

SOME OBSERVATIONS OF

# *Cnemaspis podihuna*

DERANIYAGALA, 1944 (REPTILIA: GEKKONIDAE)

## in Sri Lanka



Figure 1: *C. podihuna* (male), Mihintale.

D. M. S. S. Karunarathna<sup>1,3</sup>,  
A. A. T. Amarasinghe<sup>1,4</sup>,  
U. T. I. Abeywardena<sup>2</sup>,  
M. D. C. Asela<sup>2</sup>,  
H. B. Jayaneththi<sup>2</sup>  
and P. L. Madurapperuma<sup>2</sup>

<sup>1</sup> Taprobanica Nature Conservation Society, 146, Kendalanda, Homagama, Sri Lanka.

<sup>2</sup> The Young Zoologists' Association of Sri Lanka, National Zoological Gardens, Sri Lanka

To correspond with authors:

<sup>3</sup> dmsameera@gmail.com and

<sup>4</sup> aathasun@gmail.com

### Abstract

The dwarf day gecko *Cnemaspis podihuna* is the smallest gecko recorded in Sri Lanka, and it is considered endemic to the island. According to the IUCN (International Union for Conservation of Nature) Red List it is an endangered species. This small gecko has been previously recorded from fourteen areas of dry mixed forest and wet forest. Here we record this species from new localities: Buddhangala, Geelone, Malayadikanda, and Nilgala. The information available on this species is inadequate, even though this genus was recently critically reviewed. We observed some behaviors and ecology that may be very important for the future conservation of this species.

**Key words:** day geckos, Gekkonidae, distribution, ecology, conservation, Sri Lanka

## Introduction

Geckos are the smallest and the most primitive living Saurian lizards in Sri Lanka. There are forty-two species belonging to eight genera in Sri Lanka (Bauer et al., 2007; de Silva, 2006; Manamendra-Arachchi et al., 2007; Wickramasinghe & Munindradasa, 2007). While the majority of Sri Lankan geckos are nocturnal, members of the genus *Cnemaspis*, with the common name "day geckos", are diurnally crepuscular active little geckos. They are distributed up to 1300 m a.s.l. (de Silva et al., 2004; Manamendra-Arachchi, 1997). They are generally terrestrial or sub-arboreal in habit, and found on rock surfaces, tree trunks, and walls (Deraniyagala, 1932; Rathnayake, 2004). *Cnemaspis podihuna* is listed as an endangered species (IUCN & MENR, 2000). Even though this genus was reviewed critically by Wickramasinghe and Munindradasa (2007) and later by Manamendra-Arachchi et al. (2007), the ecology and behavior of this species are not truly recognized. Hence, it is essential to gather information on *C. podihuna* in different areas of the



Figure 2: Ventral aspect of head of *C. podihuna*.



Figure 3: Dorsal aspect of head of *C. podihuna*.

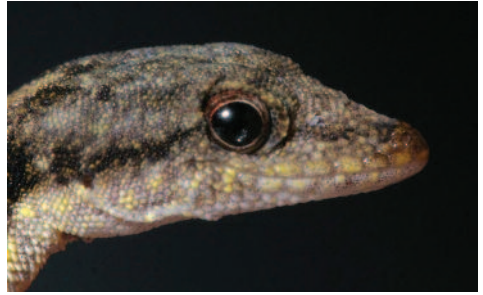


Figure 4: Lateral aspect of head of *C. podihuna*.

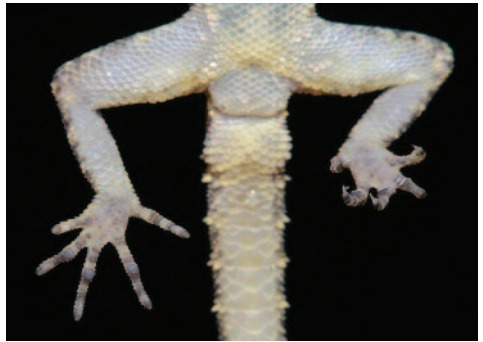


Figure 5: Ventral aspect of anal area of *C. podihuna*.

country, as a first step towards conservation of this day gecko species.

*C. podihuna* was first described by P. E. P. Deraniyagala in 1944 from the Lahugala-Maha Oya area (06° 50' N & 81° 41' E) of Eastern Province with four specimens (holotype and 3 paratypes). After 54 years, Wickramasinghe (2000) rediscovered the species from Koslanda in Badulla District with five specimens (NMSL RG 21). Again, Wickramasinghe & Munindradasa (2007) collected four specimens (NMSL20061001, NMSL20061002, NMSL20061003, and NMSL20061004) from the Lahugala area near Siyabalanduwa (06° 52' 55.9" N & 81° 42' 30.2" E; alt. 387 m) and re-described them as a neotype and syntypes of *C. podihuna* (Wickramasinghe & Munindradasa, 2007). This was criticized (Pethiyagoda, 2007) and considered as erroneous and invalid according to the ICZN by Pethiyagoda (2007) and Manamendra-Arachchi et al. (2007) who rediscovered the presumed holotype of



Figure 6: *C. podihuna* (male), Mihintale.

*C. podihuna* and re-described it. However, this action also was considered as erroneous and invalid by Amarasinghe & Bauer (2009) due to the differences in the presence of a complete tail and the number of femoral pores from the rediscovered specimen. Amarasinghe et al. (2009) considered the specimen deposited at the Natural History Museum, London, under registration number BMNH 1946.8.1.20 as the type of *Cnemaspis podihuna* Deraniyagala, 1944.

Manamendra-Arachchi et al., (2007) compared a specimen (WHT 7334) from Maligawila near Okkampitiya (06° 43' N, 81° 17' E) in the Monaragala District of the Uva Province in 2006. In addition to these locations, there are reliable records from Lahugala National Park, Ritigala, Pallegama, Mihintale, and Yala block IV. In addition to these, we recorded this species from Buddhangala, Geelone, Malayadikanda, and Nilgala.

## Materials and Methods

This paper is based on data collected by the authors from June 2003 to December 2005, during random field visits. The specimens were

hand-captured alive, all the measurements of the specimens were taken with a Tricle-brand vernier-caliper to the nearest 0.1mm, and they were released back to the wild. Scales and pores were counted using a Triplet brand 18 mm X 10 hand lens. Species identification was made according to Deraniyagala (1944 & 1953), Wickramasinghe (2000), Wickramasinghe & Somaweera (2003) and later Wickramasinghe & Munindradasa (2007) and Manamendra-Arachchi et al. (2007).

## Observations

(01) Kaalkanna near Koslanda (06°41' - 06°43' N & 80°51' - 80°53' E), in Haldumulla divisional secretariat, Badulla District of Uva Province in Sri Lanka is situated among the hills of the second peneplain (a flat lowland area with meandering streams) of the country. The vegetation of the study area is mainly savanna-type grasslands and intermediate-zone forests, home gardens, and paddy fields. The canopy of the forests was composed of *Chloroxylon swietenia*, *Schleichera oleosa*, *Tamarindus indica*, and *Mangifera indica* (height 20 m) and the sub canopy was *Cassia fistula*, *Macaranga peltata*, *Gliricidia sepium*, *Alstonia macrophylla* (height 10 m). The understory was



Figure 7: Riverine forest in Nilgala, ideal habitat of *C. podihuna*.

composed of *Lantana camara* and *Clerodendrum inerne* bushes. The mean annual rainfall of the area is between 500-1000 mm. The rainfall is mainly due to northeast monsoons. Mean annual temperature is around 22.5 °C - 25 °C. A male *C. podihuna* was first sighted at about 17.20 hr on 13th June 2003. The observation was made at a small forest patch, and at the time the sky was clear and the atmosphere was hot, at a temperature of 28.4 °C. The home gardens and the forests were separated by gravel roads. The specimen of *C. podihuna* was observed crawling from a home garden to the forest via the gravel road. It was crossing the road through dry leaves, which helped it to be camouflaged. The gecko took about 6 minutes to complete its journey across the ten-foot wide road. *C. podihuna* showed very active movements, when it was hand captured. When it got scared, a very clear bright purple skin tone was seen between the scales of the fore and hind limbs. This color change is only visible on

the back side of the upper forelimb and the front side of the upper hind limb. Simultaneously, it shook its tail very slowly and rhythmically. This tail-shaking behavior was observed at about 3 times per minute. During the period of observation, several carnivorous birds such as *Saxicoloides fulcata*, *Turdoides affinis*, *Bubulcus ibis*, *Halcyon smyrnensis*, and *Ardeola grayii* were also recorded in surrounding areas.

(02) The Geelone Mountain Forest (6°45' - 6°47' N & 81°01' - 81°03' E) in the Monaragala District of the Uva Province in Sri Lanka is an isolated mountaintop surrounded by *Hevea brasiliensis* trees (5m height) and natural vegetation. The study area has dry mixed evergreen forests with occasional *Camellia sinensis* and *Theobroma cacao* plantations. This place is cool and shady, and has several streams with rocks and occasionally large boulders. Only one specimen was observed, on the trunk of a *Hevea brasiliensis* tree (27m height) 1.5m above ground level, in the morning. At the time, the sky was clear while atmosphere was hot, at a temperature of nearly 29.2 °C. The survey area was surrounded by random *Camellia sinensis* bushes.

(03) The Nilgala Forest Reserve (07°08' - 07°10' N & 81°16' - 81°18' E) in the Bible divisional secretariat area, Monaragala District of the Uva Province in Sri Lanka is a protected forest under the Forest Department. The mean annual rainfall of the area is between 1750-2000 mm. The rainfall is mainly due to northeast monsoons. The vegetation comprises lowland intermediate semi-evergreen forests, which are dominated by *Terminalia chebula*, *Terminalia bellirica*, and *Phyllanthus emblica* trees. Nilgala also contains various stages of secondary forests, established on degraded scrublands and abandoned chena (occasional farming) cultivations. Two specimens of geckos belonging to the genus *Cnemaspis* were observed on the trunk of a *Mangifera zeylanica* tree in the riverine forest (canopy 20m-25m height) associated with *Panmedilla Oya* in the Nilgala forest reserve. One of them climbed up the tree trunk to about 20m



Figure 8: Ideal habitat of *C. podihuna* in Buddhangala.

very quickly, as they normally do when threatened. We were able to capture the other specimen, which we identified as *C. podihuna*. We also observed two other sympatric gecko species: *Hemidactylus depressus* and *Geckoella yakhuna*. The other dominant tree species are *Terminalia arjuna*, *Madhuca longifolia*, *Diospyros ebenum*, *Diospyros malabarica*, *Mangifera zeylanica*, *Schleichera oleosa*, and *Entada pusaetha*.

(04) The Malayadikanda Forest (07°14' - 07°15' N & 81°38' - 81°39' E) in the Hingurana-Paranigama area, Ampara District of Eastern Province in Sri Lanka, is a dry and rocky area with occasional large trees. The survey was done near an ancient temple surrounded by *Ficus* trees. Other vegetation types found in this area are very similar to the Nilgala Forest area. Only one male specimen was captured from the trunk of a *Ficus* sp from 3 m above ground level. This habitat is situated 30-40 meters away from a waterway. Therefore, it was not exactly a riverine forest (canopy 20-25 m height) and the forest was rather dark due to the closed canopy that reduced the light penetration. The other sympatric geckos are *Calodactylodes illingworthorum* and *Hemidactylus frenatus*.

(05) The Buddhangala Forest (07°16' - 07°17' N & 81°41' - 81°42' E) in the Ampara District is a small forest patch identified as a dry-zone forest, and

the dominant trees are *Drypetes sepiaria* and *Ficus* species. This area lacks streams and water bodies. Occasionally it has wet conditions during the rainy season. The forest floor is covered with dry leaves and fine sand. Buddhangala is a Buddhist monastery area. Eleven mature and juvenile specimens were observed on trunks of *Drypetes sepiaria* trees (15 m height). Out of 11 individuals, three of them were gravid females. They were found from 2m above ground

level, and no eggs were found. At that time the sky was clear while the atmosphere was hot, at a temperature of nearly 30.1 °C. The sympatric gecko species are *Hemidactylus brookii* and *Geckoella yakhuna*.

## Discussions

Usually *C. podihuna* lives on trees like *Chloroxylon swietenia*, *Schleichera oleosa*, *Dimocarpus longan*, *Tamarindus indika*, *Careya arborea*, and *Ficus* sp. They mainly live on large trunks either live or dead, but often this gecko is found on live trees with hard bark and cracks on the trunk. On most occasions, they can be observed at a height of about 15 m from ground level, but rarely they come down to the ground. The most significant characteristic of *C. podihuna* is that when they become frightened, they run upward to the apex of the tree and hide within rough bark. We have never observed them run downwards to hide. Contradictorily, many other *Cnemaspis* sp run downwards on the tree and hide within the litter at the base of the tree.

This species is considered an arboreal species, and this species traveling over land is not previously recorded. We have observed this gecko moving rapidly on the bark of huge trees several times, but it was very slow moving on the ground. This species was always seen on trees

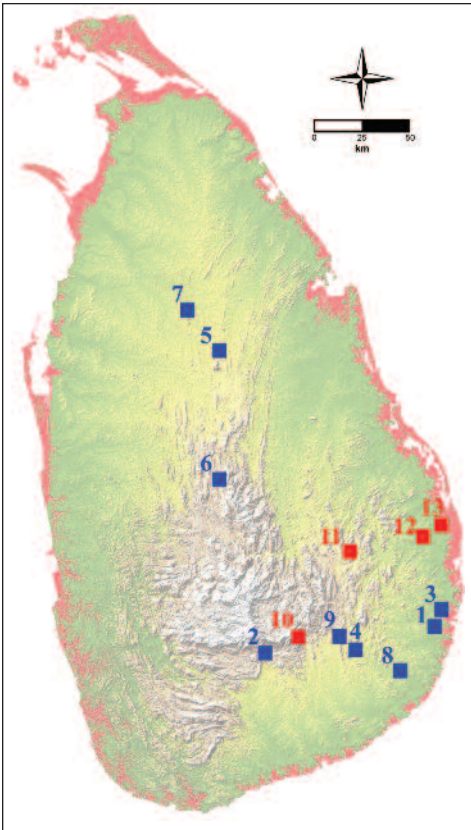


Figure 9: Showing on Distribution pattern of *C. podihuna* [1. Lahugala; 2. Koslanda; 3. Siyambalanduwa; 4. Maligawila; 5. Ritigala; 6. Pallegama; 7. Mihintale; 8. Yala Block-IV; 9. Buththala; 10. Geelone; 11. Nilgala; 12. Malayadi Kanda; 13. Buddhangala] in Sri Lanka. Red square: Authors findings; Blue square: Previous reliable records.

with rough bark and large trunks. It is presumed that they face a crisis with lack of trees with proper microhabitats as those are removed for timber. These areas were continuously disturbed with fire and anthropogenic habitat alterations. Even though there were considerable populations of *C. podihuna* in some areas, it was very difficult to estimate the exact number. We didn't attempt to catch all the specimens and never found their eggs on the trees.

## Conclusion and Recommendations

Major threats to the existence of *C. podihuna* are anthropogenic activities. Several harmful activities such as deliberate forest fires, deforestation for cultivation, and removing large trees for timber and fuel were observed in surveyed areas. Introduced plants for re-forestation (e.g. *Tectona grandis*, *Acacia melanoxylon*) have limited the growth and spread of other indigenous tree species and this may harm *C. podihuna*, because this species uses only a limited number of native tree species as its habitat. Predators in addition to the tarantula *Poecilotheria fasciata* are the white-breasted kingfisher, cattle egret, Indian robin, and common babbler. Habitat suitability assessments focusing on key wildlife species are currently widely employed for attaining biodiversity conservation objectives within the context of sustainable land use management. The planning strategies for the development of protected areas should be continually evolving, keeping in view the national needs and priorities, site requirements, and the participation of local communities. More research is needed about the biology, ecology, and other aspects of *Cnemaspis podihuna* in order to complete the information about this species. This paper will contribute to enhancing the current knowledge of *C. podihuna* within Sri Lanka.

## Acknowledgments

The authors wish to thank Channa Bambaradeniya (IUCN) for reviewing the manuscript. We also thank Anushka Kumarasinghe and Sujana Maduranga for help with improving the manuscript. Our sincere thanks go to Kunchana Mathota-Arachchi, Panduka Silva, Ramyanath Sirimanna, Niranjan Karunarathna, Toshana Peiris, Chamila Soysa, and Asanka Udayakumara (YZA) for participating in field visits. We also thank Kelum Manamendra-Arachchi (WHT) and Mendis Wickramasinghe for valuable comments, and Mendis Wickramasinghe for all photographs.



Figure 10: Burned forest in Nilgala (August).

## Literature Cited

- Amarasinghe, A. A. T. and A. M. Bauer, 2009. On the holotype of *Cnemaspis podihuna* Deraniyagala, 1944. *Taprobanica*, 1 (2): 80-82.
- Amarasinghe, A. A. T., A. M. Bauer, I. Ineich, J. Rudge, M. M. Bahir and D. E. Gabadage, 2009. The original descriptions and figures of Sri Lankan gekkonid lizards (Squamata: Gekkonidae) of the 18th, 19th and 20th centuries. *Taprobanica*, 1 (2): 83-106.
- Bauer, A.M., A. de Silva, E. Greenbaum, and T. Jackman, 2007. A new species of day gecko from high elevation in Sri Lanka, with a preliminary phylogeny of Sri Lankan *Cnemaspis* (Reptilia: Squamata: Gekkonidae). *Mitt. Mus. Nat.kd. Berl., Zool. Reihe*, 83: 22-32.
- Deraniyagala, P.E.P., 1932. The Gekkonoideae of Ceylon. *Spolia Zeylanica*, 16 (3): 291-310.
- Deraniyagala, P.E.P., 1944. A new *Cnemaspis* Gecko from Ceylon. *Journal of Royal Asiatic Society*, 36 (97): 226-227.
- Deraniyagala, P.E.P., 1953. A Colored Atlas of some vertebrates from Ceylon, Tetrapod Reptilia. Vol. 02. National Museums of Sri Lanka, Colombo. vii + 101pp.
- de Silva, A., A.M. Bauer, C.C. Austin, S. Goonewardena, Z. Hawke and V. Vanneck, 2004. The diversity of Nilgala forest, Sri Lanka, with special reference to its Herpetofauna. *Lyriocephalus*, 5 (1&2): 164-182.
- de Silva, A., 2006. Current status of the Reptiles of Sri Lanka, pp. 134-163. In: Bambaradeniya, C.N.B. (eds.). *Fauna of Sri Lanka: Status of Taxonomy, Research and Conservation*. IUCN Sri Lanka. Xiii + 308.
- IUCNLS & MENR 2007. The 2007 Red List of threatened Fauna and Flora of Sri Lanka. Colombo, IUCN Sri Lanka, 148.
- Manamendra-Arachchi, K.N., 1997. Gecko. *Sri Lanka Nature*, 1 (1): 45-55.
- Manamendra-Arachchi, K., S. Batuwita, & R. Pethiyagoda, 2007. A taxonomic revision of the Sri Lankan day-geckos (Reptilia: Gekkonidae: *Cnemaspis*), with description of new species from Sri Lanka and southern India. *Zeylanica*, 7: 1: 9-122.
- Pethiyagoda, R., 2007. The 'New Species Syndrome' in Sri Lankan herpetology: a cautionary note. *Zeylanica*, 7 (1): 1-7.
- Rathnayake, N.D., 2004. The Sri Lankan Day Geckos of the Genus *Cnemaspis*. *Gekko*, 4 (1): 39-44.
- Wickramasinghe, L.J.M., 2000. A New Record of *Cnemaspis podihuna* from Badulla District. *Sri Lanka Naturalist*, 3 (1): 3-6.
- Wickramasinghe, L.J.M. and R.K. Somaweera, 2003. Distribution and Current Status of the Endemic Geckos of Sri Lanka. *Gekko*, 3 (1): 2-13.
- Wickramasinghe L.J.M. and D.A.I. Munindradasa, 2007. Review of the genus *Cnemaspis* Strauch, 1887 (Sauria: Gekkonidae) in Sri Lanka, with the description of five new species. *Zootaxa*, 1490: 1-63.