Vegetation dynamics and species distribution patterns in the inland desert wadis of South Sinai, Egypt

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Abstract:

Abstract The present study aims to investigate the variation in vegetation and species diversity in three inland wadis (Wadi Solaf, W. Romana and W. El- Akhdar) which drain their water from surrounding high mountains to the main channel of Wadi Feiran in South Sinai. It attempted to compare the floristic diversity between these wadis to recognize the different distribution patterns of species, and to assess the role of the edaphic factors which control the distribution of the plant communities. Forty-five sample plots were selected to represent as much as possible the variation in the vegetation, and georeferenced using GPS techniques. A total of 116 species (45 annuals and 71 perennials) belonging to 95 genera and 37 families were recorded, with Asteraceae, Brassicaceae, Fabaceae, and Zygophyllaceae represented the species-rich families. Therophytes constituted the main bulk of the flora, followed by chamaephytes, phanerophytes and hemicyryptophytes. As part of the Saharo-Arabian region, the Saharo-Arabian chorotype dominated the others. Classification of the vegetation resulted in 5 vegetation groups: (A) Zilla spinosa, (B) Artemisia judaica-Zilla spinosa, (C) Artemisia judaica, (D) Anabasis articulata-Artemisia judaica-Fagonia mollis, and (E) Fagonia mollis-Zilla spinosa. Species richness was significantly negatively correlated with chlorides, while the Shannon's diversity index showed significant negative correlation with chlorides and positively correlated with calcium. Vegetation-soil relationships were assessed by Canonical Correspondence Analysis (CCA) using 13 soil factors indicated that gravel, coarse sand, fine sand, silt, clay, sodium and chlorides were the key soil variables that affect the distribution of plant communities in the inland wadis of South Sinai.

Keywords:

CCA, desert ecosystem, diversity, Egypt, multivariate analysis, vegetation

Published In:

delicia mediterranea, 39 (2), 93 - 110