

Litter-dwelling land-snail fauna along an elevation gradient in the upper catchment of the Walawe river in Sri Lanka

K.A.T.M. Athukorala¹, L.M. Amarasinghege¹ and S.J. Perera¹

Abstract

While Sri Lanka possess a high diversity and endemism of land-snails possibly caused by the high topographic heterogeneity leading to speciation of these dispersal-limited taxa, they are poorly studied, especially in the intermediate zone. The litter-dwelling land-snail fauna was investigated along an elevational gradient (100–2200m) in the upper Walawe river basin, mostly within the intermediate zone of Sri Lanka to assess how land-snail communities are influenced by elevation. Timed searches within twelve 10m×10m quadrats were sampled, in undisturbed forest patches along an elevation gradient directed transect from Udawalawe National Park to Horton Plains, from November 2017 to February 2018. Correlation analysis followed by regression was used to explore relationships between the elevation and land-snail species richness, diversity and endemism. Principal component analysis of abundance data was used to identify indicator species for high (2100–2200m), middle (350–650m) and low (100–150m) elevations. The study yielded 770 land-snail specimens representing 33 species in nine families, with 80% of species being island endemics, including a possibly undescribed cyclophorid. The species richness and diversity indices showed increasing trends with elevation, with a weak peak at mid-elevations providing evidence of the mid-domain effect. When the data were pooled into three major geological peneplains of Sri Lanka, Simpson diversity index ($r = 0.556$; $p = 0.061$) and species endemism ($r = 0.706$; $p = 0.01$) positively correlated with elevation. The study identified species such as, (a) *Euplecta gardeneri* and *Cryptozonia ceraria*, (b) *Pterocyclus cumingi* and *Theobaldius layardi* and (c) *Euplecta acuducta*, as indicators of (a) high, (b) mid and (c) low elevations. Furthermore, the species' elevational spans reduced with increasing elevation, highlighting the conservation value of remaining montane forests for preserving high endemism and threatened species with restricted ranges. Importance of preserving specious sub-montane forests is underlined as they are poorly represented in existing protected areas. Necessity for further studies on evolutionary biogeographical hypotheses related to dispersal barriers created by the peneplain topography with escarpments is also highlighted.

Keywords: Biogeography, Elevation gradient, Land snail, Species diversity, Walawa basin

¹ Department of Natural Resources, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka. Corresponding author's email: sandun.perera@appsc.sab.ac.lk