



Altitudinal species richness patterns in three mountain regions of Iran

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Background & Aims: Elevational gradients serve as baselines for comparison of population declines, range shifts and extinction risks. The majority of studies show a hump-back shaped model of altitudinal species richness patterns of plants. Climate, area, mid-domain effect and ecotone effects are considered as the main underlying predictors for these patterns. Iran is a mountainous country including different physiognomic formations ranging from the very wet Hyrcanian forests in the north to the hot deserts in Central Iran. This study is aimed at investigating species richness patterns along altitudinal gradients in several montane regions of Iran and searching for possible driving factors for these patterns.

Materials & Methods: Species richness patterns were investigated along altitudinal gradients in three mountain ecosystems, namely in a deciduous Hyrcanian forest in northern Iran (two transects), Zagros oak woodlands in western Iran (three transects), and steppic montane vegetation of the Central Plateau of Iran (three transects). The transects were sampled for vascular plant species richness using a uniform sampling method with 100 m altitudinal intervals from the valley bottom to a local mountain top. We sampled 96 plots of 400 m² (ranging from 300–2000 m of alt. for the Hyrcanian forests, 48 plots of 100 m² for the oak woodlands (ranging from 1100–2900 m of alt.), and 54 plots of 25 m² for the steppic vegetation in Shirkuh Mountains of Central Plateau of Iran (ranging from 2250 to 4075 m of altitude). All data were analysed using simple and polynomial regression analyses in order to reveal the main pattern of species distribution along the altitude.

Main Results & Interpretations: In the deciduous Hyrcanian forest, species richness did not show any significant relationship with altitude. The presence of a species-rich forest-to-steppe ecotone in the mountainous area of the Hyrcanian forest may be the main reason underpinning this pattern as this ecotone plays a role of a source of diversity at higher altitudes. There was a hump-back relationship detected of the species richness patterns in the Zagros oak woodland showing an altitudinal peak around 2100 m – a finding corroborated by many other literature sources publications (see McCain & Grytness 2010). A monotonic decrease of species richness along the altitudinal gradient was observed in the steppic vegetation. Species richness data for the altitudes lower than 2200 m is lacking in this mountain region. Nevertheless, previous studies in similar steppic ecosystems on the southern macroslopes of the Alborz range (altitudinal range of 1000–4000 m; Mahdavi et al. 2013) revealed the occurrence of a hump-back pattern with a peak at altitudes 1800–1900 m.

References

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Figure 1. Hyrcanian deciduous forest of northern Iran.
Photo: A. Naqinezhad.

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