Submitted Abstract

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Title	Altitudinal Variation Of Leaf Morphological, Stoichiometric And Δ13c Content Of Lobelia Gregoriana And Dendrosenecio Keniensis.
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Abstract

African sky islands (alpine zones) hold the key to understanding the impacts of climate change on tropical ecosystems. Select endemic alpine plants could be used for long term monitoring of changing plant habitat range size, physiology and functional traits in response to climate change. We studied morphological, leaf stoichiometric and leaf carbon isotope variation of two endemic species Lobelia gregoriana and Dendrosenecio keniensis along their full elevation range size in Mount Kenya. The objective of this study was to assess the adaptive features that make these giant plants survive the harsh alpine environmental conditions. Our study design involved setting up ninety 10 by 10 plots from 3500 m to 4300m. We measured functional traits plant height, leaf area, thickness, dry weight, specific leaf area, leaf nitrogen, carbon, phosphorous and Leaf δ13C content. We found that Dendrosenecio keniensis had wool-like pubescent leaves while L. gregoriana had mucilage packed succulent and waxy cuticle leaves to avoid freezing. Both species exhibited reduced metabolic rates as shown by the low leaf phosphorous content. Our results also showed that changes in morphology and leaf stoichiometry were determined by a combination of climate, soil and topographic variables that change along elevation on Mount Kenya. There was a leaf δ13C enrichment of 1.76 ‰ km−1 and 1.62 ‰ km−1 with altitude for D. keniensis and L. gregoriana, respectively. Leaf δ13C exhibited a depletion of −0.37 ‰ per ˚C increase of mean annual temperature along the altitude gradient for D. keniensis and −0.34 ‰ per ˚C increase for L. gregoriana. The observed changes in morphology, leaf stoichiometry and leaf δ13C along the elevation gradient were mostly associated with low alpine temperatures. This research forms a basis for the use of endemic species to track environmental changes by assessing their elevation range size over time. Studying the morphological changes of these species in relation to climate change could help understand how tropical mountain vegetation would adapt over time in respect to the projected rise in global temperatures.