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Exploring the Distribution, Morphology, Habitat Utilization and Taxonomic Position of Herpeto Diversity of District Buner, KP

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ABSTRACT

The study was conducted from September 2019 to September 2020 and was the first attempt on the Herpeto Fauna of District Buner. We have reported 37 species of Herpeto fauna including 5 Amphibians species and 32 Reptilian species. The Amphibians includes *Duttaphrynus melanostictus* (Schneider, 1799), *Duttaphrynus stomaticus* (Lutken, 1864), *Euphylyctis cyanophlyctis* (Schneider, 1799), *Hoplobatrachus tigrinus* (Daudin, 1803) and *Sphaerotheca breviceps* (Schneider, 1799). The Reptiles include (*Aspideretes gangeticus* (Cuvier, 1825), *Calotes versicolor* (Daudin, 1802), *Laudakia badakhshan* (Anderson and Leviton, 1969), *Laudakia himalyana* (Steindachner, 1869), *Laudakia nuristanica* (Anderson and Leviton, 1969), *Laudakia pakistanica* (Baig, 1989), *Eublepharis macularius* (Blyth, 1854), *Agamura persica* (Dumeril, 1856), *Cyrtopodion kachhense* (Stoliczka, 1872), *Cyrtopodion potoharense* (Khan, 2001), *Hemidactylus brookii* (Gray, 1845), *Hemidactylus flaviviridis* (Ruppell, 1835), *Hemidactylus leschenaultii* (Dumeril and Bibron, 1836), *Mesalina watsonana* (Stoliczka, 1872), *Ophisops jerdonii* (Blyth, 1853), *Ablepharus grayanus* (Stoliczka, 1872), *Eutropis dissimilis* (Hallowell, 1860), *Scincella Himalayana* (Gunther, 1864), *Eurylepis taeniolatus* (Blyth, 1854), *Varanus bengalensis* (Daudin, 1802), *Varanus flavescens* (Hardwicke and Gray 1827), *Amphisma stolatum* (Linnaeus, 1758), *Lycodon striatus* (Shaw, 1802), *Oligodon arnensis* (Shaw, 1802), *Platycephalus rhodorchis* (Jan, 1865), *Platycephalus ventromaculatus* (Gray and Hardwicke, 1834), *Ptyas mucosus* (Linnaeus, 1758), *Spalerosophis schirazianus* (Jan, 1865), *Xenochrophis piscator* (Schneider, 1799), *Bungarus caeruleus* (Schneider, 1801), *Naja oxiana* (Eichwald, 1831) and *Echis carinatus* (Schneider, 1820). In the current research the turtle *Aspideretes gangeticus* was first time reported from Ghurghushtu tehsil Khudokhail District Buner. Natural zone was dominant ecological zone on species richness leading by cultivated zone however urban zone have the least species richness.

INTRODUCTION

The term Herpetology is derived from the Greek word "Herpeton" meaning creeping and roughly translated as the study of crawling thing. Though vague, this term is suitable enough – many Amphibian and Reptiles do indeed crawl along the ground (Karns, 1986). Reptiles are the largest class of vertebrates, cold blooded and yet many new species are discovered every year and among

Amphibians hundreds of new species have been discovered and described over the last 10 years (Catenazzi *et al.*, 2016). Reptiles are cosmopolitan animals having existed in a wide range of forms for more than 230 million years. (Khalid *et al.*, 2019) (Rahman and Ifat, 1997). Order Squamata which includes lizards, snakes and worm lizards having approximately 9,150 species. The diversity in



many groups of Amphibians and Reptiles is still poorly known. Globally, Amphibians and Reptiles give less attention as compare to Birds and Mammals (Fazey *et al.*, 2005; Bhattarai *et al.* 2017). Approximately 7481 Amphibian species were described since 4 year ago (Sarwar *et al.*, 2016) while described Reptilian species at previous year were tend 10885 (Uetz, 2018). From this 32.5% of all known Amphibians and 22% of Reptiles are endangered, and close to 122 Amphibians and 22 Reptile species currently are extinct from the wild (Young *et al.*, 2004). Amphibians and Reptiles are the most neglected and least studied Wildlife groups in Pakistan (Rais *et al.*, 2014). Pakistan is known as ‘the land of many lands’ as three of the eight zoogeographic regions of the world are within the country (Roberts, 2005; Duellman, 1999; Sindaco and Jeremcenko, 2008). The Herpeto fauna of Pakistan is represented by 24 Amphibians, 195 Reptiles, 13 species of this category are considered to be endemic (Khan, 2006). In Pakistan, four families of Amphibians including Bufonidae, Megophryidae, Microhylidae and Ranidae (Khan, 2011) and 23 families of Reptiles (Cheloniidae, Dermochelyidae, Emydidae, Testudinidae, Trionychidae, Crocodylidae, Gavialidae, Agamidae, Chameleonidae, Eublepharidae, Gekkonidae, Lacertidae, Scincidae, Uromastycidae, Varanidae, Leptotyphlopidae, Typhlopidae, Boidae, Colubridae, Elapidae, Hydrophiidae, Viperidae and Crotalidae) have been reported (Khan, 2004 and 2006; Khan and Ahmed, 1987; Khan and Mufti, 1994). In Pakistan, Amphibians are represented by a single order (Anura), while four categories of Reptiles (Testudines, Sauria, Serpentes, Crocodilia) are recognized (Rais *et al.*, 2012). Reptiles form an important part of ecosystem. They are used as a source of protein in different parts of the world. Some species of Reptiles are used for medicinal purposes to cure certain diseases. Skin of certain Reptilian species is also used commercially for making different valuable items (Manzoor *et al.*, 2019). Still the Herpeto fauna of district Buner is unexplored.

MATERIALS AND METHODS

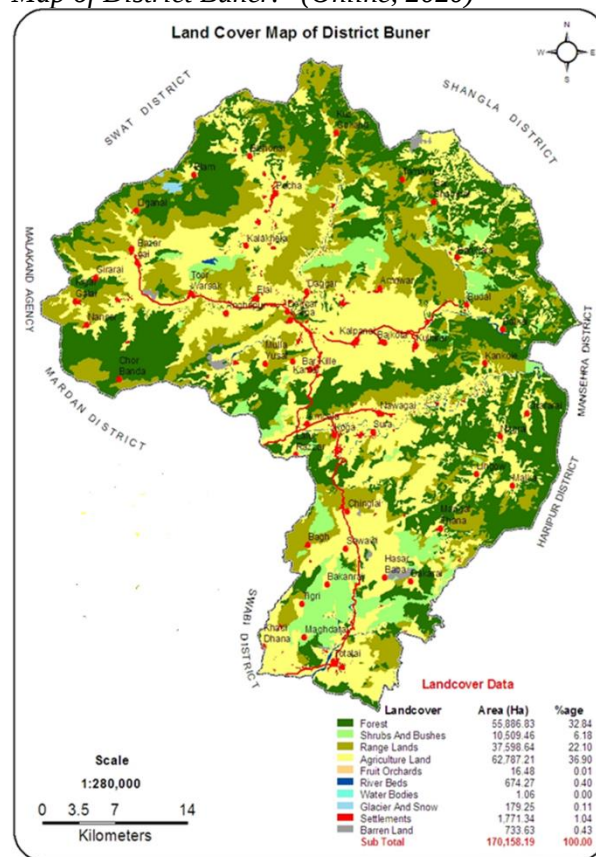
Study Area

District Buner situated in the Northern Western part of Pakistan is at latitude of 34.6° to 34.18°

north and longitude of 72.48° to 72.5° East. Buner is located in Khyber Pakhtunkhwa on the North side district Buner is bounded with district Swat and Shangla, at South with district Swabi, at East with Tor Ghar and at West with Mardan. Study area is divided into six tehsils named Tehsil Daggar, Tehsil Gadezi Tehsil Mandanr, Tehsil Khudokhel, Tehsil Gagra and Tehsil Chagharzi. (Wajiha *et al.*, 2017). District Buner is made up of plain and undulating land and mountain slopes. The plain and undulating areas are lying on the lower elevation and mountain slopes with barren rocks are on higher elevation the hydrology of the district Buner is covered by seasonal streams (Akhtar *et al.*, 2014; Saeed *et al.*, 2013).

Figure 1

Map of District Buner. (Online, 2020)



Study Design

Materials Required: Ethanol, Formalin, Chloroforms, water, Scissor, Bottle, Thread, Fixing Tray, Spray, stick, Net, Digital Camera, Gloves, Cotton, Syringe, GPS, Barometer, Digital Calliper.

Sampling strategy: Herpeto fauna collected during this survey comprised frogs, toads, lizard and snakes. Conventional methods were used to collect these Amphibian and reptiles from different areas through the years 2019 to 2020. Modes of collocation such as catching, trapping, noosing and manual methods were used. Non-conventional methods such as shooting by rubber ball and Nets were also used for small lizards and snakes (Ali *et al.*, 2012; Manzoor, 2013). Take photograph from the catching species and then released.

Preservation: Some collected species were killed by injecting concentrated formalin at the site of heart and then formalin was injected in belly, neck, legs and tail for preservation. Preserved specimens were stored in 10% formalin in air tight plastic jars and field notes were prepared (Qureshi *et al.*, 2011).

Identification: For identification of species different keys were used for reported specimens. Most of the identification keys were taken from (Khan, 2006; Mitchel and Zug, 1995; Minton, 1962; Mertens, 1971; Khan and Mirza, 1977; Khan, 1983; Khan and Baig, 1988; Akram and Qureshi, 1995; Farooq *et al.*, 2007). Online help from the group field Herpetology was also taken for this purpose (Khalid *et al.*, 2019; Rahman and Ifat, 1997).

RESULTS

The current study was conducted on the Herpeto fauna of District Buner from September 2019 to September 2020. During the study we have explore 37 species of Herpeto fauna in which 5 species of amphibian and 32 species of reptiles. The Amphibians includes *Duttaphrynus melanostictus* (Schneider, 1799), *Duttaphrynus stomaticus* (Lutken, 1864), *Euphlyctis cyanophlyctis* (Schneider, 1799), *Hoplobatrachus tigurinus* (Daudin, 1803) and *Sphaerotheca breviceps* (Schneider, 1799) and Reptiles include

(*Aspideretes gangeticus* (Cuvier, 1825), *Calotes versicolor* (Daudin, 1802), *Laudakia badakhshan* (Anderson and Leviton, 1969), *Laudakia himalyana* (Steindachner, 1869), *Laudakia nuristanica* (Anderson and Leviton, 1969), *Laudakia pakistanica* (Baig, 1989), *Eublepharis macularius* (Blyth, 1854), *Agamura persica* (Dumeril, 1856), *Cyrtopodion kachhense* (Stoliczka, 1872), *Cyrtopodion potoharens* (Khan, 2001), *Hemidactylus brookii* (Gray, 1845), *Hemidactylus flaviviridis* (Ruppell, 1835), *Hemidactylus leschenaultii* (Dumeril and Bibron, 1836), *Mesalina watsonana* (Stoliczka, 1872), *Ophisops jerdonii* (Blyth, 1853), *Ablepharus grayanus* (Stoliczka, 1872), *Eutropis dissimilis* (Hallowell, 1860), *Scincella himalayana* (Gunther, 1864), *Eurylepis taeniolatus* (Blyth, 1854), *Varanus bengalensis* (Daudin, 1802), *Varanus flavescens* (Hardwicke and Gray 1827), *Amphiesma stolatum* (Linnaeus, 1758), *Lycodon striatus* (Shaw, 1802), *Oligodon arnensis* (Shaw, 1802), *Platycephalus rhodorachis* (Jan, 1865), *Platycephalus ventromaculatus* (Gray and Hardwicke, 1834), *Ptyas mucosus* (Linnaeus, 1758), *Spalerosophis schirazianus* (Jan, 1865), *Xenochrophis piscator* (Schneider, 1799), *Bungarus caeruleus* (Schneider, 1801), *Naja oxiana* (Eichwald, 1831) and *Echis carinatus* (Schneider, 1820) were reported from different localities of District Buner in the active season of amphibian and reptiles. In the current research the turtle *Aspideretes gangeticus* was first time reported from Ghurghushtu Tehsil Khudokhail district Buner. The current research shows that district Buner have rich and unique Herpetofauna in Khyber Pakhtunkhwa. The results show that the snakes, *Laudakia* and Gecko species were abundant in the study area. In amphibian fauna the Frogs were abundant in the study area. The Turtle *Aspideretes gangeticus* was reported from only one Tehsil Khudokhail. The remaining five Tehsil did not have the turtle species.

Amphibians

Table 1

Reported species of Amphibians from district Buner LC: Least Concern

S.NO	Common Name	Order	Family	Genus	Species
1	Asian common toad	Anura	Bufonidae	<i>Duttaphrynus</i>	<i>Duttaphrynus melanostictus</i>
2	Indian marbled toad	Anura	Bufonidae	<i>Duttaphrynus</i>	<i>Duttaphrynus stomaticus</i>
3	Indian skipper frog	Anura	Dicroglossidae	<i>Euphlyctis</i>	<i>Euphlyctis cyanophlyctis</i>
4	Indian burrowing frog	Anura	Dicroglossidae	<i>Sphaerotheca</i>	<i>Sphaerotheca breviceps</i>
5	Indus valley bullfrog	Anura	Dicroglossidae	<i>Hoplobatrachus</i>	<i>Hoplobatrachus tigurinus</i>

Duttaphrynus Melanostictus (Schneider, 1799)

Distribution: *Duttaphrynus melanostictus* is commonly called Asian common Toad, Asian Black-Spined Toad, Asian Toad, Black-Spectacled Toad, Common Sunda Toad and Javanese Toad. It is distributed in Sri Lanka, Myanmar, Thailand, Laos, Vietnam, Cambodia, Southern China, Taiwan, Hong Kong and Macau to Malaysia, Singapore and the Indonesian islands of Sumatra, Java, Borneo, Anambas and Natuna Islands.

Habitat: They have been recorded from sea level up to 1,800 m (5,900 ft) altitude and live mostly in disturbed lowland habitats, from upper beaches and riverbanks to human-dominated agricultural and urban areas.

Morphology: The species grows to about 20 cm (8 in) long. Asian common toads breed during the monsoon and their tadpoles are black. Young toads may be seen in large numbers after monsoon rains finish.

Duttaphrynus stomaticus (Lutken, 1864)

Distribution: *Duttaphrynus stomaticus*, also known as the Indian Marbled Toad, Punjab Toad, Indus Valley Toad, or Marbled Toad, is a species of toad found in Asia from Eastern Iran, Pakistan and Afghanistan to Nepal, extending into Peninsular India and Bangladesh.

Habitat: These toads are usually found in cultivated plains which have still water.

Morphology: This toad lacks cranial crests and the space between the eyes is broader than the upper eyelid. The tympanum of the ear is two-thirds the diameter of the eye. The first and second fingers are nearly equal and there is a single sub-articular tubercle. A spiny ridge is found on the tarsus. There is a tibial gland and the parotoid is longer than broad. Three dark bands run transversely on the forearm. The underside is whitish with dark mottling on the throat.

Euphlyctiscyanophlyctis (Schneider, 1799)**Description**

Distribution: The species is widely distributed in South Asia and Southeast Asia, from Southeastern Iran, Southern Afghanistan, Pakistan, Bhutan, Nepal and eastern India at low to moderate elevations East through Bangladesh and Northeastern India to extreme Western Myanmar.

Habitat: This frog is a very aquatic species found in marshes, pools and various other wetlands.

Morphology: Description from George Albert Boulenger is Vomerine teeth in two small oblique series extending a little beyond the hinder edge of the choanae. Head moderate; snout scarcely pointed; canthus rostralis indistinct; interorbital space much narrower than the upper eyelid; tympanum distinct, about two-thirds the size of the eye.

Hoplobatrachu stigerinus(Daudin,1803)**Description**

Distribution: *Hoplobatrachus tigerinus* the Indus Valley Bullfrog or Indian Bullfrog, popular name Asian Bullfrog, Asian Bullfrog or Asia Bullfrog is a large species of frog found in mainland Myanmar, Bangladesh, India, Pakistan, Afghanistan and Nepal. They are found in India, Bangladesh, Pakistan, Nepal, Myanmar, Maldives, Madagascar, Afghanistan and Sri Lanka.

Habitat: They prefer freshwater wetlands and aquatic habitats. Generally they avoid coastal and forest areas. *Rana tigrina* is mostly solitary and nocturnal in nature. They inhabit holes and bushes near permanent water sources.

Morphology: Vomerine teeth in two strong oblique series commence from the inner anterior angle of the choanae; lower jaw with two not very prominent bony processes in front. Head moderate; Snout more or less pointed; canthus rostralis obtuse; nostril a little nearer to the end of the mouth than to the eye; interorbital space narrower than the upper eyelid; tympanum distinct, about two thirds the size of the eye. Green or olive above, with dark spots; often a light vertebral line. This large frog can reach a snout to vent length of 170mm.

Sphaerotheca breviceps (Schneider, 1799)**Description**

Distribution: The Indian Burrowing Frog (*Sphaerotheca breviceps*) is a species of frog found in South Asia (Bangladesh, Pakistan, Nepal, India, Sri Lanka and in Myanmar).

Habitat: The habitat ranges from dry, arid land to moist deciduous forest.

Morphology: Its Vomerine teeth form two oblique groups extending a little beyond the hind edge of the choanse. Its habit is stout. The head is short, with a rounded Snout; the occiput is swollen and the interorbital space is narrower than the upper

eyelid. In color, it is light brown or olive above, with darker spots or marblings, often a light vertebral band and sometimes another on the upper side of each flank; the throats of males are blackish

and those of females are usually brown-spotted. The male has two well-developed internal subgular vocal sacs. From snout to vent, it averages 2.5 inches.

Reptiles

Table 2

Reported species of Reptiles LC: Least Concern; V: Vulnerable; NE: Not Evaluated; C; Critical

S.No	Common Name	Order	Family	Genus	Species	IUCN Status
1	Indian Soft Shell Turtle	Testudines	Trionychidae	<i>Aspideretes</i>	<i>Aspideretes gangeticus</i>	V
2	Eastern Garden Lizard	Squamata	Agamidae	<i>Calotes</i>	<i>Calotes versicolor</i>	LC
3	Badakhshana Rock Agama	Squamata	Agamidae	<i>Laudakia</i>	<i>Laudakia badakhshana</i>	NE
4	Himalayan Agama	Squamata	Agamidae	<i>Laudakia</i>	<i>Laudakia himalyana</i>	NE
5	AgamaNuristanica	Squamata	Agamidae	<i>Laudakia</i>	<i>Laudakia nuristanica</i>	NE
6	Pakistani Agama	Squamata	Agamidae	<i>Laudakia</i>	<i>Laudakia pakistanica</i>	NE
7	Common Leopard Gecko	Squamata	Eublepharidae	<i>Eublepharis</i>	<i>Eublepharis macularius</i>	NE
8	Persian Spider Gecko	Squamata	Gekkonidae	<i>Agamura</i>	<i>Agamura persica</i>	LC
9	Kachh Ground Gecko	Squamata	Gekkonidae	<i>Cyrtopodion</i>	<i>Cyrtopodion kachhense</i>	NE
10	Potahar Gecko	Squamata	Gekkonidae	<i>Cyrtopodion</i>	<i>Cyrtopodion potoharensense</i>	LC
11	Spotted House Gecko	Squamata	Gekkonidae	<i>Hemidactylus</i>	<i>Hemidactylus brookii</i>	NE
12	Northern House Gecko	Squamata	Gekkonidae	<i>Hemidactylus</i>	<i>Hemidactylus flaviviridis</i>	NE
13	Leschenault's Leaf-Toed Gecko	Squamata	Gekkonidae	<i>Hemidactylus</i>	<i>Hemidactylus leschenaultii</i>	NE
14	Persian Long-Tailed Desert Lizard	Squamata	Lacertidae	<i>Mesalina</i>	<i>Mesalina watsonana</i>	NE
15	Jerdon's Snake-Eye Lacerta	Squamata	Lacertidae	<i>Ophisops</i>	<i>Ophisops jerdonii</i>	LC
16	Minor Snake-Eyed Skink	Squamata	Scincidae	<i>Ablepharus</i>	<i>Ablepharus grayanus</i>	C
17	Striped Gross Skink	Squamata	Scincidae	<i>Eutropis</i>	<i>Eutropis dissimilis</i>	NE
18	Himalayan Ground Skink	Squamata	Scincidae	<i>Scincella</i>	<i>Scincella himalayana</i>	NE
19	Alpine Punjab Skink	Squamata	Scincidae	<i>Eurylepis</i>	<i>Eurylepis taeniolatus</i>	NE
20	Bengal Monitor	Squamata	Varanidae	<i>Varanus</i>	<i>Varanus bengalensis</i>	NE
21	Yellow Monitor	Squamata	Varanidae	<i>Varanus</i>	<i>Varanus flavescens</i>	LC
22	Buff Striped Keel back	Squamata	Colubridae	<i>Amphiesma</i>	<i>Amphiesma stolatum</i>	NE
23	Northern Wolf Snake	Squamata	Colubridae	<i>Lycodon</i>	<i>Lycodon striatus</i>	C
24	Banded Kukri	Squamata	Colubridae	<i>Oligodon</i>	<i>Oligodon arnensis</i>	C
25	Braid Snake	Squamata	Colubridae	<i>Platyceps</i>	<i>Platyceps rhodorachis</i>	C
26	Glossy-Belied Racer	Squamata	Colubridae	<i>Platyceps</i>	<i>Platyceps ventromaculatus</i>	C

27	Oriental Rat Snake	Squamata	Colubridae	<i>Ptyas</i>	<i>Ptyas mucosus</i>	NE
28	Persian Diadem Snake	Squamata	Colubridae	<i>Spalerosophis</i>	<i>Spalerosophis schirazianus</i>	NE
29	Asiatic Water Snakes	Squamata	Colubridae	<i>Xenochrophis</i>	<i>Xenochrophis piscator</i>	NE
30	Common Krait	Squamata	Elapidae	<i>Bungarus</i>	<i>Bungarus caeruleus</i>	NE
31	Caspian Cobra	Squamata	Elapidae	<i>Naja</i>	<i>Naja oxiana</i>	NE
32	Saw Scale Viper	Squamata	Viperidae	<i>Echis</i>	<i>Echis carinatus</i>	NE

RESULTS

Aspideretes gangeticus (Cuvier, 1825)

Description

Distribution: The Indian Soft Shell Turtle (*Nilssononia gangetica*) or Ganges Soft Shell Turtle is a species of Soft Shell Turtle found in South Asia.

Habitat: Found in rivers such as the Ganges, Indus and Mahanadi.

Morphology: This vulnerable turtle reaches a carapace length of up to 94 cm (37 in). There are eight pairs of costal plates. Dorsal skin of young with longitudinal ridges of small tubercles. Head moderate; snout (on the skull) about as long as the diameter of the orbit; interorbital region, in the adult, considerably narrower than the nasal fossa; postorbital arch one third to one half the greatest diameter of the orbit; mandible with the inner edge strongly raised, forming a sharp ridge, which sends off a short perpendicular process at the symphysis; the diameter of the mandible at the symphysis does not exceed the diameter of the orbit. Olive above; back of young vermiculated with fine black lines, but without ocelli head with a black longitudinal streak from between the eyes to the nape, intersected by two or three inverted V shaped black streaks; lower parts yellowish. Length of dorsal disk 2 feet.

Calotes versicolor (Daudin, 1802)

Description

Distribution: They are found in Iran, Afghanistan, Bangladesh, Bhutan, Cambodia, China (South) (Yunnan, Guangdong, Guangxi, Hong Kong, Hainan Island), India(including the Andaman Island), Indonesia (Sumatra),Malaysia (Western) Maldives, Mauritius(Reunion, Rodrigues),Myanmar, Nepal, Pakistan , Philippines, Sri Lanka(Cyclone), Thailand and Vietnam(including PuloCondore Island). It has been introduced to Brunei, Celebes, Oman, Seychelles, Singapore and United States (Khan, 2006).

Habitat: Commonly found among low shrubs and bushes it will also scamper up tree trunks to avoid being detected.

Morphology: It is an insectivore and the male gets a bright red throat in the breeding season. It measure over 10 cm (3.9in) in length snout-to-vent. Total length including the tail is up to 37 cm (14.5 in). Two small groups of spines, perfectly separated from each other, each tympanum. Dorsal crest moderately elevated on the neck and anterior part of the trunk, extending on to the root of the tail in large individuals and gradually disappearing on the middle of the trunk in younger ones. The coloration is very variable, sometimes uniform brownish or greyish-olive yellowish.

Laudakia badakhshana (Anderson and Leviton, 1969)

Description

Distribution: This species was originally described from Northern Afghanistan. In Pakistan it has been recorded from Sost and Gulmit, near Khunjrab Pass in North Eastern Pakistan.

Habitat: The lizard inhabits rocks between 450 m and 2400 m of elevation. It has been collected from clay loess, slopes and plateau rock structures, dry water courses and in dry mountain habitat.

Morphology: Dorsum olive gray, enlarged dorsal uniformly gray, bordered by longitudinal rows of irregular dark spots; dark edged-white ocelli are arranged in oblique rows on back, flanks mottled with dark gray. Tail with small dark spots arranged as across bars. Ventrums grayish white, limbs marbled with gray, digits barred. Head scales smooth. Scales around the base of the tail 19-25, caudal arranged in annuli. Middorsals enlarged, smooth or weakly keeled, distinctly larger than ventrals. A patch of large mucronate scales on flanks. Scales on thigh large, strongly keeled. A large patch of callose abdominal scales. Snout-vent length 65-70mm, tail 99-108 mm.

Laudakia himalayana* (Steindachner, 1869)*Description**

Distribution: The Himalayan Agama extends from the Western Himalayas to Tajikistan. In Pakistan it has been recorded from Gilgit and Chitral.

Habitat: The Himalayan Agama has been recorded from remote areas of Northern Pakistan between 3000 and 3200 m of elevation. It is active by April and become common on rocks by May-June.

Morphology: Dorsum olive, marbled with black, round light spots may form a network; sometimes a dorsolateral series of black spots or spots may join to form sinuous groups. Tail barred with black, greenish white below, throat of male spotted or marbled with gray. Head scales heterogeneous, convex, smooth or keeled, largest on snout. Posterior side of head and neck with small spinose scales, per auricular spines arranged in rows while those on neck in group, neck scales granular. Supra labial 10-12. Median dorsal sub equal, round, imbricate, feebly keeled 8-14 across mid dorsum. Lateral small, with no enlarged scales, adult male may have a patch of large scales at mid ventrum of body. The skin is loose on sides of neck and body ventral smooth, smaller than median dorsal. Gular smaller than ventrals. No gular sac. Hind limbs reach to the ear of eye. Tail depressed at base, oval in cross-section, 40 or more strongly keeled sub equal scales around its thickest part. Male and female have 2-3 rows of callosepreanal scales, no abdominal patch. Snout-vent length 100-105mm, tail 139-148mm.

Laudakia nuristanica* (Anderson and Leviston, 1969)*Description**

Distribution: This species has recently been recorded from Ziarat, Khyber Pakhtunkhwa, Pakistan.

Habitat: Inhabits crevices among wet rocks and boulders along water courses in a conifer biotope of evergreen forests at 500-600m of elevation.

Morphology: In formalin, olive brown above, head and limbs dark gray, corners of eyelids cream, 3 short dark bars on supra cilliaris, median descending across eye; enlarge mid dorsal light gray interspersed with dark flecks; enlarged tubercles on flanks, light gray, contrasting sharply with olive brown ground color; ventrum dirty

white mottled with gray, throat with cream spots; posterior two-thirds of tail very dark brown, nearly black; fingers and toes barred with dark. Head, body and tail strongly depressed, tail longer than body, segmented, each segment of 4 whorls; 45 scales around base of the tail. Tympanum large, superficial. Three clusters of enlarged spinose scales around tympanum and a pair on neck. Median dorsals heterogeneous not arranged in regular rows, with few strongly keeled scales which are about twice as largest ventrals, dorsolateral granular, flanks with scattered enlarged scales, not in group. Limbs with strongly heterogeneous scales. Naris in large scales below canthus. Supralabials 13, infralabials 11-12. A preanal patch of 7 rows of callososcales another at mid abdomen of 17 rows. Snout-vent length 130-135mm, tail 238-250mm.

Laudakia pakistanica* (Baig, 1989)*Description**

Distribution: *Laudakia pakistanica* the Pakistani Agama, a species of agamid lizard found in Pakistan. Widely distributed in around Gilgit to Manshera, Northeastern Pakistan, along the River Indus.

Habitat: The Rock Agama inhabits dry barren Rocky Mountains away from human settlement. The agama either scrambled about among rocks or is seen basking on cliff tops, taking refuge under rocks and boulders.

Morphology: In formalin, dorsum jet black, chest, neck and gular region speckled with orange; ventrum dark gray; groin speckled with yellow. Midbody scales 146-158; dorsum silver gray with black mosaic, head black with scattered light scales; limbs barred with black. Number of scale rows around mid-body 146-158. Precaudal scales around the base of tail 33 - 36. Subdigital lamellae under 4th toe 30-32. Snout-vent length 81-125 mm, tail length 195-234 mm.

Eublepharis macularius* (Blyth, 1854)*Description**

Distribution: In Pakistan it has been recorded from Azad Kashmir, KPK, Northern Panjabi, Baluchistan and lower Sind.

Habitat: They reside in rocky grassland habitats. A common misconception about Leopard Gecko is that they live in dry, arid desert.

Morphology: Body dorsum in juvenile light brown, yellowish or pinkish with broad crossbars, sometimes with intervening dark brown spots. Head brown, tail ringed with light and dark; in order specimens the bars on body are broken into spots. Head spotted, sometimes a U-shaped mark on the nape. Digits short, straight, cylindrical, with a single row of sub digital lamellae. Eyelids well developed, movable. Body dorsum with granular scales, with scattered round tubercles. Tail plump, distinctly broader than body, tall unsegmented, small subcaudals. Male with 9-14 pre anal pores. Snout-vent length 120-158mm, tail 89-93mm.

Agamura persica (Dumeril, 1856)

Description

Distribution: These are reported from Iran and extends Eastward to near Karachi and Northward to the Waziristan hills.

Habitat: The Blunt-Tailed Spider Gecko has been collected from rocky and stony terrain close to sandy semi desert and on the slopes of hills at 30 - 100 m of elevation. The Gecko is sluggish, climbs rocks and hides in crevices and under rocks.

Morphology: Dorsum light gray with yellowish tinge. Five dark gray crossbars on body, as broad as or slightly narrower than interspaces, 9-10 on tail. Belly dirty white, flecked with gray. In young, bands darker dotted with light. No postmental. No femoral or preanal pores. Anderson (1999) records two preanal pores in male. Ventrals scales in 23-26 rows cross mid abdomen. Tail as long as body, tip blunt. Snout-vent length 65 mm, tail 65 mm.

Cyrtopodion kachhense (Stoliczka, 1872)

Description

Distribution: The Spotted Ground Gecko has been recorded from most of Kutch, Coastal Sind and Lasbela, Pakistan.

Habitat: It is plentiful in hard rocky terrain. It lives in cracks and holes in ground, readily colonizing crevices among rocks and nearby houses and crevices under bridges and walls.

Morphology: Dorsum yellowish gray, with irregular dark brown spots, tail barred. Sub caudal small, not broader than adjacent scales. Scales across mid abdomen 30. Dorsal tubercles sub trihedral. Snout-vent length 37-40 mm, tail 40-45 mm.

Cyrtopodion potoharens (Khan, 2001)

Distribution: It was recorded from different localities in central Potwar Plateau, Salt range, Punjab, Pakistan.

Habitat: This gecko was collected during the day from holes and crevices under roads and under from under stone. And some were collected from holes and crevices alongside of mudflats through which road run.

Morphology: Dorsum light bluish with 3-4 heterogeneous squarish dark spots arranged in 5-8 transverse series, from nape to the level of vent, tail with 10-12 dark bands. Limbs and digits heavily barred with black. Supra labials 10-15. Interorbital scales 12-17. Abdominals squarish, 25-33 across mid abdomen. Mid ventrals 121-145, from the post mentals to the preanal lip. Post femoral tubercles 5-12. Preanal pores 6-7, arranged in an angular arch, in distinctly enlarged scales. Caudal tubercles distinctly mucronate. Snout-vent length 37-52 mm, tail 47-64 mm.

Hemidactylus brookii (Gray, 1845)

Description

Distribution: The Spotted Barn Geckos has a wide range in Southeast Asia, from Borneo, China, through tropical and sub-tropical Asia, extending through India, Pakistan and West Indies the Middle East to Northern Africa.

Habitat: The Spotted Barn Gecko frequents piles of chopped vegetation, logs, crops, in crevices and holes in the ground, under tree bark, around potted plants, dark uninhabited huts, leaf litter and piles of trash.

Morphology: Dorsum shows metachromatic changes, from dark brown to light gray, spotted with dark, a dark stripe from eye to the temple. The ear opening is oval, about one-third the size of the eye. Dorsum granular, interspersed with small sub trihedral tubercles. Supra labials 8-10, infra labials 7- 9. Lamellae under 4th toe 8-10. Tail cylindrical, distinctly segmented, with 3 dorsolateral rows of small flat caudal tubercles, a single row of broad subcaudals. Male with preanal and femoral pores, separated medially by 2-3 scales.

Hemidactylus flaviviridis (Ruppell, 1835)

Description

Distribution: Its range includes Egypt (Ismailia, Sinai), Saudi Arabia, Qatar, Oman, Iraq, Iran,

Afghanistan, Bangladesh, Nepal, Pakistan, India, Socotra Island (Yemen), Somalia, Sudan, Ethiopia and Eritrea.

Habitat: It is the most common and most familiar House Gecko throughout the plain of Punjab, Sind and sub-Himalayan areas and it climbs into large trees.

Morphology: Dorsum shows marked metachromatic variation. They are greenish gray, with 5 distinct dark wavy crossbars; tail is similarly barred. they are almost uniformly grayish white; however, the ventrum is always light yellowish. Dorsum with granular scales, no distinct tubercles. Supralabials 12-15, infralabials 10-14. Lamellae under first 7-10, under fourth toe 12-15. Tail indistinctly segmented; caudal tubercles small and conical. Preanofemoralpores 8-15. Snout-vent length 86-95mm, tail 89-93mm

***Hemidactylus leschenaultii* (Dumeril and Bibron, 1836)**

Description

Distribution: This Gecko extends from Assam, Bangladesh, Eastern and Southern India, along the Western coast, reaching the lower Sind in Pakistan. In Pakistan it is recorded from various localities in the lower Indus Delta and Lasbela in Southern Baluchistan.

Habitat: This is arboreal, preferring large mango and Banyan trees and rarely venturing inside buildings.

Morphology: Dorsum gray, with dark brown crossbars or rhomboidal blotches. A dark streak from eye extends onto flanks. Dirty White belly. Supra labials 10-12, infra labials 8-10. Lamellae under fourth toe 9-11. Tail strongly depressed, segmented, with a median series of enlarged sub caudal; 6 rows of dorsal pointed sub caudal tubercles. Male with 10-17 femoral pores, medially separated by several scales. Snout-vent length 85-86 mm; tail 85 to 87 mm.

***Mesalina watsonana* (Stoliczka, 1872)**

Description

Distribution: This species ranges from Rajputana to Southern Afghanistan and Iran. In Pakistan it occurs throughout the plains.

Habitat: *Mesalina watsonana* prefers flat fields of hard soil. It particularly avoids soft loose sandy soil. It burrows are located among roots of low vegetation.

Morphology: Grayish to olivaceous dorsum, usually 2 pairs of indistinct light longitudinal stripes. Mid dorsum with longitudinal series of small white spots which edge with black. Limbs with faint light spots. Vent rum white to yellowish. Ventrals distinctly broader than long, in 8 - 10 straight longitudinal series across mid abdomen. Occipital scales in contact with the inter parietal. Lower nasal scales rests only on first supra labial. No lateral fringe on fourth toe. Dorsal and lateral scales of body granular. Snout-vent length 60 mm, tail 124 mm.

***Ophisops jerdonii* (Blyth, 1853)**

Description

Distribution: It is a widely distributed throughout Pakistan and India. In Pakistan it has been recorded from Punjab and Sind plains. From alpine Punjab, Salt range, Waziristan, Quetta and Khuzdar in Baluchistan.

Habitat: It is common in the leaf litter and inhabits moist environs of shady places in gardens, forests, grasslands and the area with much ground cover.

Morphology: Olive brown, golden or grayish above, with a pair of golden lateral streaks, upper one extending from supraciliaries to tail, lower bordering from supraciliaries to tail, lower bordering upper lip and extending along body flanks to the base of the hind limb. The space between stripes, as well as the upper border of the upper stripe, usually spotted with black. Ventrums yellowish brown. Head scales rugose, with strong striations. Scales around mid-body 28-35 scales. Femoral pores 7-12, on each side. Snout-vent length 47-49mm, tail 95-98mm.

***Ablepharus grayanus* (Stoliczka, 1872)**

Description

Distribution: They are found in India, Pakistan, Afghanistan, the mountain regions of the Eastern former Soviet central Asia and possibly Kyrgyzstan.

Habitat: This lizard frequents leaf litter are prostrate vegetation, inhabit the moist environs under fallen leaves in garden in oases, grassland, backyard garden and extend into the inhabited houses

Morphology : Body olive greenish with distinct metallic luster, flanks speckled or streaked with dark brown. A light stripe from superciliary edge to the base of tail, edge above and below with

black. Ear opening obscure, position indicated by a shallow depression. Scales around the mid body 18-20. Snout-vent length 32-33mm, tail 54-58mm.

***Eutropisdissimilis* (Hallowell, 1860)**

Description

Distribution: The Striped Grass Mabuya (*Eutropisdissimilis*) are found in South Asia. Afghanistan, Bangladesh, India (Northern Punjab, Rajasthan, Uttar Pradesh and Bengal), Nepal, Pakistan and possibly in Myanmar.

Habitat: The Striped Grass Skink inhabit open moist grass fields and extends in tilled land where it is killed in large number, as people commonly believe it to be a “deadly poisonous legged snake” its body color blends with the moist ground.

Morphology: Snout moderate, obtuse. Lower eyelid with an undivided semi-transparent disk. Nostril behind the vertical of the suture between the rostral and the first labial; no postnasal; anterior loreal in contact with the first labial; supranasals in contact behind the rostral; frontonasal broader than long; prefrontal forming a median suture; frontal in contact with the second supraocular only (exceptionally with the first as well); 4 supraocular, second largest; 6 supraciliaries; fronto parietals distinct usually nearly as long as the frontal and larger than the interparietal, which entirely separate the parietals; usually no distinct nuchals; 4, seldom 5, labial anterior to the subocular, which is about twice as long as the neighbouring shields and not narrowed below. Ear-opening oval, larger than a lateral scale, smaller than the eye-opening, with 3 or 4 short pointed lobules anteriorly. Dorsal scales strongly bicarinate, nuchals and laterals tricarinate; 34 to 36 scales round the middle of the body, subequal. The adpressed limbs overlap. Toes short; sub digital lamellae smooth. Tail about 2.6 time length of head and body. Olive or brownish above, Black-Spotted; spotted and with 3 more or less distinct light longitudinal streaks, the vertebral sometimes absent; flanks white-spotted; a short horizontal white streak below the eye; lower surfaces whitish. From snout to vent 3.5 inches; tail 5.5.

***Scincella himalayana* (Gunther, 1864)**

Description

Distribution: it is recorded from Nepal and Turkmenistan. In Pakistan it abounds in marginal vegetation along water courses in alpine Punjab, Salt Range, Chitral, Waziristan and Kalabagh,

District Mianwali, Pakistan.

Habitat: This lizard is found under stone and other object in moist grass. It is also found the sides of water courses and confined to gross field in stony terrain. Its burrows are situated under stone; at places it descends into large holes and crevices in the ground.

Morphology: Dorsum iridescent bronze, with indistinct light or dark specks, a dark vertebral stripe present in some individuals. A narrow yellow lateral stripe with irregular edge, another narrow dark brown strip extend from snout through eye, bordered below by a narrow irregular whitish stripe edge with black. All stripes continuing to the middle of the tail, distal part of it is bronze with light and dark flecks. Head and limbs bronze, with dark speckling, ventrum bluish white. Scales around Midbody 26-30. Prefrontal usually separated from each other. Lamellae under fourth toe 14 - 20. Snout-vent length 67-70 mm, tail 64-70mm.

***Eurylepistaeniolatus* (Blyth, 1854)**

Description

Distribution: *Eurylepistaeniolatus* reported from Arabia to the Transcaspia, Kutch and Sind to Kashmir. In Pakistan it has been collected from throughout the plains of Punjab and Sind to an elevation of 2000m.

Habitat: The Skink inhabits loose sandy soil or loamy with scrubby vegetation, in almost deserticolous habitat, mostly close to water courses. It is a diurnal secretive lizard, burrowing in the roots of thorny bushes and grasses.

Morphology: Dorsum pale sandy to bronze, speckled with cream. Three dark brown stripes with scattered light flecks run on the body. Tail speckled and variegated black, brown and pale gray. Ventrums vivid yellow. In juvenile each yellow scale is edged with black and there is no stripes on the dorsum. Number of scales around mid-body 21-23. A postnasal scales present. Two median rows of dorsal scales fused into a broad median row. Snout-vent length 160-165mm, tail 225-299mm.

***Varanus bengalensis* (Daudin, 1802)**

Description

Distribution: It is recorded from Assam, Myanmar, Nepal, Sikkim, throughout India and Sri Lanka. In Pakistan, it is reported from throughout the plains of Punjab and Sind, Sub-Himalayan

tracts, Waziristan and extends westward into Southeastern Iran and Eastern Afghanistan.

Habitat: The large Varanidae frequents moderately dry forests and extends into cultivated areas. During rainy season it lives in tree holes feeding on birds and eggs, otherwise it burrows in hard soil.

Morphology: Dorsum olive to brown with dark spots. Ventrums yellowish, with or without dark spots, especially under the neck. Naris a little nearer to orbit than tip of the snout. Scales on heads longer than nuchals, which are round, not keeled. Supraocular small sub equal. Abdominals smooth, in 90-110 transverse rows. Digits elongate. Tail strongly compressed with a double toothed dorsal crest. Lateral caudals keeled, a little smaller than sub caudals. Snout-vent length 815-900 mm, tail 1230mm.

***Varanus flavescens* (Hardwicke and Gray, 1827)**

Description

Distribution: The Yellow Monitor or Golden Monitor found in South Asia Flood plains of the Indus, Ganges and Brahmaputra rivers in India, Pakistan, Nepal and Bangladesh.

Habitat: The species prefers wet areas, found to be edge of forest and near to human settlements that increase its threats from direct killing.

Morphology: A medium-sized monitor, it measure from snout to vent 448mm; 952 mm including the tail and weight up to 1450 gm. *Varanus flavescens* has sub corneal teeth, scarcely compressed. Its snout is short and convex, measuring a little less than the distance from the anterior border of the orbit to the anterior border of the ear; canthus rostralis distinct. Its nostril an oblique slit, a little nearer to the end of the snout than to the orbit. Digits short, the length of the fourth toe, measure from its articulation with the tarsus to the base of the claw, not exceeding the length of the femur. The tail of the yellow monitor feebly compressed, keeled above. Scales of head small sub equal; the median series of supraocular scales slightly dilated transversely. Scales on upper surfaces moderate, oval, keeled.

***Amphiesmastolatum* (Linnaeus, 1758)**

Description

Distribution: They are found in Western Baluchistan through Eastern Iran, Saudi Arabia and North to Southern Uzbekistan.

Habitat: They are laid under stones or in burrows in the roots of vegetation during May and June young are seen in July.

Morphology: Body light olive brown, with a pair of dorsolateral light yellow stripes extending onto the tail. Anterior stripes tend to break and to spots and dashes. Dark brown to black interspersed spot. Head elongate, distinct from neck. Supra labials 7, rarely; 8th and 4th touching eye; infra labials 10, 9 or 11. Posterior genial longer than anterior, not in contact with each other. Scales at mid body 19, reduce to 17 and the level of vent; all scales keeled, except last row. Ventral 143-150, sub caudal 64-73, divided; anal divided. Snout-vent length 490-497mm, tail 85-90 mm.

***Lycodon striatus* (Shaw, 1802)**

Description

Distribution: *Lycodon striatus* is found in Afghanistan, India (Andhra Pradesh, Tamil Nadu, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Punjab and Uttar Pradesh), Eastern and North-Eastern Iran, Nepal, Pakistan, Sri Lanka, Western Tajikistan, Southern Turkmenistan (Kopet Dag) and Uzbekistan.

Habitat: *Lycodon striatus* prefers dry regions such as semi deserts and forest edges. Snakes of this species are nocturnal. By day they hide under stones, but after dark they emerge to hunt. *Lycodon striatus* feeds on Skinks, Geckos and other small lizards.

Morphology: *Lycodon striatus* from Bidar. *Lycodon striatus* is dark brown or black above, with white transverse spots or cross bands, which are widely separated anteriorly. The sides are lineolated with white, with a black spot corresponding to each white cross band. The upper lip and ventrum are uniform white (coloration in alcohol). The longest adult known to George Albert Boulenger in 1893 was 43 centimeters (17 in) in total length, with a tail 7.5 cm (3.0 in) long. The head is only slightly distinct from the neck and the snout is flattened. There are 8 upper labials, the first and second contacting the nasal scale.

***Oligodon narnensis* (Shaw, 1802)**

Description

Distribution: The Streaked Kukri Snake has been founded throughout India and Sri Lanka. In Pakistan it has been recorded from Rawalpindi to Lasbela, at low altitude.

Habitat: The Brown Kukri Snake has been collected from mesic to semi desert habitat with bushy to dense forests. It lives caves crevices and tree holes.

Morphology: Dorsum reddish to dark brown, with 32-42 black cross bars, narrowly edged with white. Nape with pair of V-shaped marks, extending backward, vent rum white. Head indistinct, snout blunt. Rostral large, extends will on top of head. Almost separating inter nasal. Loreal may be present or absent. One pre ocular 2-3 post oculars. Supra labial 7 third and fourth touching eye; 7 or 8 lower labial. Anterior genial about three times longer than posterior. Body scales smooth glossy, supra mid body. Ventrals 175-195, sub caudal 48-57; anal divided, Snout-vent length 640-643mm, tail 98-102mm.

Platyceps rhodorachis (Jan, 1865)

Description

Distribution: It is reported from Turkmenistan, Syria, Iraq, Iran and Saudi Arabia and extends to Somalia. In Pakistan it is recorded from Baluchistan and is common around Karachi. However, it does not extend in plains of Punjab, Pakistan.

Habitat: The Cliff racer prefers stony highland, with sparse grass and bushes and extends from sea level to 350-3000m of elevation. It inhabits holes in narrow crevices among rocks or barrow of rodents and lizard.

Morphology: Dorsum pale to dark gray with brownish, short, median cross bars formed of 4 rows of alternating roundish spots, posteriorly unicolor. Head brownish with lighter pre and postoculars. Vent rum white with dark speckling on lateral sides. Body cylinder, head distinct. Supra labials 9, rarely 8, fifth and sixth in eye; infra labials 9 or 10, rarely 11. Ventrals 206-220, sub caudal 125-140. Snout-vent length 947-1055mm, tail 164-170 mm.

Platyceps ventromaculatus (Gray and Hardwicke, 1834)

Description

Distribution: They are found in India and Pakistan. It extends westward to Uzbekistan and Israel.

Habitat: The racer frequents grass lands, forests with alluvial soil and moderate scrubby vegetation.

Morphology: Sandy white or light reddish brown with a medium of 57-76 crossbars formed of gray edged with black alternating with one or two lateral series of spot. The outermost touching tips of ventrals. Dorsal pattern fades out in posterior one-third of body. Head with symmetrical dark mottling on top. Body moderately robust, cylindrical, with even taper. Supra labial 9, rarely 8, fifth and sixth touching eye; infra labials 9 or 10 rarely 11. Ventral 195-213, sub caudal 97-115. Snout-vent length 1090-1100mm, tail 205-212mm.

Ptyas mucosus (Linnaeus, 1758)

Description

Distribution: The range of the Dhaman snake is quite extensive in Southeast Asia; from Java, Sumatra, Vietnam and China, it extends throughout India, the Andaman Island, Sri Lanka, Pakistan, Iran and Afghanistan.

Habitat : The Dhaman Snake frequent damp and marshy situation along water courses, grass land, cultivated land, gardens, mango groves, forests, mesic hilly and environs, etc.

Morphology: Typical mature total length is around 1.5 to 1.95m (4ft 11 in to 6ft 5 in) though specimens exceeding 2m (6ft 7 in) are not uncommon. the record length for this species was recorded as 3.7 m (12ft 2 in), second in size perhaps only to their cousin *Ptyas carinata* among all known living Colubridae Snakes. Despite their large size, oriental Rat Snakes are usually quite slender with even a specimen of 2 m (6ft 7in) commonly measuring 4 to 6 cm (1.6 to 2.4in) only around in diameter. Furthermore, the average weight of rat snakes caught in java was around 877 to 940 g (1.933 to 2.072 lb), though larger males of over 2.3m (7ft 7 in) (which average mildly larger of their two sexes in the species) may easily weigh over 2.5 kg (5.5lb). Their color varies from pale browns in dry regions to nearly black in moist forest areas. Dhaman are diurnal, semi arboreal, non-venomous and fast-moving. Dhaman eat a variety of prey and are frequently found in urban areas where Rodents thrive.

Spalerosophis schirazianus (Jan, 1865)

Description

Distribution: It is found in Transcaspia to the Zagros Mountain in Southern Iran and Tajikistan. In Pakistan, it has been recorded from Western Baluchistan and Lasbela.

Habitat: The Persian Diadem Snake frequent flat clay desert with sparse vegetation. However, it extends into fruit groves hiding under fallen trees, leaf litter, in crevices and holes in the soil.

Morphology: Dorsum pale gray, yellowish khaki. A median series of 50-54 light olive to dark gray blotches. Head marking like young *Spalerosophis diadema*. Ventrals white. Scales on ocular ring 8-10. Prefrontals 6-9. Dorsal smooth or with traces of keels 5 or 27 at mid-body. Ventrals 231-244, subcaudals 78-79, anal not divided. Snout-vent length 975-980 mm, tail 195 mm.

***Xenochrophis piscator* (Schneider, 1799)**

Description

Distribution: This snake has wide distribution in Southeast Asia. From Borneo, Taiwan, throughout India. Westward to the Indus Delta.

Habitat: The checkered keel back is more common in large ponds with thick emergent vegetation it confined itself mainly to side pools, avoiding the main stream.

Morphology: Dorsum light green-gray or light reddish brown with 5 rows of blackish blotches, smaller than interspace, often fused with each other to form a reticulation, more marked in anterior half of body, the pattern fades posteriorly. A pair of dark post-ocular supra labial bars. Ventrals white or cream. Head slightly flattened, distinct from neck. Supra labials 8-10, fourth and fifth in eye; 9-10 infra labials. Anterior genial tuberculated in adult male. Ventral 135-152, sub caudals 62-78. Snout-vent length 930-940mm, tail 175-180mm.

***Bungarus caeruleus* (Schneider, 1801)**

Description

Distribution: This species is found India from Sindh (Pakistan), to the West Bengal plains and also in Dharma agar and Tripura. It occurs throughout South India and Sri Lanka. It is also recorded from Afghanistan, Bangladesh and Nepal.

Habitat: Its range comprises a wide variety of habitats. It is found in fields and low scrubs jungle, as well as inhabited areas. It is known to take up residence in termite mounds, Brick piles, rate holes, even inside houses.

Morphology: The average length is 0.9 m (3.0ft), but they can grow to 1.75m (5ft 9 in). Males are longer, with proportionately longer tails. The head is flat and the neck hardly evident. The body is cylindrical, tapering toward the tail. The tail is

short and rounded. The eye are rather small, with rounded pupils, in distinguish in life. The head shields are normal, with no loreals: four shields occur along the margin of the lower lip: the third and fourth supraocular touch the eye. The scales are highly polished, in 15-17 rows; the vertebral row is distinctly enlarged and hexagonal. Ventral's number 185-225 and caudal 37-50, entire. Coloration is generally black or bluish black, with about 40 thin, white crossbars which may be indistinct or absent anteriorly. The pattern however is complete and well defined in the young, which are marked with conspicuous crossbars even anteriorly; in old individual, the narrow white lines may be found as a series of connected spots, with a prominent spot on the vertebral region. A white preocular spot may be present; the upper lips and the belly are white.

***Naja oxiana* (Eichwald, 1831)**

Description

Distribution: This is also the Western most species of Asiatic Cobra. *Naja oxiana* occur in the Trans Caspian region. It is found in the part of Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan and the Fergana valley, North and East Afghanistan, Northeastern Iran, the Northern half of Pakistan, from the Kashmir region East to the state of Himachal Pradesh in India and in Southwestern Tajikistan. There is also some anecdotal evidence of it ranging as far North as the Aral sea on the Uzbekistan \ Kazakhstan border.

Habitat: *Naja oxiana* is often found in arid and semiarid, rocky and stony, shrub or scrub covered foothills.

Morphology: *Naja oxiana* is Median in length, a heavy body snake with long cervical ribs capable of expansion to form a hood. Anteriorly the body is depressed dorsoventrally and posteriorly it is sub cylindrical. This species average about 1 m (3.3ft) in total length (including tail) and rarely reaches length over 1.5 m (4.9 ft). The head is elliptical, depressed and slightly distinct from the neck, with a short, rounded snout and large nostrils. The eye is Median in size with around pupil. The dorsal scales are smooth and strongly oblique, with the outer two or three scales rows longer than the remainder. Adults of this species are completely light to chocolate brown or yellowish, with some specimens retaining traces of juvenile banding, especially the first few dark ventral bands. This

species has no hood mark and no lateral throat spots.

Echis carinatus (Schneider, 1820)

Description

Distribution: Saw-scales Vipers are widely distributed from Northern Africa, through the Middle East Southern former Russia, Iran, Afghanistan, most of Pakistan excluding the high Northern Mountain India and Sri Lanka.

Habitat: *Echis carinatus* is found in a range of different substrates, including sand, rock, soft, soil and in scrublands. Often found hiding under loose rocks.

Morphology: The size of *Echis carinatus* ranges between 38 and 80cm (15 and 31 inch) in total length (Body + Tail), but usually no more than 60 cm(24 inch). Head distinct from neck, Snout very short and rounded. The nostril between three shields and head covered with small keeled scales, among which an enlarged supraocular is sometimes

present. There are 9-14 interocular scales across the top of the head and 14-21 circumorbital scales 1-3 rows of scales separate the eye from the supralabials, the fourth usually largest and 10- 13 sub labials mid body there are 25-39 rows of dorsal scales that are keeled scales with apical pits; on the flanks, these have serrated keels. There are 143-189 ventral scales that are rounded and cover the full width of the belly. The subcaudal side undivided and number 21- 52 and the anal scales is single. The color-pattern consists of a pale buff, grayish, reddish, olive or pale brown ground color, overlaid middorsally with a series of variably colored, but mostly whitish spots, edged with dark bron, and separated by lighter interblotch patches. A series of white bows run dorsolaterally. The top of the head has a whitish cruciform or trident pattern and there is a faint stripe running from the eye to the angle of the jaw. The belly is whitish to pinkish, uniform in color or with brown dots that are either faint or distinct.

Amphibians

Table 3

Collection of Amphibians from each Tehsil

S.no	Species	Gagra	Daggar	Khudokhail	Chagharzi	Mandanr
1	<i>Duttaphrynus melanostictus</i>	49	32	29	57	63
2	<i>Duttaphrynus stomaticus</i>	142	120	115	167	154
3	<i>Euphlyctis cyanophlyctis</i>	70	67	58	85	73
4	<i>Sphaerotheca breviceps</i>	9	12	6	3	1
5	<i>Hoplobatrachus tigrinus</i>	17	23	10	11	9

Reptilian

Table 4

Collection of Reptiles from each Tehsil.

S. No	Species	Gagra	Daggar	Khodokhail	Chagharzi	Mandanr
1	<i>Aspideretes gangeticus</i>	0	0	23	0	0
2	<i>Calotes versicolor</i>	15	23	11	25	27
3	<i>Laudakia badakhshana</i>	1	3	0	2	2
4	<i>Laudakia himalyana</i>	0	2	0	0	0
5	<i>Laudakia nuristanica</i>	4	7	2	1	0
6	<i>Laudakia pakistanica</i>	0	17	3	4	13
7	<i>Eublepharis macularius</i>	2	1	1	2	0
8	<i>Agamura persica</i>	0	2	0	0	0
9	<i>Cyrtopodion kachhense</i>	0	2	1	0	0
10	<i>Cyrtopodion potoharens</i>	0	0	1	0	0
11	<i>Hemidactylus brookii</i>	17	11	7	10	11
12	<i>Hemidactylus flaviviridis</i>	5	11	3	6	2
13	<i>Hemidactylus leschenaultii</i>	0	3	0	0	0
14	<i>Mesalina watsonana</i>	0	0	0	2	3
15	<i>Ophisops jerdonii</i>	3	0	1	0	1
16	<i>Ablepharus grayanus</i>	7	9	3	19	13
17	<i>Eutropis dissimilis</i>	15	23	11	25	27
18	<i>Scincella himalayana</i>	0	1	0	1	1
19	<i>Eurylepistaeniolatus</i>	0	0	0	0	1
20	<i>Varanus bengalensis</i>	12	21	25	19	7
21	<i>Varanus flavescens</i>	7	5	1	8	1

22	<i>Amphiesmastolatum</i>	0	0	0	0	1
23	<i>Lycodon striatus</i>	0	1	0	1	0
24	<i>Oligodon arnensis</i>	1	0	0	1	1
25	<i>Platyceps rhodorachis</i>	0	1	0	1	0
26	<i>Platyceps ventromaculatus</i>	3	2	1	0	0
27	<i>Ptyas mucosus</i>	3	5	0	2	2
28	<i>Spalerosophis schirazianus</i>	2	0	0	1	0
29	<i>Xenochrophis piscator</i>	1	1	2	1	0
30	<i>Bungarus caeruleus</i>	0	2	1	1	0
31	<i>Naja oxiana</i>	1	2	3	0	0
32	<i>Echis carinatus</i>	0	0	2	1	0

DISCUSSION

Our study was conducted during September 2019 to September 2020 and was the first attempt on the Herpeto Fauna of District Buner. During the study we have explore 37 species of Herpeto fauna in which 5 species of Amphibian and 32 species of Reptiles were reported from different localities of District Buner in the active season of Amphibian and Reptiles. The Amphibians includes *Duttaphrynus melanostictus* (Schneider, 1799), *Duttaphrynus stomaticus* (Lutken, 1864), *Euphylyctis cyanophlyctis* (Schneider, 1799), *Hoplobatrachus tigrinus* (Daudin, 1803) and *Sphaerotheca breviceps* (Schneider, 1799) and Reptiles include (*Aspideretes gangeticus* (Cuvier, 1825), *Calotes versicolor* (Daudin, 1802), *Laudakia badakhshan* (Anderson and Leviton, 1969), *Laudakia himalyana* (Steindachner, 1869), *Laudakia nuristanica* (Anderson and Leviton, 1969), *Laudakia pakistanica* (Baig, 1989), *Eublepharis macularius* (Blyth, 1854), *Agamura persica* (Dumeril, 1856), *Cyrtopodion kachhense* (Stoliczka, 1872), *Cyrtopodion potoharens* (Khan, 2001), *Hemidactylus brookii* (Gray, 1845), *Hemidactylus flaviviridis* (Ruppell, 1835), *Hemidactylus leschenaultii* (Dumeril and Bibron, 1836), *Mesalina watsonana* (Stoliczka, 1872), *Ophisops jerdonii* (Blyth, 1853), *Ablepharus grayanus* (Stoliczka, 1872), *Eutropis dissimilis* (Hallowell, 1860), *Scincella Himalayana* (Gunther, 1864), *Eurylepis taeniolatus* (Blyth, 1854), *Varanus bengalensis* (Daudin, 1802), *Varanus flavescens* (Hardwicke and Gray 1827), *Amphiesma stolatum* (Linnaeus, 1758), *Lycodon striatus* (Shaw, 1802), *Oligodon arnensis* (Shaw, 1802), *Platyceps rhodorachis* (Jan, 1865), *Platyceps ventromaculatus* (Gray and Hardwicke, 1834), *Ptyas mucosus* (Linnaeus, 1758), *Spalerosophis schirazianus* (Jan, 1865), *Xenochrophis piscator* (Schneider, 1799), *Bungarus caeruleus* (Schneider, 1801), *Naja*

oxiana (Eichwald, 1831) and *Echis carinatus* (Schneider, 1820). In the current research the Turtle *Aspideretes gangeticus* was first time reported from Ghurghushtu tehsil Khudokhail district Buner. The current research shows that district Buner have rich and unique Herpetofauna in Khyber Pakhtunkhwa. The results show that the Snakes, *Laudakia* and *Gecko* species were abundant in the study area. In amphibian fauna the frogs were abundant in the study area. The Turtle *Aspideretes gangeticus* was reported from only one tehsil Khudokhail. The remaining four Tehsil did not have the turtle species. Natural zone was dominant ecological zone on species richness leading by cultivated zone however urban zone have the least species richness.

Duttaphrynus stomaticus is distributed throughout the Indian subcontinent (Daniel, 1963). We reported *Duttaphrynus stomaticus* was the most dominant species in all Amphibian Fauna having relative abundance (pi value = 50.05) at Buner Pakistan. Ali *et al* (2016) reported Amphibian Fauna from District Kasur Punjab having the same relative abundance and do not collect *Duttaphrynus stomaticus* from uncultivated lands while our survey record this species from all ecological zones except rocks and observed at water bodies mostly at monsoon. Rais *et al* (2012) record Herpeto Fauna from Northern Punjab having *Duttaphrynus stomaticus* second dominant species having relative abundance (23.15). *Euphylyctis cyanophlyctis* is distributed from Thailand to Nepal, throughout India, Sri Lanka and almost throughout Pakistan below 1800 m (Khan, 1999). Rais *et al* (2012) recorded *Euphylyctis cyanophlyctis* was the most dominant species from Northern Punjab having relative abundance (42.85). We reported *Euphylyctis cyanophlyctis* from 1200 feet having relative abundance (25.54) recorded from water bodies and near water bodies.

Less abundance of this species is because of much water of District Buner is polluted with waste of marble industries and water pollution has worse effect on Amphibian Fauna.

Hoplobatrachus tigerinus is widely distributed with distribution ranges from Afghanistan, Bangladesh, India, Myanmar, Nepal, Pakistan and Sri Lanka to Madagascar and Maldives (Khan, 2006). *Hoplobatrachus tigerinus* was the 3rd abundant rank species in Northern Punjab Pakistan (Rais *et al.*, 2012). During our survey this is the 3rd abundant species having relative abundance (05.06) collected from water bodies and near water bodies mostly active at August and September.

Sphaerotheca breviceps are distributed at India, Bangladesh, Nepal, Myanmar and Sri Lanka (Khan, 2006) during the present study *Sphaerotheca breviceps* was the least abundant species having relative abundance (02.24) collected from cultivated lands, grass lands and water bodies.

We support previous studies by (Kumar, 1992).) *Varanus bengalensis* come out during day time to get heat from sun is the evidence that they are cold blooded. *Varanus bengalensis* occupies variety of habitats i.e. dry deserts, cultivated areas, barren lands and human habitations (Khalid *et al.*, 2019). Ali *et al* (2016) concluded that *Varanus bengalensis* occupies cultivated lands, human habitats and water bodies having relative abundance (13.93). Our study shows that this is highly abundant at cultivated lands followed by uncultivated lands (Forests), human habitats and near water bodies.

Calotesversicolor is the cosmopolitan and abundant species of Agamidae in Pakistan (Khan and Mahmood 2004; Balouch *et al.*, 2016) and trees are the most important habitat for them (Balouch *et al.*, 2016). Our study revealed that *Calotesversicolor* is the most abundant species at agriculture, grass lands and forests having relative abundance (16.74). Trees and bushes at the edges are highly significant habitat for it.

Hemidactylus flaviviridis,
Hemidactylus brookii and
Cyrtopodion kachhense show a clear predilection to human habitat and usually active at night having relative abundance (04.47, 09.28 and 0.50 respectively). This may be sustained by tendency of some nocturnal species of Gekkonidae which

has been attracted to human habitat due to greater availability of prey by synthetic lights (Luiselli and Capizzi, 1999; Vignoli *et al.*, 2017). We collected all these species from human habitats while *Hemidactylus flaviviridis* are distributed at rocks also.

Eublepharis macularius as the frequent lizard of Iran, Afghanistan, Pakistan, at altitude of 1800m (Khan, 2015; Masroor, 2012). We have seen this species at agricultural sites and forests having relative abundance (0.99).

We reported *Platycephalus ventriosus maculatus* from altitude of 2800m while this one was occupying elevation of 1000 m (Khan, 2015). Wall (1908, 1928) reported these species at altitude of 1800 m. Wheat fields are the important habitat for them. Our study as well prop up Balouch *et al.* (2016), the significant habitat for *Eutropis dissimilis* is herbs, grasses and crop lands frequently maize crop. At natural habitat the highly significant habitats were shrubby and bushy lands, as there protective and nutritive sites having relative abundance (16.74) and second dominant species of reptile at District Buner.

Bungarus caeruleus is common snake of Punjab, Khyber Pakhtunkhwa, Azad Kashmir, Sind and Southern Baluchistan at elevation of 1000 m (Khan, 1993; Khan, 2015). Jamal *et al.*, (2018) reported this species from 1420 m altitude. Our study relived that *Bungarus caeruleus* is the common species at elevation of 2800 m, mostly observed at cultivated land (Maize crop) at August and September.

Ptyas mucosus distributed all through India, Sri Lanka, Afghanistan, Iran, Pakistan and Adaman islands below 2000 m elevation (Khan, 2006; Khan, 2015) and reported from altitude of 4000 m by (Whitaker, 1978). We reported this species from altitude of 2800 m.

Study on richness values of snakes were reported by Khan and Baig (1988), Akram and Qureshi (1995), Farooq *et al.*, (2007), Pauwels *et al.*, (2008) and Amr and Disi (2011). Farooq *et al.*, (2018) reported that *Xenochrophis piscator* was the most dominant species (7.29 %) at Southern Punjab Pakistan while our study deal that this species are less common in District Buner having relative abundance (0.83) collected from agricultural land and near water bodies.

Laudakia pakistanica are distributed around Gilgit to Manshera, Northern Eastern Pakistan, along the river Indus (Khan, 2006). During our research this species was the most dominant species at District Buner occupying rocks and forest. Most of the samples were collected near water at some distance because of great availability of preys.

Farooq *et al.*, (2018) reported *Lycodon striatus* from Southern Punjab Pakistan and were least abundant species (0.38 %). We collected this species from near water bodies District Buner having relative abundance (0.33 N=2).

The most abundant species of snakes was *Ptyas mucosus* having relative abundance (1.99 N=12), seen at agricultural lands and near water bodies while the least abundant species was *Amphiesmastolatium* (0.16, N=1) at near water bodies.

Spalerosophiusschirazianus and *Echiscarinatus* are the least abundant species having relative abundance (0.33, N=2) at agriculture, forests and forests and rocks respectively. *Spalerosophiusschirazianus* and *Naja xiana* distributed throughout District Buner at agriculture and forests, mostly active at early night.

We reported *Mesalina watsonana*, *Ophisops jerdonii*, *Ablepharus grayanus*, *Scincella himalayana* and *Eurylepistaeniolatus* from different sites of district Buner having relative abundance (0.82, 0.82, 8.45 and 0.49 respectively), *Eurylepistaeniolatus* was the least abundant species of Skinks having relative abundance (0.16, N= 1).

Aspideretes gangeticus is wide spread in rivers, canals and large throughout Indo-Pakistan subcontinent (Khan, 2006). We collected this species from only one site (Tehsil Khodokhail) from water bodies having relative abundance (3.81 N=23).

CONCLUSION

It was the first attempt on the Herpeto Fauna of District Buner. We reported 37 species of Herpeto fauna including 5 Amphibians and 32 Reptiles. The Amphibians includes *Duttaphrynus melanostictus* (Schneider, 1799), *Duttaphrynus stomaticus* (Lutken, 1864), *Euphlyctis cyanophlyctis* (Schneider, 1799), *Hoplobatrachustigurinus* (Daudin, 1803) and *Sphaerotheca breviceps* (Schneider, 1799). The Reptiles include (*Aspideretes gangeticus* (Cuvier, 1825), *Calotes versicolor* (Daudin, 1802), *Laudakia badakhshan* (Anderson and Leviton, 1969), *Laudakia himalyana* (Steindachner, 1869), *Laudakia nuristanica* (Anderson and Leviton, 1969), *Laudakia pakistanica* (Baig, 1989), *Eublepharis macularius* (Blyth, 1854), *Agamura persica* (Dumeril, 1856), *Cyrtopodion kachhense* (Stoliczka, 1872), *Cyrtopodion potoharens* (Khan, 2001), *Hemidactylus brookii* (Gray, 1845), *Hemidactylus flaviviridis* (Ruppell, 1835), *Hemidactylus leschenaultii* (Dumeril and Bibron, 1836), *Mesalina watsonana* (Stoliczka, 1872), *Ophisops jerdonii* (Blyth, 1853), *Ablepharus grayanus* (Stoliczka, 1872), *Eutropis dissimilis* (Hallowell, 1860), *Scincella himalayana* (Gunther, 1864), *Eurylepis taeniolatus* (Blyth, 1854), *Varanus bengalensis* (Daudin, 1802), *Varanus flavescens* (Hardwicke and Gray 1827), *Amphiesma stolatium* (Linnaeus, 1758), *Lycodon striatus* (Shaw, 1802), *Oligodon arnensis* (Shaw, 1802), *Platyceps rhodorachis* (Jan, 1865), *Platyceps ventromaculatus* (Gray and Hardwicke, 1834), *Ptyas mucosus* (Linnaeus, 1758), *Spalerosophis schirazianus* (Jan, 1865), *Xenochrophis piscator* (Schneider, 1799), *Bungarus caeruleus* (Schneider, 1801), *Naja oxiana* (Eichwald, 1831) and *Echis carinatus* (Schneider, 1820). In the current research the turtle *Aspideretes gangeticus* was first time reported from Ghurghushtu tehsil Khodokhail District Buner. Natural zone was dominant ecological zone on species richness leading by cultivated zone however urban zone have the least species richness.

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Color plates of Herpetofauna of Reported Species

Duttaphrynus melanostictus (Schneider, 1799)



Duttaphrynus stomaticus (Lutken, 1864)



Euphlyctis cyanophlyctis (Schneider, 1799)



Hoplobatrachus tigerinus (Daudin, 1803)



Sphaerotheca breviceps (Schneider, 1799)



Aspideretes gangeticus (Cuvier, 1825)



Calotes versicolor (Daudin, 1802)



Laudakia badakhshana (Anderson and Leviton, 1969)



Laudakia himalayana (Steindachner, 1869)



Laudakia nuristanica (Anderson and Leviston, 1969)



Laudakia pakistanica khani (Baig, 1989)



Eublepharis macularius (Blyth, 1854)



Agamura persica (Dumeril, 1856)



Cyrtopodion kachhense (Stoliczka, 1872)



Cyrtopodion potohareense (Khan, 2001)



Hemidactylus brookii (Gray, 1845)*Hemidactylus flaviviridis* (Ruppell, 1835)*Hemidactylus leschenaultii* (Dumeril and Bibron, 1836)*Mesalina watsonana* (Stoliczka, 1872)*Ophisops jerdonii* (Blyth, 1853)*Ablepharus grayanus* (Stoliczka, 1872)*Eutropis dissimilis* (Hallowell, 1860)*Scincella himalayana* (Gunther, 1864)*Eurylepis taeniolatus* (Blyth, 1854)



Varanus bengalensis (Daudin, 1802)



Varanus flavescens (Hardwicke and Gray, 1827)



Amphiesma stolatum (Linnaeus, 1758)



Lycodon striatus (Shaw, 1802)



Oligodon arnensis (Shaw, 1802)



Platycephalus rhodorachis (Jan, 1865)



Platycephalus ventromaculatus (Gray and Hardwicke,

1834)

*Ptyas mucosus* (Linnaeus, 1758)*Spalerosophis schinaziannus* (Jan, 1865)*Xenochrophis piscator* (Schneider, 1799)*Bungaruscaeruleus* (Schneider, 1801)*Naja oxiana* (Eichwald, 1831)*Echis carinatus* (Schneider, 1820)