

## Morphometric Analysis of Himalayan ground skink *Scincella himalayanus* Gunther (Reptilia: Squamata: Scincidae) from Kashmir

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**Abstract:** Ten specimens of Himalayan ground skink *Scincella himalayanus* Gunther (Reptilia: Squamata: Scincidae) collected from Dachigam National Park, Kashmir were examined using 8 morphometric characters. The phenotypic measurements of collected specimens indicate that *S. himalayanus* differs from its closely related species. This paper also documents the first collection of *S. himalayanus* from Dachigam National Park, Kashmir. [Maqbool A. and Khanday A.L. **Morphometric Analysis of Himalayan ground skink *Scincella himalayanus* Gunther (Reptilia: Squamata: Scincidae) from Kashmir.** *J Am Sci* 2016;12(3):30-34]. ISSN 1545-1003 (print); ISSN 2375-7264 (online). <http://www.jofamericanscience.org>. 5. doi: [10.7537/marsjas12031605](https://doi.org/10.7537/marsjas12031605).

**Keywords:** Himalayan ground skink; *Scincella himalayanus*; Scincidae; morphometric characters

### 1. Introduction

Skinks are lizards belonging to the family Scincidae and the infraorder Scincomorpha. With more than 1,500 described species, the Scincidae are one of the most diverse families of lizards (Mecke *et al.*, 2013). Skinks look roughly like true lizards, but most species have no pronounced neck and their legs are relatively small; several genera (e.g. *Typhlosaurus*) have no limbs at all. Other genera, such as *Neoseps*, have reduced limbs, lacking forelegs, and with fewer than five toes (digits) on each foot. Some skinks live in trees; others live near water sources and are known to readily enter the water. As a rule, however, these reptiles are ground dwellers or burrowers. Some skinks give birth to fully formed young, while others lay eggs. Locomotion in some species resembles that of snakes more than that of lizards. Most species have long, tapering tails that can be shed during pursuit of life (Singh *et al.*, 2015). A biological ratio can determine the ecological niche of a given skink species (Schnirel, 2004).

Some species of skinks are quite small; *Scincella lateralis* typically ranges from 7.5 to 14.5 cm, more than half of which is the tail (Beane, 2006; Palmer *et al.*, 1995). Most skinks, though, are medium-sized, with snout-to-vent lengths of about 12 cm (4.7 in), although some grow larger; the Solomon Islands skink, (*Corucia zebrata*), is the largest known extant species and may attain a snout-to-vent length of some 35 cm (Vosjoli, 1993).

Since most lizards are insect predators, therefore they are of considerable value in the control of pests such as beetles, grasshoppers, flies etc. Knowlton & Janes, 1932 have proved their importance as predators of the beet leafhopper in Utah, & in Florida they are

known to be of importance in the control of celery pests.

Venugopal, 2010 has revealed the presence of 199 species of lizards within the boundaries of India. Saikia & Sharma, 2009 have reported 17 species belonging to 10 families from Simbalbara Wildlife Sanctuary. Due to cold climate, inaccessible habitat and lack of expertise, the herpetofauna of Kashmir Himalaya is poorly studied. As per the information available till date no worker has mentioned any detailed reports of herpetofauna from Kashmir Himalaya.

Morphometric analysis is the quantitative analysis of form and in case of many lizards; morphometric analysis has been used for the identification and description of organisms as well as being used to study morphological variation in the population (Inger, 1983; Musters, 1983). Morphometry is also of great use in determining the sex of lizard species. However, there is no reported usage of morphometric analysis to discriminate between the skink species of Kashmir. Therefore, the objective of this study was to analyze the morphometric characters of *S. himalayanus* in detail which may be used as diagnostic tool to distinguish this species from its closely related species found in India.

### 2. Materials and Methods

#### 2.1. Sample collection and Identification

On the 20<sup>th</sup> of June 2015, we collected 10 specimens of *Scincella himalayanus* from Dachigam National Park (Fig.1) located about 22 Kilometers from Srinagar district of the state of Jammu and Kashmir (GPS location 34.1372° N, 75.0378° E, Elevation 5500 ft. to 14000 ft. and Area 140 sq. km.).

We captured lizards by using capture nets, which were then placed in a cloth bag.

Identification of collected specimens was done by consulting literature on external morphological characters. The diagnosis of the species was confirmed as per the key provided by Khan (2002).

### 2.2. Morphometric analysis

Collected specimens were then taken into laboratory for morphometric analysis. We measured a number of morphological traits that are likely to be relevant to taxonomic purpose (Table 1 & Fig. 2). These include lizard snout-vent length, snout length. Snout width, head length, head width, forelimb length, hind limb length and body mass. All the above mentioned morphological traits were measured by using digital calliper scale. Photographs of the collected specimens were taken by using Canon EOS 60 D mounted with cannon EF 100 mm macro lens.

### 2.3. Mapping of collection site

For mapping (Fig. 1) administrative-boundary vector map of Jammu and Kashmir (Google maps) was used. Toposheet for Jammu and Kashmir (Survey of India) was geo-referenced and Dachigam national park area was digitized for the generation of map. The GPS data of the sampling sites was imported from a GPS device to mapping software (ArcMap). All the mapping was done in ArcGis package version 10.2.2 ([www.esri.com](http://www.esri.com)).

### 2.5. Data analyses

Observations made during the present study were statistically analyzed using IBM SPSS 20.0.

## 3. Results and Discussion

### 3.1. Diagnostic Characters

Body small and serpentine with a bronze dorsum (Fig. 2). Scales are in 26-28 longitudinal rows, and between axil and groin 48-50. A dark lateral band from the nose through the eye, margined above with white and more broadly below, from the orbit to the thigh. Head and the upperside of limbs bronzy; belly bluish-white, snout small and pointed, ear-openings oval, smaller than eyes. The posterior frontals are more developed almost meeting the anterior frontal and the vertical in a point. *Scincella himalayanus*, though sharing many similar morphological features with *S. ladicensis*, can be differentiated by the presence of a few interrupted series of whitish lines and dark spots above. Whereas, *S. ladicensis* has longitudinal series of black dots above. Further, *S. himalayanus* has 26-28 longitudinal series of scales

round the trunk, while *S. ladicensis* has 32-36 longitudinal series of scales round the trunk.

### 3.2. Morphometric analysis

The results based on phenotypic measurements of *Scincella himalayanus* are summarized in table 1 and shown in fig. 2. The average body length of adults measures 135.6 ( $\pm$  3.60 SD) mm, snout vent length 65.4 ( $\pm$  3.20 SD), snout length 4.54 ( $\pm$  0.03 SD) mm, snout width 4.85 ( $\pm$  0.03 SD), head length 9.34 ( $\pm$  0.02 SD), head width 6.56 ( $\pm$  SD 0.39), forelimb length 14.91 ( $\pm$  0.37 SD), hindlimb length 19.06 ( $\pm$  0.65 SD) and body mass 3.35 ( $\pm$  0.48 SD).

There are reports that phenotypic measurements have a direct influence on performance and behavioral activity of lizards (Damme *et al.*, 1998). Additional studies on the phenotypic measurements were carried by multiple authors. For instance, between species differences in SVL have been observed to result in differences in sprint performance (Losos, 1990; Bauwens *et al.*, 1995), home range (Turner *et al.*, 1969; Perry & Garland, 2002), thermoregulation, and daily activity patterns (Stevenson, 1985).

The morphological differences of two skink species found in Kashmir Himalaya may be because of distinct selective pressures acting on them. Some authors have observed that differences in selective pressures derived from community structure (i.e. predation, competitive interactions with other species, and prey spectra) may also result in species differentiation in body size (Blomberg & Shine, 2000), shape (Verwajen & Damme, 2007), and colouration (Endler, 1983; Forsman & Appelqvist, 1998).

## 4. Conclusion

The present study documents morphometric characterization of Himalayan ground skink, *Scincella himalayanus*. This data could be utilized for taxonomic applications including proper identification, comparative studies with other species and phylogenetic relationships. Effective and targeted conservative action requires detailed information about species, their distribution, systematics and ecology as well as the distribution of threat factors which affect them. Knowledge of reptilian diversity in Kashmir Himalaya remains surprisingly unsystematic, therefore innovative means of gaining rapid insight into the status of reptiles is needed in order to have systematic information about the reptiles in the region; and their conservation could be made effectively possible by framing a proper environmental policy in a time bound manner.

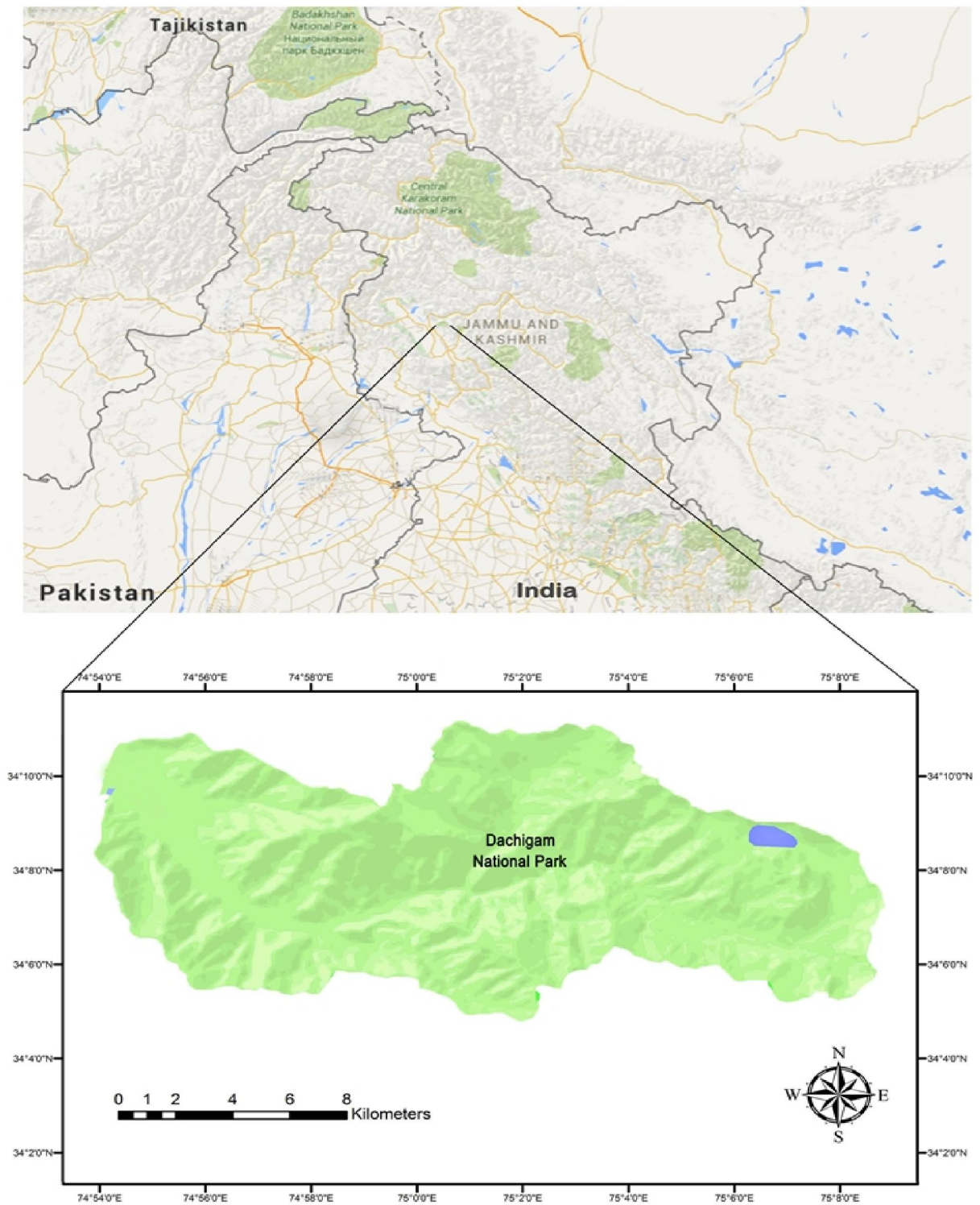


Fig.1. Map showing the sampling site

Inset: map of Jammu & Kashmir showing the location of Dachigam National Park

Table 1. Summary of measured variables (Mean  $\pm$  SD). Numbers in brackets correspond to numbers in Fig. 2.

S. No.	Variables	Mean $\pm$ SD (mm)
1	SVL* [1]	65.4 $\pm$ 3.20
2	TL* [2]	135.6 $\pm$ 3.60
3	SVL ratio	2.07
4	SL* [3]	4.54 $\pm$ 0.03
5	SW* [4]	4.85 $\pm$ 0.03
6	HL* [5]	9.34 $\pm$ 0.02
7	HW* [6]	6.56 $\pm$ 0.39
8	FL* [7]	14.91 $\pm$ 0.37
9	HL** [8]	19.06 $\pm$ 0.65
10	Body mass (g)	3.35 $\pm$ 0.48

\*SVL – snout vent length, TL\* - total length, SL\* – snout length, SW\* - snout width, HL\* - head length, HW\* - head width, FL\* - forelimb length, HL\*\* - hindlimb length, BM\*- Body mass.

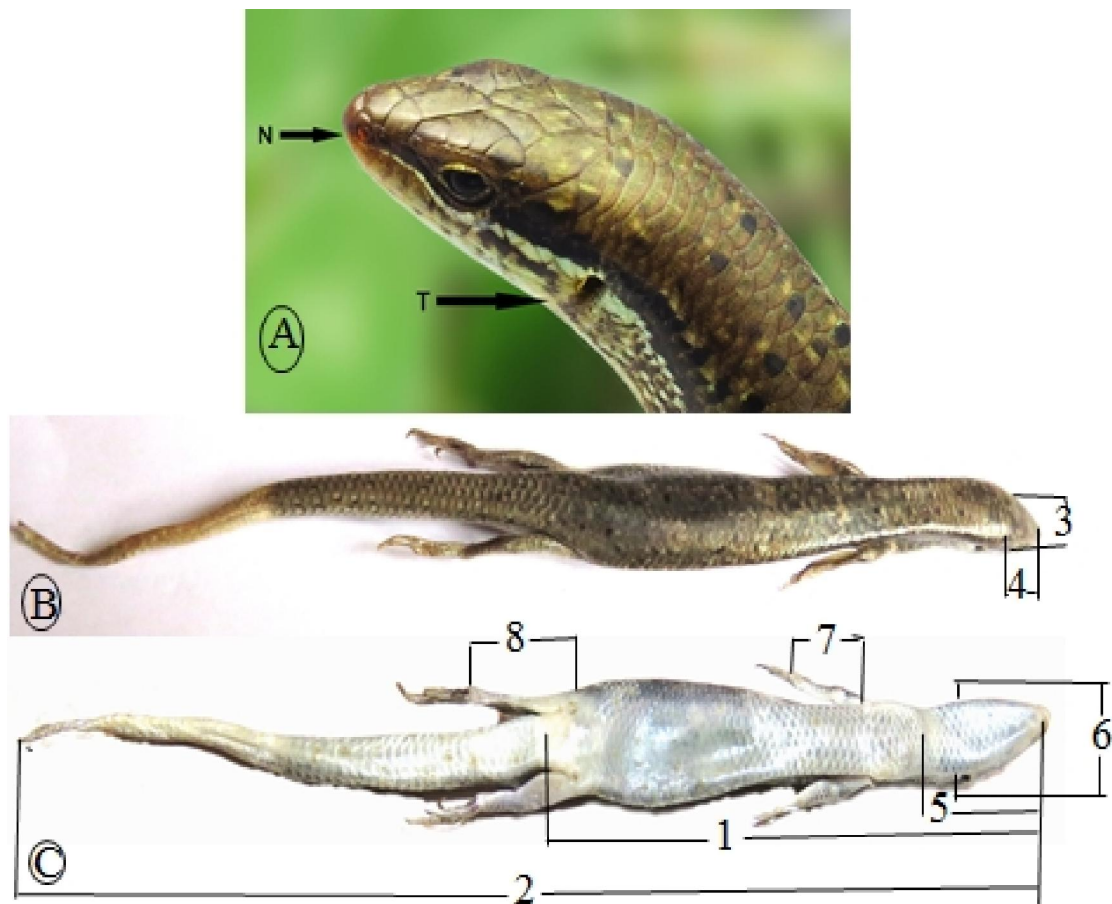


Fig. 2. Phenotypic measurements taken on Himalayan ground skink. Numbers correspond to the traits summarized in Table 1. A. Head detail showing nostril & tympanum B. Dorsal view of a skink C. Ventral view of a skink.

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