



# Herpetofauna of Sinhagad Forest Region, Northern Western Ghats, India

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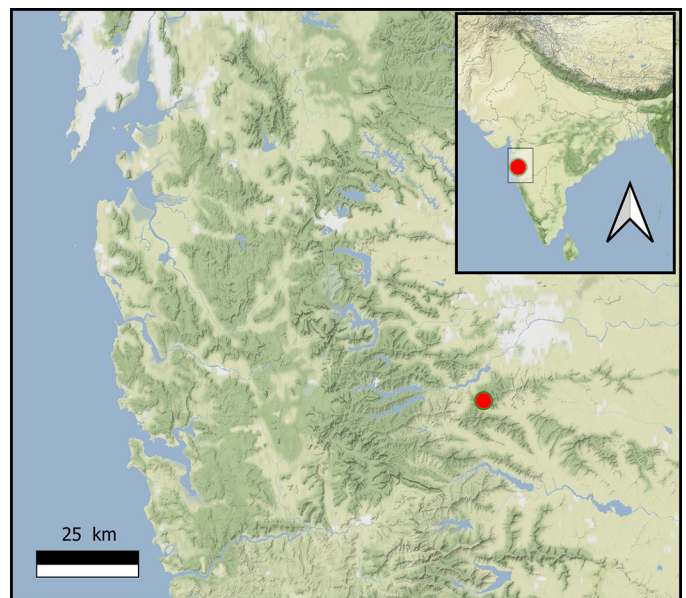
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Amphibians and reptiles are among the world’s most threatened vertebrates (Bohm et al. 2013; Catenazzi 2015). Declines in herpetofaunal species have been caused by a variety of factors that include loss of habitat, climate change, over-exploitation, water pollution, and the emergence of diseases (Gibbons et al. 2000; Kiesecker et al. 2001; Stuart et al. 2004; Araujo et al. 2006; Pounds et al. 2006; Sodhi et al. 2008; Ramesh et al. 2013; Thomas and Biju 2015; Nowakowski et al. 2017). The Indian herpetofauna, with 432 species of amphibians and 572 species of reptiles (Aengals et al. 2018; Dinesh et al. 2019), has not been immune to these threats.

Pune District, Maharashtra, India, in the northern Western Ghats, is home to 31 amphibian and 23 reptilian species (Khair and Khair 1985; Padhye et al. 2002). Herein we present an annotated checklist of herpetofauna of the Sinhagad Forest Region (18°21'56.39"N, 73°45'18.97"E; Fig. 1) in Pune District and address threats to herpetofauna in the area.

The Sinhagad Forest Region has an average annual temperature of 25.0°C and an average annual rainfall of 763



**Fig. 1.** Map showing the location of the Sinhagad Forest Region (red dots) in the northern Western Ghats of Pune District, Maharashtra, India.



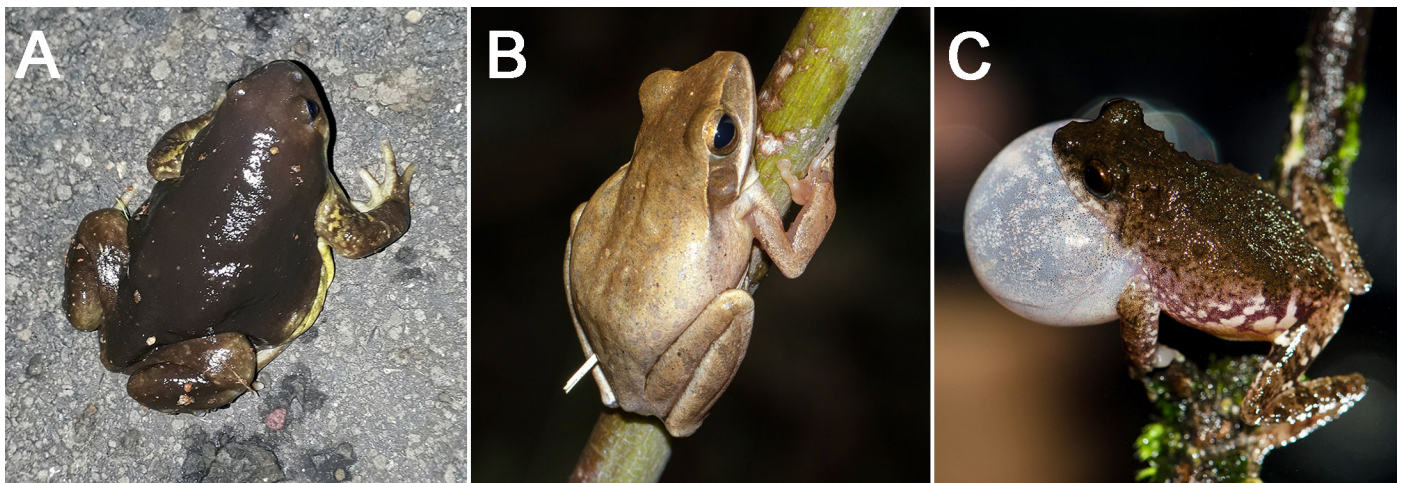
**Fig. 2.** Habitats sampled in the Sinhagad Forest Region, Pune District, Maharashtra, India: agricultural fields (left), tropical dry deciduous forest (center), and hilltop plateaus (right). Photographs by Sandeep Bapat (left and right) and Chaitanya S. Shukla (center).

**Table 1.** Checklist of herpetofauna in the Sinhagad Forest Region, Maharashtra, India. Abbreviations: Habitat (DF = deciduous forest, AG = agricultural fields, HP = hill plateau, AQ = aquatic [ponds, puddles, streams]); status (C = common, U = uncommon, R = rare); IUCN Red List Assessment (EN = Endangered, VU = Vulnerable, LC = Least Concern, DD = Data Deficient; NA = Not Assessed).

Species	Habitat	Abundance	IUCN Red List Status
<b>AMPHIBIA: ANURA</b>			
<b>Bufonidae</b>			
Common Asian Toad ( <i>Duttaphrynus melanostictus</i> )	DF, AG, HP	C	LC
<b>Dicroglossidae</b>			
Indian Skipper Frog ( <i>Euphlyctis cyanophlyctis</i> )	AG, AQ	C	LC
Indian Cricket Frog ( <i>Fejervarya limnocharis</i> )	HP, AG	C	LC
Indian Bullfrog ( <i>Hoplobatrachus tigerinus</i> )	DF, AG, HP	C	LC
Syhadra Cricket Frog ( <i>Minervarya syhadrensis</i> )	HP, AG	C	LC
Western Burrowing Frog ( <i>Sphaerotheca pashchima</i> )	HP, AG	U	NA
<b>Microhylidae</b>			
Indian Balloon Frog ( <i>Uperodon globulosus</i> ) (Fig. 3A)	AG, AQ	C	LC
Nilphamarai Narrow-mouthed Frog ( <i>Microhyla nilphamariensis</i> )	AG, AQ	C	NA
Marbled Ramanella ( <i>Uperodon marmoratus</i> )	DF	R	EN
<b>Ranidae</b>			
Wide-spread Fungoid Frog ( <i>Hydrophylax bahuvistara</i> )	DF, HP, AQ	C	NA
<b>Ranixalidae</b>			
Leith's Leaping Frog ( <i>Indirana leithii</i> )	DF, HP	C	VU
<b>Rhacophoridae</b>			
Common Indian Treefrog ( <i>Polydectes maculatus</i> ) (Fig. 3B)	DF	C	LC
Ghate's Shrub Frog ( <i>Raorchestes ghatei</i> ) (Fig. 3C)	DF, HP	C	NA
<b>REPTILIA: TESTUDINES</b>			
<b>Trionychidae</b>			
Indian Flapshell Turtle ( <i>Lissemys punctata</i> )	AQ	R	LC
<b>REPTILIA: SQUAMATA (lizards)</b>			
<b>Agamidae</b>			
Indian Garden Lizard ( <i>Calotes versicolor</i> )	DF, AG	C	NA
Roux's Forest Lizard ( <i>Calotes rouxii</i> )	DF	U	LC
Flat-headed Fan-throated Lizard ( <i>Sitana laticeps</i> )	HP	R	NA
<b>Gekkonidae</b>			
Deccan Ground Gecko ( <i>Cyrtodactylus deccanensis</i> )	DF, HP	C	LC
Spotted Leaf-toed Gecko ( <i>Hemidactylus maculatus</i> )	DF	U	LC
Murray's House Gecko ( <i>Hemidactylus murrayi</i> )	DF, HP, AG	C	NA
Leschenault's Leaf-toed Gecko ( <i>Hemidactylus leschenaultii</i> )	DF	R	NA
<b>Lygosomidae</b>			
Günther's Supple Skink ( <i>Riopa guentheri</i> )	DF	U	LC
Lined Supple Skink ( <i>Riopa lineata</i> )	DF	U	LC
Spotted Supple Skink ( <i>Riopa punctata</i> )	DF, HP	U	NA
<b>Mabuyidae</b>			
Common Keeled Skink ( <i>Eutropis carinata</i> )	DF, AG	U	LC

(continued)

Species	Habitat	Abundance	IUCN Red List Status
<b>Varanidae</b>			
Bengal Monitor ( <i>Varanus bengalensis</i> )	DF, HP	C	VU
<b>Chamaeleonidae</b>			
Indian Chamaeleon ( <i>Chamaeleo zeylanicus</i> )	DF, HP	U	LC
<b>REPTILIA: SQUAMATA (snakes)</b>			
<b>Colubridae</b>			
Black-eyed Vinesnake ( <i>Ahaetulla borealis</i> )	DF	C	NA
Banded Racer ( <i>Argyrogena fasciolata</i> )	HP	R	NA
Beddome's Catsnake ( <i>Boiga beddomei</i> )	DF	U	DD
Common Catsnake ( <i>Boiga trigonata</i> ) (Fig. 4A)	DF	C	LC
Common Trinket Snake ( <i>Coelognathus helena</i> )	DF	C	NA
Common Bronzeback ( <i>Dendrelaphis tristis</i> )	DF	C	NA
Common Wolfsnake ( <i>Lycodon aulicus</i> )	DF	C	NA
Barred Wolfsnake ( <i>Lycodon striatus</i> )	DF, HP	U	NA
Common Kukri Snake ( <i>Oligodon arnensis</i> )	HP	U	NA
Russell's Kukri Snake ( <i>Oligodon taeniolatus fasciatus</i> )	HP	R	LC
Oriental Ratsnake ( <i>Ptyas mucosa</i> )	DF, HP	C	NA
Duméril's Black-headed Snake ( <i>Sibynophis subpunctatus</i> )	DF	R	NA
<b>Elapidae</b>			
Common Krait ( <i>Bungarus caeruleus</i> ) (Fig. 4B)	DF, HP	C	NA
Slender Coralsnake ( <i>Calliophis melanurus</i> )	DF	R	NA
Striped Coralsnake ( <i>Calliophis nigriscens</i> )	DF	R	LC
Spectacled Cobra ( <i>Naja naja</i> )	HP, AG	C	LC
<b>Erycidae</b>			
Common Sandboa ( <i>Eryx conicus</i> )	DF, HP	U	NA
Red Sandboa ( <i>Eryx johnii</i> )	AG	R	NA
<b>Lamprophiidae</b>			
Condanarus Sandsnake ( <i>Psammophis condanarus</i> )	DF	R	LC
<b>Natricidae</b>			
Striped Keelback ( <i>Amphiesma stolatum</i> )	HP, AG	C	NA
Checkered Keelback ( <i>Fowlea piscator</i> ) (Fig. 4C)	DF, AQ	C	NA
Green Keelback ( <i>Rhabdophis plumbicolor</i> )	DF	C	NA
<b>Pythonidae</b>			
Indian Rock Python ( <i>Python molurus</i> )	DF	R	VU
<b>Typhlopidae</b>			
Beaked Wormsnake ( <i>Grypotyphlops acutus</i> )	DF, AG	C	LC
Brahminy Wormsnake ( <i>Indotyphlos</i> cf. <i>braminus</i> )	DF, AG	U	LC
<b>Uropeltidae</b>			
Large-scaled Shieldtail ( <i>Uropeltis macrolepis</i> ) (Fig. 4D)	DF, HP	U	LC
Phipsons Shieldtail ( <i>Uropeltis phipsonii</i> )	AG, HP	U	VU
<b>Viperidae</b>			
Indian Saw-scaled Viper ( <i>Echis carinatus</i> )	HP	U	NA
Russell's Viper ( <i>Daboia russelii</i> )	DF, AG	C	LC
Bamboo Pitviper ( <i>Trimeresurus gramineus</i> )	DF, HP	C	LC



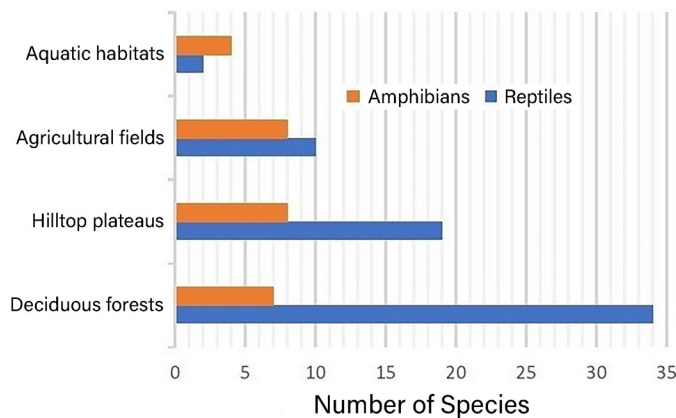
**Fig. 3.** Three amphibian species encountered during surveys in the Sinhagad Forest Region, Pune District, Maharashtra, India: Indian Balloon Frog (*Uperodon globulosus*) (A), Common Indian Treefrog (*Polypedates maculatus*) (B), and Ghate's Shrub Frog (*Raorchestes ghatei*) (C). Photographs by Chaitanya S. Shukla.



**Fig. 4.** Four reptilian species encountered during surveys in the Sinhagad Forest Region, Pune District, Maharashtra, India: Common Catsnake (*Boiga trigonata*) (A), Common Krait (*Bungarus caeruleus*) (B), Checkered Keelback (*Fowlea piscator*) (C), and Large-scaled Shieldtail (*Uroelphis macrolepis*) (D). Photographs by Chaitanya S. Shukla.

mm (<https://en.climate-data.org/asia/india/maharashtra/pune-31/#temperature-graph>). The high rainfall creates an abundance of temporary puddles, ponds, and streams during the monsoon and post-monsoon seasons. The principal natural habitat is tropical dry deciduous forest (Ranadive et al. 2013), but planted Teak (*Tectona grandis*) is abundant. The mouth of the valley has been converted into paddy fields. The uplands are dominated by hilltop plateaus.

From January 2018 to December 2019, we conducted active visual searches for reptiles and amphibians during an average of ten days per month. We searched leaf litter, rocky outcrops, under rocks, on tree trunks, along various aquatic habitats (e.g., streams, ponds, temporary puddles) in agricultural fields, forested areas, and hilltop plateaus (Fig. 2), and identified amphibians and reptiles using guidebooks by Daniel (2002), Whitaker and Captain (2008), and Gururaja



**Fig. 5.** Number of species of amphibians and reptiles in various sampled habitats in the Sinhagad Forest Region, Pune District, Maharashtra, India.

(2012). We also interviewed wildlife researchers, wildlife enthusiasts, and local people, and included their observations in a checklist of species in the area (Table 1).

We recorded a total of 57 species in 22 families, 44 species of reptiles in 16 families and 13 species of amphibians in six families. Amphibians were found in approximately equal numbers in each of the four major habitats, whereas reptiles were most abundant in deciduous forest (Fig. 5).

The Marbled Ramanella (*Uperodon marmoratus*), the only endangered species found during our study, was encountered exclusively in deciduous forest. The four vulnerable species — Leith’s Leaping Frog (*Indirana leithii*), Bengal Monitor (*Varanus bengalensis*), Philipson’s Shieldtail (*Uropeltis phipsonii*), and Indian Rock Python (*Python molurus*) — were mostly in deciduous forest and hilltop plateau habitats, with the Indian Rock Python found only in the densest forest patches and Philipson’s Shieldtail also found in an agricultural field. This clearly indicates the importance of forested areas and the hilltop plateaus for the conservation of these Red-Listed species. Although already degraded by deforestation and conversion to agriculture (especially in the lowlands) and ongoing urbanization and development to support a growing tourist trade (Shinde 2017), a proposed roadway connecting the foothills to the upland fort is likely to fragment and further degrade these important habitats, posing a threat to both threatened species and those currently of least concern.

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