

Reptilian Diversity of the Bhopal Region in the State of Madhya Pradesh in Central India

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Photographs by the senior author.

Abstract.—The wide range of habitats in the Bhopal Region of Madhya Pradesh in central India support a rich reptilian fauna. Conducting visual surveys, we recorded 34 species of reptiles (2 species of crocodylians, 3 species of turtles, 13 species of lizards, 16 species of snakes). Observations were made during the monsoon period from mid-June to mid-September in 2014–2015. Herein, we present baseline data regarding the reptilian fauna of the Bhopal Region.

Reptiles comprise a significant component of Earth's biodiversity, but populations of many species are declining, with habitat destruction the principal cause (e.g., Gibbons et al. 2000; Krauss et al. 2010; Manhas et al. 2016a). India is home to more than 500 reptilian species in 28 families. These include 279 species of snakes, 202 species of lizards, 34 species of turtles and tortoises, and three species of crocodiles (Aengals et al. 2011). In the state of Madhya Pradesh, Kalalurasam et al. (1991) documented 21 species of reptiles from the Narmada Valley, Sanyal (1995) recorded 12 species from the Indrāvati Tiger Reserve, and Rao (1998) listed nine species from the

Chambal River, Pasha et al. (2000) reported nineteen species of snakes from Pench National Park, Ingle (2002) documented 30 species of snakes from the Malwa region, Chandra and Gajbe (2003) recorded the presence of *Uropeltis ocellata* from the Pachmarhi Biosphere Reserve, Chandra and Gajbe (2005) listed 76 species of reptiles from different parts of the state, Chandra (2009) documented eight species of snakes in six families from the Pachmarhi Biosphere Reserve, and Fellows (2014) recorded 31 species of snakes in six families from the Satpura Tiger and Pachmarhi Biosphere Reserves. In the city of Bhopal, Manhas et al. (2015a) recorded 16 species

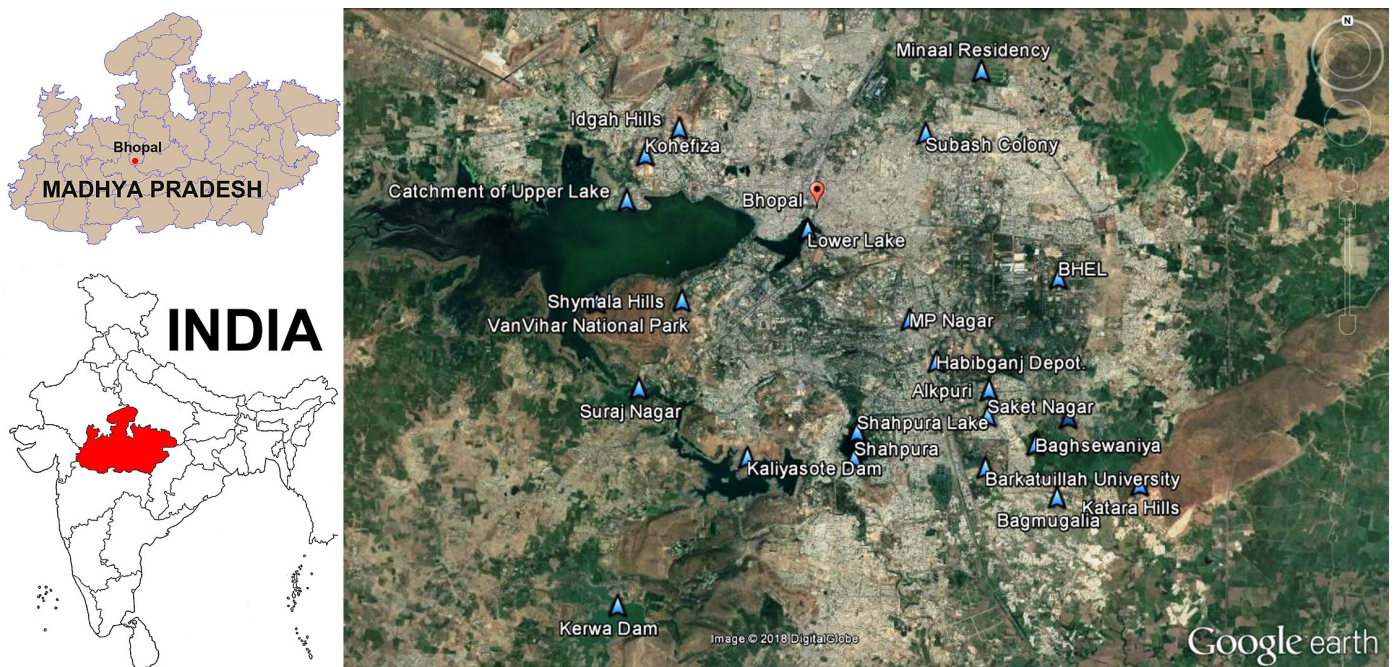


Fig. 1. Google Earth[®] map of the Bhopal District, Madhya Pradesh, India showing sampling sites.

of reptiles from the Barkatullah University campus, Manhas et al. (2015b) provided mortality data for 17 species of snakes, Manhas et al. (2016a) studied 40 individual Indian Ratsnakes (*Ptyas mucosa*), and Manhas et al. (2016b) documented an increase in the number of reptilian species from the university campus to 22. Herein we provide a list of 34 species of reptiles from the Bhopal District with the intention that these data serve as a baseline for future studies in the region.

Methods

Bhopal (23°14.01'N, 77°23.36'E; average elevation 527 m asl) is the capital of the state of Madhya Pradesh in central India (Fig. 1); it is known as the “city of lakes” because of its many natural and artificial lakes. The climate is subtropical with warm summers and a humid monsoon season. Summers extend from late March until mid-June, with temperatures averaging ~30 °C but regularly exceeding 40 °C during the peak of summer in May. The monsoon season extends from late June through late September.

We conducted visual field surveys in and around Bhopal during the monsoon periods (mid-June to mid-September)

in two consecutive years (2014–2015). We made most observations by day (mostly in the morning), but conducted nocturnal surveys whenever possible and included opportunistic sightings at any time. We collected no specimens during the study. We photographed animals using a digital camera (Sony HX-300), recorded localities using GPS coordinates, and identified species using the available literature (e.g., Smith 1931, 1935, 1943; Daniel 2002; Whitaker and Captain 2004). Subsequently, we determined the conservation status of each species by consulting the IUCN Red List of Threatened species (version 2017-3) and the Wildlife Act of India, 1972.

Results

We encountered 34 species of reptiles (2 species of crocodilians, 3 species of turtles, 13 species of lizards, and 16 species of snakes) in 14 families during the study period. Details for each species are listed below. IUCN Red List status (IUCN 2017) is NE (Not Evaluated), LC (Least Concern), VU (Vulnerable), EN (Endangered), and CR (Critically Endangered).

Mugger Crocodile, *Crocodylus palustris* (Lesson 1831) (Crocodylidae) VU — We recorded this species from the catchment area of the Upper Lake, including VanVihar National Park, and the Kaliyasote Dam. All observations were of basking individuals in July–September 2014 and 2015 at elevations of 497–512 m (23°11'40.90"–23°15'24.60"N, 77°21'37.89"–77°23'48.79"E) and ambient air temperatures of 21–29 °C.



Vyas and Singh (2004) recorded this species from the Gandhisagar Reservoir and Chandra and Gajbe (2005) reported it from Jabalpur, Shivpuri, and Seoni. Ramakrishna et al. (2006) and Meshram (2010) documented the species in Pench, Madhav, and Satpura National Parks, and Meshram (2010) recorded it in the National Chambal Sanctuary. Taigor and Rao (2010) noted the presence of this species in the Chambal River.

Gharial, *Gavialis gangeticus* (Gmelin in Linnaeus 1789) (Gavialidae) CR — We observed individuals of this spe-

cies basking in the catchment area of the Upper Lake, including VanVihar National Park, in August–September 2014 and 2015 at elevations of 511–512 m (23°13'15.40"–23°15'28.00"N, 77°21'47.20"–77°21'59.24"E) and air temperatures of 23–27 °C.



Chandra and Gajbe (2005) listed the species as occurring in Madhya Pradesh, and Meshram (2010) reported it from the National Chambal Sanctuary. Taigor and Rao (2010) noted the presence of this species in the Chambal River.

Indian Flap-shelled Turtle, *Lissemys punctata* (Bonnaterre 1789) (Trionychidae) LC — We recorded this species from the catchment area of the Lower Lake, Shahpura, Kerwa Dam, and the Upper Lake, including VanVihar National Park in July 2014 and June–September 2015 at elevations of 493–526 m (23°09'42.22"–23°15'35.05"N, 77°21'43.38"–77°25'7.59"E) and air temperatures of 22–33 °C.

Vyas and Singh (2004) recorded the species from the Gandhisagar Reservoir. Chandra and Gajbe (2005) reported it



from the Seoni and Shivpuri Districts. Ramakrishna et al. (2006) found the species in Pench and Madhav National Parks, and Chandra et al. (2008) found it in the Kanha Tiger Reserve. Taigor and Rao (2010) noted the presence of this species in the Chambal River.

Indian Peacock Soft-shelled Turtle, *Nilssonina burum* (Gray 1830) (Trionychidae) VU — We observed individuals of this species basking in July–September 2014 and 2015 in VanVihar National Park at an elevation of 517 m (23°14'7.59"N, 77°21'23.51"E) and ambient temperatures of 24–30 °C.



Das (1988) and Chandra and Gajbe (2005) reported this species from Bhopal.

Indian Roofed Turtle, *Pangshura tecta* (Gray 1830) (Trionychidae) LC — We observed this species at Van Vihar National Park, the Shahpura Lake, and from the catchment area of the Upper Lake in June–August 2014 and 2015 at elevations



of 493–527 m (23°12'27.62"–23°14'14.13"N, 77°20'19.22"–77°25'24.67"E) and air temperatures of 20–30 °C.

Taigor and Rao (2010) documented the species from the Chambal River.

Brook's House Gecko, *Hemidactylus brookii* Gray 1845 (Gekkonidae) NE — We recorded this species from the campus of Barkatullah University, the Shymala Hills, BHEL, and the Subhash Colony in June–September 2014 and 2015 at elevations of 480–584 m (23°12'0.55"–23°15'31.81"N, 77°22'40.57"–77°27'51.62"E) and ambient temperatures of 20–37 °C.



Chandra and Gajbe (2005) documented the species from various areas in Madhya Pradesh (Balaghat, Dindori, Jabalpur, Morena, Seoni, Shivpuri). Ramakrishna et al. (2006) recorded individuals in Pench and Kanha National Parks. Chandra et al. (2008) found it in the Kanha Tiger Reserve.

Yellow-Green House Gecko, *Hemidactylus flaviviridis* Rüppell 1835 (Gekkonidae) NE — We observed individuals of this species at Saket Nagar, Barkatullah University, BHEL, and the catchment area of the Upper Lake in June–September 2014 and 2015 at elevations of 483–528 m (23°12'4.87"–23°15'31.56"N, 77°27'16.58"–77°28'4.30"E) and air temperatures of 19–32 °C.



Chandra and Gajbe (2005) recorded this species from various areas in Madhya Pradesh (Balaghat, Jabalpur, Morena, Shivpuri). Ramakrishna et al. (2006) found it in the Kanha, Madhav, and Van Vihar National Parks, and Chandra et al. (2008) documented its presence in the Kanha Tigre Reserve.

South Asian House Gecko, *Hemidactylus frenatus* Duméril and Bibron 1836 (Gekkonidae) LC — We recorded this species from the Barkatullah University, Saket Nagar, the Shymala Hills, and BHEL in June–September 2014 and 2015 at elevations of 482–604 m (23°12'22.80"–23°14'08.41"N, 77°22'47.48"–77°28'10.47"E) and ambient air temperatures of 19–29 °C.



Uetz et al. (2018) listed a worldwide occurrence of this species in tropical and subtropical regions.

House Gecko, *Hemidactylus* sp. (Gekkonidae) — We encountered House Geckos that we were unable to identify to species in the Shymala Hills and at Saket Nagar in



June 2014 and September 2015 at elevations of 489–604 m (23°12'32.66"–23°14' 8.41"N, 77°22'47.48"–77°27'3.89"E) and ambient temperatures of 29–32 °C.

Indian Garden Lizard, *Calotes cf. versicolor* (Daudin 1802 (Agamidae) NE — We observed this species at the Barkatullah University, Saket Nagar, Shahpura, Nagar, BHEL, Katra



Hills, and Shymala Hills in June–September 2014 and 2015 at elevations of 471–563 m (23°11'26.67"–23°16'27.85"N, 77°23'07.24"–77°29' 2.21"E) and air temperatures of 20–30 °C.

Chandra and Gajbe (2005) recorded this species from throughout Madhya Pradesh (Balaghat, Dindori, Jabalpur, Morena, Shivpuri, and Hoshangabad). Ramakrishna et al. (2006) found it in Kanha, Madhav, Bandhavgarh, and VanVihar National Parks. Chandra et al. (2008) reported it from the Kanha Tigre Reserve.

Indian Chameleon, *Chamaeleo zeylanicus* (Laurenti 1768) (Chamaeleonidae) LC — We observed this species near Raja Bhoj Setu (Suraj Nagar) at an elevation of 515 m (23°12'45.76"N, 77°22'42.04"E) and an air temperature of 27 °C.



Chandra and Gajbe (2005) documented the species from Seoni, Jabalpur, Chhindwara, and Narsinghpur. Ramakrishna et al. (2006) recorded it from Satpura and Pench National Parks.

Keeled Grass Skink, *Eutropis cf. carinata* (Schneider 1801) (Mabuyidae) LC — We encountered this species on the campus of Barkatullah University, Bhopal in June 2014 at an elevation of 479 m (23°12'21.14"N, 77°26'51.52"E) at an air temperature of 29 °C.



Chandra and Gajbe (2005) reported the species from various districts of Madhya Pradesh (Dindori, Jabalpur, Mandla, Seoni and Shivpuri). Ramakrishna et al. (2006) recorded it from Kanha, Madhav, Pench, and Satpura National Parks. Chandra et al. (2008) documented it from the Kanha Tiger Reserve.

Bronze Skink, *Eutropis cf. macularia* (Blyth 1853) (Mabuyidae) NE — We recorded this species in June–September 2014 and 2015 in residential areas at Barkatullah University, the Shymala Hills, BHEL, and Bagmugalia at elevations of 473–523 m (23°11'37.97"–23°13'45.22"N, 77°23'2.17"–77°28'41.21"E) and ambient temperatures of 17–28 °C.



Chandra and Gajbe (2005) reported this species from Mandla and Jabalpur. Ramakrishna et al. (2006) recorded it from Kanha National Park. Chandra et al. (2008) documented its presence in the Kanha Tiger Reserve.

White-spotted Supple Skink, *Lygosoma albopunctata* (Gray 1846) (Lygosomidae) NE — We encountered this species on the campus of Barkatullah University, Bhopal in August 2015 at an elevation of 487 m (23°12'17.30"N, 77°26'56.28"E) and an ambient temperature of 26 °C.



Ramakrishna et al. (2006) recorded the species from Kanha National Park. Chandra et al. (2008) reported it from the Kanha Tiger Reserve.

Lined Supple Skink, *Lygosoma lineata* (Gray 1839) (Lygosomidae) LC — We found this species in residential areas of Bherkheda in July 2014 at an elevation of 476 m (23°13'3.03"N, 77°28'46.47"E) and an ambient air temperature of 27 °C.



Uetz et al. (2018) indicated that the species is endemic to India and occurs in Bombay, Gujarat, Madhya Pradesh, Tamil Nadu, Maharashtra, Karnataka, and Jharkhand.

Punctate Supple Skink, *Lygosoma punctata* (Gmelin 1799) (Lygosomidae) NE — We recorded this species from Saket Nagar and BHEL in July 2014 and August 2015 at elevations of 483–487 m (23°12'25.24"–23°13'50.29"N, 77°27'15.24"–77°28'58.76"E) and air temperatures of 19–22 °C.



Ramakrishna et al. (2006) recorded the species from Madhav National Park. Chandra et al. (2008) reported it from the Kanha Tiger Reserve.

Bengal Monitor, *Varanus bengalensis* (Daudin 1802) (Varanidae) LC — We recorded this species near residential areas of Bherkheda and from the campus of Barkatullah University in July 2014 and August 2015 at elevations of



476–487 m (23°12'17.30"–23°13'03.03"N, 77°28'46.47"–77°26'56.28"E) and air temperatures of 23–27 °C.

Vyas and Singh (2004) recorded this species from the catchment area of the Gandhi Sagar Reservoir. Chandra and Gajbe (2005) listed it from Dindori, Jabalpur, Mandla, Morena, Seoni, and Shivpuri. Ramakrishna et al. (2006) recorded the species from Kanha, Pench, and Van Vihar National Parks. Chandra et al. (2008) reported it from the Kanha Tiger Reserve.

Common Sand Boa, *Eryx conicus* (Schneider 1801) (Erycidae) NE — We recorded this species from the catchment area of the Kaliyasote Dam, the Shymala Hills, and the campus of Barkatullah University in June and August 2014 and July–September 2015 at elevations of 483–535 m (23°11'28.66"–23°13'49.36"N, 77°23'13.57"–77°27'20.66"E) and air temperatures of 21–28 °C.



Chandra and Gajbe (2005) documented the species from Jabalpur, Seoni, Mandasaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) recorded it from Pench National Park.

Red Sand Boa, *Eryx johnii* (Russell 1801) (Erycidae) NE — We recorded this species on the Kolar Road near Shahpura in August 2015 at an elevation of 485 m (23°10'21.11"N, 77°25'00.64"E) and an ambient air temperature of 25 °C.



Chandra and Gajbe (2005) documented the occurrence of this species from Seoni, Dindori, Mandasaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) reported it from Pench National Park.

Indian Rock Python, *Python molurus* (Linnaeus 1758) (Pythonidae) NE — We observed this species at the catchment areas of the Kaliyasote Dam and the Lower Lake in September 2014 and July 2015, respectively, at elevations of 507–509 m (23°11'11.68"–23°14'45.15"N, 77°23'37.77"–77°24'30.22"E) and air temperatures of 26–27 °C.



Chandra and Gajbe (2005) recorded this species from Dindori, Jabalpur, Mandla, Morena, Seoni, Jhabua, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) noted its presence in Kanha, Pench, and Satpura National Parks. Chandra et al. (2008) listed the species from the Kanha Tiger Reserve.

Banded Racer, *Argyrogena fasciolata* (Shaw 1802) (Colubridae) NE — We recorded this species in July 2014 and August 2015 near the Katra Hills and Barkatullah University, respectively, at elevations of 472–478 m (23°11'48.67"–23°12'7.89"N, 77°27'25.54"–77°28'19.08"E) and air temperatures of 22–24 °C.



Chandra and Gajbe (2005) reported this species from Gwalior, Jabalpur, Mandla, Ujjain, Dewas, and Indore. Ramakrishna et al. (2006) listed it from Kanha National Park. Chandra et al. (2008) recorded its presence in the Kanha Tiger Reserve.

Trinket Snake, *Coelognathus helena* (Daudin 1803) (Colubridae) NE — We recorded this species from the catchment area of the Kerwa Dam in August 2014 at an elevation of 508 m (23°12'00.17"N, 77°21'59.34"E) and an ambient air temperature of 25 °C.



Chandra and Gajbe (2005) listed this species from various districts of Madhya Pradesh (Jabalpur, Seoni, Mandsaur, Ratlam, Shajapur, Ujjain, Dewas, Indore, Dhar). Ramakrishna et al. (2006) recorded it from Pench National Park. Chandra et al. (2008) noted its presence in the Kanha Tiger Reserve.

Common Bronze-backed Treesnake, *Dendrelaphis tristis* (Daudin 1803) (Colubridae) NE — We observed this species in the catchment area of the Kerwa Dam in September 2014 at an elevation of 521 m (23°10'10.69"N, 77°22'43.29"E) at an air temperature of 21 °C.



Ramakrishna et al. (2006) documented the species from Pench National Park. Chandra et al. (2008) recorded it from the Kanha Tiger Reserve.

Common Wolfsnake, *Lycodon aulicus* (Linnaeus 1758) (Colubridae) NE — We observed this species near the Minal Residency at an elevation of 498 m (23°15'45.54"N,



77°27'25.83"E) in July 2014 and an ambient temperature of 28 °C.

Chandra and Gajbe (2005) recorded this species from Balaghat, Dindori, Mandsaur, Ratlam, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) documented the species from Pench and Kanha National Parks. Chandra et al. (2008) reported it in the Kanha Tiger Reserve.

Banded Kukri Snake, *Oligodon arnensis* (Shaw 1802) (Colubridae) NE — We recorded this species from the Katra Hills and on the Barkatullah University campus at elevations of 481–484 m (23°12'9.30"–23°12'25.65"N, 77°26'50.74"–77°29'53.19"E) in June–September 2014 and 2015 at air temperatures of 20–28 °C.



Chandra and Gajbe (2005) reported the species from Jabalpur, Ujjain, Dewas, and Indore.

Indian Ratsnake, *Ptyas mucosa* (Linnaeus 1758) (Colubridae) NE — We recorded this species from Barkatullah University, Habibganj Depot, Shahpura, and Saket Nagar in June–September 2014 and 2015 at elevations of 475–504 m (23°11'40.95"–23°12'59.32"N, 77°25'36.58"–77°29'29.42"E) at ambient temperatures of 21–30 °C.



Chandra and Gajbe (2005) reported the species from Dindori, Jabalpur, Mandsaur, Seoni, Mandla, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, Dhar, and Shivpuri. Ramakrishna et al. (2006) recorded the species from Pench

and Kanha National Parks. Chandra et al. (2008) noted its presence in the Kanha Tiger Reserve.

Buff-striped Keelback, *Amphiesma stolatum* (Linnaeus 1758) (Natricidae) NE — We recorded this species from the Barkatullah University campus, the Katra Hills, and the catchment area of the Kerwa Dam in July–September 2014 and 2015 at elevations of 471–478 m (23°10'40.89"–23°11'48.67"N, 77°21'50.99"–77°28'42.39"E) and ambient temperatures of 26–32 °C.



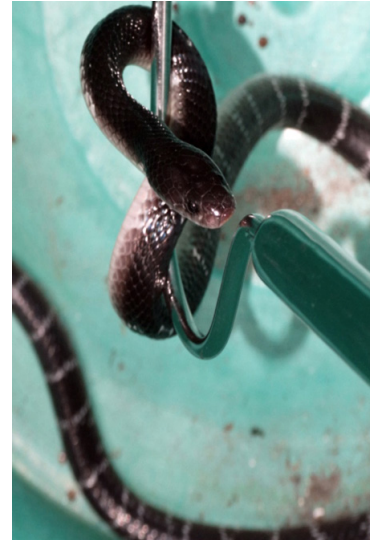
Chandra and Gajbe (2005) reported the presence of this species in the Seoni, Dindori, Mandsaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, and Dhar Districts. Ramakrishna et al. (2006) recorded it from Pench National Park. Chandra et al. (2008) listed it from the Kanha Tiger Reserve.

Checkered Keelback, *Xenochrophis piscator* (Schneider 1799) (Natricidae) NE — We recorded this species from the campus of Barkatullah University, Alkapuri, the Katara Hills, Shahpura, and the Kaliyasote Dam in June–September 2014 and 2015 at elevations of 477–512 m (23°10'40.57"–23°12'58.00"N, 77°25'17.32"–77°29'44.66"E) at air temperatures of 23–30 °C.



Chandra and Gajbe (2005) listed the species from Dindori, Jabalpur, Mandsaur, Seoni, Ratlam, Jhabua, Shivpuri, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) reported it from Pench and Madhav National Parks. Chandra et al. (2008) noted its presence in the Kanha Tiger Reserve.

Common Krait, *Bungarus caeruleus* (Schneider 1801) (Elapidae) NE — We observed this species at BHEL and Saket Nagar in September 2014 and August 2015, respectively, at elevations of 489–490 m (23°12'39.47"–23°14'43.26"N, 77°27'06.31"–77°28'21.41"E) and ambient air temperatures of 25–26 °C.



Chandra and Gajbe (2005) listed this species from Dindori, Jabalpur, Mandsaur, Seoni, Ratlam, Jhabua, Shivpuri, Shajapur, Ujjain, Dewas, Indore, Mandla, and Dhar. Ramakrishna et al. (2006) reported the species from Pench and Kanha National Parks. Chandra et al. (2008) reported its occurrence from the Kanha Tiger Reserve.

Common Indian Cobra, *Naja naja* (Linnaeus 1758) (Elapidae) NE — We recorded this species from Barkatullah University, Baghsewania, and near the Idgah and Shymala Hills in July–September 2014 and 2015 at elevations of 474–574 m (23°11'58.53"–23°16'21.00"N, 77°22'39.58"–77°27'37.19"E) and air temperatures of 20–28 °C.



Chandra and Gajbe (2005) reported the species from Dindori, Gwalior, Jabalpur, Mandla, Seoni, Mandsaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) listed it from Pench and Kanha

National Park. Chandra et al. (2008) noted the presence of the species in the Kanha Tiger Reserve.

King Cobra, *Ophiophagus hannah* (Cantor 1836) (Elapidae) VU — We observed this species in Van Vihar National Park at an elevation of 526 m (23°13'40.47"N, 77°21'38.92"E) where it was kept in captivity to protect it from smugglers.



Stuart et al. (2012) noted that this species is widely distributed throughout southern and southeastern Asia.

Brahminy Blindsnake, *Indotyphlops braminus* (Daudin 1803) (Typhlopidae) NE — We recorded this species from residential areas of Saket Nagar in June 2014 and August 2015 and from Baghsewania in September 2015 at elevations of 370–477 m (23°11'58.53"–23°12'39.47"N, 77°27'06.31"–77°27'37.19"E) and air temperatures of 18–26 °C.



Chandra and Gajbe (2005) listed this species from Balaghat, Hoshangabad, Mandsaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, Dhar, Dindori, Jabalpur, Mandla, and Seoni. Ramakrishna et al. (2006) reported it from Pench, Kanha, and Satpura National Parks.

Russell's Viper, *Daboia russelii* (Shaw and Nodder 1797) (Viperidae) NE — We recorded this species near Kohefiza, on the Barkatullah University campus, and at Saket Nagar in June 2014 and August and September 2015 at elevations of 460–515 m (23°12'5.49"–23°12'22.45"N, 77°20'57.21"–77°27'55.18"E) at air temperatures of 19–28 °C.



Chandra and Gajbe (2005) listed this species from Dindori, Mandla, Seoni, Mandsaur, Ratlam, Jhabua, Shajapur, Ujjain, Dewas, Indore, and Dhar. Ramakrishna et al. (2006) reported its occurrence in Pench, Kanha, and Satpura National Parks. Chandra et al. (2008) recorded its presence in the Kanha Tiger Reserve.

Saw-scaled Viper, *Echis carinatus* (Schneider 1801) (Viperidae) NE — We recorded this species near Alkapuri in August 2014 at an elevation of 482 m (23°13'01.82"N, 77°27'55.18"E) and an air temperature of 18 °C.



Chandra and Gajbe (2005) recorded the species from Jabalpur, Seoni, Ujjain, Dhar, and Jhabua. Ramakrishna et al. (2006) noted its occurrence in Pench National Park. Chandra et al. (2008) reported it from the Kanha Tiger Reserve.

Discussion

All of our observations were at ambient temperatures of 17–34 °C, and we did not encounter any reptiles at temperatures below or above that range. Consequently, we did not conduct surveys during the summer, when temperatures frequently exceed 40 °C, or in the winter, when temperatures often fall below 15 °C, conditions that are incompatible with extensive levels of activity by ectothermic reptiles.

Localities where we recorded reptiles are illustrated in Fig. 2. Of 34 species observed, five (*Crocodylus palustris*, *Gavialis gangeticus*, *Lissemys punctata*, *Nilssonina hurum*, *Pangshura tectum*) were aquatic whereas the other 30 species were primar-

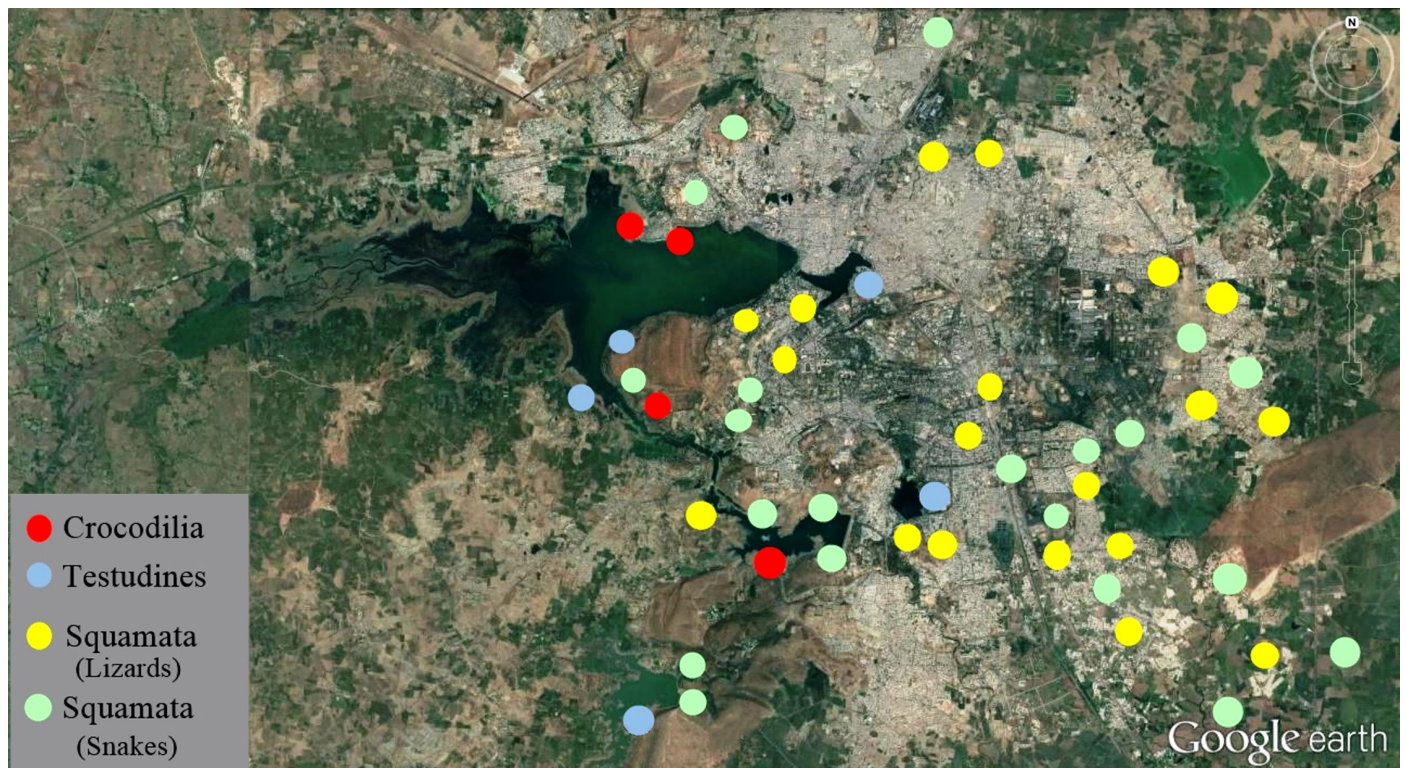


Fig. 2. Google Earth® map of the Bhopal District, Madhya Pradesh, India showing localities where reptiles were encountered.

ily terrestrial. We encountered four species of snakes (*Ptyas mucosa*, *Xenochrophis piscator*, *Amphiesma stolata*, *Naja naja*) with some regularity, whereas five species (*Python molurus*, *Eryx johnii*, *Echis carinatus*, *Dendrelaphis tristis*, *Bungarus caeruleus*, *Lycodon aulicus*) were rarely seen.

When we compared the reptiles we observed in the Bhopal Region to those recorded for other parts of Madhya Pradesh (76 species listed by Chandra and Gajbe 2005), all but two (*Hemidactylus frenatus*, *Ophiophagus hannah*) species have been recorded from the state excluding two (*Ophiophagus hannah*) kept in Van Vihar National Park, Bhopal (detained from the smuggler) and *Hemidactylus frenatus*.

Twenty-two of the species encountered had not been evaluated for the IUCN Red List (2017), seven were of Least Concern, three were Vulnerable, and one (*Gavialis gangeticus*) was Critically Endangered (note that one observation could not be identified to species). Of the 33 identified species we observed, 14 (*Crocodylus palustris*, *Gavialis gangeticus*, *Nilsonia gangeticus*, *Lissemys punctata*, *Pangshura tectum*, *Varanus bengalensis*, *Nilsonia hurum*, *Python molurus*, *Chamaeleo zeylanicus*, *Ptyas mucosa*, *Xenochrophis piscator*, *Naja naja*, *Ophiophagus hannah*, *Daboia russelii*) are protected under Schedules I and II of the Indian Wildlife Act 1972 (imposing absolute protection and violations eliciting high penalties). The remaining 20 species are protected under schedule IV of the Indian Wildlife Protection Act 1972 (also protected but penalties are less). That the conservation status of so many of these species has not been assessed through-

out their ranges is of considerable concern, as anthropogenic threats are severe and increasing throughout southern Asia.

Most of the factors threatening populations of reptiles in the Bhopal Region of Madhya Pradesh (e.g., Manhas et al. 2015a, 2015b, 2016a, 2016b) emanate from habitat loss, the greatest extent of which is attributable to the conversion of natural habitats for purposes of agriculture and urbanization. Crocodylians and turtles also are exploited for meat and, in the case of the former, their hides. Many species of squamates are threatened by vehicular traffic. However, many reptiles — especially snakes — are killed as a result of fear and superstitions. Declining reptilian populations warrant greater conservation efforts, with a particularly urgent need to create an awareness among local human populations regarding the importance of maintaining viable ecosystems in which reptiles play major roles.

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