The Comparision of Plant Species Diversity in Gradient Altitude in Baba Mosa (North Khorasan, Iran)

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Abstract: Natural cache is shelter for flora and fauna of every country. Therefore Diversity is one of the main subjects in ecosystem researches. In order to determine the relationship between diversity indices and gradient altitude in babamosa (north khorasan, Iran), open transect was used. Six transect totally as long as 60 m were placed at 1 m from each other based on of gradient altitude from sea level. First diversity indices using related formula were calculated. Then the relation between diversity indices with altitude from sea level is determined. According to this study, Shannon-Winer's index function is more suitable for study of the relation of biodiversity with gradient of altitude. May suggest this index apply in such studies.

Key words: Plant species Diversity · Babamosa · Diversity indices

INTRODUCTION

Biodiversity has so wide meaning and consists of genetic diversity up to ecosystems diversity. Species diversity is known equal to biodiversity that is limited to diversity in local or regional surface [1]. Species diversity is a reflection to structural dynamics of a place and its distribution patterns.so, plant species diversity uses for knowing of dynamic of ecosystem and ecology of the species [2]. Diversity of organisms, measurement of diversity and examination of some hypothesis about reasons of diversity are some cases that have been favored by ecologists for a long time [3]. Researchers have applied different indices in order to measurement of diversity [1]. Understanding of necessity of species diversity that has happened recently has caused to concentrate on the quality of measurement of biodiversity in plants and animals a lot [2]. Today, population explosion, industrial development and environmental pressure caused destruction of habitats and biomes. A possible solution is application of knowledge of community ecology by studying of species diversity [4]. Alpha diversity has been species diversity in a region [5] and Beta diversity mentions to the amount of changes of species in environmental gradient length [5, 6 gradient]. The first index of heterogeneity has been applied by Simpson in the year 1949 for the first time and many copies of this index have been developed up to now [5].

Another index that has wide application in studies is shannon index [7]. Ejtehadi *et al*. [8] compared level of diversity of plant species in the two trees community and determined the relation between type of plant with phytodiversity. Akafi *et al*. [4] are investigation of plant species diversity in grazed and ungrazed areas by use of abundance distribution models. They are used abundance distribution models, diversity ordering and rank-abundance distribution. In order to get a more clear- cut notion of the species abundance distribution of the same climate, were selected. The results proved that diversity of ungrazed area was higher than the grazed one, because their profiles of diversity ordering were above the grazed site. The ungrazed site had a more flattend cure and the grazed site followed both log normal and logarithmic distribution and has shifted from lognormal to logarithmic model. They show an environmental disturbance factor dominates grazing site.

MATERIALS AND METHODS

Study Area: The study area is located in North East of Iran in North Khorasan province; between (37° and 27′) and (37° and 31) northern latitude and (57° and 21′ and (57° and 29′) eastern longitude. The altitude of the study area is from 1100 to1395 meters above sea level. According to statistics in Nodeh weather station, average precipitation and the mean annual temperature are 252 mm

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and 12.2° respectively. In terms of climate in this area based on coefficient method drought De Marton (11.38) with semi-arid climate and is based on the method of Amberger c oefficient (25.52) is placed in the range of cold-dry climate areas.

Research Approach: For this study, open transect was used. Six transect totally as long as 60 m were placed at 1 m from each other based on of gradient altitude from sea level Quadrat was regulary considered at every 1 m on each transect. The samples were identified using valid reference such as Flora Iranica [9], Flora of Iraq [10], Flora of Turkey [11] Flora of Iran [12], Flora of Iran [13] and other valied resources [14-18]. After obtaining desired characteristics, first diversity indices using related formula were calculated. Then the relation between diversity indices with altitude from sea level by ANOVAcalculation, were analyzed. The amounts of diversity indices are calculated with following formula Equal (1): The index of Simpson:

$$\sum\nolimits_{i=1}^{s} p_i^2 1 \text{-} D = 1 \text{-}$$

In this equal, 1-D is the diversity index of Simpson and P is the proportion of the individuals in each species in the piece of sample.

Equal (2): The function of Shannon – Winer

$$\sum\nolimits_{i=1}^{s} p_i \ln(p_i)' = -H$$

In this formulation, H is Shannon - Winer's function and its unit is Bits / individual and S is the number of species.

Equal (3): Brillouin index H=1/N log.

n₃. n₂. n₁ / N$_i$ H = 1/N log

In this formulation, H is Brillouin index, N is total number of stands (individuals) in sample, N is the number of related stand and N is the number of stands related to second species [19].

RESULTS AND DISCUSSION

The results of study show that about 118 species belong to 98 Genera and 34 families have been recognized. The biggest family of the region is Compsitae with 22sp, Poaceae with 17sp, lamiaceae with 15sp.

Table 1: The amount of bioiversiy indices and of gradient altitude

	Simpson	Shanon-winer	Brillouin
1	2.364	1.136	1.026
2	2.643	1.384	1.155
3	2.25	0.687	0.5374
4	1.311	0.3872	0.3252
5	2.634	1.003	0.8971
6	4.458	1.726	1.504
7	2.293	1.138	0.9818
8	3.3	1.144	0.8677
9	3.75	1.011	0.6824
10	2.769	1.208	0.4827
11	1.295	0.5415	0.4827
12	5.353	1.494	1.152
13	6.5	1.631	1.215
14	13	1.992	1.437
15	5.556	1.868	1.489
16	4.667	1.386	0.9283
17	10	1.332	0.8189
18	9.5	2.039	1.58
19	5.833	1.617	1.236
20	5.571	1.704	1.413
21	2.032	1.064	0.8904
22	6	1.04	0.6212
23	45	2.164	1.441
24	11.25	1.748	1.233
25	5.571	1.586	1.175
26	23.75	2.484	1.854
27	3.45	1.405	1.147
28	2.045	0.8018	0.5886
29	11.14	1.885	1.384
30	4.565	1.615	1.199

Biodiversiyt indicis are shown in Table 1.

The study of obtained results from the relation between Brillouin and Simpson indices and gradient altitude show that there is not meaningful relationship between these biodiversities indices and gradient altitude at the level of 0.05. But there is significant difference for Shanon-Winer index between and gradient altitude. According to this study, Shannon-Winer's index function is more suitable for study of the relation of biodiversity with gradient of altitude. It may suggest this index apply in such studies.

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