt Range, descending into Punjab and lower Sindh.

Distribution outside Pakistan

Throughout India, Bangladesh, Nepal, Burma and Sri Lanka.

Key for identification of amphibian tadpoles in Pakistan

1. Body transparent; eyes lateral 2
Body not transparent, dull; eyes dorsolateral 3
2. Tail flagellum long; head broader than body
..... *Microhyla ornata*

- Tail flagellum short; head and body equally broad.....
 *Uperodon systoma*
3. Labial tooth row formula typically 2(2)/3; total size not exceeding 20 mm..... genus *Bufo*
 Labial tooth row formula very variable; total size exceeds 25 mm..... 4
4. Labial tooth row formula 1/2 *Euphlyctis cyanophlyctis*
 Anterior labium with more than two dental rows 5
5. Labial tooth row formula 2(2)/3 6
 Tooth rows on anterior labium more than three..... 7
6. Lateral labial papillae continuous round the posterior labium..... *Tomopterna breviceps*
 Oral papillae confined to lateral sides of the oral disc.....
 *Limnnectes* sp.
7. Labial tooth row formula 5(4)/(3)5.....
 *Hoplobatrachus tigerinus*
 Labial tooth row formula 8(6)/(3)2..... *Paa* sp.

CHELONIA

Family CHELONIIDAE

This family is represented by four genera and four 4 species along coastal waters of Pakistan.

Key to species of family Cheloniidae in Pakistan

1. Four pairs of costals 3
 Five or more pairs of costals 2
2. Inframarginals three, without pores *Caretta caretta*
 Inframarginals four some pierced with pores....
 *Lepidochelys olivacea*
3. Two pairs of prefrontals; dorsal plates imbricate; jaws hooked *Eretmochelys imbricata*
 Single pair of prefrontals; dorsal plates juxtaposed; jaws not hooked ... *Chelonia mydas*

Genus *Caretta* Rafinesque, 1814
 (Single species occurs in Pakistan)

Caretta caretta (Linnaeus)

1758. *Testudo caretta* Linnaeus, *Syst. Nat. Ed. 10*: 197.

Type locality

Isles of America.

Distribution in Pakistan

The loggerhead sea turtle is circumglobal in distribution. It is very rare in Pakistani coastal waters and does not nest here.

Distribution outside of Pakistan

Nests widely-along Indian coastline.

Genus *Chelonia* Brongniart, 1800

Chelonia mydas (Linnaeus)

1758. *Testudo mydas* Linnaeus, *Syst. Nat. Ed. 10*: 197.

Type locality

Ascension Island.

Distribution in Pakistan

Chelonia mydas is a pantropic species; it centers around breeding and foraging grounds along the seacoasts of Pakistan.

Distribution outside of Pakistan

Kutch, western and eastern ghats of peninsular India, Maldives, Sri Lanka, the Andamans, and the coast along Orissa.

Genus *Eretmochelys* Fitzinger, 1843

Eretmochelys imbricata (Linnaeus)

1766. *Testudo imbricata* Linnaeus, *Syst. Nat. Ed. 12*: 350.

Type locality

American and Asiatic seas.

Distribution in Pakistan

The only report from Pakistan is by Mertens (1969) of seeing small *Eretmochelys imbricata* shells in a shop in Karachi.

Distribution outside Pakistan

Indian coastal line and Indian oceanic islands.

Genus *Lepidochelys* Fitzinger, 1843*Lepidochelys olivacea* (Eschscholtz)1829. *Chelonia olivacea* Eschscholtz, *Zool. Atlas* :3.*Type locality*

Manila Bay.

Distribution in Pakistan

It is known from the mangrove vegetation along Sindh coastal strip.

Distribution outside of Pakistan

Widely distributed along coastal strip of India and Bangladesh.

Family DERMOCHELYIDAE

(A single genus and species is found along the sea coast of Pakistan)

Genus *Dermochelys* Blainville, 1816*Dermochelys coriacea* (Linnaeus)

Limbs paddle-shaped, indistinct digits; shell with smooth skin; seven longitudinal ridges on carapace

1766. *Testudo coriacea* Linnaeus, *Syst. Nat. Ed. 1*: 350.*Type locality*

Palermo, Sizilien.

Distribution

Rare along coastal Pakistan.

Distribution outside Pakistan

Reported widely along the coasts of India, Sri Lanka, and islands in the Indian Ocean.

Family EMYDIDAE

(Represented by three genera and four species in inland waters of Pakistan)

Key to the species of family Emydidae in Pakistan

1. Alveolar surface of jaws broad with a median ridge.....
..... *Geoclemys hamiltonii*

Alveolar surface with 1-2 ridges 2

2. Fourth vertebral not longer than broad, not longer than third..... *Hardella thurjii*

Fourth vertebral much longer than broad, longer than third..... 3

3. Vertebral much longer than broad; third elongate, quadrangular, with straight posterior border, its keel ends in a knob..... *Kachuga smithii*

Vertebrae are not much longer than broad, third pentagonal, its keel ends in a backward directed spine

..... *Kachuga tecta*Genus *Geoclemys* (Gray, 1821)*Geoclemys hamiltonii* (Gray)1831. *Emys hamiltonii* Gray *Synops. Rept.*, 1: 21.*Type locality*

India.

Distribution in Pakistan

Recorded from Tunsia Barrage, Saidabad, Balloki Headworks in Punjab; Jacobabad, Tharparker, and Sehwan in Sindh.

Distribution outside Pakistan

Flood plains of the Indus-Ganges-Brahmaputra. It has been reported from Nepal, Assam, Bihar, Jammu, Rajasthan, Uttar Pradesh, Western Bengal, and Jessore in Bangladesh.

Genus *Hardella* Gray, 1870*Hardella thurjii* (Gray)1831. *Emys thurjii* Gray, *Synops. Rept.*, 1: 22.*Type locality*

Indus River system.

Distribution in Pakistan

Recorded from localities in Sindh and around Karachi.

Distribution outside Pakistan

It is a widely distributed turtle in the flood plains of the Brahmaputra, Ganges and Indus Rivers.

Genus *Kachuga* Gray, 1856
(Two species represented in Pakistan)

Kachuga smithii Gray

1863. *Batagur smithii* Gray, *Proc. zool. Soc. Lond.*,
1863: 253.

Type locality

Chenab River, Punjab, Pakistan.

Distribution in Pakistan

Lower Sindh and Indus Delta, Pakistan.

Kachuga tecta (Gray)

1831. *Emys tecta* Gray, *Synops. Rept.*, 1: 23.

Type locality

India.

Distribution in Pakistan

Found throughout river system of Indus Valley.

Distribution outside Pakistan

One of the most common turtles in the flood plains of the Ganges, Narmada, Brahmaputra and Indus Rivers. It is widely distributed from Nepal, Bangladesh, and India.

Family TESTUDINIDAE

(Represented by two genera, each with one species,
in Pakistan)

Key to species of family Testudinidae in Pakistan

1. Fore limb with 4 claws; head with symmetrical shields; carapace with flat plates *Agrionemys horsfieldii*
Fore limb with 5 claws; head with asymmetrical shields; carapace with umbovate plates *Geochelone elegans*

Genus *Agrionemys* Khozatsky and Mlynarsky, 1966

Agrionemys horsfieldii (Gray)

1844. *Testudo horsfieldii* Gray, *Cat. Tort. Croc. Br. Mus.*, 7.

Type locality

India, Afghanistan.

Distribution in Pakistan

Occurs throughout northern and western Baluchistan and Waziristan.

Distribution outside Pakistan

Wide-ranging species in Middle Asia from the Caspian Sea eastward through Khazakistan, through Iran, Afghanistan, and western China.

Genus *Geochelone* Fitzinger, 1835

Geochelone elegans Schopff

1792. *Testudo elegans* Schopff, *Hist. Test.* 111

Type locality

India.

Distribution in Pakistan

Found around Karachi, where it lives in semi domesticated conditions. Recorded from Kutch and Nagar Parker, south-eastern Sindh.

Distribution outside Pakistan

The star tortoise is widely distributed in peninsular India and Sri Lanka.

Family TRIONYCHIDAE

(Represented by four genera and four species in
inland waters of Pakistan)

Key to species of family Trionychidae in Pakistan.

1. Plastron with cutaneous femoral valves; marginal bones present; seven plastral callosities *Lissemys punctata*
Plastron without femoral valves; no marginal bones; four plastral callosities 2
2. Head broad, massive, dorsally convex; nasal septum with lateral ridges 3
Head long, narrow, flat above; nasal septum without lateral ridges *Chitra indica*
3. Alveolar surface of jaw raised at its inner marginal edge, forms a projection at the joint; head with black streaks; no ocelli on young disc *Aspideretes gangeticus*
Alveolar surface not raised, grooved at the symphysis; head marked with black and yellow; in young disc with four or more ocelli *Aspideretes hurum*

Genus *Aspideretes* Hay, 1835

(Two species are represented in Pakistan)

Aspideretes gangeticus (Cuvier)1825. *Trionyx gangeticus* Cuvier, *Rech. Ossem. Foss.* Ed.3, 5,2:[186] 203.*Type locality*

Ganges River, India.

Distribution in and outside Pakistan

This turtle is widespread in rivers, canals, and large lakes throughout the Indo-Pakistan subcontinent.

Aspideretes hurum (Gray)1831. *Trionyx hurum* Gray, *Synops. Rept.*, 1: 47.*Type locality*

Fatehgarh, Ganges, India.

Distribution in Pakistan

Widely known from is known from the Indus and its tributaries.

Distribution outside Pakistan

Recorded from throughout India and Bangladesh.

Genus *Chitra* Gray, 1844*Chitra indica* (Gray)1831. *Trionyx indicus* Gray, *Synops. Rept.*, 1: 47.*Type locality*

Fatehgarh, Ganges, India.

Distribution in Pakistan

Common in the Indus and its tributaries.

Distribution outside Pakistan

Widely distributed in the river systems of Oriental region, right from Thailand to Pakistan.

Genus *Lissemys* Smith, 1931*Lissemys punctata andersoni* Webb1980. *Lissemys punctata andersoni* Webb, *Bull. Mus. Hist. nat. Paris* 4, ser. 2, sec. A(2):547-557.*Type locality*

Pondicherry, Coromandel Coast, India.

Distribution in Pakistan

Widely distributed in waters of Pakistan.

Distribution outside Pakistan

Nepal, Bangladesh, and India.

CROCODYLIA

Family CROCODYLIDAE

(Single species of genus *Crocodylus* represented in Pakistan)Genus *Crocodylus* Laurenti, 1768*Crocodylus palustris* Lesson1831. *Crocodylus palustris* Lesson, *Bull. Sci. nat. Paris*, 25: 121.*Type locality*

Plains of India.

Distribution in Pakistan

Reported from the lower Indus Valley, small populations are on record in the Hub and Dasht Rivers; along the Makran coast. A small population of mugger is being maintained in a pond near Mangu (or mugger) Pir shrine, in Karachi.

Distribution outside Pakistan

The mugger ranges from Assam through India, from Sri Lanka to westernmost Baluchistan and eastern Iran. In India it inhabits all river systems and their connecting streams and all size.

Family GAVIALIDAE

(A single species is represented in Pakistan belonging to genus *Gavialis*)

Genus *Gavialis* Oppel, 1811

Gavialis gangeticus (Gmelin)

1789. *Lacerta gangetica* Gmelin, partim, *Linn. Syst. Nat.*, 1:1057.

Type locality

Senegal, Africa, and Ganges, India.

Distribution in Pakistan

In Pakistan gharial is extremely rare, if not absent. This is why nothing definite can be said about its distribution in Pakistan. There is evidence in support of the existence of a population in the lower Indus, the East Nara in Sanghar District, Sindh.

Distribution outside Pakistan

The gharial occurs in pockets throughout the Gangetic plains in India. Widely distributed in Brahmaputra and Ganges river systems in India and Bangladesh.

REFERENCES

- ABDULALI, H., 1962. An account of a trip to the Barapede Cave, Talewandi, Belgaum District, Mysore State, with some notes on reptiles and amphibians. *J. Bombay nat. Hist. Soc.*, 59: 228-237.
- AHMED, A., 1985a. A preliminary report on the crocodiles of Pakistan. *Newsl. Crocod. Special. Group*, 4: 5-9.
- AHMED, A., 1985b. The distribution and population of crocodiles in the province of Sind and Baluchistan (Pakistan). *J. Bombay nat. Hist. Soc.*, 82: 220-222.
- ANDERSON, J., 1872. On some Persian, Himalayan and other reptiles. *Proc. zool. Soc. Lond.*, 1872: 417-498.
- ANNANDALE, N. N. AND RAO, C.R.N., 1918. The tadpoles of the families Ranidae and Bufonidae found in the plains of India. *Rec. Indian Mus.*, 15: 5-40.
- AUFFENBERG, W., 1980. Behaviour of *Lissemys punctata* (Reptilia, Testudinata, Trionychidae) in a drying lake in Rajasthan, India. *Ibid.*, 78: 487-493.
- AUFFENBERG, W. AND NAEEM A., 1991. Studies of Pakistan reptiles: notes on *Kachuga smithi*. *Hamdryad*, 16: 25-29.
- AUFFENBERG, W. AND REHMAN, H., 1977. Geographic variations in *Bufo stomaticus*, with remarks on *Bufo olivaceus*: biogeographical and systematic implications. In: *Biodiversity of Pakistan* (eds. S.A. Mufti, C.A. Woods, and S.A. Hasan), pp. 351-372. Pakistan. Museum of Natural History, Islamabad.
- BAIG, K.J. AND GVOZDIK, L., 1998. *Uperodon systoma* (Schneider): record of a new microhylid frog from Pakistan. *Pakistan J. Zool.*, 30: 155-156.
- BHADURI, J.L., 1944. On two salientian tadpoles, *Rana blanfordii* Boulenger and *Bufo himalayanus* Günther, from the Ha Valley, Bhutan, Eastern Himalayas. *J. R. Asiatic Soc. Bengal*, 10: 53-57.
- BOULENGER, G.A., 1890. *Fauna of British India, including Ceylon and Burma. Reptilia and Batrachia*. London.
- BOULENGER, G.A., 1920. A monograph of the south Asian, Papuan, Melanesian and Australian frogs of the genus *Rana*. *Rec. Indian Mus.*, 20: 1-226.
- CHURCH, G., 1959. Size variation in *Bufo melanostictus* from Java and Bali (Amphibia). *Treubia*, 25: 113-126.
- DANIEL, J.C., 1963. Field guide to the amphibians of western India. Part I. *J. Bombay nat. Hist. Soc.*, 60: 415-438.
- DANIEL, J.C., 1975. Field guide to the amphibians of western India. Part 3. *Ibid.*, 72: 506-522.
- DANIEL, J.C., 1983. *The Book of Indian Reptiles*. Bombay Natural History Society, pp. 1-141.
- DAS, I., 1991. *Colour guide to the turtles and tortoises of the Indian subcontinent*. R & A Publishing Limited, Portishead, England.
- DUBOIS, A., 1976. *Les grenouille de sousgenre Paa du Nepal famille Ranidae, genera Rana*. 275pp.
- DUBOIS, A. AND KHAN, M.S., 1979. A new species of frog (genus *Rana*, subgenus *Paa*) from northern Pakistan (Amphibia, Anura). *J. Herpetol.*, 13: 403-410.
- DUBOIS, A., AND MARTENS, J., 1977. Sur les crapauds du groupe de *Bufo viridis* (Amphibiens, Anoures) de l'Himalaya Occidental (Cachemire et Ladakh). *Bull. Soc. Zool. Fr.*, 102: 459-465.
- DUBOIS, A AND OHLER, A., 1999. Asian and Oriental toads of the *Bufo melanostictus*, *Bufo scaber* and *Bufo stejnegeri* groups (Amphibia, Anura): a list of available and valid names and redescription of some name-bearing types. *South Asian nat. Hist.*, 4: 133-180.
- DUTTA, S.K., 1992. Amphibians of India: updated species list with distribution record. *Hamdryad*, 17: 1-13.
- DUTTA, S.K., 1997. *Amphibians of India and Sri Lanka (Checklist and Bibliography)*. Odyssey Publ. House, Orrisa, pp. 342.
- FERGUSON, H.S., 1904. A list of Travancore batrachians. *J. Bombay Mus. nat. Hist. Soc.*, 1904: 499-509.
- FIRDOUS, F., 1989. Male leatherback strands in Karachi. *Mar. Turtle Newsl.*, 47: 14-15.
- GHALIB, S.A. AND ZAIDI, S.S.H., 1976. Observations on the

- survey and breeding of marine turtles of the Karachi coast. *Agric. Pakistan*, **27**: 87-96.
- GVOZDIK, L. AND RADEK, H. 1997. A small collection of amphibians from Baluchistan and Punjab, Pakistan in the Silesian Museum, Opava. *Cas. Slez. Muz., Opava (A)***46**: 203-208.
- GRUBER, U., 1981. Notes on the herpetofauna of Kashmir and Ladakh. *Br. J. Herpetol.*, **6**: 145-150.
- INGER, R.F., 1972. *Bufo* of Eurasia. In: *Evolution in the genus Bufo* (ed. W.F. Blair), pp. 1-459. Univ. Texas Press, Austin And London.
- KHAN, M.S., 1965. A normal table of *Bufo stomaticus* (sic *Bufo melanostictus*). *Biologia (Lahore)*, **11**: 1-39.
- KHAN, M.S., 1968. Amphibian fauna of District Jhang with notes on habits. *Pakistan J. Sci.*, **20**: 227-233.
- KHAN, M.S., 1969. A normal table of *Rana tigrina* Daudin. 1. Early development (Stages 1-27). *Ibid.*, **21**: 36-50.
- KHAN, M.S., 1972. The "commonest toad" of West Pakistan and a note on *Bufo melanostictus* Schneider. *Biologia*, **18**: 131-133.
- KHAN, M.S., 1974. Discovery of *Microhyla ornata* (Dumeril & Bibron) from the Punjab, Pakistan. *Ibid.*, 179-180.
- KHAN, M.S., 1976. An annotated checklist and key to the amphibians of Pakistan. *Ibid.*, **22**: 201-210.
- KHAN, M.S., 1980. Affinities and zoogeography of herpetiles of Pakistan. *Ibid.*, **26**: 113-171.
- KHAN, M.S., 1982. Key for the identification of amphibian tadpoles from the plains of Pakistan. *Pakistan J. Zool.*, **14**: 133-145.
- KHAN, M.S., 1982. Collection, preservation and identification of amphibian eggs from the plains of Pakistan. *Ibid.*, **14**: 241-243.
- KHAN, M.S., 1985. An interesting collection of amphibians and reptiles from Cholistan Desert, Punjab, Pakistan. *J. Bombay nat. Hist. Soc.*, **82**: 144-148.
- KHAN, M.S., 1986. A noteworthy collection of amphibians and reptiles from northwestern Punjab, Pakistan. *The Snake*, **18**: 118-125.
- KHAN, M.S., 1987. Checklist, distribution and zoogeographical affinities of amphibians and reptiles of Pakistan. *Proc. Pakistan Congr. Zool.*, **7**: 105-112.
- KHAN, M.S., 1990. The impact of human activities on the status and distribution of amphibians in Pakistan. *Hamadryad*, **15**: 21-24.
- KHAN, M.S., 1994a. Key for identification of amphibians and reptiles of Pakistan. *Pakistan J. Zool.*, **26**: 249-255.
- KHAN, M.S., 1994b. A revised checklist and key to the amphibians of Pakistan. *Hamadryad*, **19**: 11-14.
- KHAN, M.S., 1997a. A new toad from the foot of Siachin Glacier, Baltistan, north-eastern Pakistan. *Pakistan J. Zool.*, **29**: 43-48.
- KHAN, M.S., 1997b. A new subspecies of common skittering frog *Euphlyctis cyanophlyctis* (Schneider 1799) from Baluchistan, Pakistan. *Ibid.*, **29**: 107-112.
- KHAN, M. S., 1998. *Status of amphibian fauna of Pakistan*. In: *Biology and conservation of the amphibians, reptiles and their habits in South Asia* (ed. A. De Silva), pp.137-139. Amphibia and Reptile Research Organization of Sri Lanka, Peradeniya.
- KHAN, M. S., 2001a. Recent advances in the taxonomic status of ranid frogs of Pakistan. *Pakistan J. Zool.*, **33**:169-171.
- KHAN, M.S., 2001b. Notes on Cranial-Ridged toads of Pakistan and description of a new subspecies (Amphibia: Bufonidae). *Ibid.*, **33**: 293-298.
- KHAN, M.S. (in press). *A color guide to the amphibians and reptiles of Pakistan*. Kierger Publishing Company, Malabar, Florida, USA.
- KHAN, M.S. AND AHMED, N., 1987. On a collection of amphibians and reptiles from Baluchistan, Pakistan. *Pakistan J. Zool.*, **19**: 361-370.
- KHAN, M. S. AND BAIG, K.J., 1988. Checklist of the amphibians and reptiles of District Jhelum, Punjab, Pakistan. *The Snake*, **20**: 156-161.
- KHAN, M.S. AND MIRZA, M.R., 1976. An annotated checklist and key to the reptiles of Pakistan. Part I: Chelonia and Crocodilia. *Ibid.*, **22**: 211-219.
- KHAN, M.S. AND TASNIM, R., 1987. A field guide to the identification of herps of Pakistan. Part I, Amphibia. *Biol. Soc. Pakistan, Monogr.*, **14**: 1-28.
- KHAN, M.S. AND TASNIM, R., 1989. A new frog of the genus *Rana*, subgenus *Paa*, from southwestern Azad Kashmir. *J. Herpetol.*, **23**: 419-423.
- KHOZATSKY, L.I. AND MLYNARSKI, M., 1966. *Agrionemys*-nouveau genre de tortues terrestres (Testudinidae). *Bull. Acad. Pol. Sci. Ser. Sci. Biol.*, (2): 123-125.
- KIRTISINGHE, P., 1957. *The Amphibia of Ceylon*. Published by the author, 2 Charles Circus, Colombo 3, Ceylon, pp. 1-112.
- KULLMANN, E., 1974. Die Tierwelt Ostafghanistans in ihren geographischen Beziehungen. *Freud des. Kol. Zoo.*, **13**: 13-25.
- MCCANN, C., 1938. The reptiles and amphibians of Cutch State. *J. Bombay nat. Hist. Soc.*, **40**: 425-427.
- MERTENS, R., 1969a. Die Amphibien und Reptilien West-Pakistan. *Stuttg. Beitr. Naturk.*, **197**: 1-96.
- MERTENS, R., 1969b. Eine neue Rasse der Dachschildkrote, *Kachuga tecta*. *Secken. Biol.*, **50**: 23-30.
- MERTENS, R., 1970. Die Amphibien und Reptilien West-Pakistan. 1. Nachtrag. *Ibid.*, **216**: 1-5.
- MERTENS, R., 1971. Die Amphibien und Reptilien West-Pakistan. 2. Nachtrag. *Senckenb. Biol.*, **52**: 7-15.
- MERTENS, R., 1972. Nachtrage zum Krokodil-Katalog der senckenbergischen Sammlungen. 3. Nachtrag. *Senck. Biol.* **53**: 21-35.
- MERTENS, R., 1974. Die Amphibien und Reptilien West-

- Pakistans. *Ibid.*, **55**: 35-38.
- MINTON, S.A., 1962. An annotated key to the amphibians and reptiles of Sind and Las Bela, West Pakistan. *Am. Mus. Novit.* No. **2081**: 1-21.
- MINTON, S.A., 1966. A contribution to the herpetology of west Pakistan. *Bull. Am. Mus. nat. Hist.*, **134**: 31-184.
- MOLL, E.O., 1987. Survey of the freshwater turtles of India. Part II: The genus *Kachuga*. *J. Bombay. nat. Hist. Soc.*, **84**: 7-25.
- MOSES, S.T. 1948. *Crocodiles in India*. Bull. 15, Department of Fisheries, Baroda.
- MUKERJI, D.D., 1931. Some observations on the burrowing toad *Cacopus globulosum* Günther. *J. Proc. Asiatic Soc. Bengal (N.S.)*, **27**: 97-100.
- MURRAY, J.A., 1874. Additions to the reptilian fauna of Sind. *Ann. Mag. nat. Hist.*, **14**: 106-108.
- RAO, C.R.N., 1918. Notes on the tadpoles of Indian Engystomatidae. *Rec. Indian Mus.*, **15**: 41-45.
- ROBERTS, T.J., 1975. A note on *Testudo horsfieldi* Gray, the Afghan tortoise or Horsefield's four-toed tortoise. *J. Bombay nat. Hist. Soc.*, **72**: 206-209.
- SCHMIDTLER, J.J. AND SCHMIDTLER, J.F., 1969. Über *Bufo surdus*; mit einem Schlüssel und Anmerkungen zu den ubrigen Kroten Irans und West-Pakistans. *Salamandra*, **5**: 113-123.
- SIMCOX, A.H.A., 1906. The crocodile, its food and muscular vitality. *Ibid.*, **16**: 375-376.
- SMITH, M.A., 1931. *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia*. Vol. I: *Loricata, Testudines*. Taylor and Francis Ltd., London.
- STEINDACHNER, F., 1867. Amphibien. Novara-Expedition, *Zool. Theil. Vienna I*: 1-70.
- STEINDACHNER, F., 1869. Reptilia. In: *Reise der osterreichischen Fregatte Novara.*, **1**: 1-98.
- STERNBERG, J., 1981. *The worldwide distribution of sea turtle nesting beaches*. Center for Environmental Education, Washington, D.C., USA.
- STOCK, M., SCHMID, M., STEINLEIN, C. AND GROSSE, W-R., 1999. Mosaicism in somatic triploid specimens of the *Bufo viridis* complex in the Karakoram with examination of calls, morphology and taxonomic conclusions. *Ital. J. Zool.*, **66**: 215-232.
- WEBB, R.G., 1980. The identity of *Testudo punctata* Lacepede, 1978 (Testudines, Trionychidae). *Bull. Mus. nat. Hist. Paris*, 4e ser. 2 Section A(2): 547-557.