



# Snakes of the Matheran Hill Station in Maharashtra, India, with Notes on Natural History

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India’s complex geological history, current position in a zoogeographic transition zone, diverse climate, and varying vegetation generate a wide range of biotopes that support a highly diversified reptilian fauna (Aenglas et al. 2018). The subcontinent is home to four major biodiversity hotspots, which account for the majority of the species in the country. One of those hotspots, the Western Ghats, is one of the last remaining stretches of diverse tropical wet evergreen rainforest in peninsular India. The considerable diversity of snakes in

the region has been documented recently by Chandramouli and Ganguly (2009), Nath et al. (2012), and Ramesh et al. (2013). However, detailed studies of snake communities in various reserves throughout the region are lacking.

The hill station of Matheran is an eco-sensitive zone in the hilly terrain of the narrow northern belt of the Western Ghats. Wall (1909) conducted a survey of the area and provided a checklist of snakes; however, the area covered by his survey has changed due to the gradual (but cumulative)



**Fig. 1.** A Green Vinesnake (*Ahaetulla nasuta*) from the Matheran Hill Station, Maharashtra, India. Photograph by Anurag Nashirabadkar.

**Table 1.** Checklist of species of snakes from the Matheran. Those marked with asterisks (\*) are endemic to the Western Ghats. Abbreviations: T = terrestrial, Ar = arboreal, Aq = aquatic, LC = least concern, NE = not evaluated, NT = Near threatened, EN = endangered, A = abundant, C = common, U = uncommon, R = rare, D = diurnal, N = nocturnal, Ca = cathemeral). Elevational ranges and activities that were not assessed during the study are marked with a dash (—).

Species	Habitat	Status	Abundance	Elevational Range	Activity
<b>Leptotyphlopidae</b>					
Beaked Wormsnake ( <i>Myriopholis macrorhyncha</i> )	T	LC	U	All	—
<b>Uropeltidae</b>					
Bombay Shieldtail ( <i>Uropeltis macrolepis</i> )*	T	LC	C	>500 m	D
Shieldtail ( <i>Uropeltis phipsonii</i> ?)*	T	NE	U	>500 m	D
<b>Pythonidae</b>					
Indian Rock Python ( <i>Python molurus</i> )	T	NT	U	All	—
<b>Erycidae</b>					
Common Sand Boa ( <i>Eryx conicus</i> )	T	NT	R	≤500 m	N
<b>Colubridae</b>					
Oriental Ratsnake ( <i>Ptyas mucosa</i> )	T	LC	C	All	Ca
Common Wolfsnake ( <i>Lycodon capucinus</i> )	T	LC	C	All	N
Travancore Wolfsnake ( <i>Lycodon travancoricus</i> )*	T	NE	C	>300 m	N
Banded Racer ( <i>Argyrogena fasciolata</i> )	T	NE	U	≤500 m	D
Common Bronzeback ( <i>Dendrelaphis tristis</i> )	Ar	LC	C	All	D
Banded Kukri ( <i>Oligodon arnensis</i> )	T	LC	C	All	N
Streaked Kukri ( <i>Oligodon taeniolatus</i> )	T	NE	R	≤500 m	N
Montane Trinket ( <i>Coelognathus helena monticollaris</i> )	T	NT	U	All	N
Green Vinesnake ( <i>Ahaetulla nasuta</i> )	Ar	LC	A	All	D
Beddome's Catsnake ( <i>Boiga beddomei</i> )*	Ar	LC	A	>300 m	N
Common Catsnake ( <i>Boiga trigonata</i> )	T	LC	U	≤500 m	N
Forsten's Catsnake ( <i>Boiga forsteni</i> )	T	NE	U	All	N
<b>Natricidae</b>					
Checkered Keelback ( <i>Fowlea piscator</i> )	Aq	LC	A	All	Ca
Buff-striped Keelback ( <i>Amphiesma stolum</i> )	T	LC	C	All	D
Green Keelback ( <i>Rhabdophis plumbicolor</i> )	T	NE	C	All	N
<b>Psammophiidae</b>					
Stout Sandsnake ( <i>Psammophis longifrons</i> )	T	LC	R	—	D
<b>Pseudoxyrhopiidae</b>					
Günther's Racer ( <i>Dityophis vivax</i> )	T	LC	R	—	D
<b>Elapidae</b>					
Common Krait ( <i>Bungarus caeruleus</i> )	T	LC	C	All	N
Spectacled Cobra ( <i>Naja naja</i> )	T	EN	C	All	D
Slender Coralsnake ( <i>Calliophis melanurus</i> )	T	LC	U	All	D
<b>Viperidae</b>					
Common Bamboo Pitviper ( <i>Trimeresurus gramineus</i> )	Ar	LC	A	All	N
Russell's Viper ( <i>Daboia russelii</i> )	T	LC	C	All	Ca
Saw-scaled Viper ( <i>Echis carinatus</i> )	T	NE	U	All	N



**Fig. 2.** A Common Bamboo Pitviper (*Trimeresurus gramineus*) from the Matheran Hill Station, Maharashtra, India. Photograph by Ameya Kulkarni.



**Fig. 3.** A Stout Sandsnake (*Psammophis longifrons*) from the Matheran Hill Station, Maharashtra, India. Photograph by Gaurav Gharat.

increase of human-mediated development, much of it to promote tourism. Consequently, detailed current information on the biodiversity of the area is necessary to raise awareness and promote conservation.

Matheran, the smallest hill station in the country, is situated on the outskirts of Neral, Karjat Tehsil, Raigad District, Maharashtra (18.9866°N, 73.2679°E; 800 m asl). Annual temperatures at our 8-km<sup>2</sup> study site range from 12 to 32 °C and average annual rainfall is 3,955–4,075 mm. Terrain in the sampled area includes grasslands in the Matheran foothills

(19.000081°N, 73.305339°E), the valley that comprises the area from Alexander Point to Garbut Point (18.982019°N, 73.280370°E) and Dasturi to Neral City (19.009166°N, 73.302664°E), the dense semi-evergreen forest in the stretch between Dasturi and Garbut Point (18.996161°N, 73.286378°E), Charlotte Lake, and numerous natural ponds. Trails along the railway tracks provided access to the area between the train stations Jummapatti and Aman Lodge (19.015475°N, 73.283309°E). Waterfalls in the area surrounding Vetaleshwar and Sunset Point (19.004455°N,



**Fig. 4.** A Bombay Shieldtail (*Uropeltis macrolepis*) from the Matheran Hill Station, Maharashtra, India. Photograph by Ameya Kulkarni.

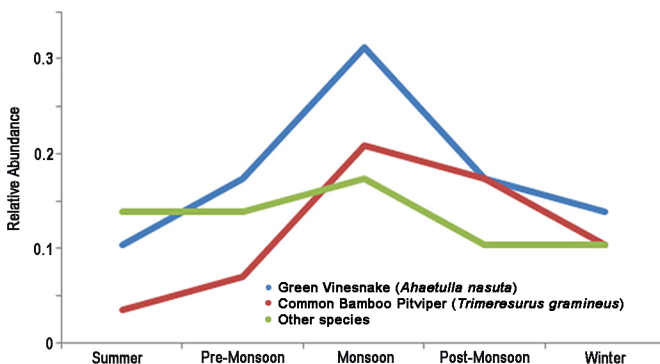
73.266624°E) were important habitats. The area around One Tree Hill Point was largely untouched forest.

We conducted weekly opportunistic diurnal and nocturnal searches at 0700–1000 h and 2200–0200 h during monsoons and monthly during the rest of the year, focusing on microhabitats that included leaf litter, under rocks, in and along streams and other wetlands, on and under low vegetation, in tree holes, and along trails. We identified species using the field guide by Daniel (2002).

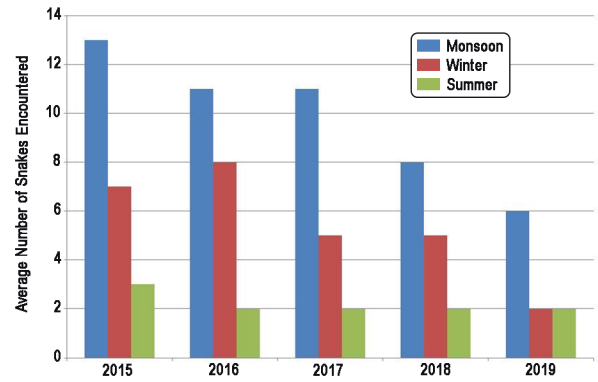
We generated a checklist of the snakes in the region that included 28 species in ten families (Table 1). Four species are endemic to the Western Ghats. The most frequently encountered species were the Green Vinesnake (*Ahaetulla nasuta*; Fig. 1), Beddome's Catsnake (*Boiga beddomei*), Checkered Keelback (*Fowlea piscator*), and Common Bamboo Pitviper (*Trimeresurus gramineus*; Fig. 2). The least frequently encountered species were the Stout Sandsnake (*Psammophis longifrons*; Fig. 3), Günther's Racer (*Dityopphis vivax*), and the Slender Coralsnake (*Calliophis melanurus*).

Of the various habitats that we surveyed, 23 of the 28 species were found in the moist, cool habitats associated with higher elevations. Only eight species were observed in drier habitats at lower elevations. Snakes were encountered most frequently during the breeding season, which, for most species, coincided with the monsoons; however, the Buff-striped Keelback (*Amphiesma stolatum*) and Spectacled Cobra (*Naja naja*) bred in mid-summer. Also, a few species were encountered only in certain habitats and elevations. For example, the endemic Bombay Shieldtail (*Uropeltis macrolepis*; Fig. 4) was restricted to elevations of about 500–800 m and encountered most frequently in leaf litter along canals adjacent to the roads and railway tracks. Being somewhat fossorial, these snakes were encountered only during the monsoons when forced to the surface by water saturating the substrate.

Varying seasonal abundance (Fig. 5) often reflected an increase in encounters with snakes during the breeding sea-



**Fig. 5.** Seasonal variation in encounters of snakes during this study at the Matheran Hill Station, Maharashtra, India. Relative abundance was calculated as number of individuals of one species divided by the total number of individuals of all species.



**Fig. 6.** Average numbers of snakes encountered during seasonal roadside surveys in 2015–2019.



**Fig. 7.** Mite (*Trombidium* sp.) infestation of the left eye of a Common Catsnake (*Boiga trigonata*) from the Matheran Hill Station, Maharashtra, India. Photograph by Gaurav Gharat.

son but also suggested that at least some species in drier areas hibernate during the cool, dry winters. We also noted a slight decrease in snake encounters during the duration of the study (Fig. 6), which we attributed to increasing anthropogenic interference, including habitat loss and fragmentation and increased road mortality. Although tourism provides vital support for the forest reserve, it appears to have adverse effects on snake numbers and diversity.

Interesting anecdotal observations during our surveys included a Green Vinesnake feeding on a small Bombay Shieldtail, an unusual isabelline Green Vinesnake in the valley that extends from Alexander Point to Garbut Point (Varma and Gharat 2018), and a Common Catsnake (*Boiga trigonata*) with a mite (*Trombidium* sp.) infestation on its left eye (Fig. 7).

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