

## ASSOCIATION FOR TROPICAL BIOLOGY AND CONSERVATION Asia Pacific Conference

" Bridging the elements of biodiversity conservation

save, study, use "

10-13 September 2019 MAS Athena, Thulhiriya, Sri Lanka

# PROCEEDINGS

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Association for Tropical Biology and Conservation Asia-Pacific Conference 2019

Bridging the Elements of Biodiversity Conservation Save-Study-Use

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MAS Athena - Thulhiriya SRI LANKA

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## 93 The Centipede's Sanctuary: Exploring Ancient Refugia from the Western Ghats, India

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The Western Ghats (WG) of peninsular India, a global biodiversity hotspot, has experienced complex geological and climatic history. It also has a climatically and topographically complex landscape. Thus, the influence of ecological and geological factors in shaping the diversity and distribution of its biota was studied using ancient centipedes as a model system. Three genera belonging to the family Scolopendridae (Digitipes, Rhysida, and Ethmostigmus) were sampled across the Western Ghats. An integrative taxonomic approach was used to generate evolutionary species hypotheses based on DNA sequences, morphology, and geographic distribution data. Allopatric speciation was detected in seven species pairs, being the predominant modes of speciation, whereas sympatric speciation observed in three species pairs. Bayesian divergence time estimates using three fossil calibrations suggested that these taxa started diversifying on peninsular India in the Cretaceous Period and historical biogeographic analyses inferred their Gondwanan affinity. An endemic radiation of five species of Ethmostigmus in peninsular India was shaped by multiple dispersal events coinciding with geo-climatic events throughout the Cenozoic. The genus Digitipes diversified only in the Western Ghats, in which the southern Western Ghats were an ancestral area with more and older lineages. Both Digitipes and Ethmostigmus species are restricted to wet forests of peninsular India (PI) and have retained that niche throughout their diversification. In contrast, Rhysida has a widespread distribution, occupying varied habitats in PI, and diversified in the Late Cretaceous and Cenozoic through dispersal, vicariance, and range expansion. Additionally, there were multiple independent dispersal events of Rhysida from PI to mainland Asia that led to distinct species and range expansion in one species in Eocene-Oligocene, supporting the Out-of-India hypothesis.

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## The phylogenetic diversification of Sri Lankan mammals in relation to those of subcontinental India

#### **Wolfgang Dittus**

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A comparison of the mammalian faunas between the Indian subcontinent and the island of Sri Lanka over geological time suggests an intermittent flow of taxa between these land masses from the Miocene onward when most crown groups of mammals evolved. When rising sea levels closed the land bridge at the Palk Strait during the Holocence, the climate also warmed and rainfall increased; moist forests spread at the expense of dry habitats. One consequence was loss from Sri Lanka of many large bodied open habitat specialists, such as rhinoceros, hippopotamus, gaur and tiger. The influx of taxa from the subcontinent into Sri Lanka also had been restricted insofar as many Indian species are absent in Sri Lanka; their ecological niches, however, are filled by Sri Lankan subspecies suggesting relatively recent diversification. Notwithstanding the bottleneck of mammal species imports, the highly variable topography, climate and vegetation of Sri Lanka provided habitat crucibles for the evolution of endemic species (n=39, including 3 genera) especially among mammals with high reproductive potential (rodents, insectivores) and of endemic subspecies (n=47) among the slower reproducing and less vagile mammals all of which were rooted in a common subcontinental taxon. Among primates, for example, the bonnet macaque is widely distributed in southern India as two subspecies, but in Sri Lanka its closest relative, the toque macaque, manifests three subspecies. Likewise, among the langurs of the genus *Semnopithecus*, the single species of Nilgiri langur of the Western Ghats is represented in Sri Lanka by four subspecies of purple-faced langur. The recent discovery of hybrids between species of Hanuman and purple-faced langur may help to clarify some divergent phylogenetic complexities noted among langur populations of South Asia. The key to resolving this and many similar evolutionary complexities of the region lies in the conservation of critical habitats that support surviving biota.

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## Placement of Indian *Didymocarpus* Wall. (Gesneriaceae) and its biogeographic implications

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The phylogenetic relationship and biogeographic history of old-world gesneriads remains poorly understood since the group is plagued with taxonomic issues. The genus Didymocarpus Wall. (Gesneriaceae) is one such morphologically diverse group comprising about 105 species distributed in Western Himalayas, North-East India, South-West China, Indo-Burma, Thailand and Peninsular Malaysia. Despite recent taxonomic revision and re-circumscription, the genus has been shown to be not monophyletic. The only molecular phylogeny available for Didymocarpus had only about one fourth of the known species in the genus and did not include any taxa from India where 24 species (out of 105 species) are known. Therefore, the origin and diversification of the Indian taxa is not clear. In this study we are revising the *Didymocarpus* phylogeny using nuclear and chloroplast markers and 60 taxa from the Sino-Himalayan and Indo-Malay region. Previously published sequences on Genbank were included in the analysis. We dated the tree using old-world gesneriads belonging to the subtribes Didymocarpinae and Loxocarpinae with a focus on Indian taxa. Preliminary results indicate that *Didymocarpus* is sister to the genera Cathayanthe and Didymostigma from China. Didymocarpus s.s formed a strongly supported monophyletic group with the exception of two morphologically distinct species, inferring the need for taxonomic re-adjustments. Three clades were distinguished within Didymocarpus in congruence with their sectional classifications. Clade 1 consisted of species belonging to Didymocarpus sect. elati from Malay peninsula. Clade 2 consisted of species from Indian, Chinese and Malay peninsula, belonging to Didymocarpus sect. Didymocarpus. Clade 3