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(DCA)

(TWINSpan)

(DEM)

(GIS)

TWINSpan

N,P,K,C

(PCA)

*Danae racemosa* *Cerasus avium* *Ficus carica* *Parrotia persica*

*Oplismenus undulatifolius*

*Galanthus transcaucasicus*

*Diospyrus lotus*

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*Cyclamen coum* *Lamium album*

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TWINSpan DCA PCA

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(E-mail:zahedi@nrf.ut.ac.ir)

◦ - Braun-Blanquet

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.DCA TWINSPAN

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CCA

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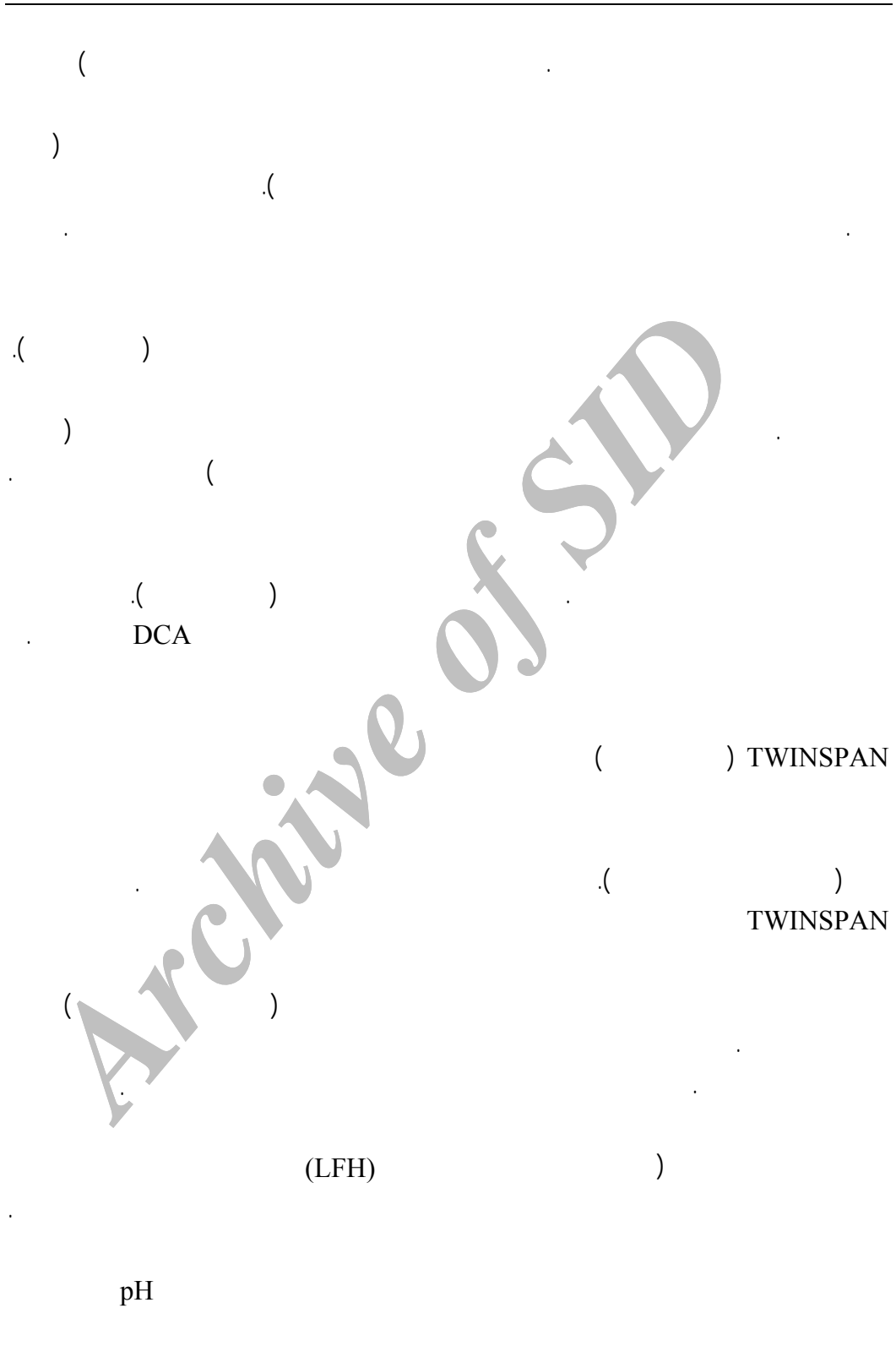
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° - Canonical Correspondance Analysis  
^ - Geostatistics  
v - Englisch

\ -Ellenberg  
y - Noirfalise  
r - Karrer  
z - Allen



pH

ε - Sorenson  
 ° - Auger

ʻ - Hill  
 γ - Differential species  
 √ - Pseudospecies



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# Archive of SID

*Archive of SID*

TWINSpan

**TWINSpan**

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# Archive of SID


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(DCA

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*Oplismenus*

*undulatifolius*

*Parrotia persica Cerasus avium*

*Cyclamen coum*

*Ficus carica*

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*Ficus carica*

*Stellaria media*

*Danae racemosa Cardamine hirsuta*

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*Stellaria*

*media*

Archive of SID



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Archive of SID

DCA

DCA

Archive of SID

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( )

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OA ClayB PCA

NB NA MB CB OB NH

PCA PCA

OB MB OA ClayB TWINSpan

PSH C/N Sand PCA

PCA PCA

PCA PCA

( ) WB

( )

PCA

## PCA

	Clay A	%	( )A
	Clay B	%	( )B
	SiltA	%	A
	Silt B	%	B
	Sand A	%	A
	Sand B	%	B
	KH	P.P.M	( )H
	KA	P.P.M	A
	KB	P.P.M	B
	CH	P.P.M	H
	CA	P.P.M	A
	CB	P.P.M	B
	OH	%	H
	OA	%	A
	OB	%	B
	PSH	P.P.M	H
	PSA	P.P.M	A
	PSB	P.P.M	B
	NH	P.P.M	H
	NA	P.P.M	A
	NB	P.P.M	B
	LA	%	A
	LB	%	B
	PH H	-	H (pH)
	PH A	-	A (pH)
	pHB	-	B (pH)
	MH	%	H
	MA	%	A
	MB	%	B
	WA	-	A
	WB	-	B
	C/NH	-	H
	C/NA	-	A
	C/NB	-	B

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PCA

PCA

*Polystichum Bromus sp*

*Cyclamen Lamium album aculeatum*

*Diospyrus lotus coum*

TWINS PAN

*Cyclamen Cardamine impatiens*

*Athyrium filix-femina coum*

(PCA)

eigen )

*Pteris**Euphorbia amygdaloides cretica**Parrotia persica Carex sylvatica*

DCA

TWINSPAN

PCA DCA

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## Relationship Between Plant Ecological Groups in Herbal Layer and Forest Stand Factors (Case Study: Neka Forest, Iran)

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### Abstract

In order to identify the plant ecological groups and to determine their distribution patterns in relation to soil physical and chemical characteristics and physiographical-features, vegetative elements and some soil properties were analyzed in submountain forest in north of Iran. This research was conducted in an area of 8 hectares at the altitude of 690-800 meters above sea level in Neka forests. For identification and classification of vegetation cover, 214 grid plots of 100 m<sup>2</sup> were chosen on the basis of Braun-Blanquet combined abundance-cover scale. Plant ecological groups were determined on the basis of vegetation data analysis (i.e., TWINSpan) and ordination analysis (i.e., DCA) methods. Geographic information system (GIS) was used for mapping plant ecological groups and Digital Elevation Model (DEM).

Comparison between plant ecological groups and slope, aspect and elevation maps showed that significant differences existed between plant groups and aspect, but there was not any significant relation between plant groups and slope or elevation. Ordination analysis was carried out using DCA in order to find out the floristic composition of ecological groups and samples. To investigate the relationship between ecological plant groups resulted from TWINSpan method and physical-chemical characterizations, soil samples were selected from organic horizons and mineral layers. Soil characteristics including organic matter, moisture, lime bulk density, C, N, P and K were used for analysis by PCA method. Results of PCA analysis indicated that the first group, namely *Parrotia persica*, *Cerasus avium* and *Ficus carica*, was related to soil physical properties. The second group, including *Danae racemosa*, *Asplenium adiantum-nigrum* and *Cardamine impatiens*, corresponds to soil fertility, particularly soil chemical properties. The third group, including *Diospyrus lotus* and *Oplismenus undulatifolius* and also the fourth group, *Cyclamen coum*, *Lamium album* and *Galanthus transcaucasicus*, were related to soil fertility.

**Keywords:** Neka submountain forest, Plant ecological groups, PCA, DCA, TWINSpan, Fertility.

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