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$\gamma^*$

( / / : // : )

( )

DCA

PAST

RDA

RDA

(F = / P = / )

( )

( )

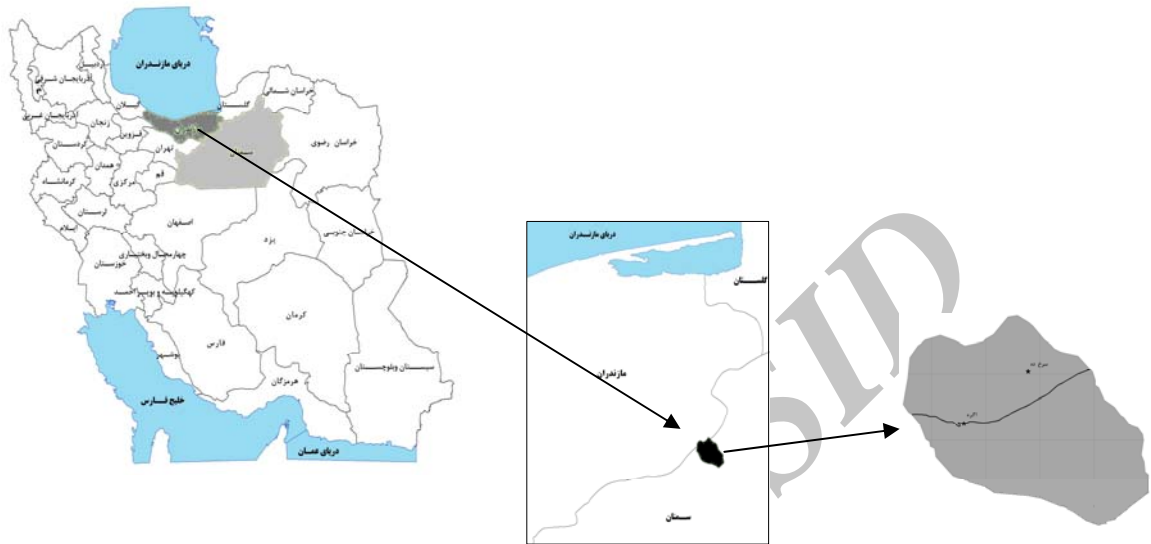
/

:

Benni *et al.*, ; Pykala *et al.*, 2005)  
 (Allock & Hik, 2003) (2006  
 ;Klimeka *et al.*, 2007 ; Sebastia, 2004)  
 (Cousins, 2009, Tarmi *et et al.*, 2009  
 Pueyoa *et al.*, ; Metzgera *et al.*, 2005) (Hoffmann, 1998)  
 Dodson & Gentyr, ) (2006  
 (Chen *et al.*, 2006) (1987  
 - .(Majnoonian, 1996)  
 Balmford )  
 .(et al., 2005  
 ; :  
 Wilson & Tilman, )  
 (2002, Tilman *et al.*, 1997  
 / ''  
 / '' / ''  
 - / '' / ''  
 Kemp *et al.*, )  
 .(2003, Rejmanekl *et al.*, 2004  
 Chapin *et* )  
 .(al., 1999  
 Baker *et* )  
 / / .(al., 2004

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<sup>1</sup> Shannon & weiner  
<sup>2</sup> Simpson  
<sup>3</sup> Margalef



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(Hirzel & Giusan, 2002)

<sup>1</sup> Overlay  
<sup>2</sup> Equal Random Classification

(ب) ( )

Arc GIS

$$D = \sum_{i=1}^S \frac{ni(ni-1)}{N(N-1)}$$

$n_i$  تعداد افراد گونه  $i$  ام،  $S$  تعداد کل گونه ها و  $N$  تعداد کل افراد است (۱۵، ۱۶، ۱۷).

( )

( )

(Mahdavi, 1996)

$$H'_{Max} \quad J' = -\sum H'$$

:  $H'_{Max}$

:  $J'$

GIS

PAST

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(الف)

$$H' = -\sum_{i=1}^S P_i \ln P_i$$

$P_i$  نسبت افراد گزارش شده از  $i$  ام گونه و  $S$ ، تعداد کل گونه ها است.

<sup>1</sup> Menhinick

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S.P  
EC  
Ph  
CaCo3  
O.C  
P  
K  
N  
Sand  
Silt  
Clay  
mrs  
mrb  
mrt  
mrp  
mrz  
mts  
mtb  
mtt  
mtp  
mtz  
mrhs  
mrhb  
mrht  
mrhp  
mrhz  
Elevation  
Slope  
Aspect

Gradian 0-360

) DCA

(

( )

RDA

RDA

(Mesdaghi, 2005)

(

)

DCA

( )

( )

( )

RDA

DCA

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( )

( )

RDA

/

(F= / P= / )

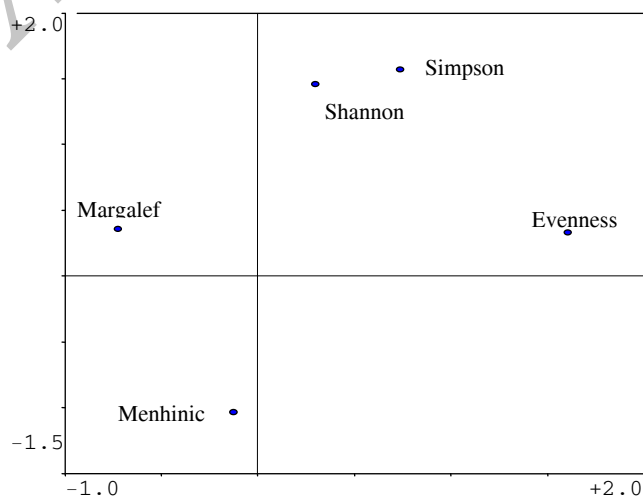
<sup>1</sup> Deterenend Correspondence Analysis = DCA

<sup>2</sup> Pylo

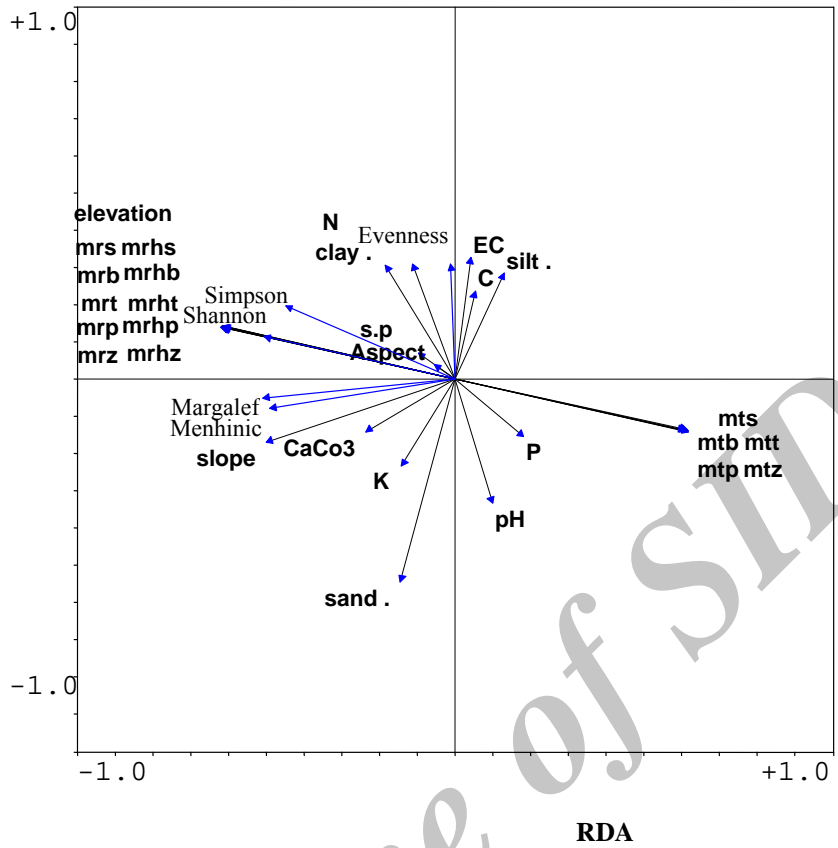
Margalef	Menhinick	Evenness	Simpson	Shannon	
/		/	/	/	Salicornia herbaceae-Eryngium billardieri
/	/	/	/	/	Hultemia persica-Rhamnus pallasii
	/	/	/	/	Salsola arbusculiformis-Salsola dendroides
/		/	/	/	Berberis integerrima-Acantholimon erinaceum
/	/	/	/	/	Halocnemum strobilaceum-Hypocylix kernerii
/	/	/	/	/	Juniperus excelsa-Artemisia aucheri
/	/	/	/	/	Acantholimon erinaceum-Artemisia aucheri
/	/	/	/	/	Salsola dendroides-Coronpus didymus
/	/	/	/	/	Hypocylix kernerii-Halocnemum strobilaceum
/	/	/	/	/	Salicornia herbaceae-Salsola arbusculiformis
/	/	/	/	/	Artemisia aucheri-Salicornia herbaceae
/	/	/	/	/	Salsola arbusculiformis-Artemisia aucheri
/	/	/	/	/	Artemisia aucheri-Acantholimon erinaceum
/	/	/	/	/	Artemisia aucheri
/	/	/	/	/	Salsola arbusculiformis-Alyssum inflatum

(DCA)

	/	/
	/	/
	/	/
/	/	/



(DCA)



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(Hooper *et al.*, 2000)



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(Moghaddam, 2006)

;Roem & Berendse, 2000)

(Sebastia, 2004

Tarmi *et al.*, (2009)

Bello *et al.*, 2006

Pykala *et al.*, (2005)  
Benni *et al.*, (2006)

(Moghaddam, 2006)

Suding & Gross, )

(2006

Zare )

Jafarian *et al.*, 2008 Chahoki *et al.*, 2007,  
(Ali *et al.*, 2000 Friedel *et al.*, 1993 Jeloudar  
Bello *et al.*, 2006 .

(Mahmoodi & Hakimian, 2006)

Sebastia, (2004)

Grime,

Moore & Keddy, (1989), (1979)

(Pourbabaei, 1383)

Mahmoodi & )

...

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(Hakimian, 2006

(pH)

Tarmi et al., (2009)

Zare )

(Chahoki *et al.*, 2007

(West, 1993; Fulbright, 1996)

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## Analysis of the Relationship between Species Diversity and Environmental Factors using Multivariate Analysis (Case Study: Sorkhdeh Rangelands of Semnan, Iran)

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### Abstract

Species diversity is important concept in ecology and vegetation management. Protection of biodiversity and applying necessary activities for protection is one of the basic roles in modern societies. To reach to the mentioned goals, this research was performed in Sorkhdeh rangelands of Semnan province to investigate species diversity and affecting environmental factors. Totally, 230 plots established at the study area for sampling of vegetation and 29 environmental factors including climatic, topographic and edaphic factors were measured. Also, 15 vegetation types were recognized in the study area. Shanon-Weaner and Simpson diversity, Paylo evenness, Menhinick and Margalef richness indices were determined for all vegetation types using PAST software. DCA analysis showed gradient length is  $>3$ , therefore RDA analysis was appropriate to show the effect of environmental factors on the studied indices. Result of multivariate analysis showed that environmental factors had significant effect on the studied indices ( $P = 0.001$ ,  $F = 3.233$ ). Two diversity indices (Shanon-Weaner and Simpson) were highly correlated with elevation, average of annual and seasonal rainfall and average of annual and seasonal relative humidity. Evenness indicator showed strong relationship with nitrogen and clay percentage. Richness indices (Menhinick and Margalef) had significant correlation with aspect, sand,  $\text{CaCO}_3$  and K of the soil. The studied indices showed no significant correlation with P and pH of soil. Results of analysis showed that 25.6% of variations in plant diversity; evenness and richness could be interoperated by environmental factors.

**Keywords:** Diversity, Evenness, Richness, Environmental factors, Multivariate analysis, Sorkhdeh of Semnan.