



Herpetofauna of the Amarkantak Plateau in Central India

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Abstract.—I conducted herpetofaunal surveys in poorly-explored sections of Central India: The Amarkantak Plateau; The Son, Johila, and Narmada river lowlands; parts of the Maikal Mountain Range; and pockets of the core zone area of Achanakmar-Amarkantak Biosphere Reserve. I recorded a total of 61 species (17 amphibian and 44 reptilian species). Noteworthy findings included the rediscovery of the Critically Endangered Sacred Grove Bush Frog (*Philautus sanctisilvaticus*) at its type locality after 54 years, new state records for Dobson’s Burrowing Frog (*Sphaerotheca dobsonii*) and Beddome’s Grass Skink (*Eutropis beddomii*), and significant new distributional records for a number of species. This study highlights the importance of landscape-level, long-term fieldwork to untangle the hidden diversity of the Amarkantak Plateau.

Biodiversity inventories and documentation are critically linked to accurate species identification (Nneji et al. 2019). Reptiles and amphibians play vital roles in ecosystems as predators, prey, herbivores, and commensal taxa (Wyman 1998; Hopkins 2007; Böhm et al. 2013). Herein I provide an overview of the herpetofauna of the Amarkantak Plateau (21°15'N–22°58'N, 81°25'E–82°05'E; central point 22°06'31"N, 81°44'53"E), which lies in the Achanakmar-Amarkantak Biosphere Reserve (AABR) of Madhya Pradesh and Chhattisgarh, India (Fig. 1). Situated at the junction of three major mountain ranges at elevations of 446–1,039 m asl, the area is characterized by mountains, narrow valleys, and high plains. Soils are generally lateritic, alluvial, and black cotton types derived from granite, gneisses, and basalts. This ecologically diverse landscape is in the Deccan Peninsular Biogeographic Zone of the country (Rodgers and Panwar 1988) and comprised primarily of tropical dry or deciduous forest biomes. The vegetation has been categorized as moist-deciduous forests, sal-forest (constituting 63% of the area), mixed-forest, riverine-forest, grassland, degraded-forest, and agro-forestry ecosystems (Roychoudhury et al. 2016). Wetlands include the Son, Johila, Narmada, Tipan, Bakan, Chandas, and Kewai Rivers and a number of smaller perennial and seasonal streams.

Due to high annual rainfall (1,322–1,625 mm), high relative humidity, and suitable temperatures, the area harbors a diverse and luxuriant flora comprising 1,527 identified species, 324 species of identified fauna, and many more undocumented floral and faunal taxa (Saxena 1970;

Mishra 1990; Verma et al. 1993; Mudgal et al. 1997; Lal and Kumar 1999; Singh et al. 2001; Khanna et al. 2001; Joshi et al. 2010). The area also is home to larger animals like the Bengal Tiger (*Panthera tigris tigris*), Indian Leopard (*Panthera pardus fusca*), Sloth Bear (*Melursus ursinus*), Gaur (*Bos gaurus*), Mugger Crocodiles (*Crocodylus palustris*), and myriad species of deer, smaller carnivores, and other vertebrate species (Roychoudhury et al. 2016). The known fauna of the Achanakmar Tiger Reserve (ATR) comprises 734 species, including 381 invertebrates belonging to 11 orders



Fig. 1. Google Earth© image showing the location of the Amarkantak Plateau in the Achanakmar-Amarkantak Biosphere Reserve (AABR) of Madhya Pradesh and Chhattisgarh, India.

and 353 vertebrates belonging to five classes (Chandra and Boaz 2018). The ATR also is regarded as an important habitat of two Critically Endangered species, the Sacred Grove Bush Frog (*Raorchestes* [formerly *Philautus*] *sanctisilvaticus*; Amphibia: Rhacophoridae) and the White-rumped Vulture (*Gyps bengalensis*; Aves: Accipitridae); two Endangered faunal species, the Clown Knife Fish (*Notopterus chitala*; Pisces: Notopteridae) and the Bengal Tiger (*Panthera tigris tigris*; Mammalia: Felidae) in addition to supporting important populations of several species of fishes and freshwater turtles.

Past studies of the herpetofauna in the area include those of Das and Chanda (1997), Chandra and Pandey (2004, 2005), Chandra and Gajbe (2005), Ingle (2012, 2018), Chandra (2014), and Chandra and Boaz (2018). However, general information on diversity and distribution is scant.

The aim of this paper is to bring together information from various sources, including peer-reviewed publications, reports, and field observations, in order to document the herpetofaunal diversity of the plateau and provide a baseline checklist. Threats to the herpetofaunal diversity of this unique landscape also are discussed.

Methods

Study Area.—The study area on the Amarkantak Plateau is located mainly in the Anuppur District of Madhya Pradesh and the Bilaspur District of Chhattisgarh, India. I identified and earmarked for surveys 14 study sites in this landscape (Table 1; Fig. 2). Using visual-encounter methods (Crump and Scott 1994), I conducted surveys during pre-monsoon, monsoon, and post-monsoon seasons on 11–12 April, 21–22

Table 1. Study sites on the Amarkantak Plateau.

Amarkantak (Anuppur) (22°42'12.09"N, 81°43'29.22"E), elev. 1,018 m
Human habitation surrounded by degraded grasslands, secondary growth, and abandoned construction.
Narmada Udgam (Anuppur) (22°40'21.14"N, 81°45'34.26"E), elev. 1,039 m
Human habitation with river and plantations; open fields with numerous temples.
Kapildhara (Anuppur) (22°42'03.43"N, 81°42'19.96"E) elev. 996 m
Mountainous and rocky; fast-flowing waterfall with riparian vegetation and large boulders surrounded by dense forest with many caves.
Sonemuda (Anuppur) (22°39'44.38"N, 81°46'02.13"E) elev. 1,054 m
Origin of the Son River surrounded by forested hills and valleys; evergreen forest with abundant canopy cover.
Durgadhara (Anuppur) (22°44'52.52"N, 81°45'43.35"E) elev. 972 m
Slow-flowing waterfall with boulders and gravel surrounded by dense Sal forest.
Doodhdhara (Anuppur) (22°42'06.33"N, 81°42'14.00"E) elev. 971 m
Slow-flowing stream with gravel surrounded by thick vegetation.
Rajendragram (Anuppur) (22°50'47.82"N, 81°36'15.24"E) elev. 870 m
Village surrounded by cultivated areas with scrub and thorn-dominant forest.
Choktipani (Bilaspur) (22°44'59.72"N, 81°48'23.28"E) elev. 750 m
Village surrounded by paddy fields, cultivated areas, and degraded forest.
Keonchi (Bilaspur) (22°62'49.00"N, 81°46'37.74"E) elev. 590 m
Village in forest with slow-moving streams.
Amadobh (Bilaspur) (22°37'34.12"N, 81°44'21.12"E) elev. 684 m
Village surrounded by dense forest with fast-flowing streams.
Lamni (Bilaspur) (22°32'00.32"N, 81°44'52.26"E) elev. 602 m
Hilltops and valleys in Sal-dominated forest.
Ataria (Bilaspur) (22°30'50.75"N, 81°45'49.83"E) elev. 575 m
Village in Sal-dominated tropical moist deciduous forest with slow-flowing streams.
Bamhani (Dindori) (22°45'57.41"N, 81°15'10.14"E) elev. 871 m
Village surrounded by dense forest with fast-flowing streams.
Gohparu (Shahdol) (23°30'30.35"N, 81°23'55.88"E) elev. 446 m
Small suburb with human habitation surrounded by degraded scrub forest and grasslands.

May, 17–19 July, 7–10 August 2015, 7–8 June, 17–20 July, 22–23 August, 13–14 September 2016, 27–30 July, 21–23 September, and 13–14 October 2017.

I also included opportunistic observations including road kills and interactions with local residents to supplement field observations to build a comprehensive species inventory. Most of the surveys were conducted during the day, with only a few short surveys at night. I captured animals by hand, examined and photographed them, and released them at their respective capture sites once their specific identity was determined. I collected no specimens (photographs served as vouchers). For frogs, I sometimes included species (especially for Sacred Bush Frogs, *Philautus sanctisilvaticus*) on the basis of calls heard along forest trails, forest edges, or along streams at 1800–2200 h and recorded with a Sony Voice Recorder EAC 001. Geographic coordinates for survey sites were recorded with a Garmin 12 receiver GPS.

Morphometric terminology, definitions, and data collection protocols followed Dutta and Manamendra-Arachchi (1996) for amphibians, Tikader and Sharma (1992) and Somaweera and Somaweera (2009) for lizards, and Whitaker and Captain (2004) for snakes. In addition, I used published keys (e.g., Lajmi et al. 2016 for species of *Hemidactylus* and Agarwal et al. 2018 for species of *Ophisops*) to identify some species. Nomenclature and taxonomic arrangements follow Frost (2020) for amphibians and Uetz et al. (2020) for reptiles.

Results

I recorded 17 species of amphibians in 10 genera and five families (Dicroglossidae–9 species, Microhylidae–3 species, Bufonidae and Rhacophoridae–2 species each, and Ranidae–one species) and 44 species of reptiles in 30 genera and 17 families (Colubridae–10 species; Gekkonidae–7 species; Mabuyidae–5 species; Agamidae, Elapidae, and Natricidae–3 species each; Lygosomidae and Typhlopidae–2 species each; and Bataguridae, Trionychidae, Lacertidae, Chamaeleonidae, Varanidae, Erycidae, Pythonidae, and Viperidae–one species each).

In the following species accounts, the common and scientific names are followed by my assessments of abundance and the IUCN Red List assessments of the species' conservation status. Abundance: R = rare (<5 individuals/survey), A = abundant (5–10 individuals/survey), VA = very abundant (>10 individuals/survey). IUCN status: NA = Not Assessed, LC = Least Concern, LR = Lower Risk, VU = Vulnerable, CE = Critically Endangered.

AMPHIBIA: ANURA

Bufonidae Gray 1825

Common Asian Toad, *Duttaphrynus melanostictus* (Schneider 1799) (Fig. 3A). VA, LC. Commonly observed in various habitats in all localities. Found on leaf litter, beside

rain-water pools, and along roadsides; encountered in and around human settlements, plantations, riverbanks, under logs and stones, and in moist holes. SVL 45–95 mm.

Marbled Toad, *Duttaphrynus stomaticus* (Lütken 1864) (Fig. 3B). A, LC. Observed in drier and semi-arid regions of the plateau, also in dry scrub forest and degraded forest. Recorded from Mai kiBagiya, Amarkantak Town on 18 July 2015. SVL 38–76 mm.

Dicroglossidae Anderson 1871

Indian Skipping Frog, *Euphlyctis cyanophlyctis* (Schneider 1799) (Fig. 3C). VA, LC. Frequently encountered in all types of permanent and temporary bodies of water. Recorded from near a waterfall in Keonchi, Bilaspur, Kapildhara, and near Durgadhara. SVL 30–60 mm.

In addition, I encountered frogs in the genus *Euphlyctis* near Durgadhara that I was unable to identify to species (Fig. 3D). These frogs were characterized by large adult size (SVL 70 mm); head wider than long; large distinct tympanum with prominent supra-tympanic fold; dorsum glandular and spinular; dorsum olive, reddish diffusion intense at tympanum, eyes, snout, and fore- and hindlimbs, sparse on chest and throat; venter yellowish-white; iris golden-yellow.

Dutta's Cricket Frog, *Fejervarya orissaensis* (Dutta 1997) (Fig. 3E). VA, LC. Observed in various habitats of several localities; near the edge of ponds, marshes, rivers, forest streams, and paddy fields; in grasslands and agricultural areas with nearby ponds, streams, and other suitable wetlands. Two individuals recorded from near Durgadhara on 10 August 2015. SVL 30–55 mm.

Indian Cricket Frog, *Minervarya agricola* (Jerdon 1853) (Fig. 3F). VA, NA. Recorded from various localities, in degraded forest surrounded by human habitation near the village of Ataria, Bilaspur, and near the villages of Gohparu and Shahdol. Four frogs observed and recorded from a permanent stream near Sonemuda. Individuals also were encountered near the edges of fast-flowing forest streams, on the forest floor, under trees in Sal forests, near brooks, near temporary pools, in open grassland, and in pools and ditches.

Small frogs with fairly robust bodies; snout mildly pointed; tympanum half the size of eye; skin warty, dorsum studded with larger and sometimes elongated irregular warts particularly in vertebral and paravertebral areas between the fore- and hindlimbs; dorsum mottled olive and with or without a pale vertebral stripe from snout to vent; venter uniformly white; males with black paired vocal sacs. SVL 25–45 mm.

Individuals from various localities differed in color and pattern: dorsum light brown without vertebral stripe (Kapildhara Waterfall area); dorsum olive with a broad vertebral stripe (Keonchi forest stream); dorsum grayish with a thin vertebral stripe (Sonemuda); dorsum brown with spotted dark patches and a thin white stripe (forest stream near Bamhani).

Jerdon’s Bullfrog, *Hoplobatrachus crassus* (Jerdon 1853)
 (Fig. 3G). A, LC. Recorded from hilly terrain near Lamni

Village, Bilaspur, also in cultivated fields and swampy areas
 around a forest stream on 9 August 2015. SVL 80–100 mm.

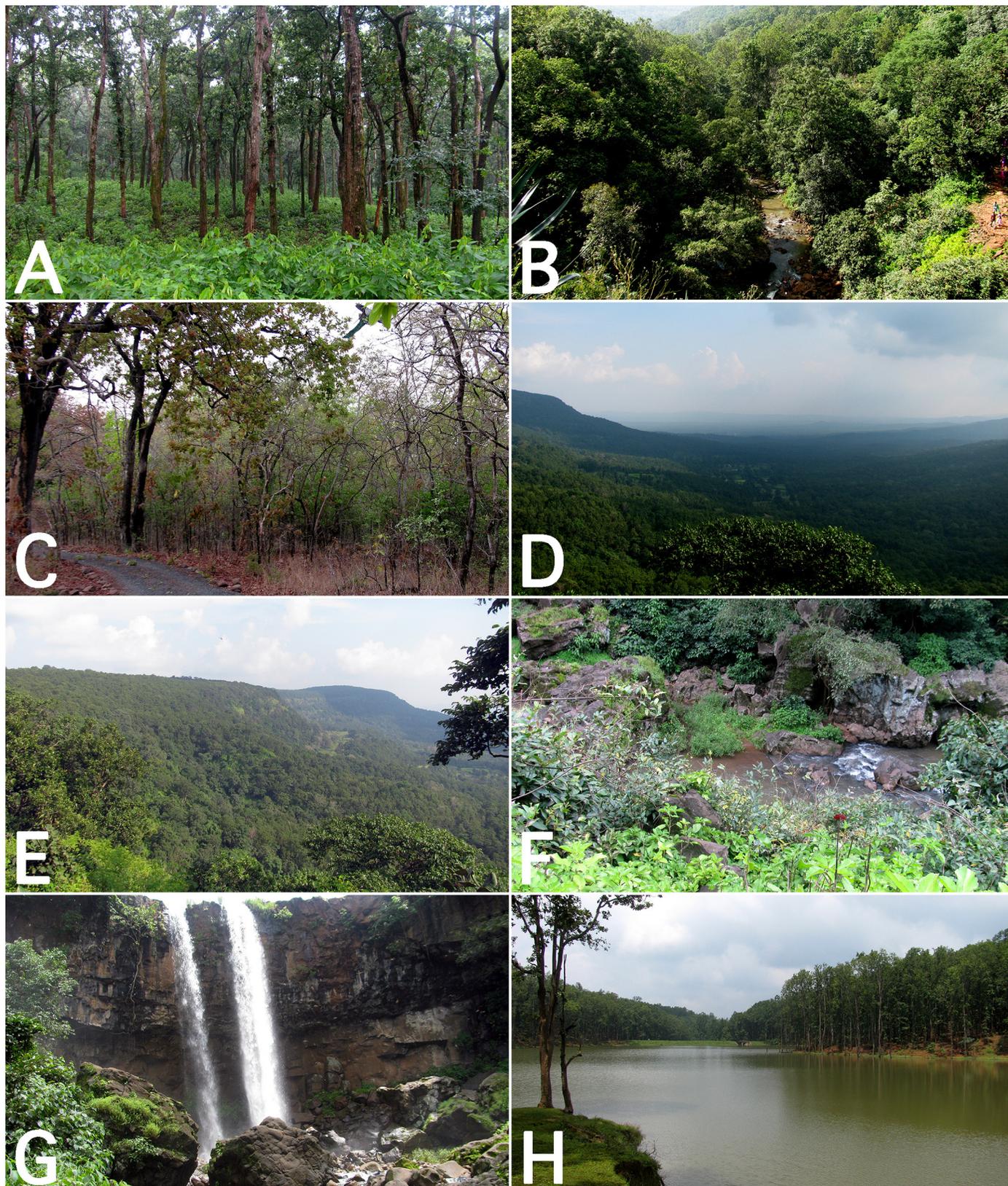


Fig. 2. Different habitats in the study area on the Amarkantak Plateau: A = Ataria; B = Doodhdhara; C = Rajendragram; D = Lamni; E = Amadobh; F = Keonchi; G = Kapildhara Waterfall; H = Sonemuda.

Indian Bullfrog, *Hoplobatrachus tigerinus* (Daudin 1802) (Fig. 3H). VA, LC. Individuals in temporary pools, along mud banks, and in open grassy areas; will hide inside hollows at the edges of ponds and ditches; frequently observed as roadkills on the 40-km segment between Amarkantak Town and Rajendragram. SVL 50–120 mm.

Short-headed Burrowing Frog, *Sphaerotheca breviceps* (Schneider 1799) (Fig. 3I). A, LC. On the forest floor near Bamhani Village, Dindori; also in open fields and Sal forest near bodies of water. SVL 40–55 mm.

Dobson's Burrowing Frog, *Sphaerotheca dobsonii* (Boulenger 1882) (Fig. 3J). A, LC. A single individual below rocks near the Kapildhara Waterfall surrounded by Sal forest in Amarkantak on 30 July 2017. A stout frog with a rounded snout; dorsum light brown; venter white. SVL 40–60 mm. This is the first record of the species in Madhya Pradesh.

Roland's Burrowing Frog, *Sphaerotheca rolandae* (Dubois 1983) (Fig. 3K). A, LC. Two individuals under loose sandy soil near Doodhdhara on 13 September 2016; also in grasslands with loose sandy soil and buried in the sandy banks of wet stream beds. SVL 30–40 mm.

Microhylidae Günther 1858 (1843)

Ornate Narrow-mouthed Frog, *Microhyla ornata* (Duméril and Bibron 1841). VA, LC. At several localities in moist leaf litter, in grasslands, usually near water; also in agricultural fields in and around Amadobh on 22 May 2015. SVL 15–25 mm.

Marbled Balloon Frog, *Uperodon systoma* (Schneider 1799) (Fig. 3L). A, LC. A single individual under a rock on the forest floor near Lamni on 22 August 2016. SVL 45 mm.

Painted Kaloula, *Uperodon taprobanicus* (Parker 1934) (Fig. 3M). A, LC. Several individuals on forest floor, inside tree holes, and under rocks; three individuals in a cultivated area on the fringe of Rajendragram Village at Amarkantak on 7 August 2015. SVL 40–50 mm.

Ranidae Batsch 1796

Wide-spread Fungoid Frog, *Hydrophylax bahuvistara* (Padhey, Jadhav, Modak, Nameer, and Dahanukar 2015) (Fig. 3N). VA, NA. Several individuals in roadside paddy fields and permanent and temporary pools in grasslands between Amarkantak and Rajendragram on 19 July and 9 August 2015. SVL 55–70 mm.

Rhacophoridae Hoffman 1932 (1858)

Common Indian Treefrog, *Polypedates maculatus* (Gray 1830). VA, LC. At various localities (Kapildhara, Sonemuda, Lamni, Keonchi, Ataria, Amadobh, and Bamhani) on trees, bushes, and shrubs in moist-deciduous forest; also in agricultural fields. SVL 35–65 mm.

Sacred-grove Bush Frog, *Raorchestes sanctisilvaticus* (Das and Chanda 1997). A, CE. Four frogs under boulders near the Kapildhara Waterfall on 14 October 2017; also under leaf litter along muddy banks of streams; a calling aggregation near a hill stream in June. SVL 25.3 mm (M) and 24.0 mm (F).

REPTILIA: CROCODILIA

Crocodylidae Cuvier 1807

Mugger Crocodile, *Crocodylus palustris* (Lesson 1831). R, VU. A single individual basking near a large pond at Sonemuda at the origin of the Son River on 11 April 2015; the area is surrounded by forested hills and valleys with evergreen forest and abundant canopy cover.

REPTILIA: TESTUDINES

Bataguridae Gray 1869

Indian Roofed Turtle, *Pangshura tecta* (Gray 1831) (Fig. 4A). R, NA. A single individual basking on a floating log in standing water near Sonemuda on 12 April 2015.

Trionychidae Gray 1825

Indian Flap-shelled Turtle, *Lissemys punctata* (Bonnaterre 1789) (Fig. 4B). VA, LR/LC. In ponds, ditches, lakes, streams, and rivers at various localities (Amarkantak Town, Kapildhara, Doodhdhara, Durgadhara, Sonemuda, Keonchi, Amadobh, and Lamni).

REPTILIA: SQUAMATA (lizards)

Gekkonidae Gray 1825

Clouded Ground Gecko, *Cyrtodactylus cf. nebulosus* (Beddome 1870) (Fig. 4C). A, LC. A single individual on rocks near the Kapildhara Waterfall on 13 October 2017; individuals also in leaf litter and under fallen logs.

Northern House Gecko, *Hemidactylus flaviviridis* Rüppell 1835. VA, NA. Two individuals from Gohparu, Shahdol; also in and around buildings, in rock crevices, and on trees.

Asian House Gecko, *Hemidactylus frenatus* Duméril and Bibron 1836. A, LC. At various localities largely in and around human habitations, seek refuge in cracks of walls and crevices; one individual on a school building in Keonchi, Bilaspur, on 20 July 2016.

Graceful Leaf-toed Gecko, *Hemidactylus gracilis* Blanford 1870 (Fig. 4D). R, LC. A single individual (SVL 35 mm) under a rock near a village surrounded by dry, scrubby, thorn-dominated forest at Rajendragram, Anuppur on 17 July 2015.

Indian Bark Gecko, *Hemidactylus leschenaulti* Duméril and Bibron 1836. A, NA. On rock clefts, in caves, on big



Fig. 3. Amphibian species recorded from the study area on the Amarkantak Plateau: (A) Common Asian Toad (*Duttaphrynus melanostictus*). (B) Marbled Toad (*Duttaphrynus stomaticus*). (C) Indian Skipping Frog (*Euphlyctis cyanophlyctis*). (D) Unidentified cricket frog (*Euphlyctis* sp.). (E) Dutta's Cricket Frog (*Fejervarya orissaensis*). (F) Indian Cricket Frog (*Minervarya agricola*). (G) Jerdon's Bullfrog (*Hoplobatrachus crassus*). (H) Indian Bullfrog (*Hoplobatrachus tigerinus*). (I) Short-headed Burrowing Frog (*Sphaerotheca breviceps*). (J) Dobson's Burrowing Frog (*Sphaerotheca dobsonii*). (K) Roland's Burrowing Frog (*Sphaerotheca rolandae*). (L) Marbled Balloon Frog (*Uperodon systoma*). (M) Painted Kaloula (*Uperodon taprobanicus*). (N) Wide-spread Fungoid Frog (*Hydrophylax bahuvistara*). (O) Sacred Grove Bush Frog (*Raorchestes sanctisilvaticus*).

trees, and inside rock crevices and tree holes at Sonemuda (Amarkantak), Lamni-Ataria (Bilaspur), and Gohparu (Shahdol) on 18 July 2016.

Spotted House Gecko, *Hemidactylus cf. parvimaculatus* Deraniyagala 1951 (Fig. 4E). A, NA. In and around buildings; two individuals on the wall of an old building in Amarkantak Town in 7 June 2016.

Termite Hill Gecko, *Hemidactylus cf. triedrus* (Daudin 1802) (Fig. 4F). A, NA. Two individuals under boulders in degraded forest near Rajendragram; also on bushes, in rock crevices, and tree holes.

Lacertidae Cope 1864

Jerdon's Snake-eyed Lizard, *Ophisops cf. jerdonii* Blyth 1853 (Fig. 4G). R, NA. A single individual (SVL 100 mm) on rocky terrain near Lamni, Bilaspur; two individuals on rocks in sandy habitat along the bank of the Narmada River (Amarkantak) on 7 June 2016.

Mabuyidae Mittleman 1952

Allapalli Grass Skink, *Eutropis allapallensis* (Schmidt 1926). A, LC. Three individuals in a forest patch in hilly terrain near Durgadhara on 21 May 2015; a single individual resting in open, dry scrub surrounded by bushes.

Beddome's Grass Skink, *Eutropis beddomii* (Jerdon 1870) (Fig. 4H). R, LC. In degraded dry deciduous forest near Gohparu, Shahdol on 22 May 2015; also in open Sal forest, dry scrub, under dry sandy soil, in leaf-litter, and in and around bushes; escapes quickly and hides in earth crevices or under rocks when disturbed. This is the first record of the species in Madhya Pradesh.

Common Keeled Skink, *Eutropis carinata* (Schneider 1801). VA, LC. In all localities sampled; individuals on the ground near rocks or bushes; also in and around human habitation.

Striped Grass Skink, *Eutropis dissimilis* (Hallowell 1857) (Fig. 4I). R, NA. A single individual among bushes in dry open scrub at Banghat near Keonchi, Bilaspur on 27 July 2017.

Bronze Grass Skink, *Eutropis macularia* (Blyth 1853). VA, NA. In leaf litter near a seasonal stream near the village of Ataria, Bilaspur at 1630 h on 21 May 2015; also three individuals on the forest floor and under rock boulders on 22–23 August 2016.

Lygosomidae Mittleman 1952

White-spotted Supple Skink, *Lygosoma albopunctatum* (Gray 1846) (Fig. 4J). A, NA. Two individuals in leaf litter near the Kapildhara Waterfall from Amarkantak on 7–8 June 2016; individuals also on a Sal forest floor and near bushes, under dry leaves, and beneath fallen logs and small boulders at several localities.

Spotted Supple Skink, *Lygosoma punctatum* (Gmelin 1799) (Fig. 4K). A, NA. At several localities of the study area; two individuals under logs and rocks in a degraded grassland in Amarkantak Town on 13–14 September 2016; also on the forest floor, under leaf litter, and in and around human habitation.

Varanidae Merrem 1820

Bengal Monitor, *Varanus bengalensis* (Daudin 1802) (Fig. 4L). A, LC. In the backyard of a roadside hotel/dhaba on 12 April 2015 at Amarkantak Town; another individual in dry scrub forest at the edge of Gohparu Village, Shahdol District; individuals also in dry to evergreen forests, plantations, inside caves, rock piles, tree holes, and in the cracks and crevices of large boulders.

Chamaeleonidae Gray 1825

Indian Chameleon, *Chamaeleo zeylanicus* Laurenti 1768 (Fig. 4M). R, LC. A single individual under bushes in an evergreen forest patch near Sonemuda on 7 June 2016.

Agamidae Gray 1827

Oriental Garden Lizard, *Calotes versicolor* (Daudin 1802). VA, NA. Individuals in and around human habitation, on roadside vegetation, in plantation areas, along edges of agricultural fields near villages (Rajendragram, Choktipani, Amadobh, Keonchi, Lamni, Ataria, Bamhani, and Gohparu); a single green color morph 2.5 m above the ground on a tree trunk in Doodhdhara.

Blanford's Rock Agama, *Psammodromus blanfordianus* (Stoliczka 1871) (Fig. 4N). VA, LC. Two individuals on a hilltop near Lamni, Bilaspur, on 21 May 2015; two different color morphs evident at various localities.

Spiny-headed Fan-throated Lizard, *Sitana spinaecephalus* Deepak, Vyas, and Giri 2016 (Fig. 4O). A, NA. An adult male (SVL 45 mm) basking in a rocky area near a riverbed surrounded by scrub- and thorn-dominated vegetation at Sonemuda on 22 September 2017; several individuals at other localities with abundant grassy patches.

Four prominent spines on the back of the head; weakly-serrated white/yellowish dewlap with a single blue line and light brown spots on individual scales extending posteriorly beyond the forearm insertion; dorsum light brown, black patch on the neck, three brown rhomboidal markings on the trunk, a light brown patch with a dark center on top of the head between the eyes, cream-colored streaks from below the eyes and behind the nostrils extending onto the flanks; forelimbs, hindlimbs, and tail with dark brown bars of variable width; venter white.



Fig. 4. Reptilian species recorded from the study area on the Amarkantak Plateau (turtles and lizards): (A) Indian Roofed Turtle (*Pangshura tecta*). (B) Indian Flap-shell Turtle (*Lisemys punctata*). (C) Clouded Ground Gecko (*Cyrtodactylus nebulosus*). (D) Graceful Leaf-toed Gecko (*Hemidactylus gracilis*). Photograph by Anil Sarsavan. (E) Spotted House Gecko (*Hemidactylus cf. parvimaaculatus*). (F) Termite Hill Gecko (*Hemidactylus cf. triedrus*). (G) Jerdon's Snake-eyed Lizard (*Ophisops cf. jerdonii*). (H) Beddome's Grass Skink (*Eutropis beddomii*) Photograph by Anil Sarsavan. (I) Striped Grass Skink (*Eutropis dissimilis*). Photograph by Anil Sarsavan. (J) Spotted Supple Skink (*Lygosoma albopunctatum*). (K) White-spotted Supple Skink (*Lygosoma punctatum*). (L) Bengal Monitor (*Varanus bengalensis*). (M) Indian Chameleon (*Chamaeleo zeylanicus*). (N) Blanford's Rock Agama (*Psammophilus blanfordanus*). (O) Spiny-headed Fan-throated Lizard (*Sitana spinaecephalus*).

REPTILIA: SQUAMATA (snakes)

Typhlopidae Merrem 1820

Brahminy Blindsnake, *Indotyphlops braminus* (Daudin 1803) (Fig. 5A). A, NA. At various localities; two individuals under moist leaves on 25 June 2015. SVL 60 mm.

Slender Wormsnake, *Indotyphlops porrectus* (Stoliczka 1871). A, NA. Under moist leaves and logs at several localities (Amarkantak, Keonchi, Bamhani, and Lamni villages) during the rainy season. SVL 50 mm.

Erycidae Bonaparte 1831

Common Sand Boa, *Eryx conicus* (Schneider 1801) (Fig. 5B). A, NA. At several localities; a single individual (SVL 700 mm) under a rock near Durgadhara; also in rat holes and termite mounds.

Pythonidae Fitzinger 1826

Indian Rock Python, *Python molurus* (Linnaeus 1758) (Fig. 5C). R, VU. In a rocky outcrop at Lamni and near a riverbed at Sonemuda,

Viperidae Bonaparte 1840

Russel's Viper, *Daboia russelii* (Shaw and Nodder 1797) (Fig. 5D). A, LC. In open grassy area, scrub jungle, rocky hillocks, forest edges, and agricultural fields near human habitation at various localities.

Elapidae Boie 1827

Common Indian Krait, *Bungarus caeruleus* (Schneider 1801) (Fig. 5E). VA, NA. In termite mounds, rodent burrows, piles of bricks and rubble, near human habitations, and agricultural farm lands at several localities.

Banded Krait, *Bungarus fasciatus* (Schneider 1801) (Fig. 5F). A, LC. A single individual (SVL 800 mm) in a paddy field near an inland waterway at Choktipani Village, Bilaspur; individuals also in termite mounds and rodent burrows.

Spectacled Cobra, *Naja naja* (Linnaeus 1758) (Fig. 5G). VA, LC. Near streams, on trees, in rock piles, rat holes, termite mounds, and granaries; also in and around human habitation and agricultural areas.

Natricidae Bonaparte 1838

Striped Keelback, *Amphiesma stolatum* (Linnaeus 1758) (Fig. 5H). VA, NA. At all localities; individuals frequently in bushes in cultivated areas; also on forest floors and in open grasslands.

Checkered Keelback, *Fowlea piscator* (Schneider 1799) (Fig. 5I). VA, NA. At all localities in and around ponds, pools, and paddy fields; also near human habitation.

Green Keelback, *Rhabdophis plumbicolor* (Cantor 1839) (Fig. 5J). A, NA. A single individual (SVL 650 mm) in an open grassland near Ataria.

Ahaetuliidae Figueroa, McKelvy, Grismer, Bell, and Lailvaux 2016

Green Vinesnake, *Ahaetulla nasuta* (Lacépède 1789). R, NA. A single individual 1.5 m above the ground in a bush under dense canopy cover near Lamni on 20 July 2016.

Colubridae Opper 1811

Banded Racer, *Argyrogena fasciolata* (Shaw 1802) (Fig. 5K). A, NA. A single individual (SVL 700 mm) under a rock pile in the Sonemuda area on 11 April 2015; individuals also in low bushes and open grasslands.

Forsten's Catsnake, *Boiga forsteni* (Duméril, Bibron, and Duméril 1854) (Fig. 5L). VA, LC. A single individual (SVL 1,200 mm) in a rock crevice near Lamni, Bilaspur, on 17 July 2016.

Common Catsnake, *Boiga trigonata* (Schneider 1802) (Fig. 5M). VA, LC. At several localities; one individual (SVL 450 mm) coiled in a bush near a forested area of Amarkantak Town, two others under rocks near Lamni, Bilaspur, on 21 September 2017.

Common Trinket Snake, *Coelognathus helena helena* (Daudin 1803) (Fig. 5N). A, NA. One individual in an open field near Narmada, Udgam, and another under bushes in degraded forest near Choktipani, Bilaspur.

Common Bronze-backed Treesnake, *Dendrelaphis tristis* (Daudin 1803) (Fig. 5O). A, NA. A single individual (SVL 800 mm) in scrub- and thorn-dominated forest at edge of Rajendragram Village, Anuppur.

Common Wolfsnake, *Lycodon aulicus* (Linnaeus 1758). VA, NA. One individual (SVL 450 mm) under the wooden roof of a thatched house on 23 September 2017; also in caves, piles of stones, wells, and hollow trees.

Barred Wolfsnake, *Lycodon striatus* (Shaw 1802). A, NA. One individual (SVL 400 mm) under boulders in scrub forest at Gohparu, Shahdol on 17 July 2015; also in tree holes and under fallen logs.

Common Kukri Snake, *Oligodon arnensis* (Shaw 1802). VA, NA. Two individuals in a tree hole at ground level on the forest floor near Choktipani, Bilaspur on 13 October 2017; also in termite mounds, caves, and rock crevices at various localities.

Oriental Ratsnake, *Ptyas mucosa* (Linnaeus 1758). VA, NA. At several localities in open fields, rocky areas, arid areas, on the forest floor in degraded forest patches, and in and around human habitation.



Fig. 5. Reptilian species recorded from the study area on the Amarkantak Plateau (snakes): (A) Brahminy Blindsnake (*Indotyphlops braminus*). (B) Common Sand Boa (*Eryx conicus*). (C) Indian Rock Python (*Python molurus*). (D) Russel's Viper (*Daboia russelii*). (E) Common Indian Krait (*Bungarus caeruleus*). (F) Banded Krait (*Bungarus fasciatus*). (G) Spectacled Cobra (*Naja naja*). (H) Striped Keelback (*Amphiesma stolatum*). (I) Checkered Keelback (*Fowlea piscator*). (J) Green Keelback (*Rhabdophis plumbicolor*). (K) Banded Racer (*Argyrogena fasciolata*). (L) Forsten's Catsnake (*Boiga forsteni*). (M) Common Catsnake (*Boiga trigonata*). (N) Common Trinket Snake (*Coelognathus helena*). (N) Common Bronze-backed Treesnake (*Dendrelaphis tristis*). Photograph by Anil Sarsavan.

Discussion

The herpetofauna of Madhya Pradesh and Chhattisgarh in central India comprises 19 species of amphibians in five families and 89 species of reptiles in 23 families (Daniel and Selukar 1964; Saksena et al. 1988; Pillai et al. 1991; Sanyal et al. 1991; Dutta 1992, 2015a, 2015b; Sarkar 1993; Chanda 1995a, 1995b; Das and Chanda 1997, 1998; Sarkar and Ray 2000; D’Cunha 2002; Gajbe 2003a, 2003b; Ingle 2003, 2008, 2011, 2012, 2018; Chandra and Gajbe 2005; Ingle et al. 2009, 2011, 2012a, 2012b, 2012c, 2012d, 2013, 2019; Mohapatra et al. 2012; Chandra 2014; Ingle and Sarsavan 2014; Gangopadhyay et al. 2015; Moiz et al. 2015; Raju and Ramachandra 2016; Chandra and Boaz 2018). Although I was unable to confirm the identities of some species in the genera *Fejervarya*, *Euphlyctis*, *Hemidactylus*, *Ophisops*, and *Calotes*, which might represent cryptic species complexes, I did document the presence of 17 species of amphibians and 44 species of reptiles during this study on the Amarkantak Plateau.

The presence of 17 species of amphibians from the so-called dry zone of central India (the headwaters of the Narmada and Son Rivers) reinforces the contention that this region may be a center of amphibian diversity. The rediscovery of the Sacred Grove Bush Frog (*Raorchestes sanctisilvaticus*) from its type locality after 54 years not only helped bridge the discontinuous distribution of the genus but also suggests that other populations of the species might survive in other relatively moist regions of the Plateau (Ingle 2018).

Two of the species recorded, Dobson’s Burrowing Frog (*Sphaerotheca dobsonii*) and Beddome’s Grass Skink (*Eutropis beddomii*) are new state records for Madhya Pradesh. New distributional records for amphibians were Dutta’s Cricket Frog (*Fejervarya orissaensis*) from Durgadhara (Amarkantak); the Indian Cricket Frog (*Minervarya agricola*) from Sonemuda (Amarkantak), Ataria (Bilaspur), and Gohparu (Shahdol); Roland’s Burrowing Frog (*Sphaerotheca rolandae*) from Doodhdhara (Amarkantak); and the Painted Kaloula (*Uperodon taprobanicus*) from Rajendragram (Anuppur). New distributional records for reptiles were the Mugger Crocodile (*Crocodylus palustris*), Indian Roofed Turtle (*Pangshura tecta*), and the Indian Chameleon (*Chamaeleo zeylanicus*) from Sonemuda (Amarkantak); the Slender Gecko (*Hemidactylus gracilis*) from Keonchi (Bilaspur); the Allapalli Grass Skink (*Eutropis allapallensis*) from Durgadhara (Amarkantak); the Striped Grass Skink (*Eutropis dissimilis*) from Banghat, Keonchi (Bilaspur); the Clouded Ground Gecko (*Cyrtodactylus nebulosus*) from the Kapildhara Waterfall (Amarkantak); the Slender Wormsnake (*Indotyphlops porrectus*) from Amarkantak, Keonchi, Bamhani, and Lamni; the Banded Krait (*Bungarus fasciatus*) from Choktipani (Bilaspur); Forsten’s Catsnake (*Boiga forsteni*) from Lamni (Bilaspur); and the Barred Wolfsnake (*Lycodon striatus*) from Gohparu (Shahdol).

The record of “*Fejervarya limnocharis* (Boie in Wiegmann 1834)” reported by Chandra and Boaz (2018) from the Achanakmar Tiger Reserve is almost certainly a case of misidentification. Indian frogs in the genus *Fejervarya* are among the most frequently encountered anurans in India. Recent taxonomic studies (e.g., Ganesh et al. 2017) resulted in the description and recognition of many new species in this complex. *Fejervarya limnocharis* is no longer considered part of the Indian herpetofauna and Indian frogs under that name represent undescribed species (Frost 2020).

Extensive systematic research on what had been known as the genus *Fejervarya* (e.g., Howlader et al. 2016; Suwannapoom et al. 2016, 2017; Garg and Biju 2017; Sanchez et al. 2018) has resulted in the recognition of two genera, the predominantly south Asian *Minervarya* and the predominantly southeast Asian *Fejervarya*. The genus *Minervarya* presently comprises 39 species that collectively range from India in the west to Thailand in the east (Frost 2020). Among them, the Indian Cricket Frog (*Minervarya agricola*) is widely distributed across the Indian Subcontinent from Sri Lanka in the south to the Gangetic Plains in Nepal, where it occupies a wide range of habitats from flooded fields and human habitation in the plains to wet forests in the uplands (Chandramouli et al. 2019). The population inhabiting the study area is clearly *Minervarya agricola*.

The presence of frogs in the genus *Euphlyctis* also is problematic. Individuals observed were characterized by large adult size, a glandular and spinular dorsum, and coloration consisting of an olive dorsum with reddish infusions that were denser at the snout, eyes, tympana, and fore- and hindlimbs but sparse on the throat and chest, a yellowish-white venter, and a golden-yellow iris. I was unable to identify these frogs to any one of the currently recognized species known to occur in central India.

The record of the Matherana Leaping Frog (*Indirana leithii*), which is endemic to the northern Western Ghats, in the Achanakmar Tiger Reserve of Chhattisgarh (Chandra 2014; Chandra and Boaz 2018) needs to be confirmed. Biju and Bossuyt (2005) doubted the presence of *I. leithii* from any localities outside the Western Ghats of Maharashtra and stated that frogs identified as *I. leithii* from elsewhere probably represent undescribed species.

Records of two lacertids (Leschenault’s Snake-eyed Lizard, *Ophisops leschenaultii*, and the Punjab Snake-eyed Lizard, *Ophisops jerdonii*) from the Achanakmar Tiger Reserve in Chhattisgarh (Chandra and Boaz 2018) need to be verified, as Indian lacertid taxonomy is complicated by generic reallocations, homonyms, synonyms, and misidentifications (Smith 1935; Venugopal 2010). Leschenault’s Snake-eyed Lizard is the most common and widely distributed lacertid in India (Venugopal 2010) and occurs primarily in open habitats (Agarwal and Ramakrishnan 2017). Ganesh and

Chandramouli (2017) recently provided some taxonomic clarity on these lizards. The Punjab Snake-eyed Lizard usually is found in open, rocky habitats at elevations above 1,500 m across most of India (excluding the eastern regions) (Agarwal and Ramakrishnan 2017). Our observation, photo voucher, and other published records (Chandra and Boaz 2018) from the study area represent the *Ophisops* cf. *jerdonii* group, which is pending taxonomic revision.

The study area is characterized by topography ranging from crop fields in the districts of Bilaspur, Anuppur, and Dindori to the hills of the Maikal Ranges of Satpura. The topography, in combination with perennial and intermittent streams, results in varied microclimates that provide diverse environmental conditions suitable for a variety of herpetofaunal species. However, I also observed a number of negative environmental factors in the area. The Kapildhara Waterfall, the type locality of the Sacred Grove Bush Frog, is considered a sacred grove (therefore the common name of the species). It is, however, relatively small and does not guarantee protection. Among the main problems in the area are infrastructural development (much of it intended to promote tourism) in small suburban clusters like Amarkantak, subsistence harvesting of wood, forest fires, mining, and the collection of non-timber forest products and medicinal plants by local tribal groups. Deforestation also has affected climatic conditions and a downward trend in annual rainfall is evident. Most of the visited sites were dry, indicating that an extended drought could become a major threat for the survival of many herpetofaunal species, amphibians in particular. Improved protection and management of the remaining habitats is urgently needed.

The Amarkantak Plateau is one of the least disturbed and ecologically diverse landscapes in central India. The biodiversity of this unique region, particularly its herpetofauna, is underestimated and mostly unexplored. Considering the scarcity of knowledge on the diversity, distribution, and natural history of the herpetofauna in the region, the present study is significant. However, the resultant information was limited by insufficient funds and the lack of a collecting permit. Consequently, this inventory represents but a fraction of the actual herpetofaunal assemblage. Additional extensive surveys supplemented with collection-based molecular systematic research is likely to reveal hitherto unrecorded species and novelties.

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tisilvaticus and *fejervaryan* frogs); Anil Sarsavan for providing some photographs (*Hemidactylus sgracilis*, *Eutropis beddomii*, and *Fejervarya* sp.); and Vivek Pagare, Kapil Kale, Mahaveer Jatwa, and Mr. Pathak for help in the field.

Literature Cited

- Agarwal, I. and U. Ramakrishnan. 2017. A phylogeny of open-habitat lizards (Squamata: Lacertidae: *Ophisops*) supports the antiquity of Indian grassy biomes. *Journal of Biogeography* 44: 2021–2032.
- Agarwal, I., A. Khandekar, U. Ramakrishnan, R. Vyas, and V.B. Giri. 2018. Two new species of the *Ophisops microlepis* (Squamata: Lacertidae) complex from northwestern India with a key to Indian *Ophisops*. *Journal of Natural History* 52: 819–847.
- Biju, S.D. and F. Bossuyt. 2005. A new species of frog (Ranidae, Rhacophorinae, *Philautus*) from the rainforest canopy in the Western Ghats, India. *Current Science* 88: 175–178.
- Böhm, M., B. Collen, J.E.M. Baillie, J. Chanson, N. Cox, G. Hammerson, M. Hoffmann, S.R. Livingstone, M. Ram, A.G.J. Rhodin, S.N. Stuart, P.P.I. van Dijk, B.E. Young, L.E. Afuang, A. Aghasyan, A.G. Aguayo, C. Aguilar, R. Ajtic, F. Akarsu, L.R.V. Alencar, A. Allison, N. Ananjeva, S. Anderson, C. Andrés, D. Ariano-Sánchez, J.C. Arredondo, M. Auliya, C.C. Austin, A. Avci, P.J. Baker, A.F. Barreto-Lima, C.L. Barrio-Amorós, D. Basu, M.F. Bates, A. Batistella, A. Bauer, D. Bennett, W. Böhme, D. Broadley, R. Brown, J. Burgess, A. Captain, S. Carreira, M. Castaneda, F. Castro, A. Catenazzi, J.R. Cedeño-Vázquez, D. Chapple, M. Cheylan, D.F. Cisneros-Heredia, D. Cogalniceanu, H. Cogger, C. Corti, G.C. Costa, P.J. Couper, T. Courtney, J. Crnobrnja-Isailovic, P.-A. Crochet, B. Crother, F. Cruz, J. Daltry, R.J.R. Daniels, I. Das, A. de Silva, L. Dirksen, T. Doan, K. Dodd, J.S. Doody, M.E. Dorcas, J. Duarte de Barros Filho, V.T. Egan, E.H. El Mouden, D. Embert, R.E. Espinoza, A. Fallabrino, X. Feng, Z.-J. Feng, L. Fitzgerald, O. Flores-Villela, F.G.R. França, D. Frost, H. Gadsden, T. Gamble, S.R. Ganesh, M.A. Garcia, J.E. García-Pérez, J. Gatus, M. Gaulke, P. Geniez, A. Georges, J. Gerlach, S. Goldberg, J.C.T. Gonzalez, D.J. Gower, T. Grant, E. Greenbaum, P. Guo, S. Haitao, A.M. Hamilton, K. Hare, B. Hedges, N. Heideman, C. Hilton-Taylor, R. Hitchmough, B. Hollingsworth, M. Hutchinson, I. Ineich, J. Iverson, F.M. Jaksic, R. Jenkins, U. Joger, R. Jose, Y. Kaska, J.S. Keogh, G. Köhler, G. Kuchling, Y. Kumluta, A. Kwet, E. La Marca, W. Lamar, A. Lane, B. Lardner, C. Latta, G. Latta, M. Lau, P. Lavin, D. Lawson, M. LeBreton, E. Lehr, D. Limpus, N. Lipczynski, A.S. Lobo, M.A. López-Luna, L. Luiselli, F. Lukoschek, M. Lundberg, P. Lymberakis, R. Macey, W.E. Magnusson, L. Mahler, A. Malhotra, J. Mariaux, B. Maritz, O.A.V. Marques, R. Márquez, M. Martins, G. Masterson, J.A. Mateo, R. Mathew, N. Mathews, G. Mayer, J.R. McCranie, J. Measey, F. Mendoza-Quijano, M. Menegon, S. Métrailler, D.A. Milton, C. Montgomery, S.A.A. Morato, T. Mott, A. Muñoz-Alonso, J. Murphy, T.Q. Nguyen, G. Nilson, C. Nogueira, H. Núñez, H. Ota, J. Ottenwalder, T. Papenfuss, S. Pasachnik, P. Passos, O.S.G. Pauwels, V. Pérez Mellado, N. Pérez-Buitrago, E.R. Pianka, J. Pleguezuelos, C. Pollock, P. Ponce-Campos, R. Powell, F. Pupin, G.E. Quintero Díaz, R. Radder, J. Ramer, A.R. Rasmussen, C. Raxworthy, R. Reynolds, N. Richman, E.L. Rico, E. Riservato, G. Rivas, P.L.B. Rocha, M.-O. Rödel, L. Rodríguez Schettino, W.M. Roosenburg, J.P. Ross, R. Sadek, K. Sanders, G. Santos-Barrera, H.H. Schleich, B. Schmidt, A. Schmitz, M. Sharifi, G. Shea, R. Shine, T. Slimani, R. Somaweera, S. Spawls, P. Stafford, R. Stuebing, S. Sweet, E. Sy, H. Temple, M. Tognielli, K. Tolley, P.J. Tolson, B. Tuniyev, S. Tuniyev, N. Üzümlü, G. van Buurt, M. Van Sluys, A. Velasco, M. Vences, M. Veselý, S. Vinke, T. Vinke, G. Vogel, M. Vogrin, R.C. Vogt, O.R. Wearn, Y.L. Werner, M.J. Whiting, T. Wiewandt, J. Wilkinson, B. Wilson, S. Wren, T. Zamin, K. Zhou, and G. Zug. 2013. The conservation status of the world's reptiles. *Biological Conservation* 157: 372–385.
- Chanda, S.K. 1995a. Amphibia, pp. 71–75. In: A.K. Ghosh (ed.), *Fauna of Conservation Areas 6. Fauna of Indravati Tiger Reserve, Madhya Pradesh*. Zoological Survey of India, Kolkata, India.
- Chanda, S.K. 1995b. Amphibia, pp. 47–49. In: A.K. Ghosh (ed.), *Fauna of Conservation Areas – 7. Fauna of Kanha Tiger Reserve, Madhya Pradesh*. Zoological Survey of India, Kolkata, India.
- Chandra, K. 2014. *Fauna of Achanakmar-Amarkantak Biosphere Reserve, Chhattisgarh and Madhya Pradesh*. Conservation Area Series, 49. Zoological Survey of India, Kolkata, India.
- Chandra, K. and A.A. Boaz. 2018. *Fauna of Achanakmar Tiger Reserve, Chhattisgarh*. State Forest Research and Training Institute, Forest Department Chhattisgarh, and Zoological Survey of India, Kolkata, India.

- Chandra, K. and P.U. Gajbe. 2005. An inventory of herpetofauna of Madhya Pradesh and Chhattisgarh. *Zoos' Print Journal* 20: 1812–1819.
- Chandra, K. and V.K. Pandey. 2004. Notes on anuran fauna of Achanakmar Wildlife Sanctuary, (Bilaspur, Chhattisgarh). *Cobra* 57: 32–37.
- Chandra, K. and V.K. Pandey. 2005. Reptilia of Achanakmar Wildlife Sanctuary, Chhattisgarh. *Cobra* 60: 1–5.
- Chandramouli, S.R., D. Ankaiah, V. Arul, S.K. Dutta, and S.R. Ganesh. 2019. On the taxonomic status of *Minervarya granosa* (Kuramoto, Joshy, Kurabayashi & Sumida, 2008) and the distribution of *M. agricola* (Jerdon, 1853) Amphibia: Anura: Dicroglossidae. *Asian Journal of Conservation Biology* 8: 84–87.
- Crump, M.L. and N.J. Scott, Jr. 1994. Visual encounter survey, pp: 84–91. In: W.R. Heyer, M.A. Donnelly, R.W. McDiarmid, L.A.C. Heyek, and M.S. Foster (eds.), *Measuring and Monitoring Biological Diversity, Standard Methods for Amphibians*. Smithsonian Institution Press, Washington, D.C.
- Daniel, J.C. and T.G. Selukar. 1964 ("1963"). Occurrence of the fungoid frog *Rana malabarica* (Bibr.) at Jagdalpur, Bastar District, M.P. *Journal of the Bombay Natural History Society* 60: 743–744.
- Das, I. and S.K. Chanda 1997. *Philautus sanctisilvaticus* (Anura: Rhacophoridae), a new frog from the sacred groves of Amarkantak, Central India. *Hamadryad* 22: 21–27.
- Das, I. and S.K. Chanda. 1998. A new species of *Philautus* (Anura: Rhacophoridae) from Eastern Ghats, south-eastern India. *Journal of South Asian Natural History* 3: 103–112.
- D'Cunha, E.P. 2002. Range extension of *Rana malabarica* (Bibr.) in Madhya Pradesh. *Journal of the Bombay Natural History Society* 99: 332–333.
- Dutta, S.K. 1992. Amphibians of India: Updated species list with distribution record. *Hamadryad* 17: 1–13.
- Dutta, S.K. 2015a. Anuran fauna of Bastar Division of Chhattisgarh State, India. *Ambient Science* 2(2): 31–38.
- Dutta, S.K. 2015b. First report of *Raorchestes sanctisilvaticus* (Das and Chanda, 1997) sacred grove bush frog from Chhattisgarh, India. *Biolife* 3: 735–738.
- Dutta, S.K. and K. Manamendra-Arachchi. 1996. *The Amphibian Fauna of Sri Lanka*. Wildlife Heritage Trust of Sri Lanka, Colombo, Sri Lanka.
- Frost, D.R. 2020. Amphibian Species of the World: An Online Reference. Version 6.1. American Museum of Natural History, New York, New York. <<https://amphibiansoftheworld.amnh.org/index.php>>.
- Gajbe, P. 2003a. New record of painted frog *Kaloula taprobanica* Parker from Shahdol district, Madhya Pradesh. *Cobra* 52: 17–18.
- Gajbe, P. 2003b. Herpetofaunal diversity of Dindori district, Madhya Pradesh. *Cobra* 54: 6–8.
- Ganesh, S.R. and S.R. Chandramouli. 2017. Identification of Leschenault's Snake-eyed Lizard, *Ophisops leschenaultii* (Milne-Edwards, 1829), with notes on its ontogenetic colour change. *Sauria* 39(2): 68–72.
- Ganesh, S.R., S.K. Dutta, and S.R. Chandramouli 2017. On the taxonomy and nomenclature of the common Indian cricket frog *Rana Agricola* Jerdon, 1853 (Amphibia: Dicroglossidae). *Asian Journal of Conservation Biology* 6: 107–113.
- Gangopadhyay, A., A.L. Dutta, and P.K. Manna. 2015. A preliminary survey of herpetofauna of Bastar District (Chhattisgarh), India. *Journal of Experimental Zoology India* 18: 409–416.
- Garg, S. and S.D. Biju. 2017. Description of four new species of burrowing frogs in the *Fejervarya rufescens* complex (Dicroglossidae) with notes on morphological affinities of *Fejervarya* species in the Western Ghats. *Zootaxa* 4277: 451–490.
- Hopkins, W.A. 2007. Amphibians as models for studying environmental change. *ILAR Journal* 48: 270–277.
- Howlader, M.S.A., A. Nair, and J. Merilä. 2016. A new species of frog (Anura: Dicroglossidae) discovered from the mega city of Dhaka. *PLoS One* 11: 1–23.
- Ingle, M. 2003. A preliminary survey of the herpetofauna of Naglok Area, Jashpur, Chhattisgarh. *Cobra* 54: 1–5.
- Ingle, M. 2008. Herpetofaunal diversity of Ujjain District, Madhya Pradesh. *Cobra* 2(2): 5–8.
- Ingle, M. 2011. Herpetofauna of Naglok Region of Jashpur District, Chhattisgarh. *Records of the Zoological Survey of India* 111: 79–96.
- Ingle, M. 2012. Inventorization of Herpetofaunal Diversity of Madhya Pradesh, Central India. Final Report, Snake Research Organization, Ujjain, Madhya Pradesh, India.
- Ingle, M. 2018. Current status of Critically Endangered Sacred Groves Bush Frog *Philautus sanctisilvaticus* (Das and Chanda 1997) in Amarkantak Plateau, Madhya Pradesh. Final Report, Snake Research Organization, Ujjain, Madhya Pradesh, India.
- Ingle, M. and A. Sarsavan. 2014. Herpetofaunal richness and its conservation status in Narsingharh Wildlife Sanctuary, Madhya Pradesh. *Cobra* 8(1): 1–9.
- Ingle, M., P. Verma, and A. Sarsavan. 2009. Herpetofaunal diversity of Shajapur District, Madhya Pradesh. *Cobra* 3(3): 5–8.
- Ingle, M., A. Sarsavan, V. Pagare, and S. Chaplod. 2011. Preliminary survey of the herpetofauna of Kheoni Wildlife Sanctuary, Dewas, Madhya Pradesh. *Cobra* 5(1): 9–13.
- Ingle, M., M. Pawar, and V. Pagare. 2012a. Urban herpetofauna: A case study in Ujjain Town of Madhya Pradesh (abstract), p. 58. In: S.K. Dutta, N. Mohanty, H.K. Sahu, P. Parida, and G. Sahoo (eds.), *Proceedings of the National Seminar on Current Trend of Wildlife Research in India with Special Reference to Herpetology*. Department of Zoology, North Orissa University, Takatpur, Baripada, Odisha, India.
- Ingle, M., A. Sarsavan, P. Verma, and M. Pawar. 2012b. Herpetofaunal inventory of Gandhisagar Wildlife Sanctuary, Madhya Pradesh (abstract), p. 37. In S.K. Dutta, N. Mohanty, H.K. Sahu, P. Parida, and G. Sahoo (eds.), *Proceedings of the National Seminar on Current Trend of Wildlife Research in India with Special Reference to Herpetology*. Department of Zoology, North Orissa University, Takatpur, Baripada, Odisha, India.
- Ingle, M., M. Pawar, P. Verma, and V. Pagare. 2012c. Amphibians and reptiles of Narsingharh Wildlife Sanctuary, Rahgarh, Madhya Pradesh (abstract), p. 39. In: S.K. Dutta, N. Mohanty, H.K. Sahu, P. Parida, and G. Sahoo (eds.), *Proceedings of the National Seminar on Current Trend of Wildlife Research in India with Special Reference to Herpetology*. Department of Zoology, North Orissa University, Takatpur, Baripada, Odisha, India.
- Ingle, M., P. Verma, and M. Pawar 2012d. Herpetofauna of Ralamandal Wildlife Sanctuary, Indore, Madhya Pradesh (abstract), p. 40. In: S.K. Dutta, N. Mohanty, H.K. Sahu, P. Parida, and G. Sahoo (eds.), *Proceedings of the National Seminar on Current Trend of Wildlife Research in India with Special Reference to Herpetology*. Department of Zoology, North Orissa University, Takatpur, Baripada, Odisha, India.
- Ingle, M., P.P. Mohapatra, and M. Pawar. 2013. Assessment of Herpetofaunal Diversity of North and South Sagar Forest Division, Madhya Pradesh. Final report, Snake Research Organization, Ujjain, Madhya Pradesh, India.
- Ingle, M., U. Yadov, A.K. Bhilala, and M. Pawar. 2019. Urban herpetofauna: A case study in Ujjain City of central India. *International Journal of Scientific Research in Biological Sciences* 6: 76–84.
- Joshi, K.C., M.S. Negi, and A.D. Tiple (eds.). 2010. *Achanakmar-Amarkantak Biosphere Reserve*. Biosphere Reserve Information Series (BRIS) Volume 2. Tropical Forest Research Institute, Jabalpur, India.
- Khanna, K.K., A. Kumar, R.D. Dixit, and N.P. Singh. 2001. *Supplement to the Flora of Madhya Pradesh*. Botanical Survey of India, Calcutta, India.
- Lal, J. and A. Kumar. 1999. Notes on some rare plants from Amarkantak (Madhya Pradesh). *Journal of Economic and Taxonomic Botany* 23: 739–741.
- Lajmi, A., V.B. Giri, and K.P. Karanth. 2016. Molecular data in conjunction with morphology help resolve the *Hemidactylus brookii* complex (Squamata: Gekkonidae). *Organisms Diversity & Evolution* 16: 659–677.
- Mishra, O.P. 1990. Addition to the flora of Amarkantak (M.P.). *Journal of Economic and Taxonomic Botany* 14: 198–200.
- Mohapatra, P.P., M. Ingle, and A. Sarsavan. 2012. Diversity and Distribution of Reptiles and Amphibians in Bunder Proposed Mining Area, Chhatarpur, Madhya Pradesh. Unpublished report to Minenviron Systems Pvt. Ltd., Nagpur, Maharashtra, India.
- Moiz, A., K. Basak, B. Sarakr, M. Suraj, and K.C. Bebartha. 2015. *Snakes and Other Reptiles of Chhattisgarh; The Field Guide*. Chattisgarh State Biodiversity Board, Raipur, Chattisgarh, India.
- Mudgal, V., K.K. Khanna, and P.K. Hajra (eds.). 1997. *Flora of Madhya Pradesh*. Vol. 2. Botanical Survey of India, Calcutta, India.
- Nneji, L.M., A.C. Adeola, A.O.K. Okeyoyin, O.C. Oladipo, Y. Saidu, J.Y. Usongo, and A. Ugwumba. 2019. Assessing the effectiveness of molecular data for species identification and diversity studies of Nigerian herpetofauna. *Mitochondrial DNA Part B* 4: 589–593.
- Pillai, R.S., M.S. Ravichandran, and P. Tamilarasan. 1991. Herpetological survey of Narmada Valley-Madhya Pradesh. 2. Amphibia of Narmada Valley. *Cobra* 5:12–14, 18–19.
- Raju, D. and S. Ramachandran. 2016. *Photographic Field Guide: Wildlife of Central India*. Notion Press, Chennai, India.

- Rodgers, W.A. and H.S. Panwar. 1988. *Planning a Wildlife Protected Area Network in India. Volume I*. Wildlife Institute of India, Dehradun, India.
- Roychoudhury, N., R. Sharma, and D.K. Gupta. 2016. Achanakmar-Amarkantak Biosphere Reserve, India: A diverse tropical forest ecosystem. *Van Sangyan* 3(6): 1–9.
- Saksena, D.N., A.K. Sarkar, and K.K. Tewari. 1988. Anuran fauna of Gwalior and Chambal divisions of Madhya Pradesh, India. *Journal of Hydrobiology* 4: 25–27.
- Sanchez, E., S.D. Biju, M.M. Islam, M. Hassan, A. Ohler, M. Vences, and A. Kurabayasi. 2018. Phylogeny and classification of fejevaryan frogs (Anura: Dicroglossidae). *Salamandra* 54: 109–116.
- Sanyal, D.P., P.K. Chandra, and S. Ray. 1991. Notes on amphibian collection from Bastar District, M.P., India. *Records of the Zoological Survey of India* 88: 45–48.
- Sarkar, A.K. 1993. Amphibia, pp. 39–49. In: A.K. Ghosh (ed.), *State Fauna Series 1. Fauna of Orissa. Part 4*. Zoological Survey of India, Kolkata, India.
- Sarkar, A.K. and S. Ray. 2000. Amphibia, pp. 299–309. In: J.R.B. Alfred (ed.), *State Fauna Series 8. Fauna of Gujrat (Part – 1). Vertebrates*. Zoological Survey of India, Kolkata, India.
- Saxena, H.O. 1970. The flora of Amarkantak, Madhya Pradesh. *Bulletin of the Botanical Survey of India* 12: 37–66.
- Singh, N.P., K.K. Khanna, V. Mudgal, and R.D. Dixit (eds.). 2001. *Flora of Madhya Pradesh*. Vol. 3. Botanical Survey of India, Calcutta, India.
- Smith, M.A. 1935. *The Fauna of British India, including Ceylon and Burma. Reptilia and Amphibia, Vol. II. Sauria*. Taylor and Francis, London, England.
- Somaweera, R. and N. Somaweera. 2009. *Lizards of Sri Lanka: A Colour Guide with Field Keys*. Edition Chimaira, Frankfurt am Main, Germany.
- Suwannapoom, C., Z. Yuan, N. Poyarkov, Jr., F. Yan, S. Kamtaeja, R.W. Muphy, and J. Che. 2016. A new species of genus *Fejevarya* (Anura: Dicroglossidae) from northern Thailand. *Zoological Research* 37: 1–11.
- Suwannapoom, C., Z. Yuan, K. Jiang, F. Yan, W. Gao, and J. Che. 2017. A new species of rain-pool frog (Dicroglossidae: *Fejevarya*) from western Thailand. *Zoological Research* 38: 243–250.
- Tikader, B.K. and R.C. Sharma. 1992. *Handbook of Indian Lizards*. Zoological Survey of India, Calcutta, India.
- Uetz, P., P. Freed, and J. Hošek (eds.). 2020. The Reptile Database. <<http://www.reptile-database.org>>.
- Venugopal, P.D. 2010. An updated and annotated list of Indian lizards (Reptilia: Sauria) based on a review of distribution records and checklists of Indian reptiles. *Journal of Threatened Taxa* 2: 725–738.
- Verma, D.M., N.P. Balakrishnan, and R.D. Dixit (eds.). 1993. *Flora of Madhya Pradesh*. Vol. 1. Botanical Survey of India, Calcutta, India.
- Whitaker, R. and A. Captain. 2004. *Snakes of India. The Field Guide*. Draco Books, Chennai, India.
- Wyman, R.L. 1998. Experimental assessment of salamanders as predators of detrital food webs: Effects on invertebrates, decomposition and the carbon cycle. *Biodiversity and Conservation* 7:641–650.