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NOTE

RANGE EXTENSION OF THE COMMON SLUG SNAKE *PAREAS MONTICOLA* (CANTOR, 1839) (REPTILIA: SQUAMATA: PAREIDAE): A NEW FAMILY RECORD FOR NEPAL

Dipa Rai, Manoj Pokharel & Tapil P. Rai

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Range extension of the Common Slug Snake *Pareas monticola* (Cantor, 1839) (Reptilia: Squamata: Pareidae): a new family record for Nepal

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The family Pareidae Romer, 1956 is composed of a small group of primarily nocturnal and partly arboreal snakes that have evolved to specialize in feeding terrestrial snails and slugs (Loredo et al. 2013; You et al. 2015; Hosono 2017; Uetz et al. 2021). The family is further divided into two subfamilies (Pareinae and Xylophiinae) and four genera (*Aplopeltura* Duméril, 1853; *Asthenodipsas* Peters, 1864; *Pareas* Wagler, 1830; and *Xylophis* Beddome, 1878) (Deepak et al. 2018; Uetz et al. 2021). The genus *Aplopeltura* and *Asthenodipsas* are endemic to southeastern Asia (Loredo et al. 2013; Uetz et al. 2021), *Xylophis* is endemic to the Western Ghats of peninsular India (Deepak et al. 2018, 2020), whereas *Pareas* has a relatively wide distribution in the tropical to subtropical regions of the Oriental biogeographic realm (Bhosale et al. 2020; Vogel et al. 2020; Wang et al. 2020).

There are 22 species described within *Pareas* making it the largest of all the four genera in the family (Bhosale et al. 2020; Liu & Rao 2021). The recent surge in the number of studies aiming to resolve the complex taxonomic and phylogenetic status of *Pareas* has led to the addition of several new species (Bhosale et al. 2020; Ding et al. 2020; Wang et al. 2020; Liu & Rao 2021). Yet, specialized

feeding behavior and niche partitioning between the species has caused increased rate of speciation and sympatric co-occurrence of closely related *Pareas* species that appear morphologically similar (Hosono 2017; Ding et al. 2020; Vogel et al. 2020). Thus, despite the increasing research, information on the true diversity, distribution, and natural history of species belonging to this genus are still far from complete (Bhosale et al. 2020; Vogel et al. 2020).

Pareas monticola (Cantor, 1839) is one of the most widely distributed species of the genus *Pareas* (Vogel et al. 2020; Uetz et al. 2021). Occurrence of *Pareas monticola* sensu stricto has been established from northeastern India, northern Myanmar, China (Motuo in Tibet and Yunnan Province), Bhutan, and Bangladesh (Sylhet Division) (Hakim et al. 2020; Vogel et al. 2020; Koirala et al. 2021). It has not been reported from Nepal, but its presence in the Darjeeling and Sikkim of India (Uetz et al. 2021; Vogel et al. 2021) makes it likely for the species to occur in the adjoining areas of eastern Nepal, which share a similar biotope (Khatiwada et al. 2015). In this paper, we present the first evidence of occurrence of *Pareas monticola* sensu stricto from Nepal. Apart from

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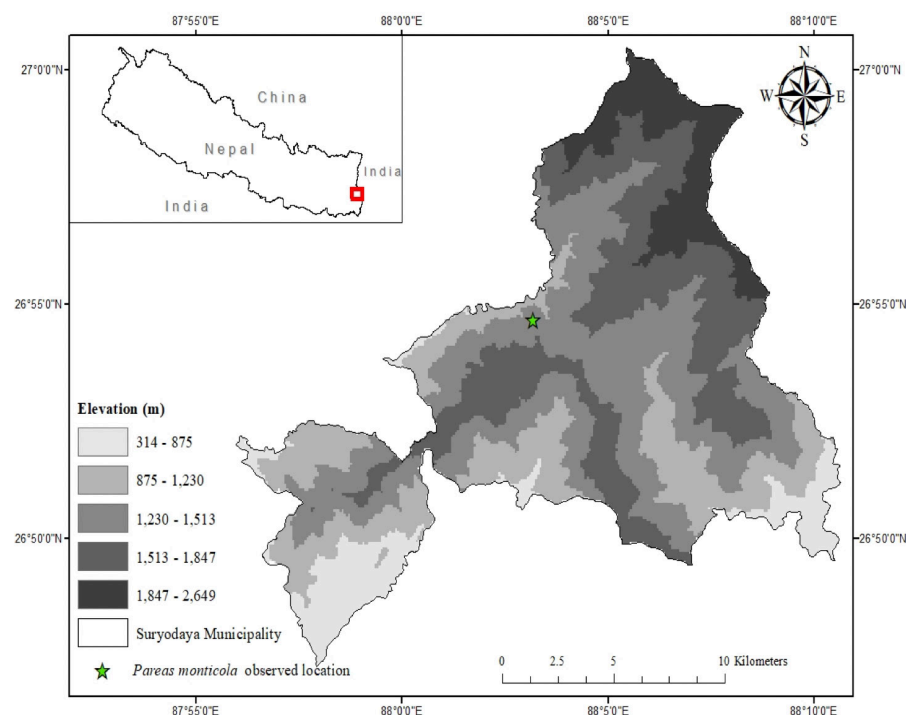


Figure 1. Map showing *Pareas monticola* recorded location in Suryodaya Municipality of Ilam district. Inset map shows where the region lies in Nepal.

adding a new species of herpetofauna to the list, this is a new family record for the snakes of Nepal.

An individual *Pareas monticola* (Image 1a,b) was encountered on 04 August 2020 at 2040 h during a herpetological survey in Arubote village of Suryodaya Municipality-10 in Ilam district of eastern Nepal (26.910°N 88.053°E; 1,400m) (Figure 1). The snake was observed approximately 1 m above the ground moving on a wooden stack along a trail. The substrate condition was moist due to recent rainfall and there was a high activity of snails and slugs in the vicinity. The snake had a laterally compressed slender body with large eyes and vertical pupils. Its body coloration was brown with the presence of distinct black bars in the dorsolateral part. A black line extended from eye to the nape and another similar line from behind the eye to the angle of the mouth (Image 1a,b). We took several photographs of the snake for identification and expert consultation. The snake was identified as *Pareas monticola* by Mr. Paul Freed based on its morphological characteristics. The key to the species is loreal and prefrontal contact with the eye, no preocular, and the presence of enlarged vertebral scales (Ding et al. 2020).

The present locality is approximately 25 km (aerial distance) south-west of Darjeeling in India. The region has a subtropical climate and is characterized by having high precipitation and humidity, especially during the monsoon (June–September) (Lillesø et al. 2005). Tea

plantation dominates much of the landscape which is interspersed with human settlements and patches of forest having *Schima wallichii*, *Castanopsis indica*, and *Alnus nepalensis* as the major tree species (Image 2). Two perennial streams run through the landscape and join the Jommai river a few kilometers downstream.

The present habitat and geographical features are in accordance with other areas where *Pareas* species are known to occur (Hauser 2017; Ding et al. 2020; Liu & Rao 2021). The nocturnal and partially arboreal habits of the species have also been supported by our observation. Snails and slugs mostly prefer moist areas and are highly sensitive to variation in water availability and temperature (Prior 1985). High rainfall during monsoon and the presence of perennial water sources should provide suitable habitat conditions for snails and slugs to thrive in this region, thereby supporting the occurrence of their predator like *Pareas monticola*. Moreover, due to significant genetic variations among the populations of *Pareas monticola* across their range, it has been identified as a species complex rather than a single species (Vogel et al. 2021). Furthermore, our inability to record detailed morphometry and molecular evidence of the observed specimen hindered us from making confirmation on its taxonomic status. Hence, we suggest further studies in the tropical to sub-tropical regions of eastern Nepal to collect meticulous morphological and molecular data on this species to understand its phylogenetic position.



Image 1a,b. *Pareas monticola* recorded moving on a wooden stack in Suryodaya Municipality of Ilam district, Nepal. © Dipa Rai.



Image 2. A typical *Pareas monticola* habitat in Arubote village of Suryodaya Municipality in Ilam district, Nepal. © Dipa Rai.

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