

Influence of management and environmental factors on species composition and species richness in semi-arid rangeland in western Iran



M. Faramarzi^{A,B}, S. Kesting^A, N. Wrage^A, J. Isselstein^A

^AInstitute of Grassland Science, Department of Crop Sciences, von-Siebold-Str. 8, Georg-August-University Göttingen, 37075 Göttingen, Germany

^BCurrent adress: Natural Resources Group, Faculty of Agricultural Sciences, Ilam University, Ilam, Iran

(e-mail: mfarama@uni-goettingen.de)

Introduction

A large proportion of rangeland in western Iran is in either fair or poor condition. Aim of this study was to disentangle the importance of environmental and management factors for species composition and species richness of a rangeland area in western Iran.

Material and Methods

Study area: 43 sites in four grazing areas (GA) in the south-east of Kermanshah, western Iran (Fig. 1)

Measurements: species richness; expansion of species, bare soil, stones, litter; topographic variables: altitude, slope aspect; soil parameters: P content, K content, organic carbon, pH, texture

Management data obtained through census databases and interviewing farmers

Results

Only north-facing aspect, stones and the amount of K were significantly related with the distribution of plant species (Fig. 1).

Of the measured soil and topographic variables, only altitude showed a significant linear correlation with species richness.

There are indications that grazing intensity was very important for vegetation composition and species richness. Thus, the ANOVA analysis indicated that the grazing intensity as a management variable was negatively associated with species richness (Table 1).

Conclusions

Our results suggest that of the measured environmental variables, only few showed a significant correlation with species richness or species composition. Grazing intensity may have had an important influence on plant diversity. Here, the occurrence of plant species indicating overgrazing in areas with presently low grazing pressure suggest that it is important to include past grazing management into analyses of plant diversity in semi-arid rangelands of Iran.

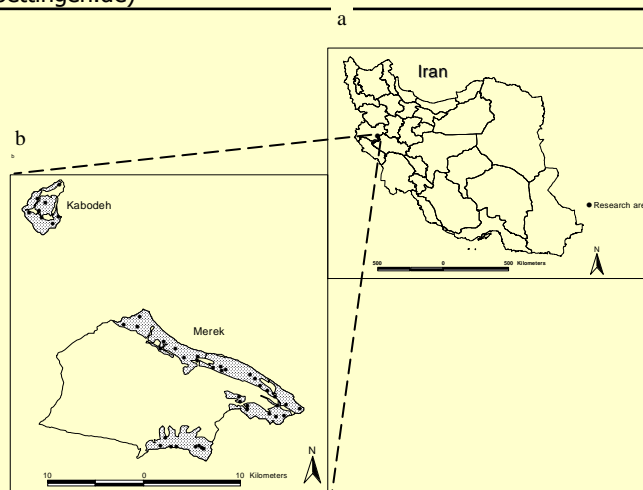


Fig. 1 a: Location of the study area in Iran. b: Map of the research areas (two catchments) in Kermanshah. The dotted area indicates the rangeland of the catchments, larger black dots mark the sampled sites (N= 43).

Table 1: Grazing intensity and species richness in the four grazing areas (GAs). Different superscript letters indicate significant differences ($P < 0.05$) between GAs.

	GA1	GA2	GA3	GA4
Total livestock dependent on rangeland (AU/ha)	0.57	3.75	2.88	0.82
Species richness	29.7 ^a	28.1 ^a	29.8 ^a	40.3 ^b

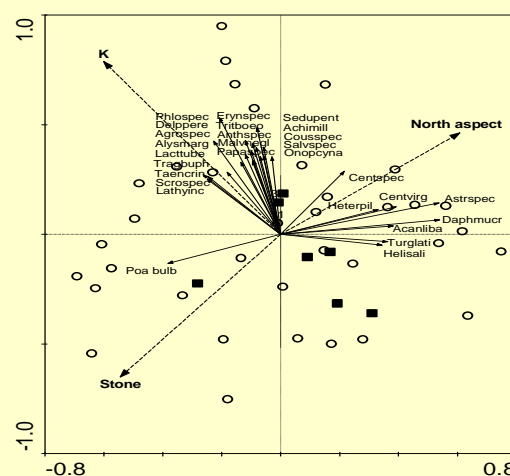


Fig. 2: Ordination diagram based on RDA gradient analyses of species, samples, and measured variables in the study area. Only species with a fit better than 10% are presented to increase legibility.